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Neuropedagogical Approaches to Developing Tactical Readiness for Special Combat Techniques in Military Cadets

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Abstract: *This study examines the application of neuropedagogical principles to the teaching of special combat techniques (service-applied hand-to-hand combat) to cadets of higher military educational institutions of the National Guard of Ukraine. The paper identifies key neuropsychological factors, including hemispheric lateralisation, sensory channel preferences, temperament, and properties of the nervous system, that may influence the acquisition of motor skills in military training contexts. Drawing on a review of scientific and methodological literature, the study proposes a framework for integrating neuropedagogical approaches into the physical training of cadets, with the aim of enhancing tactical readiness for the use of physical force measures in extreme service conditions. The paper argues that neuropedagogically informed instruction, which accounts for individual neuropsychological profiles, adapts teaching methods accordingly, and leverages principles such as neuroplasticity and sensory engagement, may improve the effectiveness of motor skill acquisition and tactical decision-making. Limitations include the absence of empirical data testing these propositions, and future research should employ controlled experimental designs to evaluate the proposed framework.*

Keywords: *neuropedagogy; tactical readiness; neurophysiological approaches; extreme conditions; hand-to-hand combat techniques; male and female cadets; special fighting techniques; physical training; motor-skill acquisition*

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1. Introduction

Contemporary military education requires innovative approaches to training cadets in complex motor skills, particularly those related to combat readiness. Neuropedagogy, an emerging educational approach grounded in research on brain functioning, offers a framework for developing teaching methods that account for individual neuropsychological differences in how cadets perceive, process, and retain motor information.

The purpose of the paper was structured by the following tasks. 1) to determine the significance of neuropedagogy in the process of teaching cadets motor skills; 2) identify the components of the neuropsychological profile of students that most affect the effectiveness of the learning process and improvement, 3) identify the key properties of the nervous system of students.

The National Guard of Ukraine (NGU) performs complex tasks including maintaining public order, protecting strategic facilities, and participating in combat operations. Officers must be prepared to apply physical force measures, including hand-to-hand combat techniques, in situations where the use of weapons is inappropriate, such as in crowded spaces or during confined-area assaults. Effective use of these techniques requires not only physical capability but also tactical thinking, situational assessment, and adherence to legal principles of proportionality, necessity, and minimisation of harm (United Nations Office on Drugs and Crime, 2017). Failure to comply with legal norms can result in serious consequences for both the individual and the institution. These requirements make neuropedagogically informed training, which addresses cognitive and decision-making processes alongside physical skills, particularly relevant.

Successful practices of NATO countries, in particular, the training of police officers, special forces and military personnel for the tactical use of special techniques, demonstrate the importance of integrating this component into the training of future officers. The public expects NGU officers to be professional, efficient and humane when performing assigned tasks. This emphasises the importance of training that allows the use of special combat techniques (measures of physical impact, force) only to the necessary extent and as effectively as possible. Thus, the study is relevant and timely and meets the requirements and realities of today.

The empirical review was carried out according to the plan of initiative research work on the topic 'Special physical readiness of future officers of the National Guard of Ukraine (code 'Rationality')'.

It should be emphasised that the effective organisation of the physical training system of representatives of the 'power bloc' provides not only physical endurance and combat effectiveness, but also contributes to strengthening the moral and psychological state, professional development and health of personnel. This is the basis for increasing the defense capability of the state and ensuring the national security of Ukraine. Modern pedagogical models (technologies), in particular organisational and pedagogical conditions, play a key role in the development of military-applied skills of military specialists of the security and defense sector of Ukraine (SBOU). They provide a holistic approach to training, take into account current threats, introduce advanced technologies and combat experience. Such an approach contributes to increasing the efficiency of performing assigned tasks, strengthening the moral and psychological stability of personnel and strengthening the defense capability of the state in today's realities.

Knowledge and use of the features of constructing tactical schemes of duel with the opponent (opponents) are of essential importance for military personnel. This provides them with a tactical advantage, increases combat effectiveness, forms resistance to stressful conditions and helps to adapt to various scenarios of real combat operations.

Analysis of scientific and methodological and specialised literature has shown that theoretical and empirical studies devoted to the features of the organisation of the system of application of physical force (hand-to-hand combat techniques) by higher education students of higher military educational institutions of the National State University (and other institutions of the State Military Academy) are extremely rare. This emphasises the significance and demand for the chosen direction of scientific research.

Purpose of the article. The aim of this paper is to analyse the theoretical contribution of neuropedagogical principles to the development of tactical readiness for special combat techniques and to propose a conceptual framework applicable to military cadet training. The study synthesises current theoretical knowledge and proposes a conceptual framework for integrating neuropedagogical principles into tactical readiness training.

The study pursues three objectives: (1) to analyse neuropedagogical principles relevant to the teaching of motor skills in military contexts; (2) to identify the neuropsychological profile characteristics that most influence the effectiveness of combat technique instruction; and (3) to propose a framework for integrating neuropedagogical approaches into the tactical readiness training of NGU cadets.

2. Features of the Development of Combat Tactics of Cadets in Extreme Situations

Tactical readiness to use physical impact measures (force) is a multifaceted characteristic that combines physical fitness, tactical thinking, knowledge of special combat techniques, as well as the ability to act within the legal framework, taking into account moral and ethical norms. This set of qualities determines the ability of an officer to act confidently, effectively and safely in conditions of physical confrontation, ensuring the minimisation of risks for himself, subordinates and others.

Understanding the essential characteristics of the tactical readiness of future officers is key to forming an effective system of their training. This is of particular importance in the context of integrating special combat techniques into the educational process. After all, such techniques should not only ensure effective neutralisation of threats, but also meet modern standards of humanity, legality and proportionality of the use of force (Bondarenko et al., 2020).

It should be emphasised that the training of highly qualified officer personnel is carried out at the Military University. In the National Guard of Ukraine, military-professional training of cadets (future officers) is carried out in the educational process.

It should be noted that in modern paedagogical science, a number of approaches have been identified that determine the specifics of the formation of a person's readiness for professional activity. Among them, the most popular are: creative, cultural, personalistic and mixed approaches.

Taking into account the scientific concepts mentioned above by the researchers, it was established that some scientists and practitioners do not fully apply effective and competitive methods of developing tactical thinking in representatives of the studied category (Khatsayuk et al., 2021). This significantly levels the process of increasing their professional skills in using the necessary 'combat arsenal' of service-applied hand-to-hand combat when performing assigned tasks. Therefore, 'the readiness of future officers to build rational tactical schemes for applying physical impact measures (force) in extreme conditions of service-combat activity' is a derivative of the term 'personal readiness for professional activity' and is consistent with the scientific concepts of the researchers. It was established that the readiness of future officers (servicemen of the Security and Defense Forces of Ukraine) for effective military-professional activity has a significant impact on the actualised – 'paedagogical influence'. It is worth noting that the formation of individual readiness is possible provided that there is a clear understanding of the substantive aspects of future military-professional activity, as well as compliance of key competencies with the requirements for the officer corps of the Security and Defense Forces of Ukraine (SDF of Ukraine) (Lyubchych, 2023).

Based on the literature reviewed, we define the tactical readiness of future officers as a complex personal formation integrating: (1) physical preparedness - strength, endurance, reaction speed, and coordination; (2) psychological resilience - maintaining composure and decision-making capacity under stress; (3) tactical-analytical competence - situational assessment, prediction of adversary actions, and selection of optimal response strategies; and (4) legal-ethical awareness - knowledge of and adherence to legal norms governing the use of physical force. This readiness is

dynamic, develops through structured pedagogical intervention, and must account for the specific demands of NGU service conditions.

It is also interesting that the above-mentioned personal formation is dynamic and is formed under the influence of specially organised training (pedagogical influence), which takes into account:

- 1) the peculiarities of service and combat activities (SBD), characteristic of the NGU and other institutions of the SBOU;
- 2) conditions that are close to real extreme situations; individual abilities and the level of initial training of future officers.

In addition, the readiness of future officers is manifested in the ability to quickly build and implement rational tactical schemes, using measures of physical impact, force (special combat techniques) in accordance with the situation, minimising risks to themselves, colleagues and the civilian population. In turn, the ability of cadets of the NSU (SBOU institutions) to build rational tactical schemes for conducting duels is one of the dominant characteristics of their professional preparedness. Effectively conducting duels with an opponent requires not only physical fitness, but also a high level of tactical thinking, the ability to analyse the situation, predict the actions of the enemy and adapt their decisions in accordance with the conditions of hand-to-hand combat (Ivanov, 2013).

In the context of modern challenges associated with the implementation of the tasks assigned to the NSU, the formation of this type of readiness acquires strategic importance. A high level of preparedness for the application of physical impact measures (special combat techniques) is necessary to perform assigned tasks that involve neutralising the enemy's aggressive actions in conditions of increased dynamics and unpredictability of situations (extreme conditions of SBD).

Understanding the criteria, levels and components of the readiness of higher education students of VVNIZ institutions of SBOU to build tactical schemes for the application. It should be emphasised that the basis of this type of readiness of representatives of the studied category includes:

- 1) the physical component (development of strength, endurance, speed of reaction and coordination of movements necessary for successful combat);
- 2) psychological resilience (the ability to remain calm and focused during confrontation, to quickly make effective decisions). ;
- 3) analytical and strategic thinking (the ability to assess the tactical situation, predict the enemy's actions and choose the optimal strategy and technique for conducting hand-to-hand combat);
- 4) technical skills (mastery of technical techniques of physical impact, force (special fighting techniques), which are effective and at the same time comply with legal and ethical norms).

3. Practical Features of the Development of Combat Elements in Cadets

Neuropsychological characteristics will significantly influence not only the process of learning and improvement of motor skills and abilities, but also on the nature of decision-making, the method of using force coercion of offenders by police officers. In the latter case, the effectiveness of the use of physical force depends not only on the degree of formed motor skills, timely and rapid assessment of a particular situation, the legality of the use of physical force and on the individual typological characteristics of the personality of the employee himself, his readiness to act in extreme conditions.

Neuroeducation is important for teachers. They will be able to increase the effectiveness of the educational process through knowledge of the structure of the brain, its ability to memorise, process, record, store and recall the received information flows. The teacher is able to influence the development of the brain of cadets

Training should be aimed at implementing and increasing the semantic characteristics of the activity, its importance for female cadets, at developing and improving the emotional and value

orientation of the learning process. The basics of neuropedagogy guide the teacher to develop new pedagogical technologies based on the study and practical application of the types of thinking of female cadets, contribute to the adaptation processes in the applied technologies, means, and methods of teaching not to the level of intelligence of female cadets, but to their personal capabilities (Meleshko et al., 2024).

An important indicator of professional and applied physical training of female employees is the orientation of the educational process to teaching motor actions, to the formation of their skills and abilities directly related to professional activity. The basic laws of neuropedagogy include: the consciousness of learning for both female cadets and teachers; timeliness of learning; logic, expediency, consistency of influences on the educational, developing, educational functions of the educational process; controllability of activity in the learning process.

Neuroeducation is important for teachers. They will be able to increase the effectiveness of the educational process through knowledge of the structure of the brain, its ability to memorise, process, record, store and recall the received information flows. The teacher is able to influence the development of the brain of cadets by word, emotional sphere, structure of classes, means, methods and styles of teaching, creation of a certain surrounding atmosphere (friendliness, diversity, order, design, music, lighting, etc.), feedback, etc. (Khatsayuk et al., 2020).

Training should be aimed at implementing and increasing the semantic characteristics of the activity, its importance for cadets, at developing and improving the emotional-value orientation of the learning process. The basics of neuropedagogy guide the teacher to the development of new pedagogical technologies based on the study and practical application of the types of thinking of cadets, contribute to the adaptation processes in the applied technologies, means, and methods of training not to the level of intelligence of cadets, but to their personal capabilities (Tokuhamma-Espinosa, 2014).

Rapidly changing motor tasks, with a high emotional component of performing certain exercises, will contribute to the effectiveness of the educational process. Important in this regard is the use of technical training aids, video visualisation tools, as well as the use of modeling elements and connections with practical activities. For the development of physical qualities, in our opinion, combined methods are most suitable, where the motor skills of service-applied exercises are improved in combination with professionally important physical qualities (Turchynov et al., 2016).

The neuropedagogical educational process will be effective if it respects and takes into account the properties of the nervous system, which include:

- adaptive processes. When developing motor skills in employees, methods of fragmentary and holistic learning should be used. The breakdown and gradual mastery of individual phases of movements will create conditions for individual mastery of the action as a whole. For the development of motor skills, guiding, preparatory, imitation, standard, simplified and complex exercises and tasks are used;

- interest and novelty. A motor skill is a motor action performed to implement and solve a motor task. Students should be interested in the educational process during which this skill is developed. To activate and train brain processes, it is necessary to actualise the tasks being solved and the exercises being performed (Khatsayuk et al., 2023).

Performing the tasks and proposed updated exercises will create updated templates and develop trajectories of actions. This will begin to form new templates, themes and movements, as well as muscle-motor, vestibular, tactile, organic and other sensations will arise and improve;

- Speed of execution and control of actions. This indicator is directly related to the speed of brain activity and neural processes. The faster the information received is processed, the faster you can get a response, including automated control of coordination mechanisms. This will allow the motor skill to develop into a motor habit;

- Modification and mobility. The process of developing motor action is progressive and gradual. Brain activity will be carried out progressively as new requirements are put forward, new tasks are set and new skills and knowledge are acquired;

- Planning. During the development of motor actions, the brain is engaged in planning and executing movements;

- Neuroplasticity. The human brain has the ability and capacity to change in response to new experiences, as well as to restore and form lost connections. This quality of the brain affects the processes of adaptation, acquisition of new skills and general changes in life. Constant efforts lead to mastery of the new, gaining experience and developing an attitude towards growth. By exploring new motor actions, students force the brain to focus on a complex system, which increases its ability to learn and comprehend new things. Regular physical and motor activity is important for the development of neuroplasticity;

- completeness. The brain is a unique organ with individual characteristics, a unique memory system, speed and flexibility of thought processes. Its development is stimulated by free creative activity, the absence of stress and overstrain, as well as the acquisition of new skills and disciplines.

Research on sex-related cognitive differences suggests some average-level differences in specific cognitive domains, however, contemporary neuroscience emphasises that within-group variation far exceeds between-group differences, and that observed differences are strongly influenced by socialisation, training, and task context (Hyde, 2005; Joel et al., 2015). In the context of combat technique instruction, paedagogical approaches should be adapted to individual learner characteristics, including preferred sensory modalities, prior motor experience, and learning pace, rather than to categorical sex-based assumptions. Instructors should assess each cadet's neuropsychological profile individually and tailor teaching strategies accordingly. Assessment methods also differ between the biological sexes (Naukovo-pedahohichni problemy fizychnoyi kul'tury, Kyiv, 2022).

Within the framework of the specified circumstance, the teacher must use different methods and methodological techniques when teaching and improving female cadets and male cadets motor actions in general and combat techniques in particular (Zabara & Serhiyenko, 2023).

A rapid change of motor tasks with a high emotional component of performing certain exercises will contribute to increasing the effectiveness of the learning process. Important in this aspect is the use of technical training tools, video visualisation tools, as well as the use of modeling elements and connection with practical activities (Möding, Woll & Wagner, 2022). For the development of physical qualities, in our opinion, related methods are most suitable, when the motor skills of service and utility exercises are improved in connection with professionally important physical qualities (Robinson & Aronica, 2009).

The brain, when performing the tasks set and the proposed updated exercises, will create updated schemes and develop courses of action. Thus, new schemes, themes, movements will begin to form, muscular-motor, vestibular, tactile, organic and other sensations will arise and improve;

- speed of execution and control of actions. This indicator is directly related to the speed of brain activity and nervous processes. The faster the information received is processed, the faster you can get a response, up to the automated control of coordination mechanisms. This will allow motor ability to develop into a motor skill;

- variability and mobility. The process of forming motor action is progressive. Brain activity will be carried out progressively as new requirements are put forward, new tasks are set, and new skills and knowledge are acquired;

- planning. When forming motor actions, brain activity is busy planning, as well as performing movements;

- neuroplasticity. The human brain has the ability and ability to change under the influence of new experience, as well as to restore and form lost connections. It is this quality of the brain that affects the processes of adaptation, the processes of acquiring new skills, and changes life as a whole. Constant efforts lead to mastering the new, gaining experience, and forming a growth mindset. By learning new motor actions, students force the brain to focus on a complex system, which improves its ability to learn and understand new things. A prerequisite for the development

of neuroplasticity is regular physical and motor activity - completeness. The brain is a unique organ with individual characteristics, the predominance of a unique memory system, speed and flexibility of thought processes. Its development is stimulated by free creative activity, the absence of stress and overwork, and the mastery of new skills and sciences (Shneider, 2007; Svetaz et al., 2020).

4. Neuropedagogical Processes of Developing Physical Competence of Cadets in Extreme Combat Situations

The main goal of neuropedagogy is to build a system of education and upbringing that optimally takes into account the individual neuropsychiatric characteristics of students (neuropsychological profile), based on the study of the brain foundations of human mental activity, associated primarily with the perception, storage, processing and reproduction of received information and experience. These characteristics include:

- individual lateral profile of students (functional asymmetry of the cerebral hemispheres); - sexual, gender differences;
- leading type of temperament;
- leading sensory channel of perception and processing of information by the student;
- patterns of work and the level of development of higher mental functions that ensure intellectual and creative activity, communication and self-regulation of students (attention, memory, thinking, imagination, speech, emotions and will).

The above characteristics will have a significant impact not only on the process of learning and improving motor skills, but also on the nature of decision-making, the method of applying force to offenders. In the latter case, the effectiveness of the use of physical force depends not only on the degree of development of motor skills, timely and rapid assessment of a specific situation. An important indicator of professional and applied physical training of female employees is the orientation of the educational process to teaching motor actions, to the formation of skills and abilities in them that are directly related to professional activity.

An important indicator of the professional and applied physical training of officers is the orientation of the educational process to the training of motor skills and the development of skills and abilities directly related to professional activity. The fundamental principles of neuropedagogy include: meaningful learning for both students and teachers; timely learning; consistency, appropriateness and consistency of influence on the educational, developmental and educational functions of the educational process; and controllability of educational activity.

Neuroeducation is important for teachers. They will be able to increase the effectiveness of the educational process by understanding the structure of the brain, its ability to remember, process, record, store and reproduce the received information flows. Teachers are able to influence the development of the cadets' brains through language, emotions, lesson structure, teaching aids, methods and styles, creating a specific atmosphere (friendliness, diversity, order, design, music, lighting, etc.), feedback, etc.

Teaching should be aimed at understanding and strengthening the meaningful nature of the activity, its importance for the cadets, as well as at developing and improving the emotional and value orientation of the educational process. The basics of neuropedagogy guide teachers in developing new paedagogical technologies based on the study and practical application of cadets' thinking models. They contribute to the processes of adapting the applied technologies, means and methods of teaching not to the level of intelligence of the cadets, but to their personal capabilities, thereby freeing the physical, motor, spiritual and mental components of the students' bodies. Thus, educational technologies at the current stage of development of education must necessarily be based and built on an understanding of the organisation of brain activity and its individual functional asymmetry. In this context, the instructor should use a variety of methods and teaching techniques when teaching and improving motor skills in female and male cadets.

5. Conclusion

This study examined the potential application of neuropedagogical principles to the tactical readiness training of future NGU officers. Three main conclusions emerge. First, the neuropsychological profile of individual cadets, including hemispheric lateralisation, sensory channel preferences, temperament, and the developmental level of higher mental functions, represents a theoretically important but currently underutilised factor in military motor skill instruction. Accounting for these individual differences may improve the effectiveness of combat technique training. Second, key properties of the nervous system, particularly neuroplasticity, adaptive processing, and the role of novelty in learning, provide a neuroscientific rationale for specific instructional design choices, such as progressive complexity sequencing, multimodal instruction, and contextualised practice under simulated stress conditions. Third, tactical readiness for the application of physical force measures is a multidimensional construct that encompasses physical, psychological, tactical-analytical, and legal-ethical components. Neuropedagogical approaches may contribute to all four dimensions by optimising how cadets acquire, retain, and deploy complex motor skills under cognitive and emotional load. However, these propositions remain theoretical. The present study did not include empirical testing of a neuropedagogical training intervention. Future research should employ controlled experimental designs, comparing neuropedagogically adapted instruction against standard training methods, with validated measures of motor skill acquisition, tactical decision-making accuracy, and performance under simulated stress conditions.

In the course of the development of motor actions in employees, methods of disjointed and holistic learning should be used. The breakdown into parts and the gradual mastery of individual phases of movements will create conditions for individual mastery of the action as a whole. To form a motor action, suggestive, leading, imitative, standard, simplified, complicated exercises and tasks are used; curiosity and novelty. Motor action is a motor act performed to perform and solve a motor task; cadets should be interested in the educational process during which this skill is formed. In order to activate and train brain processes, it is necessary to update the tasks being solved and the exercises being performed.

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