



ORIGINAL CONTRIBUTION

Impact of War on the Ukrainian Agricultural Universities: Institutional Challenges, Resilience, and Adaptation to the Condition

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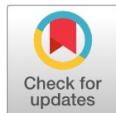
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Abstract— This study provides an analysis of the impact of the Russian invasion on the functioning and resilience of Ukrainian agricultural higher education, focusing on Dnipro State Agrarian and Economic University (DSAEU). As one of the first in-depth case studies on Ukrainian agricultural universities during full-scale war, this research examines the effects of armed conflict on institutional adaptation, processes of educational programs, and community support systems. For this purpose, data were collected through “structured content analysis of official rector’s reports from 2020 to 2023”, applying the REST framework (Political-, Economic-, Social, and Technological-) analytical framework to differential evaluation of internal and external challenges. The results shows markedly disruptions to physical infrastructure, loss of personnel, and transitions to distance and blended learning formats in the universities. Despite these challenges, DSAEU demonstrated notable institutional resilience, maintaining a high level of educational activity, supporting students and academic staff, and also expanding digital infrastructure. However, the findings show a decline in student learning outcomes, limited access to practical training, and the persistent psychological stress within the academic community. In conclusion, this study is underpinned by the theory of institutional resilience and adaptability, and the need to focus on leadership, learning, and infrastructure. The limitations of this research are its availability in only one case and based on reports, which might not reflect all the informal adaptation that occurs. This is due to the relevance of the findings of this research study to policymakers, research scholars, and academicians who are engaged in formulating crisis management strategies within institutions of higher education. Further research should be carried out using a comparative research methodology to determine its generalizability.

Index Terms— Adaptation, Agricultural education, Higher education institutes, Ukraine, War

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Introduction

Agricultural education plays an important role in supporting the agrarian sector in Ukraine, which remains one of the country’s largest employers and a cornerstone of its economic stability, according to statistics (Shmatkovska et al., 2024). Innovative development plans for agricultural education are essential for maintaining Ukraine’s competitive position as a global exporter of agricultural products, especially for cereals (Shpykuliak et al., 2024). It also ensures the long-term resilience of the sector in the face of ongoing geopolitical challenges (Uygur & Peyravi, 2025).

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Acknowledging the significance of agricultural education for economic development and food security, there is a gap in the literature on the impacts of armed conflict on the higher education system, and in particular, agrarian universities. Previous research has focused on the disruption of education in the context of peacetime challenges, or public health emergencies like the COVID-19 pandemic, as opposed to the war's complex and multidimensional impacts (Kremen et al., 2023). This gap is the need of the hour to formulate evidence-based approaches to develop the institutional adaptive capacity and post-crisis educational policy reforms. Ukraine has been a significant player in the global food security domain with a well-established agrarian industry and high country competitiveness as an exporter. Prior to the onset of full-scale war, Ukraine was among the top five countries exporting grains, with the majority of the agrarian produce being exported.

Despite facing substantial economic losses during the conflict, including over \$2.25 billion in damages to rural households and a significant reduction in crop and livestock production (FAO, 2022), the Ukrainian agricultural sector has demonstrated remarkable resilience. With the support of international partners, Ukraine continues to supply a significant share of the world's wheat, corn, and sunflower oil, maintaining its importance as a key player in international trade even under wartime conditions (Halkin, 2024).

Educational losses began to be actively discussed in the world during the quarantine restrictions of COVID-19. Losses are usually understood as the failure to achieve certain outcomes due to a lack of or limited access to learning. And it was the pandemic that first caused crises in many educational systems of the world.

While considerable attention has been paid to educational losses during the COVID-19 pandemic (Bassleer et al., 2025; Chasciar et al., 2025), the direct impact of full-scale war on university operations, learning outcomes, and the resilience of academic communities in Ukraine remains insufficiently studied. The destruction of infrastructure, forced migration, psychological trauma, and disruptions in traditional and digital learning modalities have created unique challenges that cannot be addressed with peacetime educational policies.

In Ukraine, educational losses are due to both the long quarantine and the war. The forced interruption of studies, the destruction of educational institutions, the lack of an opportunity to study face-to-face, restrictions on distance and mixed formats of work, as well as interruptions with electricity and communication, are the main challenges that Ukrainian education has faced during the previous years. Undoubtedly, this has led to educational losses – differences between expected and actual learning outcomes. Therefore, this problem requires special attention and effective ways of its solving (Lopushinsky et al., 2022).

Previous studies have primarily analyzed general educational disruptions or distance learning challenges in wartime or crisis contexts (Rajab, 2018), but there is a lack of empirical data and systematic analysis regarding the specific mechanisms, institutional responses, and coping strategies employed by Ukrainian higher education institutions during the ongoing war. There is also a need to investigate how prior experience with digitalization and pandemic-related shifts prepared universities for new, more severe challenges.

Although a substantial body of literature has addressed the impact of COVID 19 restrictions on education worldwide, the effects of armed conflict on the daily functioning of universities, especially with reference to real life institutional experience, remain significantly underexplored. In particular, there are limited empirical studies on the higher education sector during the ongoing war in Europe. This research seeks to fill this gap by analysing the case of one of Ukraine's leading agricultural universities during wartime. Accordingly, this study addresses the following research questions:

- What are the principal challenges faced by agricultural universities in Ukraine during the war?
- How have these institutions adapted their educational processes, infrastructure, and support systems to ensure continuity and quality?
- What lessons can be drawn from this experience to inform crisis preparedness and resilience strategies in higher education?

So, the purpose of this research work was to evaluate the peculiarities of the functions and efficacy of the educational institution during the war, to analyse the challenges faced by the university since the beginning of the full-scale invasion. Also, find a way to overcome the negative consequences of a more effective educational environment in these specific conditions

Literature Review

Disruption of higher education by armed conflict

Recent research demonstrates that armed conflict can profoundly disrupt higher education by causing large-scale displacement of academic staff and students, destabilising institutional operations, and leading to the loss of intellectual resources. Evidence from the 2023–2024 Gaza conflict shows that the widespread relocation of university personnel intensifies the risk of brain drain and undermines academic stability, affecting teaching, research, and institutional cohesion, with consequences for both local and global knowledge networks. In some contexts, these processes may also foster 'brain circulation', enabling the transfer of expertise across regions (Abusamra, 2024). The Ukrainian experience of university relocation during two major waves of displacement, in 2014 and during the ongoing war, further illustrates the complexity of institutional adaptation, including challenges in maintaining academic continuity, resource allocation, and community engagement over time (Finikov et al., 2025).

Digital transformation, inequality, and psychological stress

The urgent moves to online instruction during critical events place extraordinary pressure on institutions of higher learning. In the case of Ukraine, the war has further complicated the already existing technical limitations, unequal access to means of learning, and increased psychological strain on students and teachers. In spite of the rapid coping with the demands of online education, the unequal levels of digital literacy and inequitable access to the necessary tools to learn have remained critical barriers to effective learning (Banyoi et al., 2023; Galynska & Bilous, 2022; Marchenko, 2023). The same has been observed in conflict-affected regions such as Sudan, where fighting has targeted educational facilities and disrupted the academic work, the safety, and the professional growth of the university community (Mahgoub et al., 2024).

Lessons from other crises: Pandemics and natural disasters

The need for digital transformative practices, resilient institutions, and innovative pedagogy, in order to sustain academic continuity, is evidenced in the impact of natural disasters and the COVID-19 pandemic (Aydin & Ayvazoglu Demir, 2022). Successful case studies demonstrate the disruption of educational processes within universities, but most of them engage in the adoption of e-learning and blended learning models (Ayebi-Arthur, 2017; Barrios et al., 2022; Chasciar et al., 2025; Jam et al., 2025). Implementation of the 'flipped classroom' technique in conjunction with the flexible adjustment of curriculum on pedagogical processes fosters institutions' ability to adapt, respond, and be flexible in student-centred learning experiences. Increasing educational inequity and lack of achievement as a result of the disruptive impact of the pandemic illustrated the need for 'adequate support frameworks', flexible assessment practices, and strategic planning at institutional levels, in order to maintain quality and resilient educational frameworks in times of crisis (Bassleer et al., 2025).

Psychological and institutional challenges under prolonged conflict

Research on populations affected by war condition demonstrates that displacement and prolonged exposure to violence, profound psychological and educational problems and shortages. A longitudinal study carried out on Ukrainian adolescents shows that forced migration entails higher levels of anxiety, depressive symptoms and post-traumatic stress, reinforcing the need for the provision of mental health support shielded within educational frameworks during and after the war (Goto et al., 2025). The Palestinian and Syrian contexts affirm that the higher education systems under occupation or prolonged instability remain greatly impacted by the breakdown of governance, academic mobility, and resource circulation. Educational resilience is the outcome of responsive institutional frameworks, active community participation, and creative pedagogical approaches that enable the uninterrupted flow of learning within the prevailing systems (Hasan & Buheji, 2024; Tozan, 2025).

Pedagogical approach

Disruptions in education during crises underscore the importance of flexible teaching methods and the use of technology to strengthen institutional resilience (Yevdokymova, 2024). Studies conducted during the COVID-19 pandemic showed that while emergency distance education was unequal in terms of digital readiness and student participation, it encouraged universities to create innovative academic assistance and flexible teaching (Aydin & Ayvazoglu Demir, 2022; Bano et al., 2025; Oliveira et al., 2021; Shumba et al., 2025).

Resilience in agricultural higher education

The empirical studies examining agricultural higher education during a crisis highlight the role of institutional support, digital tools, and leadership in preserving the quality of education and sustaining the development of the sector in the long term. The studies in Iran during the COVID-19 crisis demonstrated that the resilience of educators depends not only on the availability of digital tools and adaptive teaching, but on the specific professional development planning, mental health support of educators, and psychological support of faculty members (Ghiasvand et al., 2024). The same problems were faced by other countries during the pandemic, which exposed the agricultural education and extension system's vulnerabilities and adaptability. The prompt shift to online teaching and learning the provision of hands-on training to students created additional challenges (K. Davis, 2020). The experience of first-year agricultural teachers during this period has shown the extent of problems with remote teaching, especially in practice. However, these challenges were met with the development of new pedagogical skills and the strengthening of professional support networks, which led to an improvement in the overall resilience of the field (S. Davis et al., 2025).

Universities

Research indicates that through the development of an innovation ecosystem and enabling job creation, along with serving as an economic anchor for the region post-shock, Universities can support Local Economic Resilience by providing opportunities for creating jobs during difficult times and developing plans for managing an economic shock (Howard et al., 2024). The experience of wartime agricultural education in Ukraine demonstrates the need for strategic vision, adaptive leadership, and targeted reconstruction efforts. University Leadership in Ukraine has created

Crisis Management Plans that include fostering community support, rebuilding the infrastructure of higher education to create resilience, and providing input into how to respond to conflict-related education policy needs (Nifatova et al., 2023).

Perspectives on resilience in higher education

The conceptualisation and empirical study of resilience in Higher Education has changed significantly in recent years. Almost all universities are now working to develop the ability to use their resources continuously and adaptively to create sustainable learning and innovation. The conflict experiences of higher education workers present unique ethical and pedagogical issues as instructors are often expected to find ways to balance competing student views, instil social cohesion in the classroom, and cope with societal violence and other pressures (Finkelstein et al., 2025). Many of the issues facing university staff during contemporary pandemics also stem from similar systemic issues, such as limited resources and lack of training, coupled with the impact of COVID-19 on the professional development of higher education staff. The development of resilience strategies for university staff should include support from their institutions, as this support builds the capacity of universities to create knowledge and provide value to their communities (de los Reyes et al., 2022). Additionally, a resilience approach to universities highlights their potential as platforms for helping their respective societies achieve sustainability and, therefore, gives universities an opportunity to build collaborative networks and leadership roles that can help organisations address emerging challenges, including the current global pandemic.

Hypotheses

Based on the analysis of the literature, the following hypotheses are created:

1. Universities affected by war conditions and armed conflict develop unique adaptation strategies and resilience mechanisms distinct from those observed during peacetime crises, which are driven by the specific challenges of war (Abusamra, 2024; Nifatova et al., 2023).
2. Digital preparedness and prior experience with remote learning (e.g., developed during the COVID-19 pandemic) have moderated the negative impact of conflict on educational continuity and institutional adaptation, but persistent inequalities and psychological stress remain major barriers based on Galynska and Bilous (2022), Banyoi et al. (2023), Bassleer et al. (2025), and Chasciar et al. (2025).
3. At times of crises, we see Educational Resilience created through the combination of: Innovative Technology (both hardware & Software); Institute Leadership; More Assertive & Direct Educational Support for mental health; and appropriate development of inclusive policy for displaced and vulnerable Individuals (Students). (Brunner et al., 2025; Goto et al., 2025; Hasan & Buheji, 2024; Mahgoub et al., 2024; Morrice, 2022; Robinson & Laycock Pedersen, 2021).

Method

Data sources

The study is based on an analysis of the annual reports of the Rector of “Dnipro State Agrarian and Economic University (DSAEU)”, published on the university’s website (https://www.dsau.dp.ua/ua/page/zvity_rectora.html).

Data collections

The data were collected via a systematic review of the rector’s reports for the relevant wartime period. Each document was examined for quantitative indicators (e.g., student numbers, staffing, digitalisation metrics) and qualitative descriptions of institutional challenges and adaptive strategies. Data extraction followed a structured template to ensure consistency across years and to enable cross-period comparison. No personal or sensitive information was collected, as the analysed documents contain only aggregated institutional data.

Sampling and case selection

This research employs a single-case study design focused on DSAEU. The university was purposefully selected because it represents one of the key regional agricultural higher education institutions in Ukraine and provides publicly accessible, detailed annual reports that document the impact of war on institutional functioning. Case study methodology is appropriate here, as it allows an in-depth exploration of organisational adaptation, crisis management, and educational resilience within a real institutional context.

Analytical framework and methodological justification

To analyse the external and internal conditions influencing the university’s functioning during wartime, the widely used REST-analysis framework was applied. REST analysis is a methodological tool for examining political (R – political), economic (E – economic), social (S – social), and

technological (T – technological) factors affecting institutional development (Bodak, 2025; Sammut-Bonnici & Galea, 2015). This framework is particularly suitable for strategic assessments of higher education institutions facing environmental shocks such as armed conflict.

As well as, the several theoretical methods were used, including analysis, synthesis, and deduction, which enabled the identification of relationships and general patterns in this manuscript. The method of concretisation was employed to illustrate specific changes in the educational process and to identify the strengths and weaknesses of university functioning during the war. The method of abstraction, defined as step-by-step moving from abstract concepts to concrete interpretation (Balan & Babenko, 2020), is used in the Discussion section to conceptualise educational problems and propose solutions in the context of Russian aggression against Ukraine.

Ethical considerations

No human subjects were involved, and no confidential or personal data were collected. Therefore, ethical approval was not required in terms of using humans or their rights. The research fully complies with institutional and national standards and is based on university open-access data.

RESULT AND DISCUSSION

General characteristics of the University

History of the University

The history of the university begins on September 11, 1922, when Kyiv Veterinary and Zootechnical Institute was established on the basis of the Kyiv Polytechnic Institute, which in 1930 was divided into two independent higher educational institutions - Kyiv Veterinary and Kyiv Zootechnical Institutes. On May 23, 1934, a decision was made to transfer Kyiv Zootechnical Institute to Dnipropetrovsk, and in October 1934, it was renamed Dnipropetrovsk Agricultural Institute. The further formation of the university covers the following periods:

- For successful training of highly qualified specialists and the development of science, the Dnipropetrovsk Agricultural Institute received the status of the Order of the Labor Red Banner (1983).
- Dnipropetrovsk Agricultural Institute of the Order of the Labor Red Banner was reformed into the Dnipropetrovsk State Agrarian University (1991)
- Dnipropetrovsk State Agrarian and Economic University (DSAEU) was formed through the reorganization of Dnipropetrovsk State Agrarian University (2013);
- Dnipropetrovsk State Agrarian and Economic University was renamed into Dnipro State Agrarian and Economic University (2017).

For more than a century of educational activity, the university has turned into a well-known, multidisciplinary educational institution of the IV level of accreditation (the highest level). The university has more than 70,000 graduates who work and are working in Ukraine and far beyond it.

The powerful educational and scientific traditions established by generations of scientists and lecturers are successfully developed and multiplied by the university staff to implement state tasks on the formation of a modern educational space.

University today

Dnipro State Agrarian and Economic University (<https://www.dsau.dp.ua>) is an educational, scientific, and industrial complex, which includes six agrarian and technological colleges: Verhnodniprovsk Vocational College, Erastiv Vocational College named after E. K. Brodskyi, Nikopol Vocational College, Novomoskovsk Vocational College, and Technical College.

The university stands as a multidisciplinary institution providing a comprehensive spectrum of educational opportunities, ranging from professional pre-university training to doctoral and postdoctoral studies. It actively engages in both fundamental and applied research, functions as a leading methodological and scientific centre, and possesses a well-developed educational and scientific infrastructure, including production facilities. The institution also promotes the dissemination of scientific knowledge and the organisation of cultural and educational events.

Educational programmes are offered at all levels, including preliminary higher education, short-cycle (initial) higher education, bachelor's, master's, and doctoral degrees, fully complying with Ukrainian legislation. The university thus prepares candidates for advanced scientific qualifications and ensures continuity across all stages of higher education.

The university has 5 educational and scientific buildings, 7 dormitories, an experimental field with a total area of 1535.77 hectares, with a selection and seed plot. The university includes 7 faculties, 35 departments, computer classes, a scientific library with reading rooms, 7 sports halls, educational and production workshops, science laboratories, geodetic training ground, a Department for Information and Technical Support of Educational Process, a Department of International Relations and Public Communications, a Department for Internal Audit and Quality Control of Educational Activities, Department of Training and Certification of Scientific personnel, Veterinary Medicine Clinic, Research Center of Biosafety and Ecological Control of Agricultural Resources, Center of Natural Agricultural Production named after M. Rudenko.

The mission, values, and motto of the university

We are sure that every person has talent. We strive to create an educational and scientific space where each student, in partnership with teachers and employers, will be able to reveal his or her potential, acquire modern knowledge and practical skills, and develop his or her personal qualities for a successful career in the field of agrarian and other businesses and the public sector at the national and international levels. We provide opportunities for everyone to acquire and develop new competencies throughout life. Gathering talents, growing together, we transform AgroCulture.

Motto of the university: Dnipro State Agrarian and Economic University - University for life.

Our values

Partnership:

the university builds its relations with students, teachers, employers, representatives of communities, and authorities on the principles of respect, trust, and equal partnership. We are open to new ideas, ready to change, and contribute to joint projects.

Accessibility:

the university is open to everyone, regardless of age, gender, nationality, religion, or other characteristics, for everyone who is ready to dedicate themselves to professional development and change people's lives for the better.

Quality and efficiency:

we strive for quality and efficiency in everything we are involved in - in the organization of the educational process, scientific activity, internal and external communications, and the use of resources. We contribute to improving people's quality of life and the effective use of natural resources.

Fields of knowledge and educational programs of specialist training

The training of bachelors, masters, and doctors of philosophy is carried out at 7 faculties according to educational programs of specialties in accordance with the license granted by the Ministry of Education and Science of Ukraine. The Dnipro State Agrarian and Economic University reissued a license for educational activities in the field of higher education in accordance with the procedure established by law. The University has the right to carry out educational activities in the field of higher education at the first, second, and third levels of higher education in its structural subdivisions (faculties):

- Faculty of Agronomy;
- Faculty of Biotechnology;
- Faculty of Engineering and Technology;
- Faculty of Veterinary Medicine;
- Faculty of Water Engineering and Ecology;
- Faculty of Management and Marketing;
- Faculty of Accounting and Finance

DSAEU provides a wide range of educational services and has the right to train specialists according to educational levels (Table I)

Table I
Fields of knowledge and specialties at the University

Code and name of the field of knowledge *	Code and name of specialty *
Bachelors	Bachelors
05 Social and Behavioral Sciences	051 Economics
07 Management and Administration	071 Accounting and Taxation
	072 Finance, Banking and Insurance
	072 Finance, Banking, Insurance and Stock Market1
	073 Management
	075 Marketing
10 Natural Sciences	101 Ecology
18 Production and Technologies	181 Food Technologies

Cont...

Code and name of the field of knowledge *	Code and name of specialty *
19 Architecture and Construction	183 Environmental Protection Technologies 192 Construction and Civil Engineering 194 Hydrotechnical Construction, Water Engineering and Water Technologies
20 Agricultural Sciences and Food	201 Agronomy 204 Livestock Production and Processing Technologies 206 Horticulture 207 Water Bio-resources and Aquaculture 208 Agricultural Engineering
Masters	Masters
05 Social and Behavioral Sciences	051 Economics
07 Management and Administration	071 Accounting and Taxation 072 Finance, Banking and Insurance 072 Finance, Banking, Insurance and Stock Market 073 Management 075 Marketing
10 Natural Sciences	101 Ecology
18 Production and Technologies	181 Food Technologies
19 Architecture and Construction	194 Hydrotechnical Construction, Water Engineering and Water Technologies
20 Agricultural Sciences and Food	201 Agronomy 204 Livestock Production and Processing Technologies 206 Horticulture 207 Water Bio-resources and Aquaculture 208 Agricultural engineering
21 Veterinary Medicine	211 Veterinary Medicine 212 Veterinary Hygiene, Sanitation and Expertise
28 Public Management and Administration	281 Public Management and Administration
PhD	PhD
05 Social and Behavioral Sciences	051 Economics
07 Management and Administration	072 Finance, Banking, Insurance and Stock Market 1 073 Management
10 Natural Sciences	101 Ecology
13 Mechanical Engineering	133 Industrial engineering1
20 Agricultural Sciences and Food	201 Agronomy 204 Livestock Production and Processing Technologies
21 Veterinary Medicine	211 Veterinary Medicine 212 Veterinary Hygiene, Sanitation and Expertise
28 Public Management and Administration	281 Public Management and Administration

The total number of people receiving educational services at the university is 7,074, which is by 21% more than in 2022 (5,598 applicants in 2022) and by 34% more than in 2021 (4,659 applicants in 2021).

The Dnipro State Agrarian and Economic University has six separate structural units (professional colleges). According to the current license, vocational colleges of the university train candidates for vocational pre-university education in 15 specialties (Table II)

Table II
Specialties in separate structural subdivisions of DSAEU (colleges)

Name of the college	Name of specialty (specialization)
Verhnodniprovs'k Vocational College	072 Finance, Banking, Insurance and Stock Market
Verhnodniprovs'k Vocational College	072 Finance, Banking and Insurance
Verhnodniprovs'k Vocational College	076 Entrepreneurship and Trade
Verhnodniprovs'k Vocational College	076 Entrepreneurship, Trade and Exchange Activity
Verhnodniprovs'k Vocational College	081 Law

Cont...

Name of the college	Name of specialty (specialization)
Erastiv Vocational College named after E. K. Brodsky	073 Management
Erastiv Vocational College named after E. K. Brodsky	201 Agronomy
Nikopol Vocational College	193 Geodesy and land management
Nikopol Vocational College	207 Water Bio-resources and Aquaculture
Nikopol Vocational College	208 Agricultural Engineering
Novomoskovsk Vocational College	201 Агрономія
Novomoskovsk Vocational College	204 Livestock Production and Processing Technologies
Novomoskovsk Vocational College	211 Veterinary Medicine
Technical College	071 Accounting and Taxation
Technical College	181 Food Technologies

Peculiarities of university functioning under martial law

Main activities of the university

Among the main problems facing higher education in the conditions of war in Ukraine, the following can be noted: A threat to the life and health of students and staff of higher educational institutions.

- large-scale destruction and damage to infrastructure; forced relocation of institutions;
- lack of electric power because of the blackout graphs; difficulties in carrying out scientific and innovative activities;
- restrictions on international cooperation;
- insufficient financing of higher education.

From the first day of the full-scale invasion of Russian troops on February 24, 2022, the university and structural units organized work in accordance with the Decree of the President of Ukraine No. 64/2022 "On the introduction of martial law in Ukraine", continuing to work in distance learning format (since the beginning of the COVID-19 pandemic).

The transition to distance learning revealed a number of challenges that have adversely affected the quality and effectiveness of educational activities. The absence of in-person supervision from teachers, which is intrinsic to traditional formats, has reduced opportunities for individual support and timely feedback. At the same time, students are now required to exercise a higher degree of self-discipline, since the lack of a structured timetable and classroom environment often results in procrastination and lower engagement. Technical obstacles, including unstable internet connectivity and audio or video interruptions, regularly disrupt access to course materials and impede communication. Furthermore, the limited social interaction characteristic of remote learning has restricted opportunities for students to exchange ideas, participate in meaningful discussions, and collaborate with their peers, making it more difficult to maintain motivation and active involvement in the educational process.

By order of the rector, a forced vacation was introduced at the university from February 28, 2022, to March 11, 2022.

More than 90% of the university's employees were on site, so they could continue their work.

A number of orders were issued to ensure the life of the university, the safety of employees and students, relevant briefings were held, and work was carried out to protect the infrastructure and communications of the university and dormitories.

Employees and students of the university actively helped Temporarily Displaced Persons (TPPs) with their accommodation in university dormitories. Besides, a volunteer center was opened to provide material assistance to TDPs, donate blood, and collect funds to support the soldiers of the Armed Forces of Ukraine (AFU). Only the Charitable Fund for the Development of the University transferred more than 400,000 UAH to the Armed Forces Support Fund.

The university helped to solve the staff problem in those agricultural enterprises, whose workers entered the Armed Forces of Ukraine, and many other measures were carried out. The university also handed over 6 units of motor vehicles for the needs of the Armed Forces. Thanks to a clear organization, the university staff has been preserved.

Unfortunately, the university suffered material losses. As a result of constant shelling by the Russian occupiers of Nikopol, the educational buildings and dormitories of the separate structural unit of the university, "Nikopol Vocational College of DSAEU," were partially destroyed. Total losses were approximately 6.4 million UAH. Thanks to the sponsorship of the employees of the college, university, and graduates, temporary repairs were made to the damaged roof, windows, and walls of the buildings. However, the danger of destruction remains to this day due to constant rocket attacks on Nikopol.

The educational process continues in distance format on the Moodle platform of DSAEU for the second, third, and fourth year bachelor students. Educational classes were conducted according to the current procedure in the Moodle system of DDAEU using available services for online conferences (Zoom, etc.).

The 1st year bachelor students were educated in the mixed format (online lectures and regular classes in auditoriums).

All levels of students of Veterinary Medicine and Biotechnology faculties continue their education in a mixed format.

The educational services in the conditions of war and distance learning require special approaches. Taking into account the experience, we can offer some recommendations that may be useful in preparing for classes:

- Equal access to education: In wartime, access to education may be limited or difficult. It is important to develop strategies and resources to ensure access to educational services for all students, regardless of their location or circumstances.
- Security and privacy: data security and privacy issues should be taken into account when conducting distance learning. It is advisable to apply security measures, such as data encryption, protection against unauthorized access, and the confidentiality of students' personal information.
- Flexibility: in wartime instability and the possibility of emergency situations. It is important to provide flexibility in curriculum planning and to allow students to adapt to unforeseen circumstances, providing the opportunity to get an education at their own pace.
- Psychological support: In wartime, students may experience stress and emotional difficulties, so you need to provide them with access to psychological counselors or support groups.
- Community Engagement: It is important to create forums, virtual groups, and other opportunities for the exchange of ideas, communication, and support among students, faculty, and administration.

The benefits of returning to full-time education are not limited to the education itself. These are primarily professional, practical, social, psychological, motivational, and scientific advantages. Full-time education contributes to the development of numerous important skills, which are necessary for a student to be a useful and active person in various aspects of an individual's social life.

The main advantages of returning to the usual face-to-face form of education in the post-war period are:

- Interaction in real time. Face-to-face learning provides real-time interaction between students and the teachers, as well as between the students themselves. This is an indispensable opportunity for people who learn better through collaborative activities and group work. Asking questions and receiving answers in real time, receiving immediate feedback, and performing tasks "here and now" create an environment for establishing quality communication between participants of the educational process.
- Improvement of social skills. Attending face-to-face classes improves a number of social skills that everyone needs to be a productive individual in the future. As for collaboration, working in groups is an important part of the traditional learning process, and a lack of collaboration skills can significantly affect the professional competitiveness of students.
- Improvement of organizational skills. Schedules and deadlines require students to be able to organize their time and respect the time and attention of others. Time management skills are the first guarantee of a successful person who must be able to synergize study/work and personal time/family/entertainment.
- Motivation. The traditional atmosphere of educational interaction in the classroom motivates students, in contrast to virtual classes, where "putting it off until tomorrow" has every chance to become a common phenomenon, not only for students but also for teachers. Full-time education creates an instant "here and now" setting for the entire learning process.
- Availability. Face-to-face learning may be the best learning method for those who do not like interacting with ICT or do not have access to technological devices. This advantage, however, in the context of war, is quite questionable. It is also questionable in the time of global digitalization. During the period of martial law, the maximum coverage of the participants of the educational process still takes place in a mixed format, when students can choose the most relevant study option for themselves.

Organization of the educational process and qualitative indicators of students' knowledge

According to the Development Strategy of DSAEU for the period from 2020 to 2025, a high level of the educational process is the main task for ensuring the quality of higher education at the university. The implementation of a student-centered approach in the activities of the university is carried out in order to ensure the proper level of training of specialists, which meets the requirements of higher education standards and the labor market.

Involvement of the employers for the development, periodic review, and implementation of educational programs, the improvement of curricula to increase the share of practical training, and the introduction of a dual form of education at the university took place through a series of events, round tables, memoranda, etc.

Proposals and comments of all stakeholders were taken into account during the updating of educational programs, and the necessary changes were made to the training plans.

Taking into account the wartime and the epidemic situation, the educational process at the university was carried out in different formats: mixed, distance, and dual forms of education.

In 2023, in order to give access to methodical materials for students' self-education, continuous work was carried out to fill and update the library repository with scientific and methodological complexes of disciplines.

About 7.5 thousand users worked in the Moodle distance learning system, including more than 300 scientists and lecturers, 7,200 students, including 5,467 full-time and 1,733 part-time ones. In total, about 3,800 new courses in educational disciplines have been created.

In 2023, the possibility of using the Zoom video communication service was extended for teachers and students of the university on a free basis.

The educational process at the university is organized in accordance with the Constitution of Ukraine, the Laws of Ukraine "On Education" and "On Higher Education", normative legal acts of the Ministry of Education and Science of Ukraine, the Regulation on the Organization of the Educational Process at DSAEU, and other regulatory documents.

The military activities in Ukraine, the movement of students abroad, living close to active hostilities, and the partial lack of communication in 2022-2023, unfortunately, did not contribute to the increase in students' knowledge quality.

Thus, the absolute success rate of students in the university is 80.91% (in the 2020-2021 academic year, this indicator was 94.5%). The main indicator that characterizes the level of assimilation of the studied material is the quality of students' knowledge in academic disciplines. The analysis of the semester results indicates a decrease in the average quality of knowledge among the bachelor's (Fig. 1) and master's (Fig. 2) students.

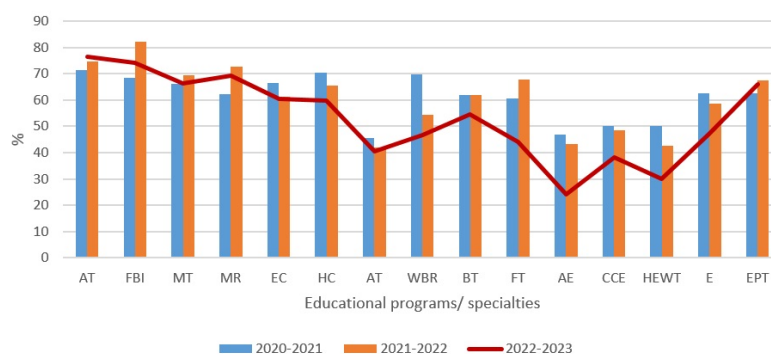


Fig. 1 Qualitative indicators of knowledge of the first (bachelor's) level students.

Note: AT – Accounting and Taxation; FBI – Finance, Banking and Insurance; MT – Management; MR – Marketing; EC – Economics; HC – Horticulture; A – Agronomy; WBA – Water Bio-resources and Aquaculture; BT – Livestock Production and Processing Technologies; FT – Food Technologies; AE – Agricultural Engineering; CCE – Construction and Civil Engineering; HEWT – Hydrotechnical Construction, Water Engineering and Water Technologies; E – Ecology; EPT – Environmental Protection Technologies.

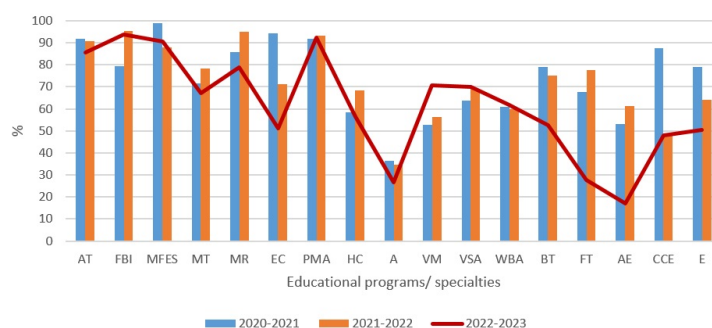


Fig. 2 Fig 2. Qualitative indicators of knowledge of the second (master's) level students Note: AT – Accounting and Taxation; FBI – Finance, Banking and Insurance; MFES – Management of Financial and Economic Security; MT – Management; MR – Marketing; EC – Economics; PMA – Public Management and Administration; HC – Horticulture; A – Agronomy; VM – Veterinary Medicine; VSA – Veterinary Hygiene, Sanitation and Expertise; WBA – Water Bio-resources and Aquaculture; BT – Livestock Production and Processing Technologies; FT – Food Technologies; AE – Agricultural Engineering; CCE – Construction and Civil Engineering; E – Ecology.

Despite the differences in the quality of knowledge between the social, humanities, and natural sciences, in general, it can be argued that the quality of knowledge among bachelors (by 8.5%) and masters (by 12.4%) has decreased.

Practical training of students

The share of students' practical training at the University is from 7% to 27%, depending on the professional direction. Theoretical training share is about 73-93%.

In accordance with types and duration of internships by specialty and educational degree, it can be noted that, on average, internships lasted from 4 to 10 weeks and prevailed in specialties of agricultural sciences and food, as well as engineering and technical direction. The total duration of industrial practices ranges from 4 to 13 weeks and prevails in specialties of agricultural sciences and food, veterinary medicine, engineering, and technical direction.

It can be noted that the share of educational practices for bachelor students is 73% and for master students is 27%. Industrial practical training bachelor students is 55%, and for master students is 45%. The total duration in percentage ratio is ensured by 32% educational and 68% industrial practices. The total number of enterprises where students had practical training is 737 institutions of various types of organization and forms of ownership (Table III-IV). Their number in the 2022-2023 academic year increased by 172 units compared to the previous period.

Table III
Number and types of places for the practical training of students

Type of places for practical training	Number
Societies, agricultural firms, other agribusiness enterprises	340
Private agricultural enterprises	131
Farms	126
State institutions	61
Established basic farms	52
Financial institutions	13
Foreign bases	7
Educational and research farms	4
Research institutions	3
In total	737

Table IV
Basic enterprises by faculties

№ з/п	Type of places for practical training	Faculty*	Faculty*	Faculty*	Faculty*	Faculty*	Faculty*	Faculty*
№ з/п	Type of places for practical training	A	AF	MM	ET	WEE	VM	BT
1	Established basic farms	3	4	4	13	33	6	13
2	Research institutions	1	-	-	-	3	-	2
3	Educational and research farms	1	-	1	-	3	-	2
4	Foreign bases	-	1	1	2	-	2	2
5	Societies, agricultural firms, other agribusiness enterprises	41	61	42	64	31	7	37
6	Private agricultural enterprises	10	5	22	9	13	70	21
7	State institutions	3	6	13	2	17	13	2
8	Farms	41	16	17	10	-	2	21
9	Financial institutions	-	7	-	-	-	-	-
	In total, %	100	100	100	100	100	100	100

Note*: designation of faculties: A – Agronomy; AF – Accounting and Finance; MM – Management and Marketing; ET – Engineering and Technology; WEE – Water engineering and Ecology; VM – Veterinary Medicine; BT – Biotechnology.

During the 2022/2023 educational year, 15 students had internships abroad, including students of the following educational programs: Agronomy, Livestock Production and Processing Technologies; Veterinary medicine; Food Technologies; Management; Accounting and Taxation. The main countries of foreign internships were Italy, Latvia, the Czech Republic, and Germany.

Scientific and innovative activity

The results of the research work of Dnipro State Agrarian and Economic University in 2023 were reflected in the national rankings of higher education institutions, namely: 128th place in the TOP-200 universities of Ukraine in 2023, against 135th place in 2022; 95th place in terms of publication activity in the scientometric database Scopus in 2023, against 108th place in 2022.

In 2023, scientific and pedagogical workers of the university carried out 44 initiatives of scientific research, 6 scientific research projects commissioned by the state, which were financed at the expense of the general fund of the state budget of Ukraine; besides, all research was fundamental.

The amount of scientific research financing from the state budget is shown in Fig. 3

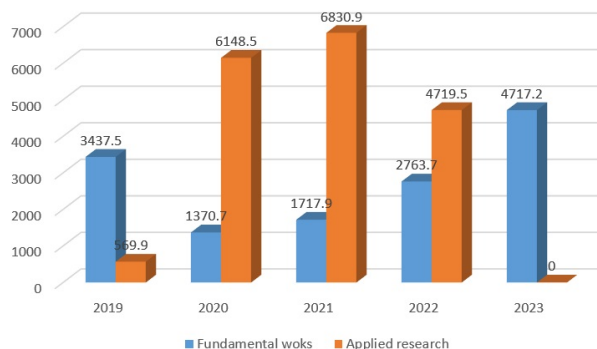


Fig. 3 Volumes of state funding (thousands of hryvnias) of fundamental and applied scientific research in 2019-2023

Commercialization of scientific research is actively carried out through the implementation of contracts for the creation of scientific and technical products. The order of agribusiness and state institutions in 2023 amounted to 1,681.9 thousand UAH. The dominant theme of the contracts is the testing of innovative elements of agricultural technologies and the economic efficiency of their implementation.

The realization of the scientific product "Experimental Field", where new Ukrainian winter wheat, foreign selection and other products are tested, this year amounted to 3,025.2 thousand UAH. The total increase in the financing of scientific and innovative activities of the university, compared to 2022, is more than 30%.

The number of publications that are included in scientometric databases should traditionally be included in the target indicators of the scientific activity of a university. The analysis of the publication activity of scientific and pedagogical workers of DSAEU in the Scopus and Web of Science databases in 2019-2023 indicates a gradual increase in the number of status publications. The number of articles published by university scientists shows a tendency to decrease the achieved level of their number, with a qualitative redistribution in favor of the Scopus database (Fig. 4). After all, as evidenced by the data of DSAEU profile in this scientometric database, 392 authors currently have relevant articles in the Scopus database. It should also be noted the growth of the Hirsch index of our university - from h14 in 2022 to h19 in 2023, which is accompanied by an increase in the rating from 108th to 95th place due to an increase number of citations (<https://osvita.ua/vnz/rating/88976/>)

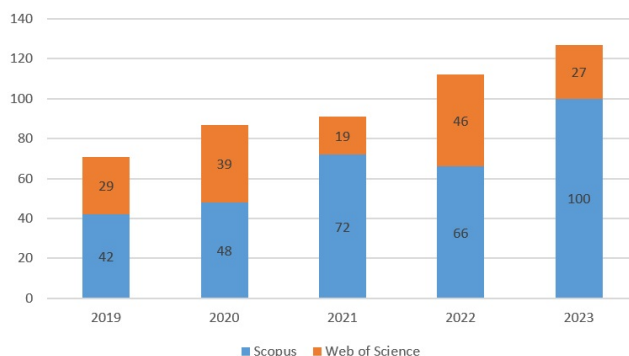


Fig. 4 Publications indexed by the scientometric databases Scopus and Web of Science Core Collection (2019-2023)

In 2023, considerable attention was paid to the development of innovative activities of the university, in particular, more than 30 applications for the issuance of security documents were submitted. In total, 23 utility model patents and 1 invention patent were obtained during the reporting period. It should be noted that this number is much higher compared to 2022, when only 14 innovative developments were patented, including 1 patent for an invention.

In 2023, scientific cooperation with international partners took place under martial law conditions, which complicated the implementation of international mobility programs. At the same time, an important achievement of the university is the commercialization of research in partnership with international organizations. In 2023, two such projects were implemented as part of the Agreements with FAO (laboratory diagnostics and research) and with the Public Union "Rural Women Business Network" as part of the international project WeProsper (Government of Canada), the direction is the development of cooperation and women's entrepreneurship.

University teachers received 19 individual grants for international mobility and 19 grants as part of research teams. Most of the grants were received as part of international cooperation with the Czech University of Natural Sciences in Prague (Table V).

Table V
Examples of international cooperation of DSAEU, 2023

Partner country	Partner institution	Type of cooperation
Spain	University of Cordoba	International academic mobility
Areas: Veterinary Medicine, Business and Administration, Food Processing, Agriculture Spain	University of Girona	International academic mobility Areas: Environmental Sciences, Environmental Economics
Poland	Wroclaw University of Environmental and Life Sciences	Development of academic cooperation within the EU GREEN Consortium
Czech Republic	Czech University of Life Sciences Prague	International project "Increasing the potential of PhD students for qualitative research in Ukraine". Erasmus+ KA1 – International academic mobility

Educational (upbringing) activity

The high-quality training of agricultural sector specialists in Ukraine is closely related to the students' upbringing. The organization of upbringing activities at DSAEU is carried out in the following directions: organizational and methodical work; national, patriotic, and civic education; mass cultural work and aesthetic education; formation of a healthy lifestyle and physical education; moral and legal education; labor and professional education. University identifies and supports gifted student youth, encourages students for achievements in educational and scientific activities, various competitions, Olympiads, sports competitions at the level of faculties or university, as well as at the national and international levels.

The effectiveness of educational (upbringing) activities at the university is determined by the following criteria:

- improvement of social and educational activity of students;
- increasing number of students participating in public, volunteer, and charitable actions.
- increasing number of winners in national Olympiads, in national contests of student scientific papers;
- increasing number of participants in the International Student Professional Creative Competition "Agrarian Sciences and Food";
- increasing the number of participants in national competitions of amateur creativity among higher educational institutions;
- attracting as many students as possible to participate in amateur artistic groups, sports sections, and increasing the creative, sports, and other achievements of students.

The main task is the upbringing of a nationally conscious, harmoniously developed personality based on the acquisition of social and state (national) values (honesty, will, unity, dignity), the formation of patriotism, respect for the Constitution and laws of Ukraine, social activity and responsibility for entrusted state and public affairs, readiness to fulfill the duty to protect the independence and territorial integrity of Ukraine, the observance of European values.

Discussion

Many review and analytical works on the impact of the war on the functioning of universities have been developed mainly by scientists from Ukraine, who quickly accumulated scientific efforts in view of the extreme urgency of the topic and the need to find quick solutions to preserve the educational process, as far as possible in the conditions of war (Gorbatyuk & Polishchuk, 2022). As for foreign research, which considers the functioning of universities during the war, such scientific works mostly relate to the time of the Second World War, so they are completely outdated. However, some of the basic ideas expressed in those publications are still universal. For example, after World War II, American higher education expanded rapidly and became an engine of opportunity and a model for the world. In particular, legislation that funded the education of military personnel and people affected by the war played a large role, which immediately brought income to colleges and universities that were stagnant during the war (Tierney, 2021).

Social assistance to military personnel is an important and necessary component of the state's social policy. Military personnel perform important functions to ensure the national security and defense of the country, and therefore should have the support of the state in cases where they need assistance. In the context of the war in Ukraine, social assistance to servicemen is of particular importance. In these conditions, servicemen and their family members need additional support and assistance. Education is another aspect of welfare that is of great importance to military personnel and their children. Providing access to quality education, including general secondary education, higher education, and vocational training, aims to help military personnel and their families secure a stable future after war (Viktorova, 2023).

The case of Najran University, which transitioned to fully remote instruction during the conflict involving Saudi Arabia, the Arab coalition, and Yemeni rebel groups, offers insight into the viability of distance education in crisis conditions. Research findings from this context suggest that online modalities can serve as a functional substitute for traditional classroom instruction, with no statistically significant differences in educational outcomes observed between the two approaches. Nevertheless, our own observations indicate that prolonged reliance on distance

learning may not fully replicate the benefits of in-person interaction, particularly in war-affected regions (Rajab, 2018). However, our data, as well as findings from Ukraine and other Eastern European contexts, suggest that the lack of live communication and direct interaction continues to negatively affect student motivation and learning outcomes, particularly over prolonged periods of remote education (Chykalova & Yukhno, 2023; Mylostyvyi et al., 2024). This finding is consistent with the conclusions of Barrios et al. (2022) and Bassleer et al. (2025), who highlight the persistent digital divide and limitations of distance-only models in ensuring educational quality and student engagement.

Despite the ongoing challenges of war, the outlook for higher education in Ukraine remains optimistic. Universities in cities such as Kyiv, Dnipro, Cherkasy, Poltava, and across western regions have maintained their academic capacity and institutional integrity. Looking ahead, strategic allocation of resources will be essential for universities to re-evaluate their priorities and invest in forward-looking scientific fields. Importantly, Ukrainian higher education has preserved a significant reserve of intellectual capital, as most faculty members have chosen to remain in the country, driven by a sense of patriotism and personal duty—reinforced, in part, by wartime regulations restricting the departure of men of military age. The continued presence of a large proportion of students within Ukraine further supports the long-term competitiveness of its higher education system (Kozinchuk et al., 2022). These observations align with recent reports from other conflict-affected regions, such as Sudan and Gaza, where universities' resilience depends on both institutional commitment and adaptive policy measures Abusamra (2024) and Mahgoub et al. (2024).

Nevertheless, the challenge of sustaining meaningful live communication during extended periods of distance education has become increasingly pronounced, not only in general schools but also within higher education institutions. Genuine engagement between instructors and students remains crucial for fostering collaborative problem-solving, enhancing communication skills, and cultivating an active approach to learning. Consistent with Chasciar et al. (2025), our findings suggest that ongoing psychological strain and diminished peer interaction are major obstacles to the success of emergency online instruction, particularly during prolonged disruptions.

Future research in the sphere of remote education should focus on equipping faculty for blended teaching formats and adopting innovative, interactive methodologies (Chykalova & Yukhno, 2023). This recommendation is aligned with international evidence highlighting the necessity for targeted professional development and sustained investment in digital technologies as essential elements of institutional resilience (Barrios et al., 2022; Howard et al., 2024).

We consider the most effective format for obtaining educational services in extreme conditions is mixed forms of education, which are also known as "blended learning". This format combines elements of traditional learning in educational institutions with the use of information technologies and online resources. It involves conducting lectures, creating and discussing joint projects, organizing practical classes and independent work, interacting with the teacher or fellow students through virtual platforms and tools, etc. (Chykalova & Yukhno, 2023; Mylostyvyi et al., 2024).

Blended learning plays a significant role in the active interaction between students and teachers. It motivates joint problem solving, discussion of proposed ideas, group work, and joint learning. This approach promotes the development of communication skills and an active position in acquiring knowledge. Empirical research from recent years demonstrates that blended learning models are more likely to support student engagement and academic achievement during disruptions than purely remote or traditional modalities (Bassleer et al., 2025; Nasir et al., 2024).

Unfortunately, the system of adequate evaluation methods, taking into account all possible aspects of work and training conditions, remains a painful problem.

Blended learning has great potential to improve the quality of education and ensure the flexibility of learning. However, it requires planning, preparation, and improvement of educators themselves. Innovative approaches and constant readiness for changes are important success factors in the organization of blended learning (Chykalova & Yukhno, 2023; Nasir et al., 2024).

However, we note that in many ways this depends precisely on the balance and quality of the educational process in the format that will maximally correspond to the dominant priority of preserving human lives, the health of the participants, and the completeness of the educational process.

The main advantage of the distance learning format is physical security of the participants of the educational process, however, the obvious psychological consequences of war, such as post-traumatic syndromes, depression, nervous disorders make it impossible for many people to return to a peaceful and productive life, perhaps even for a long time, which can affect a whole generation of Ukrainians, from children to the elderly (Gorbatyuk & Polishchuk, 2022). Similar patterns have been documented in studies of Syrian and Palestinian youth, where forced migration and exposure to violence are associated with long-term mental health risks and educational setbacks (Goto et al., 2025; Hasan & Buheji, 2024; Morrice, 2022).

Implications

This study contributes to the theoretical literature by illustrating the multifaceted nature of resilience in higher education under conditions of war. The Ukrainian experience demonstrates that institutional adaptation is driven by a combination of leadership commitment, flexible pedagogical approaches, and targeted support for students and staff. Practically, the findings underscore the necessity of ongoing professional development for educators, strategic investment in technology, and the establishment of robust support systems for mental health. At the policy level, our

results highlight the importance of sustained government funding, adaptive crisis-management frameworks, and inclusive policies that prioritise the well-being and future employability of graduates. These implications are relevant not only for Ukraine but for other higher education systems facing crisis conditions worldwide (Howard et al., 2024; Robinson & Laycock Pedersen, 2021).

Future research should further investigate the long-term impact of war-induced trauma on educational attainment and institutional performance, as well as the role of blended and adaptive learning models in supporting student and staff resilience in diverse contexts (Bassleer et al., 2025; Chykalova & Yuhno, 2023).

Conclusion

Since war is, in any case, a temporary phenomenon, and the value of human life is dominant in the modern axiological paradigm, the main feature of the functioning of higher educational institutions in the conditions of a large-scale armed conflict and the unpredictability and cruelty of the enemy's actions, in particular towards the civilian population, is the balancing between all factors of the educational process in such a way that the safety of all participants of educational process is a prerogative.

Among all levels of education, higher educational institutions have the greatest scope for the variability of learning models in view of the conscious age of the students, their focus on the result. Distance learning has demonstrated an unprecedented alternative to face-to-face interaction during the covid crisis and in the early stages of the war, when education was not ready for classroom learning in such a way as to guarantee the safety of students, teachers, and administration.

With the prolongation of the crisis period for an indefinite period, it also becomes obvious that practical skills, which are determined by narrow professional specialization, cannot be acquired during the distance form of education. It is also necessary to take into account the fact that during the academic period, universities are limited in time. If we take into account that the quarantine measures in Ukraine began in March 2020 and lasted almost the entire time until the start of the war, many students became graduates or completed most of their educational and professional programs. It is obvious that this will affect the quality of their professional training and readiness to start working in their specialty immediately after receiving their diplomas.

Limitations

This study is subject to several limitations. First, the analysis is based on a single case study of Dnipro State Agrarian and Economic University, and findings may not be fully generalisable to all higher education institutions in Ukraine or other contexts. Second, data were derived exclusively from official annual rector reports, which, while comprehensive, may omit certain informal or less-documented adaptation processes and challenges experienced at the departmental or individual level. Third, the absence of direct survey or interview data restricts the ability to capture the subjective experiences of students and academic staff during the war.

Future research directions

Future research should expand to include multi-institutional comparative studies to assess the generalisability of these findings across the Ukrainian higher education sector and beyond. Further, mixed-methods approaches incorporating surveys and in-depth interviews with students, faculty, and administrators are needed to explore personal experiences, challenges, and adaptive strategies in greater detail. Longitudinal research will also be valuable for evaluating the long-term consequences of war-induced disruptions on professional competencies, mental health, and career trajectories of graduates.

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