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TRANSFORMATION OF THE OFFICER TRAINING SYSTEM OF THE ARMED FORCES OF UKRAINE AMIDST RUSSO-UKRAINIAN WAR (2014–2025)

Abstract: In the context of the ongoing Russo–Ukrainian war, Ukraine’s military education system has faced an unprecedented challenge: the need to undergo transformation while operating under the conditions of high-intensity combat. The evolution of the conflict from hybrid threats (2014–2021) to the full-scale invasion by the Russian Federation, characterized by the extensive use of technological innovations (2022–2025), necessitates a fundamental revision of officer training methodologies.

The scientific problem lies in the need to bridge the gap between the dynamic changes on the battlefield and the inertia of traditional educational curricula.

The study aims to identify and substantiate the correlation between changes in combat tactics and the transformation of the tactical-level officer training system of the Armed Forces of Ukraine (AFU), as well as to determine the effectiveness of implementing NATO standards under real war conditions.

The research employs a comprehensive approach. A comparative-historical method was used to periodize the stages of military education development. System-structural analysis allowed for investigating the transition from a directive command model to the Mission Command philosophy. The JALLC (Joint Analysis and Lessons Learned Centre) methodology was utilized to analyze the mechanisms of implementing combat experience into educational programs. Graphical modeling was applied to construct and substantiate the Model of Correlation between Battlefield Requirements and Military Educational Transformation (2014–2025).

The study identifies and characterizes three stages of the AFU officer training evolution: «Institutional» (integration of L-courses and TLP procedures), «Adaptive» (decentralization of training and the phenomenon of «mobilized officers» in 2022–2023), and «Technological» (net-centric operations in 2024–2025). It is demonstrated that a key factor in achieving tactical advantage has been the shift in the officer’s role: from a traditional platoon commander to a manager of tactical capabilities, who orchestrates multi-domain resources (infantry, artillery, UAVs, EW). It is established that the integration of Unmanned Systems has transformed the educational process from a model of «catch-up modernization» to a model of «anticipatory adaptation», wherein training centers act as drivers of tactical innovation.

The transformation of military education in Ukraine has created a unique precedent for combining NATO interoperability standards with the flexibility required for asymmetric warfare. The practical significance of this study lies in the development of recommendations for adapting officer training doctrines in partner nations to the challenges of drone warfare and the conditions of a transparent battlefield.

Keywords: military education; Lessons Learned; L-courses; Mission Command; officer training; Professional Military Education; NATO standards.

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Трансформація системи підготовки офіцерських кадрів Збройних Сил України в умовах російсько-української війни (2014–2025)

***Анотація:** В умовах триваючої російсько-української війни система військової освіти України постала перед безпрецедентним викликом, що проявляється необхідністю трансформації безпосередньо під час бойових дій високої інтенсивності. Еволюція характеру збройного протистояння від гібридних загроз (2014–2021) до повномасштабного вторгнення військ російської федерації на території України з елементами впровадження технологічних інновацій (2022–2025) вимагає докорінного перегляду методології підготовки офіцерського складу. Наукова проблема полягає у необхідності подолання розриву між динамічними змінами на полі бою та інерційністю традиційних освітніх програм.*

Дослідження має на меті виявити та обґрунтувати кореляцію між зміною тактики ведення бойових дій та трансформацією системи підготовки офіцерів тактичного рівня Збройних Сил України, а також визначити ефективність імплементації стандартів НАТО в умовах реальної війни.

Методологічну основу роботи становить комплексний підхід. Використано порівняльно-історичний метод для періодизації етапів розвитку військової освіти. Застосування системно-структурного аналізу дозволило дослідити перехід від директивної моделі управління до філософії Mission Command. За допомогою методології JALLC (Joint Analysis and Lessons Learned Centre) проаналізовано механізми імплементації бойового досвіду в навчальні програми. Метод графічного моделювання застосовано для побудови та обґрунтування моделі кореляції між вимогами війни та трансформацією військової освіти у період з 2014 по 2025 рік.

У дослідженні виокремлено та охарактеризовано три етапи еволюції підготовки офіцерів Збройних Сил України: «Інституційний» (інтеграція L-курсів та процедур TLP), «Адаптивний» (децентралізація підготовки та феномен «мобілізовані офіцери» у 2022–2023 рр.) та «Технологічний» (мережево-центричні операції 2024–2025 рр.). Доведено, що ключовим фактором тактичної переваги стала зміна ролі офіцера: від класичного командира взводу до менеджера тактичних спроможностей, який управляє мультидоменними ресурсами (піхота, артилерія, БПЛА, РЕБ). Встановлено, що інтеграція автономних систем (Unmanned Systems) трансформувала освітній процес з моделі «наздоганяючої модернізації» у модель «випереджаючої адаптації», де навчальні центри виступають драйверами тактичних інновацій.

За результатами дослідження прийшли до висновків, що, трансформація військової освіти в Україні створила унікальний феномен поєднання стандартів взаємосумісності з НАТО в загальній системі вищої військової освіти в умовах війни.

***Ключові слова:** військова освіта; Lessons Learned; L-курси; Mission Command; підготовка офіцерів; професійна військова освіта; стандарти НАТО.*

Introduction. The modern system of training military specialists in the Armed Forces of Ukraine (AFU) represents a highly dynamic and adaptive model of military education. It has gradually evolved from a post-Soviet training system to full operational and conceptual interoperability with NATO standards. The trend of changes in the training of AFU military specialists can be divided into two main periods: during the hybrid aggression of the Russian Federation (2014–2022) and under the current conditions of the full-scale invasion of Ukraine by the Russian Federation (2022–present).

This situation requires not only the modernization of the technical competencies of the officer corps but also a fundamental shift in approaches to leadership psychology, a revision of the role of junior commanders, and the integration of battlefield situational awareness and technological advancements into educational curricula.

Despite certain positive developments, such as participation in NATO DEEP initiatives (NATO Standardization Office, 2014), fragmentary improvements in subject content, and the introduction of modules involving foreign instructors, Ukraine currently lacks a systemic implementation of CLIL (Content and Language Integrated Learning) and TBLT (Task-Based Language Teaching) in military education (Myronenko, 2024; Suslov, 2023; Tarasenkova, 2022). There is a lack of tested models, methodological materials, trained instructors, and adapted assessment systems. This necessitates the study of foreign experience in implementing CLIL/TBLT and the development of recommendations for the national system of military education (Suslov, 2025).

Researching the evolutionary trends of military specialist training in the AFU is crucial, as it allows for identifying patterns in the adaptation of educational programs to modern armed conflict conditions, assessing the effectiveness of integrating the latest technologies and combat operations management concepts, and formulating scientifically grounded recommendations for optimizing training strategies and enhancing the combat capability of the Armed Forces of Ukraine in the long term.

Taking the above into account, the relevance of this study is driven by the need for scientific comprehension of the unprecedented changes that have occurred in the Armed Forces of Ukraine over the last decade, accompanied by continuous combat operations on its own territory.

The aim of this article is to identify and substantiate the correlation between the changing character of tactical operations and the transformation of the tactical-level officer training system of the Armed Forces of Ukraine, as well as to determine the effectiveness of implementing NATO standards under real war conditions. To achieve this aim, the study addresses the following research objectives: first, to periodize the transformation of the military education system from 2014 to 2025 and identify key vectors of change at each stage; second, to reveal the features of the institutional integration of the national officer training system with NATO standards requirements during the 2014–2021 period; third, to conduct a comparative analysis and construct a matrix of correspondence for transformational changes in officer training during the active phase of the war (2022–2025) and their consistency with NATO operational interoperability standards; and finally, to develop a model of correlation between war requirements and military educational transformation for the period from 2014 to 2025.

Analysis of recent research and publications. The transformation of military education is a subject of particular attention among both domestic scholars (M. Kasianenko, V. Mirnenko, Yu. Prykhodko, V. Telelym) and international experts (J. Kutac, N. Reynolds, J. Watling). The specific features of military education development in Ukraine have been investigated by O. Zabolotnyi, A. Zelnytskyi, and others (Zelnytskyi, 2020). These scholars focused on the core functions of higher military education as a component of defense planning, identified key challenges affecting its

development, and developed a change management model for the higher military education system in Ukraine.

Institutional changes and the peculiarities of the military education system transformation have been highlighted in the works of V. Mirnenko (Mirnenko, 2023), while the improvement of Professional Military Education (PME) in Ukraine has been explored by D. Viter, O. Mitiahin, and V. Rakhmanov. The current state and problematic issues regarding the implementation of PME learning outcomes in Ukraine were examined by V. Hromenko, V. Karpenko, and O. Kolesnyk (Karpenko, 2025). Professional training of military specialists was also researched by A. Stanishevskiy.

In current conditions, a critical perspective is taken regarding the justification of officer training components (Chernovol, 2023). While authors often view these components within the framework of development, analysis, forecasting, and motivation, there is a lack of emphasis on radical practical steps directly dictated by the battlefield. However, a positive aspect of Chernovol's work (2023) is the analysis of publications identifying general trends dedicated to experience and psychology in military education. In this context, Anishchenko (2022) focused on the peculiarities and methodological foundations of forming officers' readiness for professional activity. It is highlighted that officer readiness directly depends on «motivation and activation of cognitive activity, methods of value construction, formation of value-semantic orientations, and awareness of the necessity to achieve a high level of readiness for various types of military-professional activities», which is grounded in pedagogy and psychology.

Significant for this research is the detailed analysis of the shortcomings and advantages of unit command and control at the onset of the full-scale invasion by the Russian Federation (Zabrodskiy, 2022). This analysis specifically highlighted the features of decentralized command, which enabled rapid and effective obstruction of enemy forces.

A fairly objective analysis was also conducted regarding the impact of the war on the Ukrainian military education system and the use of the Mission Command philosophy in the Armed Forces of Ukraine (Salkutsan, 2022). The article examines the system of professional military education in Ukraine and focuses on the policy for its development in the future.

Understanding the current state and the implementation of technological advancements that influence changes in traditional approaches to warfare is highly relevant (Sobchenko, 2024). The research is relevant to the issues of taking into account the features of modern technologies in the educational process.

The generalization of existing publications confirms that the issue of military education transformation is in the focus of systematic attention of the domestic and international scientific community. However, despite the significant scientific contribution, most of the mentioned studies focus primarily on separate aspects of reform (institutional, regulatory, pedagogical) or are limited to specific timeframes (Counterterrorist Operation, Joint Forces Operation, or the early stages of the full-scale invasion). At the same time, the dynamics of the full-scale war (2022–2025), the emergence of new domains of warfare, and the rapid technological saturation of the battlefield require a comprehensive rethinking of training approaches that go beyond

standardized preparation and theoretical knowledge acquisition. Today, the direct correlation and causal link between the evolution of enemy tactics/technologies and the content of educational curricula remain insufficiently studied.

Methods. The study employs a complex of general scientific and special methods:

Historiographical and Comparative Analysis. To compare the Soviet training model with the modern system, taking into account the implementation of L-courses, and to determine the staging of reforms across the periods of 2014, 2022, and 2025.

JALLC Methodology (NATO Lessons Learned). To analyze the cycle of transforming a «Lesson Identified» into a «Lesson Learned» within the curricula of higher military educational institutions.

Empirical Analysis. Included the study of the regulatory framework (Education Management Strategy, Personnel Policy Concept) and reports from partners (RUSI, RAND) to verify the changes.

Graphical Modeling. For constructing, designing, and substantiating the Model of Correlation between Battlefield Requirements and Military Educational Transformation (2014–2025).

Results. Ensuring the state's defense capability in the context of the Russian Federation's aggression against Ukraine is directly linked to the quality of training and the level of professional competence of the officer corps. The officer training system of the Armed Forces of Ukraine has evolved at an extremely rapid pace. While the main problem in 2014 was the lack of combat-ready units with trained personnel and shortages of armament and military equipment, by 2024, the challenges had shifted to the domain of technological superiority. Drone management, situational awareness, and the implementation of artificial intelligence on the battlefield have become integral components of the unit command and control system. At the same time, the training of Armed Forces of Ukraine officers is constantly being improved and integrated with battlefield requirements. This demands not merely the consideration of combat experience in the educational process, but a comprehensive approach to generalizing and systematizing available information derived from combat operations. Subsequently, based on the results of systemic analysis, it will be possible to identify general trends, important drivers, and influential factors. These can then be integrated into the educational process through scientific substantiation, taking into account the security environment in medium- and long-term perspectives.

The system of training military specialists in Ukraine prior to 2014 was formed on the basis of the Soviet model of military education and combat training. The onset of Russian aggression in 2014 and subsequent hostilities in Eastern Ukraine served as a catalyst for a deep transformation of the military education system. However, the issue of transforming military specialist training in Ukraine began within the framework of the Defence Education Enhancement Programme (hereinafter – DEEP) in 2007. Within the framework of the program, support introduced by international partners enabled the modernization of the military educational process in Ukraine through the training of faculty members and the improvement of curricula in partnership with NATO member countries. The main goal of the Program for Ukraine at that time was to support the reform of the military education system in accordance with NATO standards. Ukraine has

actively participated in the implementation of the program since 2012. Since 2013, support under the DEEP program has already been received by 8 higher military educational institutions of Ukraine and 3 non-commissioned officer (NCO) training centers (Salkutsan, 2022). Furthermore, since 2015, the improvement of the NCO training system in Ukraine has acquired a more large-scale character (Ukrinform, 2023).

In the context of transforming and improving the officer and NCO training system, the State Targeted Defence Programme for the Development of the Armed Forces of Ukraine for the Period up to 2020 (President of Ukraine, 2017). This program contained clear indicators regarding the transformation of the officer training system. The main emphasis was placed on aligning the network of educational institutions with the real needs of the Armed Forces of Ukraine, incorporating the specifics of training military specialists for battlefield realities into the educational process, and implementing combat experience into officer and NCO training curricula.

A key regulatory act of that year was the Resolution of the Cabinet of Ministers of Ukraine «On the Reorganization and Establishment of Military Training Units of Higher Educational Institutions» (Cabinet of Ministers of Ukraine, 2015). As a result, the subordination structure of military training units located within civilian higher educational institutions underwent significant changes.

Against the backdrop of the Russian Federation's actions attempting to seize new territories of Ukraine, the decision of the National Security and Defence Council (President of Ukraine, 2016) was enacted on June 6, 2016. It should be noted that a distinct feature of this decision was the identification of military education as a separate direction within the state's strategic objectives

That same year, the Concept for the Development of the Professional Non-Commissioned Officer Corps of the Armed Forces of Ukraine was approved (Order of the Ministry of Defense of Ukraine, 2022). This concept defined the sergeant as an officer's assistant in combat training, thereby implementing the NATO concept within the AFU. Alongside this, the idea was laid down for the sergeant to act as a leader and mentor for enlisted personnel and as a specialist in tactical actions. However, the implementation of this Concept was not fully adapted within the military due to the professional level of the NCO corps, the weak material and technical base of training centers, and training programs that failed to change the concept of combat training in the forces. The structure of NCO training continued to be carried out according to the post-Soviet training system. However, on October 17, 2019, the Verkhovna Rada adopted the Law of Ukraine «On Amendments to Certain Legislative Acts of Ukraine Regarding the Performance of Military Duty and Military Service» (Verkhovna Rada of Ukraine, 2019) the main idea of which was the elimination of the Soviet system of military ranks and the introduction of a new NCO hierarchy fully compliant with NATO standard STANAG 2116.

As can be seen from the above, cardinal changes in the training system of AFU officers and NCOs were made only with the onset of the Russian Federation's aggression on the territory of Ukraine. Although changes in military education were anticipated with the introduction of the NATO DEEP program for Ukraine, its implementation directly depended on legal and political steps. Furthermore, only in 2020 were leadership courses for officers launched at the National Defence University of Ukraine within the framework

of a pilot project based on prospective programs, specifically: the Command and Staff Course (L2), the Joint Staff Course of the operational level (L3), and the High Level Course of the strategic level (L4). The result of training in these courses was the acquisition by officers of specific competencies necessary, primarily, for the execution of joint actions in the planning and execution of operations (Mitiagin, 2021).

The concept of introducing leadership courses was driven by changes in Ukraine's military education system aimed at meeting international standards. It sought to guarantee the development of innovative and team-building skills, as well as critical and systems thinking capabilities for the strategic resolution of national security and defense issues (Ukrainian Military Pages, 2020).

In late 2020, a review of the Ukrainian military education system was conducted with the direct participation of advisors from the USA, Canada, Lithuania, Germany, and Denmark. It constituted the world's first institutional audit of Professional Military Education (PME) in a NATO partner country. Based on the assessment results, practical recommendations were developed and incorporated into the baseline plan of the «Professional Military Education» project. Foreign advisors from Canada, the USA, Denmark, Lithuania, the Czech Republic, Poland, and Germany continue to consult on the implementation of NATO planning and military decision-making procedures (TLP, MDMP, JOPP) and the synchronization of PME curricula. Within the framework of international partnership, the creation and introduction of the Strategic Leadership and State Policy Course (L-5) in Ukraine should be highlighted separately (NATO Standardization Office, 2014).

The subsequent stage of military education development in Ukraine involved improving organizational aspects regarding the training of officers and non-commissioned officers (NCOs) in higher military educational institutions and institutions of professional pre-higher military education (Ministry of Defence of Ukraine, 2022). This, in turn, allowed for amendments to specialized legislation, thereby legitimizing the functioning of a new component of the multi-level military education system—specifically, Professional Military Education. Consequently, after two years of testing within a pilot project, the PME system (L-courses) became operational within the general military education system as the core direction for officer training.

Education and Science of the Ministry of Defence of Ukraine (Mirnenko, 2023) is highly relevant. In collaboration with scholars, the Director analyzed and identified key directions for the transformation of the military education system under the NATO DEEP program for Ukraine. Considering the realities and the necessity for changes in the military education system, the leadership of the Armed Forces of Ukraine and the Ministry of Defence took specific actions: in 2021, the adapted NATO standard Bi-SCD 075-007 was implemented. Furthermore, in 2022, the Resolution of the Cabinet of Ministers of Ukraine «On Amendments to the Resolution of the Cabinet of Ministers of Ukraine» (Cabinet of Ministers of Ukraine, 2022) was adopted, which defined, at the state level, the continuous educational and professional development of officers throughout their military careers as a necessary future perspective for the state's defense capability as a whole. However, with the onset of the full-scale invasion, the full implementation of these two documents was not successful. The training and education of officers and NCOs

in the AFU focused on replenishment and retraining, dictated by frontline needs. Moreover, the trend of changes on the battlefield did not correlate with training durations. The specific features of officer and NCO training in higher military educational institutions could not be realized within short timeframes and required changes to educational curricula, taking into account the technological saturation of the battlefield and the introduction of new branches of troops (forces) into the structure of the Armed Forces of Ukraine, namely the Unmanned Systems Forces and Assault Troops. At the same time, officer training in PME courses envisages the acquisition of competencies for joint actions within unified military command and control bodies and interoperability with NATO member units. However, this still does not correspond to reality, due to the specific features of conducting operations at the operational and tactical levels in Ukraine. A previous study (Karpenko, 2025) identified shortcomings and problematic issues that significantly affect the execution of combat tasks under the conditions of the full-scale invasion by the Russian Federation.

Discussion. As evidenced by the foregoing, the transformation of military education and the positive trend of amendments to state-level guidance documents necessitate the implementation of improvement pathways and the search for new effective solutions that account for the specifics of the modern battlefield. Simultaneously, there is a need to review the specific features of officer training, continuously monitor positive and negative factors influencing the educational process of military specialists, and take into account the needs of the Armed Forces of Ukraine, their prospective structure, and changes in tactics at both the tactical and operational levels of command.

The forms, methods, and content of personnel training in the Armed Forces of Ukraine underwent transformational changes during the period of 2014–2025. The catalyst for these changes was the Russian Federation, whose actions led to a hybrid war (2014–2021) and a full-scale war (from 2022 to the present) against a sovereign and independent Ukraine.

In the general training system of the Armed Forces of Ukraine, the establishment of training centers based on the branch-specific principle was introduced. Among the first were the 142nd Training Center of the Special Operations Forces (SOF), the 198th Training Center of the Naval Forces, and the 199th Training Center of the Air Assault Forces. The purpose of such centers was retraining and professional development within the framework of collective training for tactical-level units.

Concurrently, during combat operations in the Donetsk and Luhansk regions of Ukraine, the use of UAVs and specific (non-military/commercial) drones became widespread. This significantly increased the efficiency of tactical-level units regarding reconnaissance and terrain scouting (ISR). At the same time, active cooperation began with the Ukrainian volunteer organization «Army SOS» regarding the implementation of the «Kropyva» (Nettle) software at the tactical level. Its integration into the tactical command and control system subsequently proved effective and essential for the Armed Forces of Ukraine.

However, inherent shortcomings that affected the efficiency of implementing new forms and methods of training in the educational process must also be highlighted. Primarily, this concerns the insufficient integration of combat experience into academic

curricula. Changes to programs were made unsystematically and independently by each higher military educational institution. Training curricula included only those changes acquired by academic staff members in combat conditions. Furthermore, the deficit of modern simulation systems and training fields for implementing acquired combat experience hindered the realization of these plans in the educational process.

In 2014, the transformation of military education took place within the framework of a shift from Soviet standards to NATO principles (STANAG). Furthermore, taking into account the specifics of combat task execution by units of the Armed Forces of Ukraine during the Anti-Terrorist Operation (ATO) in the Donetsk and Luhansk regions, training curricula were adjusted. This was preceded by the engagement of tactical-level units in actions that had not been practiced during tactical exercises and unit coordination prior to 2014. Examples include convoy escort, ensuring the breakout of other units from encirclement, organizing the evacuation of the civilian population, and participating in stabilization, search-and-strike, and raid operations. Therefore, since 2014, the emphasis in the training of tactical-level officers has been focused on changes that can be categorized into three clusters:

Survivability & Sustainability. This was realized through the introduction of personnel cross-training elements and tactical medicine, as well as the specifics of its provision in combat conditions. As a result, the basic requirements for officers became the ability to organize and ensure unit adaptability to combat conditions and the implementation of TCCC survival protocols, which constitute the basis of unit combat readiness according to STANAG 2122.

Lethality & Maneuver. Officer training took into account the specifics of dividing a unit into a fire element, a support element, and an assault element. Considering the possibility of interacting with artillery units or a separate gun (mortar) during the execution of combat tasks, the ability to adjust their fire became a necessity. Additionally, it became necessary to provide target designation and organize air guidance for Army Aviation airplanes and helicopters. Consequently, the emphasis shifted from individual firearms training for officers to Fire and Maneuver management. Requirements for a platoon commander evolved to include the ability to organize and coordinate joint fire support (JFO/JTAC), considering the engagement of artillery and aviation in combat conditions.

Command & Control. Attention in officer training was concentrated on the ability to utilize rangefinders, weather stations, GPS applications, and software designed to increase the efficiency of tactical-level units, such as «Kropyva» (Nettle). Practicing templated tactical tasks became irrelevant. As a result, the introduction of the technological component into officer training transformed into skills for operating within a unified information environment (C4ISR), while the «no templates» training methodology enabled the formation of officer readiness to implement Mission Command principles.

Based on the analysis of the impact of the hybrid war since 2014, we were able to project the correlation of the transition within the educational process of the Armed Forces of Ukraine toward NATO standard requirements (table 1).

Table 1

The correlation of changes in the educational process of the Armed Forces of Ukraine with NATO standard requirements during in the Period 2014–2021

Implemented practice in officer training	Result of changes in officer training	NATO standard requirements
Tactical medicine and support specifics	Transition from general medical training to TCCC protocols (MARCH algorithm) and organization of MEDEVAC/CASEVAC (STANAG 2122). Emphasis on Care Under Fire.	TCCC (Tactical Combat Casualty Care) & Force Health Protection
Firearms training (division into groups: assault, support, security)	Implementation of Small Unit Tactics corresponding to the NATO squad structure: Assault Element, Support Element, and Security Element.	Small Unit Tactics (SUT) & Fire and Maneuver
Cross-training	Increasing fire capabilities of the tactical-level unit, ensuring unit functionality support (Redundancy). The loss of a machine gunner does not stop the unit's operation, as a rifleman can replace him.	Cross-Training & Functional Redundancy
Artillery/mortar fire adjustment	The officer became a Joint Fires Observer (JFO). This enabled acting according to the CFF procedure and executing a «Call for Fire»	Call For Fire (CFF) & Joint Fires Integration
Target designation and air guidance (fixed/rotary wing)	Training under simplified Joint Terminal Attack Controller (JTAC) protocols. Introduction of standardized reports for calling in air support.	Close Air Support (CAS) & Air-Ground Integration
Use of rangefinders, GPS, software («Kropyvva»)	Integration into the C4ISR system (Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance). Officers began working with Battle Management Systems (BMS) to ensure situational awareness.	C4ISR Operations & Digital Literacy
Practicing maneuvers without templated scenarios	Abandoning templated exercises in favor of Free-play exercises (decision-making actions). Development of critical thinking for operations in VUCA conditions (volatility, uncertainty, complexity, and ambiguity) became a priority for tactical-level officers.	Mission Command & Adaptive Decision Making

However, the start of the full-scale invasion by the Russian Federation's troops into Ukraine in February 2022, which shook the whole world, became a new challenge for the Armed Forces of Ukraine.

While in the 2014–2021 period, UAVs in the Armed Forces of Ukraine were viewed as an auxiliary means of reconnaissance (ISTAR), since 2022 they have become a basic element of fire engagement. This provoked changes in the educational curricula for training future officers. Against this background, the training process for future officers currently focuses on adapting them to professional activity under conditions of mass employment of reconnaissance and strike UAVs, as well as FPV drones, by the enemy. In turn, officer training correlates with a combination of theory and the acquisition of practical skills regarding countering enemy reconnaissance and electronic warfare assets.

A positive development in the system of preparation for battlefield operations of AFU units was the creation of the Combat Simulation Center (ArmyInform, 2022). Training of combat pilots and drone operators is conducted using weapon simulators, wargaming, and by modeling tactical-level battlefield conditions.

In 2025 alone, Ukraine trained over 5,000 operators of unmanned systems. A key achievement of 2025 was the deployment of a network of certified training centers in Ukraine. This became possible thanks to the successful implementation of the Resolution of the Cabinet of Ministers of Ukraine dated October 1, 2024, No. 1129, which introduced an experimental project on the certification of unmanned systems operator schools (Ministry of Defence of Ukraine, 2026). Eight leading educational institutions received certified status, and the total number of organizations that received permits to train specialists for the needs of the Defence Forces of Ukraine reached 34, including 19 centers specializing in UAVs. Taking into account the number of already trained UAV operators, the question arises regarding the study and practical application of their integration into the general command and control system of troops. We view the next step as a review of tactics at the tactical and operational levels of command. For this purpose, the most appropriate approach is the employment of UAV operators in conjunction with the actions of infantry, support units, and fire support. Within the scope of training officers of tactical and operational command levels, there is a necessity to revise educational curricula. Specifically, issues of interaction and comprehensive employment of infantry, mechanized, air assault, and artillery units with high-tech strike assets and troop support means must be studied and practically practiced by officers of the Armed Forces of Ukraine

In the context of drone warfare, which strikingly distinguishes the full-scale invasion by the Russian Federation into Ukraine from other armed conflicts, technologies and warfare tactics change at breakneck speed. In this context, officer training focuses on general requirements, specifics, and conditions for executing combat tasks at the tactical level. Despite this, to remain relevant and maintain a tactical advantage in the technological domain and operational awareness, a separate direction for training instructors of UAVs and UGVs (Unmanned Ground Vehicles) has been singled out. These instructors, in turn, regularly deploy to execute combat tasks to maintain their proficiency. Furthermore, training center instructors maintain direct contact with former graduates and test new technologies, on the basis of which they update and shape educational curricula (Baker, 2025).

In addition, attention should be paid to the specifics of training AFU officer personnel. Training in higher military educational institutions has not stopped since the beginning of the full-scale invasion; on the contrary, it has gained momentum, and the number of those studying for a military specialty has increased. While retraining, both individual and collective, is occasionally conducted on the territories of European Union countries at the expense of international partners, the direct training of future tactical-level officers continues on the territory of Ukraine. However, massive missile and drone attacks by the Russian Federation on the territory of Ukraine, and especially on critical infrastructure elements, AFU training grounds, and training centers, have forced a review of the officer professional training process. As a result, in order to increase the

survivability of personnel, and especially of academic staff with combat experience, measures of dispersion, camouflage, and the application of deception elements have been introduced into the educational process of educational institutions and training centers. This is already a requirement of the present day and a specific feature of AFU officer training under the conditions of the full-scale invasion by the Russian Federation.

An important example of rapid adaptation to the challenges of war was the «Captains' Course» project. The Captains' Course was established within the Territorial Defence Forces (TDF) of the Armed Forces of Ukraine in 2022. It was developed based on NATO combat planning standards, taking into account the latest combat experience from the Russo-Ukrainian war. The course is designed for company and platoon commanders, as well as battalion staff officers. The project itself was implemented with the support of the «Come Back Alive» charity organization and companies such as Genesis, SKELAR, Headway, Appflame, AMO, and Universe. In 2024, the «Captains' Course» became a Professional Military Education (PME) course and was included in the unified catalog of certified courses of the Armed Forces of Ukraine (Come Back Alive, 2024).

It is also worth noting that under full-scale war conditions, daily training time was increased from 6 to 10–12 hours. Weekly training increased to 72 hours instead of 40 hours. Of the total training time, 70% is allocated to practical sessions, specifically for practicing skills on military equipment and in tactical-level unit command and control (Ukrinform, 2024).

The most notable trend in the 2024–2025 period became the full integration of autonomous systems into the educational process. The Armed Forces of Ukraine were the first in the world to distinguish the Unmanned Systems Forces as a separate branch of troops. Operator training now includes not only piloting but also an engineering component, such as field repair and modification of UAVs, as well as the ability to operate and execute combat tasks under conditions of dense signal suppression by enemy Electronic Warfare (EW) assets. In this context, new challenges have arisen in the training of tactical-level officers.

Based on the analysis of empirical data from the full-scale invasion period, we identify key vectors of change in the officer training system, which are projected in figure 1.

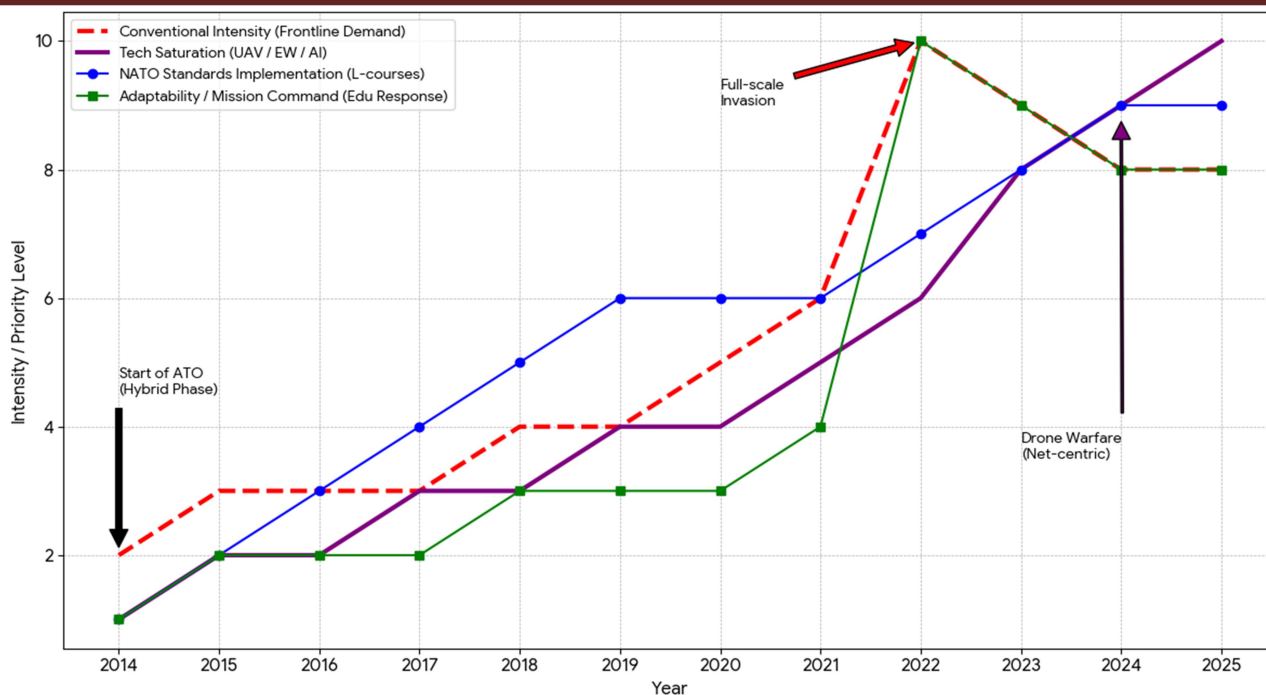


Figure 1. Correlation between Battlefield Requirements and Military Educational Transformation in Ukraine (2014–2025).

The analysis of the constructed Correlation Model representing the relationship between Battlefield Requirements and the Educational Response allows us to state the following:

during the 2014–2021 period, a «catch-up modernization» effect was observed, wherein changes in educational curricula lagged behind the evolution of hybrid threat tactics;

During the 2024–2025 period, the dynamics of educational transformation demonstrate a tendency toward synchronization with the increasing Technological Saturation of combat operations. This is achieved through a rapid feedback loop (Lessons Learned Process), whereby the experience of employing FPV drones and situational awareness systems (Delta, Kropyva) is implemented into training modules in near real-time.

Furthermore, within the scope of our research, we designed a Matrix of correspondence regarding changes in the officer training system of the Armed Forces of Ukraine to NATO standards during the 2022 – 2025 period (table 2).

Table 2

Matrix of Correspondence of Changes in the Officer Training System of the Armed Forces of Ukraine to NATO Standards in the Period 2022–2025

Implemented practice in officer training	Result of changes in officer training	NATO standard requirements
Dominance of Unmanned Systems	Transition from UAVs as purely reconnaissance assets to their application in various roles (strike, combat support, logistics, reconnaissance). Tactical-level officers acquire knowledge on organizing and planning operations using available forces and assets simultaneously in air, land and cyber domains	Multi-Domain Operations (MDO)
Battle Planning	Scaling of the «Captains' Course» (TDF) and its recognition as Professional Military Education (PME). Abandonment of Soviet directive command. Mobilized officers assigned to battalion staffs undergo retraining on planning according to NATO procedures adapted to war realities.	TLP & MDMP (STANAG 2199)
Digital Simulation & Modelling, Wargaming	Tactical situation modeling allows for saving resources and practicing scenarios impossible to replicate on training grounds due to high risk. Officers improve their proficiency in practical planning and situation assessment using digital technologies.	CAX (Computer Assisted Exercises)
Agile Learning (Program Adaptability)	Rapid curriculum updates driven by feedback from the front. Continuous cycle of experience analysis considering changes in enemy tactics. Officers learn to organize and maintain constant combat readiness of counter-measures against enemy EW, FPV drones, strike drones, and SIGINT. Tactical-level officers practically practice assault actions within units considering changes in enemy tactics.	Lessons Learned Process (LL), JALLC doctrine, Observe-Orient-Decide-Act (OODA Loop)
System Survivability	Dispersion of training centers, camouflage, arrangement of protected locations. Forced but effective decentralization of training, increasing the autonomy of higher military educational institutions and training units (centers). Officers acquire practical skills in protecting unit forces and assets and preventing their detection/engagement by enemy high-precision weapons.	Force Protection
Intensity	Increase in training time for practical skills (Hands-on training) considering the knowledge necessary for successful command and combat task execution by the unit. Training focused on results and specific task execution.	Performance Oriented Training

The training of military specialists in Ukraine under the conditions of the russo-Ukrainian war has undergone radical changes: from reforms starting in 2014 to a large-scale overhaul following the full-scale invasion in 2022. In turn, the international experience of partner countries and continuous support played a vital role in shaping updated standards for the training of Armed Forces of Ukraine officers.

Analysis by the leadership of the Armed Forces of Ukraine in 2014 enabled the timely identification of a critical shortage of junior officers capable of making decisions

under conditions of uncertainty and active combat operations. The centralized Command and Control model in effect at that time proved ineffective against hybrid threats.

Institutional changes included the introduction of leadership courses (L-courses) based on NATO standards. For the first time, Ukraine adapted L-courses into the general higher military education system simultaneously at the tactical, operational, and strategic levels. This allowed for the designation of Professional Military Education (PME) as a distinct component within the higher military education system and its adaptation to the overall framework of officer professional development. This approach has proven to be novel and universal for NATO member countries.

In turn, after 2022, the changes that occurred in the military education system in Ukraine enabled:

decentralize the training of military specialists. This led to a transition from large training grounds to dispersed groups and mobile instructors;

officer leadership (Mission Command) gained relevance. A new type of officer must possess a high degree of autonomy in decision-making;

digital literacy of tactical-level officers. This became a necessary tool in the application of technological strike assets, situational awareness, and combat and comprehensive support;

digitalization of operations for the execution of combat tasks. This enables increased efficiency in working with digital technologies in fire control and countering electronic warfare (EW) and signals intelligence (SIGINT).

The aforementioned indicates that the transformation of military education is not merely an internal reform, but an integrated part of global standards for professional military training.

Conclusions. Summarizing the results of the research on the transformation of the officer training system of the Armed Forces of Ukraine amidst the evolution of the military conflict (2014–2025), the following concluding provisions can be formulated:

General Trend of Military Education Transformation (PME Transformation Trend). The evolution of military specialist training in Ukraine has progressed from crisis response to a systemic, technologically oriented restructuring. And adapted into the general system of higher military education, which is a unique experience for NATO member countries.

Institutional Stage (2014–2021): Characterized by the abandonment of the Soviet model of rigid centralized **Command and Control** in favor of Euro-Atlantic principles. A key achievement was the creation of a multi-level **Professional Military Education (PME)** system through the introduction of L-courses. This allowed for the unification of planning procedures (**TLP, MDMP**) and the formation of a personnel reserve **interoperable** with NATO partners.

Adaptive Stage (2022–2023): The full-scale invasion provoked a transition to a **Distributed Learning** model. Emergency mobilization and the phenomenon of «express officers» required shortening training terms without losing quality, which was achieved thanks to international training missions (**Operation Interflex, EUMAM**) and the intensification of the practical component.

Technological Stage (2024–2025): The defining trend became the integration of unmanned systems and EW assets into the tactical level. The officer transformed from a «unit commander» into a «manager of complex technical systems» operating under conditions of **Net-centric warfare**.

Furthermore, a transformation of the officer's authority occurred, based not on the importance of military rank, but on professional competencies, the ability to preserve the lives of subordinates (**Risk Management**), and adaptation to battlefield challenges. This constitutes a modern challenge for the educational process and the revision of officer training curricula.

Prospects for Further Research. Further scientific elaboration is required regarding the issues of using artificial intelligence in military decision-making processes and developing a methodology for training officers for cognitive warfare.

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