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Innovative Technologies in Tactical and Specialised Police Training and Prospects for Their Development

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Abstract. The article examines current issues concerning the introduction of innovative technologies into the system of tactical and special training for police officers in the context of modern security challenges and the transformation of Ukraine's security sector. Scientific interest in this topic is caused by the search for new ways to improve the professional training of police personnel under the conditions of the growing complexity of service and combat tasks, the spread of hybrid threats and the development of digital technologies. The aim of the article is to explain the theoretical and methodological foundations for modernising the educational process in law enforcement agencies, the applied foundations for integrating innovative technologies into the system of tactical and special training for police officers, as well as to determine the prospects for their further development. The research is theoretical in nature, which determined the application of a set of general scientific and special tools. The main focus is placed on the analysis of primary sources, the systemic structuring of material, the comparison of international educational practices and the development of models for the further development of the personnel training system for law enforcement agencies. The work contains an analysis of theoretical developments and applied aspects of introducing innovations into the professional training of law enforcement officers, which reflects the current state of this issue. The main areas for the use of digital and simulation-based training tools are identified, in particular virtual and augmented reality technologies, computerised training simulator systems, distance learning platforms, biofeedback systems and interactive methods for modelling service-related situations. The analysis of the results proves that the integration of innovations into the educational process ensures an increase in its effectiveness. This contributes not only to an appropriate level of professional competence, but also to the development of law enforcement officers' ability to make rapid decisions in unpredictable and changing circumstances, as well as to enhancing police officers' psychological resilience to the stress factors of service activity. The main problems in implementing

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Military Science. Vol. 4 No. 2 (2026)

innovative technologies are identified, including an insufficient level of logistical support, the need to train instructor staff and the need to modernise the methodological training toolkit. The results obtained may indicate that the proposed authorial recommendations serve as a basis for modernising the system of departmental education. Their implementation will contribute to improving the tactical training of personnel and developing modern digital infrastructure in educational institutions within the system of the Ministry of Internal Affairs of Ukraine. The introduction of these technologies will contribute to increasing police officers' readiness to respond effectively to modern security threats and to ensuring an appropriate level of public security and compliance with the law.

Keywords: innovative technologies, tactical and special training, police officers, virtual reality, simulators, professional competence, development.

Introduction

Modern conditions for ensuring community and public security, combating crime and maintaining law and order require the continuous improvement of the system of professional training for police officers. A priority in this context is the introduction of modern technological solutions during tactical training. This approach guarantees a high level of professional readiness among law enforcement officers to perform their official powers in non-standard situations and extreme conditions. The use of innovations in the educational process will not only increase its effectiveness, but will also contribute to the development of key professional competencies – the ability to make prompt decisions, maintain psychological resilience and interact effectively within a team [1]. Digitalisation, in particular virtual reality (VR) and augmented reality (AR), simulation trainers, interactive training grounds and digital systems for assessing police officers' actions, opens up broad prospects for improving the educational process. This will make it possible to safely model potentially dangerous situations, practise actions during mass disturbances, the detention of armed offenders or the neutralisation of terrorist threats. The use of innovative technologies ensures that the process of police training is brought closer to the real conditions of their service activity, which is becoming critically important due to the current threats in Ukraine. Current trends in the digital modernisation of police education in the European space and the focus on forming practically oriented competencies demonstrate the need to update approaches to organising tactical and special training for police personnel. At the same time, the effective implementation of these technologies requires the professional development of teaching staff, the modernisation of the material and technical base of educational institutions and the development of unified methodological standards. The use of modern innovative technologies ensures the maximum reproduction of the conditions of real service activity, in particular during counteraction to offences and the elimination of terrorist threats, which is of particular importance against the background of the current threats to national security faced by Ukraine [2; 3].

Thus, consideration of the aspects of implementing innovations in the system of tactical and special training for police officers has a significant scientific and applied basis. The data obtained make it possible to optimise the educational process in the National Police of Ukraine, strengthening the professional skills and ability of personnel to operate effectively in stressful situations, which is a prerequisite for the reliable maintenance of law and order and public security.

Therefore, the main aim of the article is a comprehensive theoretical and applied research of the mechanisms for introducing high technologies into the training of law enforcement officers. To achieve the aim of the research, a task was defined, which consisted in analysing and highlighting current problems concerning the introduction of the latest technologies into the tactical and special training of police officers.

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Military Science. Vol. 4 No. 2 (2026)

Methodological Framework

The methodological apparatus of the research is based on a combination of general scientific and special tools, which made it possible to conduct a comprehensive consideration of the mechanisms for integrating innovations into tactical and special training and to outline the vectors of their future transformation. The theoretical basis of the work consists of the key principles of systemic, competence-based and interdisciplinary approaches to designing the educational process in the law enforcement sphere.

The systems approach was applied to conduct a comprehensive analysis of the structure of tactical and special training for police officers as an integrated pedagogical system combining the educational, technological and organisational components of professional training. The competence-based approach made it possible to consider the introduction of the latest technologies as an instrument for forming police officers' professional competencies, in particular the ability to make decisions under conditions of risk, interact effectively within a team and act in complex operational and service-related situations. The interdisciplinary approach ensured the integration of developments in the fields of pedagogy, security studies, information technologies and the psychology of professional activity.

The methodological apparatus of the research is based on a combination of general scientific and special methods, each of which performed a specific task. The analytical and generalising approach made it possible to outline trends in the development of innovations in personnel training. Comparative analysis became an instrument for studying global practices in the professional training of police officers. Through the methods of systematisation and classification, the technological toolkit was organised (simulator trainers, biofeedback systems, digital platforms), which directly affects the quality of law enforcement training.

Moreover, the method of logical generalisation and scientific modelling was applied, which made it possible to formulate conceptual guidelines for the further evolution of high technologies in the system of tactical and special training for police officers and to develop conceptual approaches to creating an integrated innovative educational environment in educational institutions within the system of the Ministry of Internal Affairs of Ukraine.

The application of the above-mentioned methodological approaches and research methods ensured a comprehensive examination of the problem of adapting modern technological tools to the needs of the professional development of specialists and made it possible to substantiate scientific and practical recommendations for improving the effectiveness of tactical and special training under the conditions of modern security challenges.

Results

As the data indicate, the current stage of development of the system of tactical and special training for police officers in Ukraine is characterised by active processes of modernising the content of academic disciplines, the introduction of practically oriented teaching methods and the implementation of a competence-based approach to the formation of professional abilities and skills [4]. An example of this is the fact that the key centres for implementing these changes are higher education institutions with specific learning conditions – Kharkiv National University of Internal Affairs, Odesa State University of Internal Affairs and the National Academy of Internal Affairs, which consistently improve the methodology for training students in accordance with the requirements of current educational trends and international standards for training personnel for police bodies [5;6;7].

The results of the analysis show that certain problematic aspects continue to exist within the professional training of police officers. In particular, there is a shortage of modern training grounds, the absence of an integrated digital platform for tactical modelling, as well as the limited introduction of innovative technologies and training platforms into the learning process [8]. Accordingly, a

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Military Science. Vol. 4 No. 2 (2026)

significant part of classes retains a traditional format, which does not always ensure the reproduction of real conditions of service activity, as a result of which the effectiveness of forming police officers' professional readiness to act in emergency situations is reduced.

It is impossible not to take into account that the transformation of the state security sector, caused by armed aggression, an increased level of terrorist threats and growing social tension, necessitates a review of existing approaches to the system of tactical and special training for police personnel [9]. Accordingly, training should be focused not only on improving combat and tactical skills, but also on developing psychological resilience, the ability to act effectively in extreme situations, make prompt decisions under limited time conditions and ensure constructive interaction with citizens in an environment of increased stress.

In view of the above, one of the main areas for achieving positive results in the development of the system of professional training for police officers is the phased introduction into the educational process of interactive modelling and scenario-based training technologies, which facilitate the modelling of realistic scenarios of police operations, the analysis of typical errors and the improvement of teamwork skills [10].

In this regard, the effective use of the potential of these technologies requires the modernisation of the material and technical base of educational institutions, the continuous improvement of the digital competence of academic staff and the formation of a unified methodological toolkit for their implementation. It has been established that, in the current realities, the combination of innovations with tactical and special training is acquiring critical importance. This creates the prerequisites for the formation of a new type of specialist whose professional training correlates with modern security challenges and the strategy for the development of Ukraine's security and defence sector.

In the current realities, innovative tools are becoming a determining factor in the transformation of the educational model for police training. Their use makes it possible to organically combine the theoretical basis with the applied aspects of service activity, which directly improves the quality of training and ensures the formation of a high level of professionalism among future police officers [11].

The use of digital, simulation and information and communication tools opens up qualitatively new prospects for reproducing various service-related situations close to real ones, within which a police officer must act promptly, accurately and in compliance with safety requirements. The integration of VR (virtual reality) and AR (augmented reality) is indeed one of the most widely discussed trends in modern education for law enforcement and security structures. This makes it possible to combine the theoretical basis with the safe practice of practical skills. The application of these technologies will ensure the creation of an interactive educational environment close to reality, which will enable cadets to model and practise tactical actions during the detention of offenders, the conduct of evacuation measures, the maintenance of public order and other situations of service activity. The use of virtual training grounds will contribute to the formation of effective teamwork skills, the development of analytical thinking and the enhancement of the ability to make prompt decisions in stressful situations. The experience of leading European police academies, in particular CEPOL, the Police Academy of the Netherlands and Police Scotland College, has confirmed that the introduction of VR technologies into the process of training personnel for the National Police contributes to reducing the adaptation period of young officers under real service conditions by 25–30% and to reducing risks during the performance of operational and service-related tasks [12]. It should be noted that similar innovative approaches are also gradually being implemented in the domestic system of police training education. In particular, the National Academy of Internal Affairs has created the virtual simulator "Police Officer in Action", which provides for the modelling of situations involving responses to public order violations and the commission of criminal offences, thereby improving the quality of practical training for cadets [13]. One of the promising areas of innovation in the field of professional police training is the introduction of computerised training

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Military Science. Vol. 4 No. 2 (2026)

complexes, which will ensure the integration of multimedia technologies with tactical scenarios of varying levels of complexity. Such systems model a wide range of situations – from domestic conflicts to aggressive actions involving the use of firearms, which will contribute to the formation of stress resilience and the development of rapid response skills. The use of modern complexes such as FATS®, VirTra, as well as their domestic analogues, creates an opportunity not only to practise algorithms for police officers' actions under conditions close to real ones, but also to conduct an objective analysis of errors and assess the level of professional readiness of each participant in the training [14]. Accordingly, innovative approaches are also becoming widely used in the process of psychological training for police personnel. The use of neurotechnologies, biofeedback systems and specialised software creates the possibility of monitoring the emotional state, stress level and concentration of students. This approach will increase the effectiveness of forming psychological resilience to the stressogenic and risk factors of professional activity. Distance learning systems (e-learning) make a significant contribution to the development and modernisation of the process of professional police training, acting as an important instrument for ensuring the continuous professional development of law enforcement officers. It should be noted that the use of digital online platforms creates a favourable environment for conducting tactical and special courses, webinars and testing, as well as for carrying out video analysis of police officers' actions during the performance of tasks in service activity. It should also be noted that the development of such educational systems is actively supported through the partnership between the Ministry of Internal Affairs of Ukraine and international institutions, in particular the European Union, within the framework of the EUAM Ukraine project [15].

The introduction of innovative technological approaches into the system of professional training for police officers has similar significance in the context of researching the application of modern innovative pedagogical methods, in particular "problem-based learning" (learning based on solving problem situations), "case study" (the method of analysing specific cases) and "team decision games" (team-based decision-making games). This toolkit contributes to the transformation of the educational process towards the development of critical perception of information and the strengthening of teamwork, effective team interaction skills and leadership qualities among police officers. Trends in the development of the system of professional training for law enforcement officers under modern conditions indicate the active development of integrated tactical training centres, within which a virtual (VR) learning environment, real conditions at training grounds, simulation modelling laboratories and digital systems for monitoring training results are combined. It is important to emphasise that similar multimodal training complexes are already functioning successfully in a number of NATO member states, in particular Poland, Germany and the United States of America [16].

Therefore, the introduction of similar innovative approaches into the system of police training in Ukraine may become a significant step towards harmonising national educational standards for training personnel for police bodies with European norms and practices. Thus, this makes it possible to conclude that the introduction of innovative technologies into the system of tactical and special training for police officers should be regarded not only as a means of improving the educational process, but also as an important strategic area for the development of modern education and training for law enforcement officers. Ultimately, the rational and purposeful use of such technologies will ensure the training of highly qualified, psychologically resilient and technologically competent police officers capable of responding effectively to current security challenges.

Under the conditions of the strategic course towards European integration and the renewal of departmental education, the problem of the strategic development of innovative technologies in the field of tactical and special training for police officers is acquiring particular importance. At the current stage, when dynamic changes are taking place in the security sphere, including the growth of hybrid threats, the spread of cybercrime and the likelihood of mass violations of public order, there

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Military Science. Vol. 4 No. 2 (2026)

is an urgent need for the continuous improvement of police officers' professional competence through the introduction of modern digital, information and communication, and pedagogical technologies. The prospects for the further development of innovations should be analysed within several interconnected areas, in particular technological, educational, scientific-methodological and international areas, which will ensure a comprehensive approach to the formation of an innovative environment. The technological area of development of the personnel training system for police bodies covers the introduction of digital and high-technology training methods, including integrated training grounds for modelling operations, new-generation VR/AR complexes, as well as the use of artificial intelligence (AI) technologies to analyse the professional actions of cadets and automatically assess the results of the training process. In this aspect, it is worth taking into account that in global police training practice, these technologies demonstrate high effectiveness, since simulation training using artificial intelligence provides the possibility of modelling a wide range of scenarios involving offender behaviour and police responses in rapidly changing situations [17]. The educational area of development of the modern police training system is characterised by a gradual transition from classical forms of learning to an integrated, blended format of the educational process, which combines classroom training with the use of distance learning platforms, digital simulators and video analytics technologies. The introduction of this approach will make it possible simultaneously to expand access to learning resources and to create individual learning plans adapted to the personal characteristics, learning pace and professional level of students at police training institutions. The scientific-methodological area of innovation development in the system of tactical and special training for police officers should provide for the formation of a coherent methodology for assessing the effectiveness of the technologies introduced. One of the main tasks of this area is the formation of unified criteria for assessing the quality of the educational process, the development of methods for analysing the results of training simulations, as well as the creation of a certification system for VR/AR programmes intended for use in training units of the Ministry of Internal Affairs. In this regard, the leading role should belong to the research institutions of the Ministry of Internal Affairs, which should ensure scientifically substantiated monitoring of the impact of innovative technologies on improving the level of professional competence of police officers. The international area of innovation development in the field of professional police training is manifested in the formation and development of integration-based partnerships between national police training institutions and leading European institutions, in particular CEPOL, FRONTEX, Europol Academy and Interpol Global Academy. The implementation of joint educational programmes, professional internships and exchanges of experience in the field of introducing digital simulators and VR technologies will ensure the gradual harmonisation of national police education standards with the requirements of international standards [18]. A promising area of development is the formation and introduction of digital security systems that will integrate educational institutions, National Police units, research centres and IT companies into a single innovative information and educational space. The functioning of such systems will contribute to the continuous updating of educational and methodological content, the introduction of the latest technological solutions, as well as the organisation of interagency training on the basis of real data from operational and service-related activities [19]. In the future, it seems appropriate to establish a National Centre for Police Training Innovation, whose activities will be aimed at coordinating the processes of developing, testing and introducing innovative technologies into the system of professional police training. The main tasks of such a centre should include integrating research results into personnel training practice, developing modern digital educational products, as well as ensuring the international certification of training programmes in accordance with the requirements and standards of the European Union [20].

Thus, the prospective development of innovations in the field of tactical and special training for police officers consists in the comprehensive integration of technological, educational, and scientific-organisational approaches. The consistent implementation of these areas will ensure an improvement

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Military Science. Vol. 4 No. 2 (2026)

in the quality of professional training for specialists, the strengthening of the institutional potential of the National Police of Ukraine, and the formation of a modern learning culture aimed at security, effectiveness, and compliance with European standards.

Discussions

The research topic has been considered by the following authors: V. Andrushchenko, V. Klymchuk, I. Petrescu & C. Dima, O. Bandurka, M. Tulenkov, O. Hrebeniuk, S. Derevianko, M. Kovalchuk, R. Humeniuk, and I. Lytvynenko. The researchers' scientific works comprehensively highlight the role of innovative tools and methods integrated into the system of tactical and special training. The authors have proven their determining role in increasing the professional skills of police officers, as well as in developing the ability to respond promptly to current threats to public security. In addition, strategic vectors for the further modernisation of these approaches have been outlined in order to optimise the entire system of departmental education.

A review of the work of modern researchers makes it possible to state that the introduction of innovations into tactical and special training within the system of departmental education of the National Police of Ukraine is a strategically oriented process. This activity is aimed at developing practical tools and key competencies necessary for the effective performance of official duties under dynamic security conditions. This issue is in the focus of attention of the international scientific community, in particular in the work of V. Andrushchenko, "Innovative Approaches to the Professional Training of Law Enforcement Officers: Theory and Practice", where it is substantiated... (2021); V. Klymchuk, "The Use of Virtual Reality Technologies in the Training of Police Officers" (2022); I. Petrescu & C. Dima, "Simulation-Based Police Training: Enhancing Tactical Decision-Making through Technology" (2023); O. Bandurka and M. Tulenkov, "Professional Training of Police Officers under the Conditions of Reforming the System of the Ministry of Internal Affairs of Ukraine" (2020); O. Hrebeniuk, "The Competence-Based Approach in Police Training: Theoretical and Methodological Foundations" (2021); V. Kryvorotko, "Innovative Teaching Methods in the System of Police Service Training" (2022); S. Derevianko, "Tactical and Special Training under Martial Law: Challenges and Ways of Improvement" (2023); M. Kovalchuk, "Scenario-Based Modelling in the Educational Process of Police Officers: Current Experience and Prospects" (2021); R. Humeniuk, "Innovative Technologies in the Educational Process of the Ministry of Internal Affairs of Ukraine System" (2023); I. Lytvynenko, "The Concept of Establishing a National Centre for Police Training Innovation" (2024).

Research of the scientific literature confirms the dominant role of tactical and special training in the professional development of a police officer. It ensures the synthesis of theoretical knowledge and practical skills necessary for a professional response to the challenges of service activity. The regulatory and methodological foundation of such training consists of acts of the Ministry of Internal Affairs of Ukraine, educational and professional programmes of higher education institutions of the Ministry of Internal Affairs, and international educational paradigms.

Conclusion

The analysis conducted of the current state of professional training for personnel of the National Police shows that the introduction of innovative technologies is a determining factor in increasing the effectiveness of the system of tactical and special training for police officers, since it contributes to the comprehensive integration of theoretical knowledge, practical skills and the formation of psychological readiness among law enforcement officers for effective action in complex and dynamic situations of operational and service-related activity. As a result of the research, it has been substantiated that the integration of virtual reality (VR) and augmented reality (AR) technologies, computerised training simulator complexes, biofeedback systems and distance learning platforms (e-learning) significantly increases the effectiveness of professional police training. These innovative

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Military Science. Vol. 4 No. 2 (2026)

technologies contribute to the creation of realistic models of service-related situations, the formation of teamwork skills, the development of critical thinking and self-control, and also ensure an increased level of safety and promptness in police officers' actions.

In the course of the research, it was established that particular emphasis should be placed on the introduction of innovative pedagogical technologies, in particular problem-based learning, case study and team decision games, which will ensure the formation of analytical thinking, the development of leadership competencies and the strengthening of teamwork.

In view of the prospects for the further development of innovative approaches in the system of police training, there is a need to form a single digital educational space within the Ministry of Internal Affairs of Ukraine. Such a space should provide for the integration of simulation training grounds, VR/AR training complexes, intelligent systems for the automated analysis of learning outcomes, as well as the creation of a centralised database of electronic educational resources. An important factor in the development of the police training system in Ukraine is the intensification of international cooperation aimed at aligning national standards with European requirements.

The analysis of the experience of institutions such as CEPOL, FRONTEX, Europol Academy and other structures of the European Union shows that the integration of innovative approaches and technologies into the process of professional training for law enforcement officers significantly increases their level of professional competence, moral and psychological resilience and readiness to respond to modern security challenges.

Thus, the integration of innovative technologies into the system of tactical and special training for police officers should be regarded as one of the key strategic areas of state policy in the field of national security and police education. Its practical implementation will ensure the training of a new generation of police officers – highly professional, motivated and technologically oriented specialists capable of effectively performing service tasks under the conditions of growing challenges and dynamic changes in the security environment.

The assessment of the current state of professional training for personnel of the National Police indicates that the introduction of innovative technologies is a key factor in increasing the effectiveness of the system of tactical and special training for police officers, since it contributes to the comprehensive integration of theoretical knowledge, practical skills and the formation of psychological readiness among law enforcement officers for effective action in complex and dynamic situations of operational and service-related activity.

The generalisation of the research results makes it possible to conclude that the integration of innovative technologies into the system of tactical and special training for police officers is appropriate as a comprehensive instrument for improving the quality of professional education. The use of digital simulators, VR/AR technologies and analytical learning platforms contributes to the formation of practical readiness, psychological resilience and the ability to make effective decisions under the dynamic conditions of service activity.

An important factor in the development of the police training system in Ukraine is the intensification of international cooperation aimed at aligning national standards with European requirements. The analysis of the experience of institutions such as CEPOL, FRONTEX, Europol Academy and other structures of the European Union shows that the integration of innovative approaches and technologies into the process of professional training for law enforcement officers significantly increases their level of professional competence, morale and psychological resilience, and readiness to respond to modern security challenges. A promising area of further research should be linked to the examination of the effectiveness of specific innovative instruments, the adaptation of new technologies to real working conditions, the analysis of their impact on the quality and safety of performing service tasks, as well as the creation of a single digital educational space within the system of the Ministry of Internal Affairs of Ukraine that will comply with modern European standards of police education and ensure the continuous professional development of police officers.

ISSN (print): 2786-9318
ISSN (online): 2786-9326
Military Science. Vol. 4 No. 2 (2026)

Recommendations

It is recommended that educational institutions with specific learning conditions that train police officers integrate innovative technologies into tactical and special training programmes, combining traditional teaching methods with interactive and digital tools, and that heads of units of the National Police of Ukraine use them when developing educational and methodological materials, modernising educational programmes and improving the system of professional training for police officers.

Conflict of Interest

The authors declare that they have no competing interests regarding the subject matter of the article.

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Інноваційні технології в тактико-спеціальній підготовці поліцейських та перспективи їх розвитку

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Анотація. У статті досліджено актуальні питання впровадження інноваційних технологій у систему тактико-спеціальної підготовки поліцейських у контексті сучасних безпекових викликів та трансформації сектору безпеки України. Науковий інтерес до теми спричинений пошуком нових шляхів удосконалення фахової підготовки особового складу поліції в умовах зростання рівня складності службово-бойових завдань, поширення гібридних загроз та розвитку цифрових технологій. Метою статті є пояснення теоретико-методологічних засад модернізації освітнього процесу в правоохоронних органах. прикладних засад інтеграції інноваційних технологій у систему тактико-спеціальної підготовки поліцейських, а також визначення перспектив їх подальшого розвитку. Дослідження має теоретичний характер, що зумовило застосування комплексу загальнонаукового та спеціального інструментарію. Головний аспект приділено аналізу першоджерел, системному структуруванню матеріалу, порівнянню міжнародних освітніх практик та розробці моделей подальшого розвитку системи підготовки кадрів для правоохоронних органів. Робота містить аналіз теоретичних напрацювань і прикладних аспектів впровадження інновацій у професійну підготовку правоохоронців, що відображає актуальний стан цієї проблематики, визначено ключові напрями використання цифрових та симуляційних засобів навчання, зокрема технологій віртуальної та доповненої реальності, комп'ютеризованих тренажерних систем, платформ дистанційного навчання, систем біологічного зворотного зв'язку, та інтерактивних методів моделювання службових ситуацій. Аналіз результатів доводить, що інтеграція інновацій в освітній процес забезпечує зростання його результативності. Це сприяє не лише належному рівню фахової компетентності, а й розвитку здатності правоохоронців до швидкого ухвалення рішень у непередбачуваних та мінливих обставинах, а також підвищенню психологічної стійкості поліцейських до стресових факторів службової діяльності. Визначено основні проблеми впровадження інноваційних технологій, серед яких недостатній рівень матеріально-

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технічного забезпечення, потреба у підготовці інструкторського складу та необхідність модернізація методичного інструментарію навчання.. Отримані результати можуть свідчити про те, що запропоновані авторські рекомендації слугують підґрунтям для модернізації системи відомчої освіти. Їх впровадження сприятиме вдосконаленню тактичної підготовки особового складу та розбудові сучасної цифрової інфраструктури в освітніх установах системи МВС України. Запровадження зазначених технологій сприятиме підвищенню готовності поліцейських до ефективного реагування на сучасні безпекові загрози та забезпеченню належного рівня публічної безпеки і дотримання законності.

Ключові слова: інноваційні технології, тактико-спеціальна підготовка, поліцейські, віртуальна реальність, симулятори, професійна компетентність, розвиток.