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The education system under wartime conditions: challenges, adaptation strategies, and development prospects for civilian and military education in Ukraine (2022–2025)

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Abstract. The education system transformation amidst russia's large-scale war against Ukraine is a strategic adaptation to wartime conditions, encompassing structural, content,

infrastructural, human resources, psychological, and legal changes. The main objective is to ensure educational continuity, prepare personnel for the defence sector, and preserve the country's intellectual potential.

The article examines the key areas of education transformation, including:

- Organisational and structural transformation: the shift to joint and remote learning, reserving alternative educational bases, and establishing mobile educational centres
- Content transformation: updating curricula, introducing basic military training, and integrating militar and patriotic education.
- Infrastructural and technological transformation: digitisation of education, the use of VR/AR technologies in military education, and the reconstruction of educational facilities.
- Human resources transformation: retraining educators and enhancing qualifications for teaching in wartime conditions.
- Psychological and social transformation: implementing emotional and psychological support, inclusive educational initiatives, and social adaptation for students and educators.
- Legal and regulatory transformation: adapting educational legislation, expanding academic mobility, and international integration of education.

The article also examines the key challenges faced by Ukraine's education system, including the destruction of educational institutions, the mass forced displacement of students, pupils, and educators, the transition to remote learning, the deterioration of participants' psychological well-being, and the need for basic military training.

The research confirms that effective education transformation during wartime is only achievable through an integrated approach, strategic government management, and the adoption of innovative solutions focused on ensuring learning quality, preparing human resources for the security and defence sector, and establishing a resilient educational network capable of responding to modern threats.

Keywords: education under wartime conditions, military education, educational institutions, remote learning, psychological effects of war, educational reforms, basic military training, education transformation.

Introduction

The large-scale aggression launched by the russian federation against Ukraine in February 2022 posed an existential challenge to all sectors of public life, including the national education system. Transforming the educational structure during wartime is a key factor in understanding the changes within educational systems during global crises. With the onset of aggression, the educational network in both civilian and military sectors underwent significant changes, reflecting not only the consequences of hostilities but also shaping strategy for national security and defence.

The educational process has undergone significant transformations in both the civilian and military sectors. Since the onset of the large-scale invasion, 3,798 educational institutions have been affected, with 365 completely destroyed. These destructions have not only deprived thousands of children, students, and cadets of the opportunity to study in normal conditions but have also posed new challenges for the educational community in terms of adapting and restoring the learning process [1, 4].

A scientific analysis of changes in Ukraine's educational infrastructure between 2022 and 2025 highlights key issues and mechanisms of transformation arising from the wartime conditions. It is also crucial to note that these changes must ensure not only the continuity of the educational

process but also the strengthening of national security through military training adapted to the realities of war.

In wartime, it is clear that traditional approaches to education management can no longer fully meet modern demands. The ongoing changes are a response to external threats, and only an integrated approach — particularly through the integration of civilian and military education — can guarantee the resilience and adaptation of national education. This analysis focuses on understanding the root causes of these changes and identifying specific levers to ensure maximum effect in both the short and long term.

The war has presented unprecedented challenges to Ukraine's educational system, necessitating the consolidation of efforts from state authorities, the educational community, and international partners to maintain the continuity and quality of education under martial law.

The relevance of this research lies in the need to assess the impact of military actions on the accessibility and quality of education for Ukrainian schoolchildren, students, and cadets, as well as on the reform of military education under martial law. The results of this analysis could provide a foundation for developing strategies to adapt and develop the national educational model in wartime conditions.

The aim of this research is to examine the war's impact on the education levels of Ukrainian schoolchildren and students from 2022 to 2025, analyse the transformation of the educational process in Ukraine's military training institutions, and assess key changes, adaptation strategies, and prospects for the education system's development under martial law.

Methodological Framework

The transformation of the education system during wartime is a multifaceted process, involving a wide range of theoretical approaches, methods, and concepts. In wartime, the educational landscape undergoes profound changes, reflecting new demands for human resources training in both civilian and military sectors. To analyse these changes, several theoretical approaches must be considered, including the methodological approach, the concept of education as part of national security, and strategies for adapting educational structures to wartime realities.

1. Systemic approach to education as a foundation for understanding transformational processes. The systemic approach posits that any educational system is a complex organism, made up of interconnected elements — from students and teachers to educational institutions and state authorities. In wartime, these elements are influenced by both external and internal factors, necessitating not only operational changes but also a profound reorganisation of the entire educational process. A key aspect of this approach is analysing the interconnections between different education sectors and their adaptation to new conditions, particularly in the context of military aggression.

2. Concept of adaptation and flexibility in educational structures. As war imposes limitations on traditional forms of learning, the concepts of adaptation and flexibility within educational structures become essential. Legislative changes, such as the use of distance learning technologies, online education, and mobility for students and staff, form part of the strategy for swiftly adapting education to new realities. Legislative acts, including amendments to the Ukrainian Law "On Education" and other regulatory documents, establish the legal framework for ensuring the continuity of education during wartime.

3. Application of empirical and theoretical methods. A thorough analysis of changes in education, particularly in wartime conditions, requires both theoretical research methods (such as analysis of political speeches, review of legal acts, and government strategy assessments) and empirical methods (such as surveys, expert interviews, and monitoring the implementation of new educational practices). These methods allow for evaluating not only the effectiveness of current

changes but also for identifying the underlying causes of the challenges educational systems face in wartime.

Thus, the theoretical framework of this research facilitates a deeper understanding of the mechanisms behind the transformation of educational processes in Ukraine during wartime and helps to identify strategic directions for ensuring the effective operation of educational models in complex geopolitical and military contexts.

The theoretical foundation of this article draws on the works of both domestic and international scholars studying the impact of crisis situations on educational structures. In particular, Cedos research [1] examines the challenges and prospects for higher education in Ukraine during wartime, alongside a briefing by the Ministry of Education and Science of Ukraine based on the study "War and Education: Two Years of Full-Scale Invasion" [2]. Legal and regulatory acts that govern the organisation of education under martial law are also considered, including the Regulation on the Specifics of Organising the Educational Process at Higher Military Educational Institutions of the Ministry of Defence of Ukraine [3]. For problem formulation and conclusion development, scientific works by domestic researchers in military education, such as O. Verbovenko [11, 19, 21], Ye. Romanenko [11, 17, 19, 20], and V. Kyrylenko [11], were consulted. In developing proposals based on the research findings, the works of V. Hurkovskyi [12, 16, 17–21], L. Semenenko [12, 16, 21], Yu. Dobrovolskyi, and I. Tkach [16] were also referenced.

Results and Discussion

The transformation of the education system during the russian federation's large-scale war against Ukraine is a purposeful, integrated process involving profound structural changes in both civilian and military education. This is driven by the need to adapt to the crisis conditions of wartime, ensure learning continuity, prepare human resources for the defence sector, and preserve the nation's intellectual potential. It entails a strategic shift in educational approaches, technologies, management models, and legislative norms to optimise the effectiveness of the educational process, considering the realities of wartime.

Examining the key components of the education system transformation under wartime conditions and outline their content:

1. *Organisational and structural transformation.*

• Transitioning participants in the educational process to joint and remote learning formats. Education adapts to conditions of danger, blackouts, and the large-scale migration of those involved in the educational process.

• Reserving alternative educational bases, establishing mobile educational centres, and relocating key educational institutions to safer areas within the country. Organisational and structural transformation also includes optimising the network of educational institutions, such as through the closure or merger of establishments.

2. *Content transformation in education*

• Curriculum updates. Incorporating new mandatory subjects into the educational process, particularly basic military training.

• Transition to a competency-based model. Shifting the focus to practical skills, critical thinking, adaptability, and resilience.

• Integration of military and patriotic education. Promoting a strong national identity and preparing youth for active involvement in the defence of the state.

3. *Infrastructure and technological transformation.*

• Reconstruction and protection of educational facilities, alongside the construction of bomb shelters and protective structures.

- Digitalisation in education. Widespread adoption of online resources, adaptive learning platforms, and artificial intelligence.
- Integration of VR/AR technologies into military education.

4. *Human resources transformation.*

- Expansion of qualification requirements for educators. The need for additional training in crisis psychology and teaching methods in wartime conditions.
- Retraining of teaching staff. Equipping them with new competencies essential for effective work during wartime.

5. *Psychological and social transformation.*

- Psychological support models. Introduction of rehabilitation and support programmes for students, cadets, and educators.
- Inclusive educational initiatives. Expanding learning opportunities for military personnel, veterans, and internally displaced persons.
- Social adaptation programmes. Supporting the return to education for those who have served in the Armed Forces of Ukraine or lost access to education due to the war.

6. *Regulatory and legal transformation.*

- Educational legislation adaptation. Amendments to laws on remote learning, certification, and simplification of military personnel admission procedures.
- International integration of education. Aligning Ukraine's education system with European standards and those of NATO member countries.
- Academic mobility expansion. Creating opportunities for Ukrainian students and military personnel to study at foreign educational institutions.

The transformation of education during wartime is not simply an adaptation but a complete rethinking of education's role in times of crisis. War imposes new demands on specialist training, particularly in the military sector, driving the search for unconventional solutions to maintain education quality and ensure national security through education.

The challenges encountered by both civilian educational institutions and military training institutions during wartime are to discuss next.

1. Damage and destruction of educational institutions, including military training facilities. One of the most significant challenges facing Ukraine's educational infrastructure is the widespread destruction of educational facilities. As of 2nd September 2024, russian aggression had led to **3,798** educational institutions being bombed and shelled. Of these, **3,428** were damaged, and **365** were completely destroyed [4]. These figures highlight the scale of the destruction to educational infrastructure caused by the conflict. This includes both civilian schools and higher education institutions, including military academies, severely disrupting the training process for cadets and students. Nearly **400** educational institutions in Ukraine have been entirely destroyed due to the war, with one in seven schools suffering damage.

Official reports from the Ministry of Education and Science of Ukraine indicate that by August 2022, more than 60 higher education institutions in Ukraine had been partially or entirely destroyed. Considering the vital role of military education in maintaining the country's defence capacity, the destruction of military training institutions represents a particularly severe issue that demands a comprehensive approach to rebuilding infrastructure and optimising the training process [3].

Experts estimate that restoring Ukraine's educational infrastructure will cost nearly 14 billion US dollars. However, some of the damaged institutions are beyond repair. The destruction of educational infrastructure severely disrupts access to education for children and young people, impacting the quality of their learning, socialisation, and integration into society.

2. Mass forced displacement of educational participants. During the war, a large number of students, cadets, and educators were compelled to leave their educational institutions due to threats to their safety and lives. According to official figures, more than 3 million people, including over 500,000 students and cadets, have become internally displaced, complicating their learning process and adaptation to new conditions. The change in both their place of study and residence has significantly affected the psychological wellbeing of those involved in education, particularly their ability to concentrate on learning and adjust to new circumstances. These statistics are supported by United Nations reports and official data from the Ministry of Education and Science of Ukraine, which detail the scale of student and educational staff displacement. Information on displaced persons can be accessed through the International Organisation for Migration [5].

Approximately 1.8 million children have left Ukraine, with 2.5 million becoming internally displaced. Furthermore, 23,000 educators have fled the country [1].

The ongoing conflict has caused widespread displacement, including among students. According to Human Rights Watch, millions of children have been forced to abandon their homes, severely disrupting their education [7].

According to data published on the "Education.UA" website, around 40% of students from eastern Ukraine and 30% from the south were forced to leave the country or relocate to other regions due to the ongoing conflict [8].

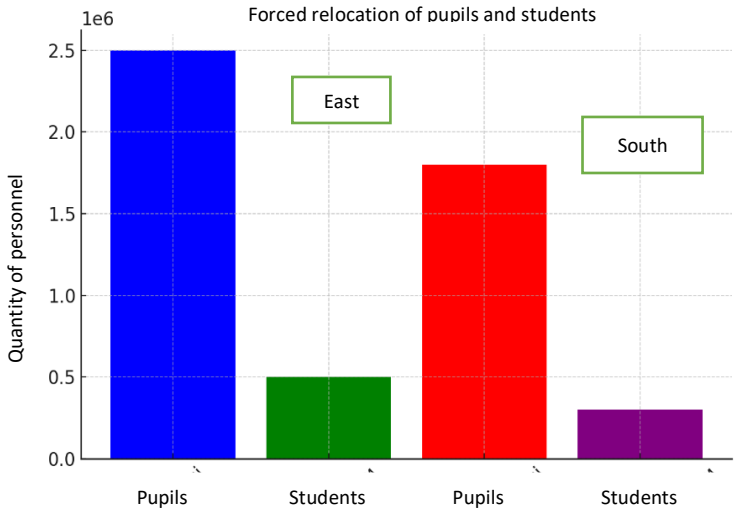


Figure 1. The number of forcibly displaced students in Ukraine

This histogram illustrates the scale of forced displacement of students in Ukraine during the war. A significant number of students from the east and south of the country were forced to change their place of residence, impacting their access to education and adaptation to new conditions.

3. Transition to remote and joint learning. To ensure continuity in the educational process, educational institutions in Ukraine were forced to rapidly transition to remote and joint learning. Given the various circumstances participants in the educational process found themselves in, the shift to online formats became not only a necessity but also a demand of the time. According to data from the Ministry of Education and Science of Ukraine, by the first half of 2022, over 80% of the country's educational institutions had adapted their curricula to remote learning formats.

However, this process has not been without challenges, particularly due to inadequate technical equipment in some educational institutions and the low digital literacy of certain

participants, requiring significant investment in infrastructure. At the same time, the destruction of educational infrastructure and the forced displacement of participants led to reduced education accessibility. The shift to remote learning exposed both advantages and drawbacks, including unequal access to the internet and technical resources. The adoption of digital technologies has become essential. The Ministry of Education and Science of Ukraine is actively pursuing the digital transformation of the educational process. According to the Ministry's data, over 1 billion UAH were allocated in 2022 to support remote education [3].

Due to security risks, most educational institutions switched to remote or joint learning, requiring swift adaptation from both students and educators [8].

Research by the Cedos Analytical Centre shows that, as of December 2022, 36% of schools in Ukraine operated in a joint format (combining remote and in-person learning), another 36% were fully remote, and only a small proportion of schools could offer in-person lessons [1].

This histogram shows the distribution of learning formats in educational institutions during the war. Most institutions shifted to remote or joint learning due to security risks and infrastructure damage. This change necessitated quick adaptation to new learning conditions by both students and teachers.

4. Educational participants' psychological well-being and mental health. Under wartime conditions, psychological well-being became a significant concern for those involved in the educational process. Stress from combat, the threat to life, and the need to adapt to new learning conditions have greatly impacted the mental health of students, cadets, educators, and pupils. A study by Kyiv National University found that over 70% of educational participants exhibited signs of stress and psycho-emotional disorders. This highlights the need for a comprehensive approach to psychological support and the development of mental health programmes within educational institutions. Numerous psychological support initiatives have been introduced in Ukraine, particularly at universities specialising in psychological assistance. Information about these programmes can be found on the official websites of the National Psychological Association of Ukraine [6].

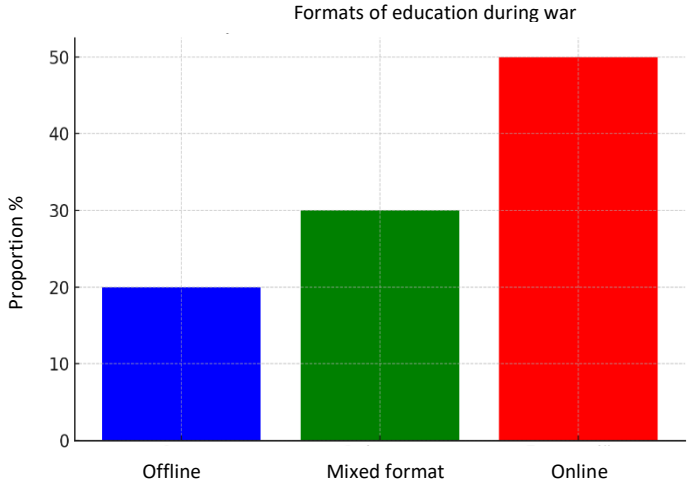


Figure 2. Learning formats in educational institutions of Ukraine during the war

Constant stress and danger have had a detrimental effect on students' and educators' mental health, requiring the implementation of psychological support programmes [1]. According to a Reuters study, the number of children in need of psychological support tripled by 2024 [9].

This histogram (Fig. 3) shows the heightened stress levels among students and teachers during the war. Ongoing threats, changes to the learning process, and uncertainty about the future have negatively impacted the psychological well-being of those involved in education, emphasising the need for an integrated approach to psychological support within educational institutions.

It is therefore clear that the establishment of psychological support centres for educational participants should be a priority for state policy.

5. Introduction of basic general military training (BGMT) and the military education reform. Military education in Ukraine is undergoing significant transformation to meet new requirements for defence strategy and national security. Traditionally, military education has played a key role in officer training; however, the threats posed by modern warfare now require a reassessment of training methods for both military human resources and civilians. This initiative aims to build a mobilisation reserve and enhance overall societal readiness for defence. Similar programmes are already in place in countries such as Israel, Switzerland, and the Baltic states, which help to form a highly motivated reserve force and strengthen national resilience.

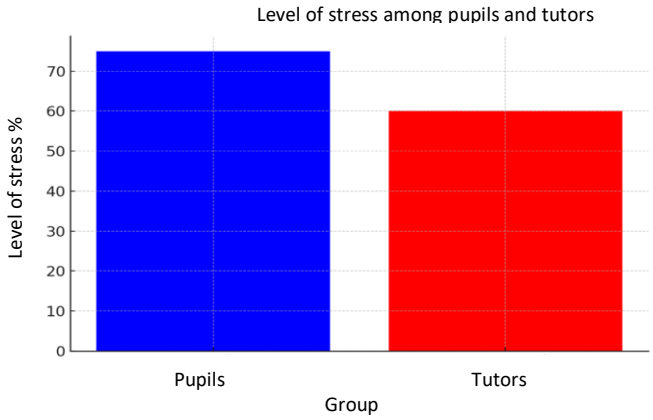


Figure 3. Students' and educators' stress level under wartime conditions

The introduction of BGMT continues to spark debate within the educational community, among students, and parents regarding the necessity of mandatory military training for all. The absence of a clear, unified model for programme implementation, the definition of training module content, and the allocation of workload between theory and practice complicate the reform's execution. Additionally, the introduction of BGMT requires considerable financial investment: in the development of material and technical infrastructure, training qualified instructors and teachers, and providing appropriate educational equipment, including modern simulators, training devices, and weapon models.

At the same time, modernising the military education system and training institutions is essential, including the development of new programmes that meet the demands of modern warfare. It is important to note that the challenges facing military education are a central concern for the country’s political leadership. For example, Ukrainian Defence Minister Rustem Umierov announced the launch of a survey in the Army+ app to gather suggestions from service members on improving the National Academy of Land Forces named after Petro Sahaidachny. The results of this survey became a key reference point for systemic reforms at this vital military educational institution in Ukraine [14].

From a public administration perspective, this approach reflects a desire to integrate public opinion into the military education reform process. It is a significant step towards establishing feedback between government bodies and military human resources. This not only ensures the

consideration of the needs of those directly involved in the educational process and the adaptation of the system to the modern challenges of war but also makes such interaction essential for ensuring the effectiveness of educational reforms. Furthermore, it promotes the development of adaptive strategies in military education, which plays a crucial role in transforming the education system in Ukraine during the war.

Statistical data on military education reform in Ukraine during the war is limited. However, it is clear that the war has required modernisation of training programmes for military specialists, integration of modern technologies and simulators into the educational process, and increased cooperation with international partners to enhance the quality of military education [10].

Figure 4 illustrates the main directions for reforming military education in Ukraine during the war. Updating curricula, implementing modern technologies, and expanding international cooperation aim to enhance the effectiveness of military training in line with the current needs of the Armed Forces of Ukraine.

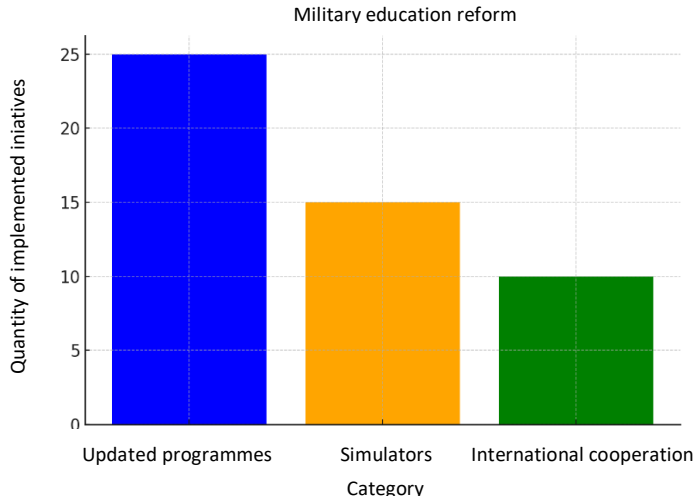


Figure 4. The main directions of the military education reform in Ukraine during the war

The need for rapid adaptation (updating) of military training programmes to the realities of modern warfare is clear. However, bureaucracy and outdated approaches are hindering progress.

6. Adaptation of legislation and structural changes. Legislative reforms have become a key aspect of transforming the national education network during the war. Laws regulating the education system have been adjusted to new realities, notably through amendments to the Law of Ukraine "On Education," which allow remote learning, protect the rights of displaced persons, and facilitate the repurposing of educational institutions. However, despite these changes, the legislative adaptation process remains slow and often fails to keep pace with the rapid developments taking place.

Regarding structural changes, the Ministry of Education and Science of Ukraine is working to optimise the structure of higher education institutions, particularly by consolidating universities and reducing separate units within institutions that lack the necessary technical infrastructure to conduct research and provide quality educational services.

Thus, the challenges faced by the national education system in the context of full-scale war are complex and multifaceted. These challenges include not only material losses but also issues such as psychological support for those involved in the educational process, adaptation to new educational formats, and the need to integrate innovative technologies into education.

A methodological approach to resolving these issues requires a conceptual framework, including changes to legislation, infrastructure development, and reforms in military education.

Conclusion

We fully agree with the domestic researcher Savytsky M.V., who rightly pointed out that the war has exacerbated existing problems and outdated issues in education, which we had been grappling with long before its onset. We must now address both old and new challenges, as time to correct mistakes and seek new strategies is rapidly diminishing [13].

russian aggression has fundamentally reshaped approaches to education in Ukraine. In wartime, the educational process has undergone significant transformations, aimed at adapting to new realities and ensuring the continuity of learning.

The war has acted as a catalyst for rethinking and reforming many areas, education included. Successful transformation in education is only possible through a comprehensive approach, combining public governance, civic initiative, and international support. Technological warfare requires new methods for training military human resources. The evolving nature of military operations, the introduction of new technologies, and modern combat techniques demand the integration of innovative training technologies, such as immersive simulators and simulation complexes, which create realistic conditions for military preparation. In short, military education must adapt to the realities of modern warfare, incorporating combat experience, the latest technologies, and psychological training. In the field of military education, the harmonisation of educational programmes with NATO standards is set to be completed. Civilian education, on the other hand, requires large-scale digitalisation, updates to teaching methodologies, and improvements in digital literacy.

Throughout Ukraine's history, there have been moments when education acted as the light guiding the nation out of darkness. Take, for example, Vasyl Sukhomlynskyi, who, during the Second World War, despite all the hardships, worked tirelessly to rebuild destroyed schools, strengthen their material and technical foundations, and teach children, believing that education was key to the nation’s revival. Today, we face a similar challenge. We cannot afford to lose an entire generation due to bureaucracy, negligence, waiting for decisions from above, or relying on Western aid to restore educational institutions.

Let us be clear: restoring educational institutions, advancing education, and building the nation’s intellectual potential are strategic priorities for us, Ukrainians. The future of the state depends on our education, critical thinking, and scientific capacity. While international partners offer support, the true responsibility for developing a strong, competitive education system lies with us. Only we can ensure that Ukraine not only recovers but becomes an equal, not dependent, player on the world stage.

Recommendations

To ensure the effective transformation of education in wartime, the following steps are necessary:

1. **Comprehensive restoration of educational infrastructure.**
    - Rebuilding destroyed educational institutions must become a strategic national policy priority. A structured approach should be taken to implement modular solutions for temporary learning spaces, alongside utilising international funds and state investments to rapidly restore critical educational institutions.
    - Restoration of military educational institutions should take priority, as their functionality directly impacts the nation's defence capabilities.
2. **BGMT implementation as part of education modernisation.**

- Preparing young people for state defence, fostering a conscious and responsible society ready to resist any aggressive actions against Ukraine.
- An integrated approach to using combat simulation modelling, virtual trainers, and tactical simulators.
- Introduction of educational programmes that incorporate combat experience in Ukraine, analysing both successful and unsuccessful military operations.

3. Psychological support and rehabilitation for educational process participants.

- Integration of psychological support programmes for students, pupils, teachers, and service members in training.
- Military educational institutions should include courses on adapting to combat stress and building psychological resilience in wartime within their educational programmes.

4. Development of remote and adaptive learning models.

- Creation of digital platforms to enable continuous learning, even in areas without physical access to educational institutions.
- Use of artificial intelligence for personalised learning, allowing educational programmes to be tailored to the specific needs of each student or cadet.

5. Changes to legislation and management structures.

- Adapting legislation to wartime conditions, particularly regarding regulatory support for mobile learning, recognition of non-formal education, and simplified certification procedures.
- Modernisation of management structures within military education.

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