

The Experience of Using Innovative Technologies in the Training Process of Military Pedagogical Personnel

Досвід використання інноваційних технологій у процесі підготовки військово-педагогічних кадрів

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Purpose. To scientifically analyze the theoretical foundations and practical experience of using innovative technologies in the training process of military pedagogical personnel and to evaluate their effectiveness.

Method. The methodological approach of the article is based on the analysis of existing scientific literature, the comparative analysis of international and national military education practices, and the application of observation methods in pedagogical practice.

Theoretical implications. The study revealed that the integration of innovative technologies into the training process enhances the flexibility of pedagogical models and approaches, thereby renewing traditional concepts of military education. This approach contributes to the creation of an adaptive, interactive, and learner-centered training environment that supports the development of cadets' knowledge, skills, and competencies. At the same time, from a theoretical perspective, the use of artificial intelligence, simulation, and digital resources lays the foundation for new methodological directions in the advancement of military pedagogy.

Practical implications. Cadets who engage with simulation and virtual reality technologies adapt more rapidly to real combat conditions and develop their decision-making skills. Through e-learning platforms, military pedagogical personnel can continuously update their knowledge and construct individualized training trajectories. Artificial intelligence-based analytical systems identify the strengths and weaknesses of participants in the training process, thereby creating more effective learning opportunities. At the same time, the application of innovative technologies enhances the operational efficiency of training and fosters the consolidation of officers' teamwork, leadership, and strategic planning skills.

Value. This article systematizes the theoretical and practical foundations of innovative technologies in the training process of military pedagogical personnel, thereby creating a methodological basis for future research and applications.

Paper type. Empirical.

Мета дослідження. Провести науковий аналіз теоретичних засад і практичного досвіду застосування інноваційних технологій у процесі підготовки військово-педагогічного персоналу та оцінити їхню результативність.

Метод дослідження: Методологічний підхід ґрунтується на аналізі сучасної наукової літератури, порівняльному вивченні міжнародних та національних практик військової освіти, а також на використанні методів педагогічного спостереження.

Теоретична цінність дослідження. Дослідження засвідчує, що інтеграція інноваційних технологій у систему підготовки підвищує варіативність і гнучкість педагогічних моделей, модернізуючи традиційні концепції військової освіти. Це забезпечує формування адаптивного, інтерактивного та студентоцентричного освітнього середовища, яке сприяє розвитку знань, умінь і компетентностей майбутніх офіцерів. Одночасно використання штучного інтелекту, симуляційних систем та цифрових ресурсів формує підґрунтя для нових методологічних підходів у розвитку військової педагогіки.

Практична цінність дослідження. Залучення курсантів до роботи із симуляційними технологіями та засобами віртуальної реальності прискорює їхню адаптацію до умов, наближених до бойових, і розвиває навички прийняття рішень. Платформи електронного навчання забезпечують можливість безперервного підвищення кваліфікації військово-педагогічного персоналу та формування індивідуальних освітніх траєкторій. Аналітичні системи, побудовані на технологіях штучного інтелекту, дають змогу ідентифікувати сильні та слабкі сторони учасників освітнього процесу та підвищувати ефективність навчання. Використання інноваційних технологій також підсилює оперативність підготовки та сприяє розвитку командної взаємодії, лідерства й стратегічних управлінських компетентностей офіцерів.

Цінність дослідження. Стаття системно узагальнює теоретичні та практичні засади застосування інноваційних технологій у підготовці військово-педагогічного персоналу, формуючи методологічну основу для подальших досліджень і практичного застосування.

Тип статті. Емпірична.

Key words: military pedagogical personnel, innovative technologies, training process, digital transformation, professional development.

Ключові слова: військово-педагогічний персонал, інноваційні технології, навчальний процес, цифрова трансформація, професійний розвиток.

Introduction

In the contemporary system of international relations, the constant transformation of the security environment, the dynamics of regional conflicts, the rise of hybrid warfare, and the integration of advanced technologies into the arsenal of armed forces necessitate new approaches to traditional models of military education. Under these conditions, the training of military pedagogical personnel should not be limited to the transmission of theoretical knowledge but must also ensure the development of practical skills that prepare service members for modern combat environments. Particularly, wars and local armed conflicts of the 21st century have demonstrated that officers familiar with technology achieve greater success in rapid decision-making, strategic planning, and team leadership.

A striking example of this was Azerbaijan's victory in the 44-day Patriotic War of 2020, which vividly demonstrated the role of technology in modern military operations. The effective use of UAVs and other high-tech systems was not only a matter of technical superiority but also the result of the training of highly qualified military personnel capable of operating such technologies. Therefore, the integration of innovative technologies into the training of military pedagogical personnel carries strategic importance for ensuring national security.

The purpose of this article is to investigate the theoretical foundations of employing innovative technologies in the training process of military pedagogical personnel, to analyze practical examples based on Azerbaijani and international experiences, and to scientifically substantiate effective application opportunities derived from the results.

The relevance of this research lies in the fact that the changing requirements of modern warfare demand the continuous renewal of pedagogical approaches. In this regard, the application of information and communication technologies, simulation systems, virtual and augmented reality, and AI-based educational resources in the preparation of military pedagogical personnel must be studied both from methodological and practical perspectives. The exploration of this topic is not only consistent with the modernization policy of the Armed Forces of Azerbaijan but is also crucial in terms of integration into international standards.

Theoretical background

The application of innovative technologies in the training process of military pedagogical personnel is closely connected with learner-centered and competence-based approaches, which represent key principles of modern pedagogy. Information and communication technologies, simulation and modeling systems, as well as virtual and augmented reality tools, complement traditional teaching methods, making learning more interactive and adaptive. These technologies not only facilitate the acquisition of theoretical knowledge by cadets but also contribute to the development of practical skills in environments that closely resemble real combat conditions. At the same time, AI-based instructional models enable the creation of individualized learning trajectories, which theoretically substantiates the effectiveness of military pedagogical practice.

Problem Statement

Traditional military training methods do not fully correspond to the dynamics of modern combat operations, the rapid implementation of technological innovations, and the evolving competency requirements of personnel. The contemporary military environment demands high adaptability, swift decision-making, and advanced technological proficiency, which necessitates the application of new approaches in the activities of pedagogical personnel. Since the theoretical and practical foundations of integrating innovative technologies into the training process are not yet fully systematized, certain gaps remain in pedagogical preparation. This situation particularly complicates the effective integration of information and communication technologies, simulation

systems, and AI-based training environments into the military education system. Therefore, scientific investigation of the problem and the development of solution mechanisms aligned with modern requirements are of critical importance.

Results

The Impact of Innovative Technologies on Military Pedagogical Activity

The role of innovative technologies in the development of modern military pedagogical activity is indispensable. Information and communication technologies, simulation and modeling systems, artificial intelligence, and applications of virtual and augmented reality transform traditional training methods and contribute to the formation of new pedagogical approaches. These technologies enable military pedagogical personnel to use more flexible and effective tools not only in the transmission of knowledge but also in the development of cadets' skills and competencies [3, pp. 44].

In addition to increasing interactivity in the training process, innovative technologies also enhance the learning motivation of personnel. For instance, simulation and virtual reality systems provide cadets with an opportunity to operate in environments that imitate real combat conditions, allowing the development of practical skills without risk [9, pp. 15]. This approach contributes to the more effective formation of officers' decision-making under stress, operational planning, and team management abilities [2].

On the other hand, AI-based adaptive learning systems personalize instructional materials by taking into account the individual characteristics of cadets and creating conditions for addressing weaker areas more intensively. This improves the quality of pedagogical activity and ensures a more purposeful organization of the training process [8, pp. 120]. The application of information and communication technologies also enables the wider and faster dissemination of knowledge, which is particularly significant in the acquisition of rapidly evolving military knowledge and technologies [7, pp. 33].

Thus, innovative technologies not only enrich the methodological foundation of military pedagogical activity but also enhance the effectiveness of instruction by ensuring the preparedness of personnel for modern combat conditions. The new pedagogical model shaped by the implementation of these technologies aligns with the modernization strategy of the Armed Forces of Azerbaijan and directly contributes to the strengthening of national defense potential [1].

The Application of Innovative Technologies in the Armed Forces of Azerbaijan

The application of innovative technologies constitutes one of the key directions in the development strategy of the Armed Forces of Azerbaijan. In the modern era, the integration of technological innovations into military education and training not only ensures the professional growth of officers and pedagogical staff but also emerges as a fundamental factor in strengthening national defense potential. In particular, the implementation of information and communication technologies, simulation and modeling systems, e-learning platforms, and artificial intelligence-based tools has significantly enhanced the quality of instructional and training activities in the Azerbaijani Armed Forces [1].

As a result of reforms carried out in the military education system during the period of independence, special attention has been given to the integration of new technological opportunities into the training curriculum. The electronic educational databases created by the Ministry of Defense not only ensure that officers and cadets acquire up-to-date knowledge but also enable the preparation of personnel in accordance with international standards [3, pp. 52]. Consequently, the use of modern methods in the teaching process by military pedagogical staff has expanded, while their information literacy and technological competence have been strengthened [7, pp. 41].

The 44-day Patriotic War provided a practical demonstration of the Azerbaijani Army's

proficiency in employing modern technologies. During the conflict, the effective use of UAV technologies not only secured tactical superiority on the battlefield but also highlighted the pedagogical and training levels of the highly qualified officers who operated them [4, pp. 77]. This experience reaffirmed that simulation, modeling, and real-time training systems play an irreplaceable role in ensuring the effective application of modern technologies within military pedagogical training.

Within the framework of recent reforms, simulation centers and modern training ranges have been established in the Azerbaijani Armed Forces. These centers provide cadets with the opportunity to develop decision-making skills in environments that simulate combat conditions. The application of simulation systems enhances not only officers' tactical knowledge but also their essential competencies such as psychological resilience, leadership under stress, and teamwork in operational contexts [9, pp. 28].

At the same time, the application of e-learning systems within the Azerbaijani Armed Forces is being expanded. Through these systems, cadets and pedagogical staff are able to continuously enhance their knowledge, with training materials remaining readily accessible online. The use of e-learning is particularly important under conditions of rapid technological change, as it allows for the frequent updating of knowledge and ensures the continuity of pedagogical activity [8, pp. 135].

Furthermore, the cooperation of the Azerbaijani Armed Forces with international military education structures has accelerated the adoption of innovative technologies. In joint training programs implemented with NATO and other international partners, digital simulation systems, modern command and control platforms, and cybersecurity training modules are widely applied [2]. This cooperation ensures that Azerbaijani officers acquire the knowledge and skills necessary not only for national defense but also for operating effectively within the international security environment.

Overall, the application of innovative technologies in the Armed Forces of Azerbaijan ensures the transformation of pedagogical activity in line with contemporary requirements. This approach not only increases the quality of training but also strengthens the preparedness, adaptability, and technological competence of personnel in real combat conditions. As a result, the technology-driven reforms carried out in the Azerbaijani Army contribute to the effectiveness of the national defense strategy while simultaneously reinforcing the scientific and methodological foundations of military pedagogical activity.

Innovative Technologies in International Military Practice

In the modern era, one of the key directions in military pedagogical activity is the application of innovative technologies in the training process. International experience demonstrates that military educational institutions do not rely solely on traditional teaching methods but also extensively utilize digital resources, simulation and modeling systems, AI-based training tools, and virtual reality technologies. In particular, the implementation of innovative technologies in the military academies of NATO member states plays a significant role in developing officers' knowledge and skills in accordance with the requirements of the international security environment [5].

At the United States Military Academy and other Western higher military institutions, operational planning and decision-making exercises are conducted in digital environments known as *war-gaming*. These exercises allow cadets to work with real-time scenarios under simulated combat conditions, developing situational analysis, strategic decision-making, and leadership skills [2]. At the United States Naval Academy, simulation laboratories provide cadets with the opportunity to test various operational conditions, enabling the development of practical skills in a safer environment [9, pp. 23].

European countries also place particular emphasis on the use of innovative technologies in military education. For example, in Germany and the United Kingdom, virtual reality (VR) and augmented reality (AR) technologies are widely applied in military pedagogical training. These technologies allow cadets to experience operational conditions without entering a real battlefield,

helping to build psychological resilience [6, pp. 216]. Simultaneously, joint military training programs within the European Union include specialized simulation exercises in cybersecurity and information warfare, highlighting the importance of preparing for new types of hybrid threats [8, pp. 124].

Another significant trend observed in international practice is the implementation of AI-based learning systems. NATO training centers employ adaptive learning platforms that provide individualized learning trajectories, allowing cadets to master knowledge more effectively. Artificial intelligence analyzes cadets' responses, participation, and performance to personalize the training process and encourage focus on weaker areas [8, pp. 130]. Additionally, military educational institutions in the United States and the United Kingdom utilize *big data* technologies to monitor officers' training outcomes in real time, supporting pedagogical decision-making with statistical analyses [2].

International experience also demonstrates that innovative technologies play a crucial role not only in tactical and strategic training but also in the socio-psychological domain. For instance, the Canadian Armed Forces' training programs extensively use interactive simulation games to develop decision-making under stress and teamwork skills. This approach enhances personnel resilience to the emotional and psychological pressures they may encounter in real operational conditions [9, pp. 26].

Overall, research indicates that innovative technologies have become an integral part of military pedagogical activity. They make officer training more flexible, adaptive, and interactive, and they develop the capabilities required to operate effectively in contemporary security environments. Studying and applying international experience in Azerbaijan's military education system is therefore considered a significant step in strengthening national security.

Recommendations and Development Perspectives

The research indicates that the effective implementation of innovative technologies in the training process of military pedagogical personnel requires the development of a purposeful strategy. First and foremost, it is essential to design specialized programs aimed at enhancing the digital literacy of pedagogical personnel. Within the framework of these programs, practical training on the use of information and communication technologies, simulation systems, and virtual and augmented reality tools will significantly improve the quality of pedagogical activity [7, pp. 36].

The second important direction is the strengthening of the material and technical base for the application of modern technologies. The establishment of simulation laboratories and e-learning platforms in military training centers, as well as the integration of AI-based adaptive learning systems, will facilitate the professional preparation of officers for real combat conditions [8, pp. 124]. At the same time, this will allow for a more objective assessment of the training process based on measurable outcomes.

The third direction concerns the expansion of international cooperation. Implementing joint projects with NATO and other international military education structures, studying modern practices, and adapting them to the national military education system create significant opportunities for future development [5].

From a development perspective, the continuation of the digital transformation process within the Armed Forces of Azerbaijan is of particular importance. As a result of this transformation, it will be possible to implement personalized learning models, cybersecurity simulation programs, and real-time analytics systems in the training process. Thus, organizing military pedagogical activity on an innovative basis will not only enhance the quality of education but also strengthen the resilience of the national security system.

Conclusion

The conducted research demonstrated that the application of innovative technologies in the training process of military pedagogical personnel represents not only a methodological advancement but also a strategic necessity. In the contemporary era, the dynamic transformation

of the security environment, the emergence of new types of warfare based on information, cyberspace, and technology, and the evolving requirements for officers' professional training necessitate such innovations. In this context, alongside traditional teaching methods, the integration of innovative technologies such as artificial intelligence, simulation and modeling systems, virtual and augmented reality, and e-learning platforms is of critical importance.

The results indicate that innovative technologies enhance the effectiveness of military pedagogical activity in several ways. First, they develop cadets' abilities to adapt to real combat conditions and improve their decision-making, team management, and performance under stress. Second, the implementation of personalized learning models allows cadets to address their weaknesses, thereby facilitating more effective knowledge acquisition. Third, the use of information and communication technologies in the training process increases pedagogical flexibility and strengthens learning motivation.

At the same time, the digital transformation policy implemented within the Armed Forces of Azerbaijan creates favorable conditions for the application of innovative technologies. Projects carried out by the Ministry of Defense in recent years, along with experience gained through international cooperation, demonstrate that both institutional and technical capacities exist for further development in this area. Nevertheless, enhancing the digital literacy of pedagogical personnel, strengthening the material and technical base, and systematically assimilating international experience remain current and pressing tasks.

Thus, the application of innovative technologies in the training process of military pedagogical personnel is not only a requirement of modern educational methodology but also one of the strategic pillars of the national security system. This approach will directly contribute to enhancing the combat capability of the Armed Forces of Azerbaijan, ensuring the comprehensive professional preparation of officers, and further strengthening the country's defense potential.

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Competing interests

The authors declare that they have no competing interests.

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