Innovative Educational Technologies: European Experience and its Implementation in the Training of Specialists in the Context of War and Global Challenges of the 21st Century

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Abstract

The objective of this article is to dissect the European encounter with pioneering educational technologies in the face of the 21st century's global challenges. The methodologies employed encompass theoretical content analysis and empirical survey techniques. The outcomes underscore the core of the innovation concept in education, along with the theoretical underpinnings guiding the integration of innovations within European pedagogical frameworks. Drawing from empirical measurements, several assertions are substantiated. Notably, the significance of the learning environment emerges, alongside educators' general inclination toward embracing innovative educational approaches in contrast to traditional teaching methods. Worth highlighting is the European Union's provision of specialized programs aimed at honing proficiency in working with groundbreaking technologies via internships. In Germany, the "Promotion an Hochschulen in Deutschland" initiative is exclusively tailored to train research and instructional personnel for the country's higher education establishments. France's Sorbonne University offers dedicated courses to augment digital prowess. Correspondingly, in England, the Centre of Excellence for Teaching and Learning is dedicated to fostering the professional advancement of aspiring educators, guaranteeing their possession of pertinent proficiencies. These mobile internships for European educators have evolved into a standard practice for nurturing digital literacy. Participation in such endeavors is characteristic of contemporary European educational hubs, further propelling educators' preparedness and growth within the digital epoch. The conclusions underscore the assorted array of innovations employed by instructors, encompassing platforms, interactive whiteboards, mobile applications, and cloud services.

Keywords: innovation, education, Europe, challenges, digital competence

1. Introduction

The modern information society requires new education mechanisms that would focus on acquiring modern knowledge, skills, and abilities, integrating with digital technologies, and acquiring a new quality in the environment of specialists. Relevant training innovations have become extremely relevant after the COVID-19 pandemic when the use of distance learning has demonstrated its viability and competitiveness. These successes have given rise to the idea of incorporating innovative digital methods into the usual educational process, combining them with traditional education, which should create new educational realities and opportunities in the future. This process, which has already begun, has demonstrated the effectiveness of cooperation with employers at the level of

developing relevant curricula and incorporating the most up-to-date labor market requirements. Thanks to this, innovative technologies in higher education have received an additional incentive for their development, although the process of their implementation and the specifics of their application still require additional reflection in terms of scientific reflection. Some of these problems were investigated by Sönmez (2021). Also, Dhawan (2020) showed problems of using of online learning. He thought that Internet-learning is not a panacea in the time of Covid-19 crisis. But reflections of these and others scientists need to be continue.

In higher education, digital pedagogies have been found to be as effective as or even more effective than traditional classroom teaching for both knowledge and practical skills development. Specifically, video tutorials/social media and flipped classroom approaches demonstrated significant positive impacts on student learning, as indicated by Tsekhmister's (2022) meta-analysis. Nonetheless, the author highlights the need for larger controlled experiments to further substantiate these findings.

1.1 Research Focus

Thanks to innovative tools and software solutions, European educational systems have a significant potential for further development and integration with the latest educational technologies. The study of such experience is extremely relevant for reforming educational systems in developing countries, as well as for those seeking to harmonize the requirements of national higher education institutions with current trends. At the same time, this process is important for Ukrainian realities. Russian aggression against Ukraine has become a powerful challenge to Ukrainian society, including the education sector. Under such circumstances, the adoption of advanced educational technologies has slowed down and entered a waiting phase. The military challenge has become an obstacle to normal development, so innovation under martial law is also important (as a phenomenon) for the reverse formation of the relevant European experience.

1.2 Research Aim and Research Questions

The purpose of the article is to analyze the European experience of introducing innovative educational technologies in the context of the global challenges of the 21st century. To realize this goal, the following issues will be considered:

Describe the essence and understanding of innovation in education.

To study the theoretical aspect of the use of innovative technologies in the modern education system.

Identify the features of the introduction of innovations in the educational sphere and compare the relevant theoretical results with the empirical data obtained.

2. Literature Review

2.1 What Are Innovations in the Education System?

An innovation in education is any innovation that contributes to improving the efficiency of the existing educational system. Thus, educational innovations refer to the introduction of new methods, approaches, or technologies into the educational process in order to optimize the quality of learning and achieve better results. Modern researchers note that the use of innovations contributes to the training of specialists of the future, as innovative technologies (or special methods) develop relevant (social, digital, informational, critical) skills in students that will be useful to them in the future (Devadze, Gechbaia, & Gvarishvili, 2022). Innovations in education cover various areas of the educational process, they may include special teaching methods, learning content, assessment and monitoring of student performance, the use of innovative technologies and forms of learning organization, etc. Some scholars emphasize that educational innovations affect the development of an individual learning trajectory, promote student engagement in active learning, and help to foster interest in learning among students (Chang López, 2022).

2.2 Innovative Technologies of Modern European Education: Theoretical Aspect

Modern innovations are important features of society that have a qualitative impact on its competitiveness. As a result of the widespread use of innovative technologies in education, new levels of well-being and development of the state mechanism, management systems, private business, social sphere, service sector, etc. are being formed. Such results indicate that education should be aimed at training qualified specialists for the future (Fromm et al., 2021). Under such conditions, European educational institutions have introduced a wide range of innovative learning opportunities.

Such trends are also relevant for Ukraine, as Ukrainian society is actively implementing European educational

standards (Bondar et al., 2019; Tsekhmister, 2021). This process is characterized not only by legislative and regulatory initiatives but also by the pedagogical search for optimal models: updated forms of organizing the educational process, methods and ways of teaching, providing theoretical knowledge, practical skills. Researchers define the main goal of modern education in Ukraine as the creation of the necessary educational environment that would focus on the integral development of specialists who would be competitive in the labor market and have all the necessary characteristics to respond quickly and flexibly to changes in qualification requirements or social changes, make appropriate adjustments to their own educational trajectory, be responsible for the results of their studies, etc. Among all the proposed transformations, there is a need to permanently take into account the innovativeness of new methods and systems, which in modern circumstances demonstrate not only the progress in industrial production but also the evolution of data transmission using digital channels of information.

In April 2023, a comprehensive literature search was conducted using PubMed and Medline databases, as well as manual searches and reference tracking, to identify the most recent randomized controlled trials (RCTs) related to case-based learning in medical and pharmacy education. The meta-analysis conducted by Tsekhmister (2023) concludes that case-based learning is an active teaching method. However, it also highlights that while medical and pharmacy education has made progress, there is still room for improvement to meet the diverse needs of various specializations.

The main goal of modern European education is to train specialists. Given the conservatism of teaching methods, the use of methods that have been popular for a long time, innovative technologies have been slow to take root in the educational practices of European countries. However, since the 21st century, globalization processes and the evolution of digital technologies have accelerated significantly - total digitalization, along with the COVID-19 pandemic, have challenged the traditional educational system (Sönmez, 2021; Chang López, 2022). In the early 2020s, these processes demonstrated the need for fundamental changes, including the introduction of innovative solutions that allow for optimal consideration of changes in society and the labor market. Accordingly, the conservatism regarding the introduction of new digital teaching methods in the light of digitalization has been overcome - as a result of global quarantine restrictions, it turned out that the development of innovative distance learning is sufficient to actively exploit them in practice (Yoleri & Nur Anadolu, 2022). The popularity of digital learning environments has led to a general increase in information literacy, which in turn has also led to the rapid introduction of innovations in the education sector (Williams et al., 2023). This also contributes to the informatization of learning: the development of the fourth industrial revolution, generally aimed at the transformation and widespread use of digital tools. Accordingly, the article will focus on the analysis of digital innovation technologies.

2. Method

2.1 Research Design

The study is based on a theoretical content analysis and an empirical stage. At the theoretical stage, the main general aspects of the use of innovative technologies in the system of training specialists of the future are characterized, the role of modern innovations in the educational system is studied. Also, at the theoretical stage, the concept of innovation is characterized, and its main features are described. In the empirical part of the study, the key aspects of the use of innovative technologies were experimentally and practically tested. The final stage of the study summarizes the data obtained, compares them with the works of other scientists, draws the main conclusions, and characterizes further prospects for the use of innovations in the education system.

2.2 Participants

The experimental part of the study involved 450 teachers from different educational institutions. The latter taught various courses, including special disciplines for the development of information and digital literacy. Accordingly, all teachers had different experience in teaching with the use of innovations. Before taking the survey, all participants agreed to participate in the pedagogical experiment.

2.3 Instruments and Data Collection

In order to study the role of innovative technologies in the higher education system, a special survey was conducted among teachers using the Google-forms tool. This allowed us to reach a wide range of participants from different European educational institutions. The data was organized and processed using the Excel program. The research information was collected from 05.02.2023 to 10.05.2023, that is, almost during the second semester of the academic year. To study the effectiveness of using innovative technologies as a means of supporting the professional

development of students, special open and closed questions were developed. The study also used the Digital Opportunities Index of European countries.

2.3.1 The First Part. Closed Questions

1. How often do you use innovative educational technologies in the organization of training (Select one answer)

a) All the time
b) A couple of times a week
c) Several times a month
d) Very rarely
e) Not at all

2. Which of the following innovative technologies are used in your educational institution? (Select the answers that apply)

a) Digital resources and platforms
b) VR technologies
c) AR tools
d) Artificial intelligence (AI) technologies
e) Mobile applications for learning
f) Digital interactive whiteboards
g) Other (please specify)

3. If you are using innovative technologies, please indicate their key benefits in (Select all that apply)

a) Attracting a large number of students
b) Improved cooperation between teacher and student
c) Increasing the level of interest among students
d) Providing access to a variety of professional learning content
e) Obtaining better results and level of learning

4. How would you rate your level of mastery of innovative educational technologies in your organization? (Please select one answer)

a) High level
b) Medium level
c) Below-average level
d) Unsatisfactory level
e) I do not use technology at all. Very low.

2.3.2 The Second Part. Open Questions:

1. When did you start using innovative digital technologies in the organization of training?

2. What are the main advantages of using modern innovative technologies? How do you assess the usability of modern educational platforms?

3. Would you like to improve your level of mastery of digital resources?

4. Have you attended any special courses to develop digital and information competence? Were they effective for you?

6. Should we further develop innovative education (education based on innovative technologies, methods, and forms of teaching)?

2.4 Analysis of Data

The use of system analysis made it possible to study the phenomenon of using innovative technologies in the system of training future specialists as a complex system that is constantly evolving. Based on this method, the main

capabilities of modern innovative technologies were also outlined. The methods of comparison, generalization, and typological method were also important. Their use made it possible to process the results and group them. The study also used the principles of comparativism to compare the key strengths and weaknesses of the use of innovative educational technologies and identify potential opportunities for their improvement. Using the principles of abstraction and generalization, the transition from the analysis of the results to the formation of final conclusions on the peculiarities of the use of modern innovative technologies in European education was made.

In addition, using a modern rating (based on the digital capabilities index), the main digital capabilities of modern European countries are characterized.

2.5 Ethical Criteria

The survey was based on the following ethical criteria:

1. Anonymity of the survey
2. Voluntary participation
3. Respect for all participants of the experiment, for the expression of any opinions
4. No discrimination based on gender or age.

At the same time, it should be noted that the above stages of research are in line with the accepted principles of academic ethics.

3. Results

Innovative educational technologies are an important part of the organizational structure of modern education in Europe.

It has been found that modern teachers mostly use innovative technologies a couple of times a week - 47%. Innovative teaching tools are used several times a month by 23%. On a regular basis, 20% of respondents use innovations. At the same time, only 10% of respondents do not use them in their professional activities. (See Figure 1).

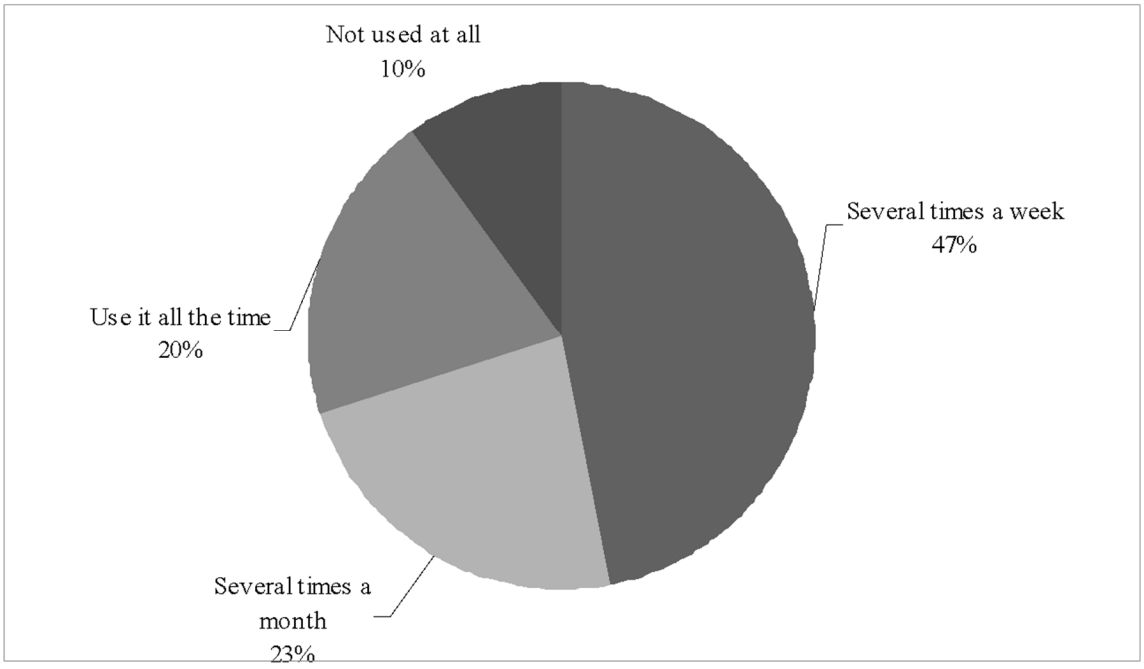

Figure 1. Diagram of the Use of Innovative Technologies

Source: author's development

In response to Question 1 of Part 2 of the questionnaire, the vast majority of teachers noted that they started using modern innovative forms and methods of work during the Covid-19 pandemic, i.e., when the digitalization of education reached a high level (61%). However, many respondents (34%) emphasized that they had used such technologies before the pandemic, including multimedia presentations, additional digital resources, special educational messengers, etc. At the same time, respondents from Ukraine noted that due to military operations, they are forced to use distance learning (or mixed) forms of education based on the use of digital technologies and forms of learning organization.

An important aspect of the training of specialists of the future in the European Union has become the widespread use of multimedia and the tendency to humanize the educational process. These elements have become important components of any theoretical training of specialists, which is generally caused by current trends in the acquisition of relevant competencies, critical thinking skills, creativity, the ability to cooperate with others, and soft skills. According to scientific concepts, current general trends in the organization of the educational process and the introduction of innovative technologies in Europe also include the ability to analyze and combine information, have appropriate public speaking skills, work in a team, communicate at a high level, and have digital competencies. There are different ways to implement such a concept that would take into account all of the above comments (See Table 1).

Table 1. The Most Popular Solutions That Promote Innovations in Education in the EU (according to the concept of scientists

№	Solution	Description
1	Using LMS (Learning management systems)	The introduction of special distance learning systems that allow for the administration of the educational process through special software generally adapts educational institutions to the requirements of today, facilitates the management of the educational process by both teachers and the administration of educational institutions.
2	Eurocentrism	The use of the principle of Eurocentrism opens up opportunities for academic mobility for students and teachers. This is facilitated by the unification of educational requirements, the formation of separate learning environments (especially relevant for higher education - we are talking about the Bologna system), and the acquisition of cross-cultural experience in communication, study, and work.
3	Interdisciplinarity	Modern training of specialists based on innovative technologies requires the integration of various academic disciplines to form a broader outlook among students. Interdisciplinarity also helps to develop the required level of soft skills, even among representatives of technical sciences.
4	Lifelong education	Dynamic changes in production processes, robotization, and computerization of the service sector point to the need for continuous learning and mastery of new skills. The leading innovative educational technology is lifelong learning, with educational institutions now present in all EU member states.
5	Decentralization of management of educational institutions	The functioning of modern European educational institutions is largely autonomous, which allows them to respond in a timely manner to changes in educational paradigms and introduce the latest technologies into the educational process. This distinctive feature of European educational systems is often underestimated when determining the effectiveness of innovative technologies, although mobility in introducing new things should be recognized as a positive factor.

Source: authors' development

Thus, the current guidelines of European education are aimed at using innovative technologies. This principle is put into practice through the selection of appropriate tools. The most popular innovative tools are digital learning resources and platforms, interactive whiteboards, mobile applications, and cloud services. Teachers who taught practical disciplines noted that it is important for them to use virtual reality technologies, simulation training, etc. (See Figure 2).

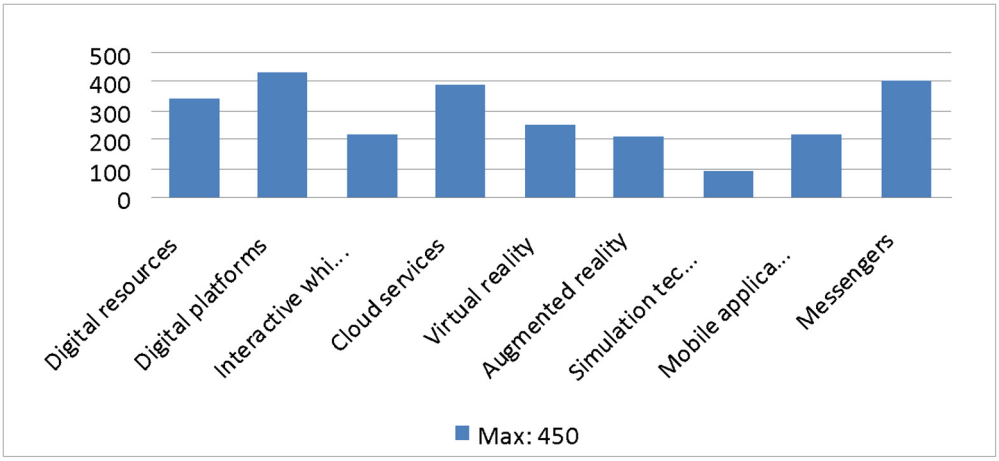

Figure 2. Diagram of the Prevalence of Innovative Tools

Source: author's development

The use of innovative educational technologies has several important advantages for the development of innovative education in general. In particular, they help to optimize the quality of education, ensure the implementation of a personality-oriented learning path, etc. The main advantages of applying innovative solutions in the training of future specialists include improving student engagement in the learning process, creating better motivation among students, improving access to education, developing individualized learning, etc. (See Table 2).

Table 2. Main Advantages of Using Innovations

Advantages	Quantity
Attracting a large number of students	45%
Accessibility of education	95%
Improving cooperation between teacher and student	93%
Increasing the level of interest among students	75%
Improving the level of student engagement in learning	62%
Providing access to a variety of professional learning content	95%
Improving the motivation of students	52%
Development of individualized learning	87%
Obtaining better results and level of learning of educational material	67%
Developing critical thinking among students, forming relevant skills (including digital skills).	71%

Source: author's development

It is worth noting that the use of innovative educational technologies requires an appropriate level of digital and information competence among teachers. Modern teachers noted that they mostly have an average level of digital competence (54%). We believe that for the further development of innovative learning, it is necessary to improve digital and information literacy among teachers. Twenty-one percent of respondents rated their level of mastery of

innovative technologies as high. Below average level - 17%. Unsatisfactory level - 6%. Very low level – 2.

Accordingly, to develop effective innovative learning, it is important to improve the overall level of mastery of innovative technologies. This can be realized through the participation of teachers in special courses on digital literacy, information competence, etc. It should be noted that such courses are popular in Europe, as some respondents said they had attended such additional courses and emphasized their effectiveness (34%).

At the same time, digitalization is a relevant aspect of innovative education development. Based on the analysis of the Digital Opportunity Index, modern European education has great digital opportunities for improvement in terms of both technological and human resources. The most favorable conditions for the formation of digital education as a phenomenon are available in European countries with a high level of economic development. This is confirmed by the analysis of the current data of the Digital Opportunity Index. (See Table 3).

Table 3. Digital Opportunities in Accordance with the Economic Ranking of Countries

Country	Rating	Rank
Sweden	78,91	3
Netherlands	78,82	4
Switzerland	78,45	5
Denmark	78,26	6
Finland	77,90	7
Germany	76,11	8
Norway	75,68	10
France	72,19	16
Austria	71,31	18
Belgium	70,04	21

Source: compiled based on Countries Benchmarking the Future of the Network Economy (2022)

Thus, as can be seen from TABLE 2, modern European countries have high rates of both economic development and digital opportunities in education. These indicators will influence the further development of higher digital education in European countries, transforming it to meet innovative trends. The digital opportunities available to countries are closely linked to their economic ranking and level of technological advancement. High-income economies lead in digital innovation, while upper-middle-income countries are rapidly growing their digital ecosystems. Lower-middle-income and low-income economies have the potential to leverage digital technologies to drive growth and development with the right investments and support. Bridging the digital divide and promoting digital literacy are essential to unlocking the full potential of digital opportunities across all economic rankings. High-income countries, such as the United States, Germany, Japan, and South Korea, typically lead in digital opportunities. These countries boast robust digital infrastructure, a thriving technology sector, and significant investment in research and development. Their populations have widespread access to high-speed internet and digital services, making them ideal environments for technological advancements, start-ups, and digital entrepreneurship. Digital opportunities in these countries include cutting-edge technologies like artificial intelligence, blockchain, and the Internet of Things (IoT), as well as advanced e-commerce platforms, digital financial services, and a thriving app economy. For the other hand, many low-income countries face challenges in accessing digital opportunities due to limited resources, infrastructure constraints, and lower levels of digital literacy. However, various international organizations and initiatives are working to bridge the digital divide and provide digital training and resources to these countries. There are opportunities for partnerships and investments to empower these economies with digital tools for education, healthcare, agriculture, and business development.

4. Discussion

Innovative educational technologies have been rapidly evolving and gaining prominence in the context of education

worldwide, including in Europe. The European experience in implementing these technologies has shown their potential to revolutionize the training of specialists across various fields, even in challenging contexts such as during times of war. European countries have been at the forefront of integrating digital tools, virtual learning platforms, and online resources into their educational systems. These technologies have proven to be effective in enhancing learning experiences, promoting collaboration, and providing access to a wealth of knowledge and information. From interactive simulations and virtual labs in the sciences to immersive language learning apps and gamified educational platforms, these innovations cater to diverse learning styles and preferences.

During periods of conflict and war, educational continuity can face significant disruptions. However, innovative educational technologies offer a lifeline for maintaining access to quality education, even in adverse conditions. Virtual classrooms, distance learning, and digital learning resources can facilitate uninterrupted learning for students and professionals alike, regardless of their physical location or the challenges posed by the conflict. Furthermore, these technologies can foster resilience and adaptability in the training of specialists. For instance, in fields like healthcare and emergency response, virtual simulations and remote training can prepare professionals to handle crises and challenging situations effectively. Additionally, digital tools can facilitate cross-border collaborations, allowing experts from different European countries to share knowledge and best practices, contributing to a more comprehensive approach in addressing the impacts of war and conflicts.

As demonstrated in the results, the Covid-19 pandemic has influenced the widespread adoption and use of digital innovative forms and methods of organizing learning. This is confirmed by other contemporary scholars. In particular, Dhawan (2020) noted that the sudden outbreak of the Covid-19 disease caused by the Coronavirus (SARS-CoV-2) has shaken the modern world. This situation has challenged the existing model of education around the world and forced teachers to instantly shift to online learning, and accordingly use digital innovative forms of education (Dhawan, 2020, p. 5). Ramsaroop, Batchelor, and Petersen (2022) also emphasized that the Covid-19 pandemic has transformed the modern education system. According to Shackleton and Mann (2021), at that time, a large number of educational and academic institutions that had previously been reluctant to revise their traditional curriculum had no choice but to start using digital technologies extensively and move completely to online learning. la Velle et al. (2020), using the example of an analysis of education in England, emphasized the importance of the Covid-19 pandemic for the digital development of modern education. The results demonstrated in the study indicate that, in general, teachers have a positive attitude towards innovative technologies and actively use them. At least only about 10% of respondents said they do not use innovations in their teaching, relying entirely on traditional methods of education. So, it's important to recognize that the implementation of innovative educational technologies in the context of war may face unique challenges. These challenges can include limited access to reliable internet infrastructure, power outages, security concerns, and issues related to digital literacy. Addressing these challenges requires a multi-faceted approach, including investment in digital infrastructure, training for educators and students in utilizing technology effectively, and ensuring the security and privacy of online learning environments.

Regarding Question 1 in Part 2 of the survey, a significant majority of educators indicated that they commenced their utilization of contemporary innovative approaches and techniques during the Covid-19 pandemic, a period coinciding with the elevated integration of digital education (61%). Nevertheless, a notable portion of respondents (34%) underscored that they had employed such technologies prior to the pandemic, encompassing multimedia presentations, supplementary digital materials, specialized educational messaging platforms, and more. Concurrently, participants hailing from Ukraine highlighted that due to ongoing military operations, they have been compelled to adopt distance or hybrid educational formats reliant on digital technologies and instructional methods.

According to Nīmante, Kalniņa, and Baranova (2022), learning environments based on innovative educational technologies are “designed to facilitate the engagement of students with diverse backgrounds and learning needs” (p.213). At the same time, the experience of distance learning in the difficult circumstances of COVID-19 has influenced the development of innovative inclusive environments (Nīmante et al., 2022, p. 213-214). According to Wong, Fink, and Bhati (2021), the pandemic events have influenced educational institutions to introduce various innovations in teaching, organizational processes, and well-known educators to reconsider their approach to education (p. 221). This correlates with the obtained indicators, which show that modern teachers resort to using a wide range of innovative educational technologies that form a specific learning environment. The most common are digital resources, digital learning platforms, cloud services, and interactive whiteboards. Teachers of practical disciplines use virtual reality, augmented reality, and simulation learning tools among their tools. The results prove the thesis that the learning environment is an important element of modern education. It's important to highlight that the utilization of cutting-edge educational technologies necessitates a suitable degree of digital and information proficiency among educators. Contemporary educators have indicated that their digital competence primarily falls

within an intermediate range. We hold the view that advancing digital and information literacy among teachers is imperative for the progressive evolution of innovative learning. An appreciable 21% of survey participants evaluated their grasp of innovative technologies as advanced. Conversely, 17% reported a below-average proficiency, while 6% regarded their competency as unsatisfactory, and a mere 2% described it as very low.

Many contemporary scholars have wondered whether education will change in the post-covid era. Delic and Riley (2020) have discussed this issue. On the other hand, Wong et al. (2021) believe that innovations in education will be widely used even after the pandemic (p.238). The problem of post-COVID education is also raised in the study by Sönmez (2021). A relevant direction is the large-scale digitalization of the educational process (Hitchcock, Sage, and Smyth, 2019; Reid, 2020). Stoika's (2022) study proves that digital technologies are actively used in Hungarian universities. The author emphasizes the upcoming large-scale digitalization of the educational space in Hungary. Other researchers also emphasize the further digitalization of education (Mehlenbacher and Mehlenbacher, 2020; Gumenyuk et al., 2021). However, this issue still remains open. As shown, researchers identify many advantages of modern education, which will continue to evolve towards a combination of traditional and innovative methods, or simply towards the use of innovative methods. Thanks to the developed mechanisms of implementation, European national education systems have adapted to the challenges of globalization, including the COVID-19 pandemic. At the same time, it is difficult to determine the impact of the military challenge, which is associated with unpredictable consequences (Rajab, 2018).

The results show that the most popular innovative tools are individual digital resources and platforms. Modern studies emphasize the effectiveness of modern digital learning platforms as a means of shaping professional development (Chikuvadze, 2023; Hart-Davis, 2018; Sarosa et al., 2022). Gumenyuk et al. (2021) also emphasized the role of innovative digital technologies in the transformation of education. Clark-Wilson, Robutti, and Thomas (2020) described the key aspects of organizing learning using digital innovative technologies. The authors also emphasized their effectiveness (Clark-Wilson et al., 2020, p. 1224). At the same time, the most common innovative and training tools at European Union universities are webinars, briefings, videoconferences, video lectures, digital consultations, virtual classes, etc. The main characteristic of virtual workshops based on Internet technologies is interactivity. Modern European universities use video lectures or video seminars in online communication. Such forms of work ensure simultaneous two-way broadcasting, processing, and provision of important interactive materials at a distance. At the same time, video counseling is quite common, especially in Finnish universities. As digital education promotes independent learning, students may need additional help from a teacher in their preparation. A striking example is the education system in Finland, where such a counseling system operates at different educational levels. Special centers in the European Union are engaged in the development of innovative education. In particular, in Germany, special graduate training programs (Internationale Promotions program) are actively developing. The German Research Society is engaged in the implementation of modern interactive tools.

The data obtained demonstrated that the problem of developing and improving skills in working with innovative technologies is relevant for many European educational institutions. This aspect is also emphasized by many scientists. In particular, White et al. (2023), who studied the state of digital competence of Swedish teachers, emphasized the importance of further developing it among the surveyed teachers (p. 126). At the same time, many modern teachers want to improve their skills in working with modern technologies on their own (Liubarets et al., 2022).

It is worth noting that the European Union has special programs that develop skills in working with innovative technologies through internships. In particular, Germany has a special program for the training of research and teaching staff for German higher education institutions (Promotion an Hochschulen in Deutschland). In France, the Sorbonne University also offers special courses to improve digital skills. In England, the Centre of Excellence for Teaching and Learning (CETL) also promotes the professional training of teachers of the future, who must have relevant competencies. Such mobile internships for European teachers are a common practice in the development of digital literacy. They affect not only the mobility of the teacher, but also develop their soft skills, digital skills, and introduce them to innovative teaching methods in a particular country. Accordingly, the task of a modern teacher is to improve not only digital literacy but also their professional competence in general by participating in various internships and advanced training courses. The following activities are typical for modern European educational development centers. European educational institutions have responded to these dynamics by offering specialized programs that equip individuals with the skills needed to navigate the complexities of the contemporary world. Moreover, Europe's focus on social welfare and inclusivity has led to the integration of perspectives from diverse backgrounds, fostering a richer understanding of global challenges and their potential solutions.

The study by Bezlutska et al. (2021) indicates that modern professional training of future specialists should be based on the development of various competencies, including managerial ones. At the same time, Ostanina et al. (2023) focused their study on the peculiarities of forming digital competence for modern teachers. The authors note that an important way to improve it is the participation of teachers themselves in special courses and webinars (p. 132). A similar concept was previously described in Bader, Oleksiienko, and Mereniuk (2022). Khan and Vuopala (2019) also demonstrated that digital competence is important for all specialties in the modern educational process (p. 18).

In general, these opinions are confirmed in this study. At least, the vast majority of teachers have the necessary level of competence to conduct classes and work with innovative technologies in general. Continuous development of the relevant competencies will be an important challenge for the formation of specialists of the future. In conclusion, the European experience with innovative educational technologies demonstrates their potential to transform specialist training and education in various fields. Embracing these technologies in the context of war can help maintain educational continuity, foster adaptability, and build resilience among professionals. While challenges exist, the integration of digital tools in education remains a promising avenue for empowering specialists even amidst the complexities of conflict and uncertainty.

5. Conclusions

Thus, the European experience of introducing innovative educational technologies in the context of the global challenges of the XXI century is quite thorough. In particular, it has been determined that modern paradigms of European education tend to use innovative technologies in practice. The study has shown that the most commonly used innovative tools are platforms, interactive whiteboards, mobile applications, and cloud services. According to the research results, it was found that:

1. The vast majority of teachers have a sufficient level of digital competence, which allows them to use innovative technologies freely.
2. The current European experience of using innovations in education is based on a considerable practical component that can withstand the challenges of globalization. However, it is difficult to determine how effective the proposed mechanisms are in wartime, as military operations in the EU have not been taking place for a long time.
3. Modern teachers use a wide range of innovative educational technologies that form a specific learning environment. The study confirmed the thesis about the importance of using a specific educational environment for the introduction of innovative technologies in education.

At the same time, the problems of adapting the requirements of European educational systems outside the regulatory framework of the EU member states are poorly understood. Harmonizing the use of innovations in terms of legal regulation will be an important issue for further research.

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