

Dynamics of the Professional Endurance Indicators in Officers of the Operational Level in a Higher Military Educational Institution During Training

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Abstract: The paper presents the results of an experimental study on the development of professional endurance and psycho-emotional stability in the future officers of operational level during training in a higher military educational institution. The educational research was conducted in three stages, in the National Defence University of Ukraine, named after Ivan Cherniakhovskyi. The current level of professional endurance in this category of officers gave grounds to assume that with traditional approaches to the organisation of the educational process, it is quite difficult to achieve a high level of development of this property. Therefore, there is a need to find and substantiate the pedagogical conditions for developing professional endurance in officers and improving their mental health. To confirm the effectiveness of the implementation of the conditions defined by the authors at the beginning and end of the experiment, a comparison of the obtained data of the experimental group (EG) and control group (CG) was carried out according to the authors' criteria and indicators. The results of the study on the implementation and substantiation of pedagogical conditions for the development of professional endurance in officers confirmed that the proposed measures contributed to the effective development of this quality. Statistical methods ensure that the officers from the EG had statistically significant changes in professional endurance as a result of the experiment. Comparison of the development of professional endurance in the EG at the beginning and end of the experiment using the Wilcoxon rank-sum test confirmed the effectiveness of implementing appropriate pedagogical conditions for the development of professional endurance and psycho-emotional stability.

Keywords: Endurance, professional military activity, motivational criterion, emotional-volitional criterion, intellectual criterion.

INTRODUCTION

In the current conditions of Ukraine's sovereignty and independence, the need to solve problems related to ensuring the security of the individual, society, and the state itself is becoming increasingly important. Specialists of the Armed Forces of Ukraine, the Security Service of Ukraine, the State Border Guard Service of Ukraine, the Ministry of Internal Affairs, and other structures and departments of the security and defence sector make a significant contribution to security maintenance. As a result, in the context of reforming the sector, the requirements for the professional activity of specialists in the relevant fields, first of all, military officers and bodies performing tasks in the field of security and defence of the country, are significantly increasing.

A study of the peculiarities of service and combat activities of officers of the governing bodies and departments of the security and defence sector shows that the effective performance of their functional duties will be facilitated by the following professionally important qualities: managerial (directiveness, care for subordinates, authority, leadership, etc.), mental (self-control and endurance, patience, resilience, balance, responsibility, obligation), moral (ethics, persuasiveness, honesty, etc.), physical (endurance, strength, etc.) [1-11]. One of the effective, professionally important qualities that allow overcoming these adverse conditions in preparation for future professional military activities, as well as increasing the level of development of neuropsychological stability, psychomotor and physical qualities, is professional endurance [5, 12-14].

Professional endurance is important in the life of every specialist, regardless of his profession, and allows him to perform a significant amount of motor

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activity, maintain a high level of motor activity for a long time, quickly regain strength after vigorous physical activity [15]. The professional endurance of military specialists is their ability to withstand troubles and difficulties, prolonged stressful events or actions related to their professional activity. Thus, based on the analysis of findings, it can be concluded that the problem of professional endurance of military specialists is relevant and important in combat activities and develops depending on the nature of the tasks and the conditions under which they are performed. However, in scientific research, practically no attention has been paid to the dynamics of indicators of professional endurance of future military command in studying at a higher military educational institution. The following criteria of professional endurance were studied:

- motivational criterion indicators (motivation for professional military activity; motivation for the development of professional endurance);
- emotional-volitional criterion indicators (pronouncement of the strength or weakness of the nervous system; development of volitional qualities; emotional readiness for the development of professional endurance);
- intellectual criterion indicators (knowledge of methods, technologies and means of developing professional endurance; knowledge of the organisation of self-development of professional endurance, taking into account age and individual characteristics)
- subject-performance criterion indicators (professional subjectivity of officers; physical endurance; the endurance of the nervous system).

The purpose of the study was to introduce pedagogical conditions for the development of professional endurance in the future officers of the operational level, the result of which was to increase the level of development of this property.

MATERIALS AND METHODS

Assessment of the dynamics of professional endurance indicators was conducted on the basis of the National University of Defence of Ukraine, named after Ivan Cherniakhovskiy, with future officers of the operational level. According to the structure of the general population using the method of cluster

selection of units of analysis, during the selection of training groups as a unit of study [16-20]. Experimental and control groups were formed of 87 and 90 officers, respectively. It was taken into account that the sample should be "statistically significant", i.e. large enough to obtain reliable information. The requirements of representativeness and homogeneity were met during the selection of groups. According to the main qualitative indicators and the level of development of the components of professional endurance of officers, these groups turned out to be homogeneous, which is confirmed by the mathematical statistics. The study was planned. Each participant voluntarily gave written consent to participate in the study.

To achieve the goal and perform the tasks, a set of methods was used to study the impact of pedagogical conditions on the object of the study that affects the level of professional endurance, establish objective patterns of training and development of professional endurance of operational officers: questionnaires, surveys, interviews, observation, testing, pedagogical experiment, mathematical processing of experimental results and their interpretation. Thus, to determine the size of the sample, the representativeness of the sample was assessed. In order to confirm the significance of differences in professional endurance indicators, measured in two different conditions on the same sample, the nonparametric statistical Wilcoxon rank-sum test was used [21].

To determine certain indicators of professional endurance, the following methods were used: to determine the values-based orientations of the individual – the method of S. Bubnov "Diagnosis of the real structure of value orientations of the individual" [22]; to determine the significance of the motives for the development of professional endurance – method of R.C. Nagovitsyn [23] adapted to the present study. The method of N. Stambulov [24] was used to determine the level of development of volitional qualities; a test questionnaire "SAN" [25] helped to determine the emotional state. Determination of the subjectivity of operational officers was carried out by the method of M.A. Schukina [26] "The level of development of personality subjectivity" and the method of A.V. Karpov [27] "Diagnosis of the level of development of reflectivity". The level of development of physical endurance was determined by the author's method of diagnosing the level of physical fitness of future military administration [28-31].

The pedagogical study on the development of professional endurance in officers was conducted

during 2017-2020 and covered several stages. At the first stage (March-December 2017), philosophical, psychological and pedagogical sources on the subject and normative documents on the organisation of professional endurance training with officers of operational level were analysed, systematised, and studied. Moreover, pedagogical experience in the development of professional endurance was studied, and the current state of development of professional endurance in terms of the components determined by the authors has been clarified. At the second stage (January-August 2018), the pedagogical conditions for the development of professional endurance in officers were identified and substantiated; the evaluation criteria and indicators of the formation of their professional endurance were defined and substantiated; the scientific apparatus and the programme of pedagogical research were developed [32].

Analysis of scientific sources, taking into account the peculiarities of professional military activity of officers of military administration, made it possible to identify the following pedagogical conditions for the development of their professional endurance: pedagogical modelling of professional endurance in officers in the process of operational training; application of author's professionally-oriented methods of endurance development; improvement of evaluation criteria and indicators of professional endurance in officers. At the study's third stage (September 2018-February 2020), the authors have conducted a pedagogical experiment and analysed its results. To confirm the effectiveness of the introduction into the educational process of pedagogical conditions for the development of professional endurance during the experiment, the indicators of EG and CG were compared according to the authors' criteria at the beginning and end of the experiment [33, 34].

RESULTS

The development of scientific and applied pedagogical aspects of the development of professional endurance in officers is based on the methodological and theoretical provisions of modern pedagogical science. The study is based on the results and conclusions of the analysis of the problem of professional endurance of military specialists, providing pedagogical validity of theoretical and applied aspects of the phenomenon. The identified trends and features of professional endurance of military specialists allow identifying significant signs of their professional

endurance. The authors consider the professional endurance of officers as a professionally important quality, which is an integral manifestation of their mental and physical spheres. Such qualities ensure the success of professional military activities in difficult, unpredictable conditions by overcoming fatigue, stress, tension and adverse combat circumstances, service-combat and other types of professional military activity [34-37].

The military profession is characterised not only by high social significance and responsibility but also by increased requirements for the state of health of personnel. Successful work in extreme conditions depends on the level of specialised knowledge and skills and requires neuropsychic stability, the quick concentration of attention, memory, thinking, and positive motivation from the subject. During training, one of the educators' tasks in a higher military educational institution is to ensure that the students can prevent professional burnout and notice the symptoms of burnout syndrome in its early stages. In summary, it can be noted that the development of professional endurance in officers as a criterion for the effectiveness of their professional military activities is a complex pedagogical phenomenon that requires constant targeted influence. It is important to consider pedagogical conditions for the development of this property. The obtained results were represented by three levels (low, average, high), which corresponded to the levels of development of their professional endurance. Comparing the experiment results, the authors identified significant changes in the state of development of professional endurance of officers according to motivational, emotional-volitional, intellectual, and subject-performance criteria (Tables 1-4). Table 1 shows the development of indicators of the motivational criterion before and after the experiment.

The analysis of the findings of the pedagogical experiment showed significant changes in EG in comparison with CG, namely: high level of motivation for professional military activity increased from 16.09% to 37.93%, and low, on the contrary, fell from 17.24% to 5.75%; the high level of motivation to develop professional endurance increased from 18.39% to 42.53%, and the low level fell from 25.29% to 6.9%. Thus, EG servicemen are mainly characterised by internal motivation for professional military activity, and the changes with the predominance of external positive motivation are much greater than with external negative motivation. These results are statistically significant for EG at the level of $p \leq 0.01$. In the CG, the

Table 1: Dynamics of Development of Motivational Criterion Indicators of Officers' Professional Endurance (W0.05 = 47, W0.01 = 32)

Indicators	Levels	Stages of the experiment									
		EG					CG				
		start		end		Wexp	start		end		Wexp
		qty	%	qty	%		qty	%	qty	%	
motivation for professional military activity	high	14	16.09	33	37.93	12.6	19	21.11	29	32.22	48.1
	average	58	66.67	49	56.32		59	65.56	53	58.89	
	low	15	17.24	5	5.75		12	13.33	8	8.89	
motivation for the development of professional endurance	high	16	18.39	37	42.53	14.2	18	20.0	24	26.67	34.5
	average	49	56.32	44	50.57		47	52.22	49	54.44	
	low	22	25.29	6	6.90		25	27.78	17	18.89	

high level of motivation for professional military activity increased from 21.11% to only 32.22%, and the motivation for the development of professional endurance increased from 20.0% to 26.67%. The CG is mostly characterised by external motivation for professional military activity, with a large advantage of external negative motivation [38-42]. Table 2 shows the results of input and output control of indicators of emotional and volitional criteria.

Thus, all indicators of this criterion in EG are statistically significant at the level of $p \leq 0.01$, especially for such indicators as the pronouncement of the strength or weakness of the nervous system, where the number of respondents with high levels increased from 5.75% to 32.18%, and the development of volitional qualities – from 0% to 24.14%. In CG, the results of only the indicator of emotional readiness for the

development of professional endurance are statistically significant at the level of $p \leq 0.05$. Based on the obtained data, it can be stated that according to the results of the pedagogical experiment, the officers from EG achieved a much higher endurance of the nervous system and the level of development of volitional qualities than CG [43]. It is worth noting that the strength or weakness of the nervous system and endurance of the nervous system are related but different concepts. The strength of the nervous system is the efficiency of cerebral hemispheric cells, the ability to endure extreme stresses in their activities, resistance to the action of emergency stimuli. At the same time, the endurance of the nervous system is an ability to respond adequately to strong, prolonged or frequently repeated stimuli without violating the law of force.

Table 2: Dynamics of Development of Emotional-Volitional Criterion Indicators of Officers' Professional Endurance (W0.05 = 47, W0.01 = 32)

Indicators	Levels	Stages of the experiment									
		EG					CG				
		start		end		Wexp	start		end		Wexp
		qty	%	qty	%		qty	%	qty	%	
pronouncement of the strength or weakness of the nervous system	high	5	5.75	28	32.18	14	9	10.0	20	22.22	51
	average	14	16.09	45	51.73		20	22.22	37	41.11	
	low	68	78.16	14	16.09		61	67.78	33	36.67	
development of volitional qualities	high	-	0	21	24.14	12	-	0	6	6.67	54
	average	48	55.17	58	66.67		54	60.00	61	67.78	
	low	39	44.83	8	9.19		36	40.00	23	25.55	
emotional readiness for the development of professional endurance	high	33	37.93	44	50.57	27	7	38.89	8	44.44	
	average	26	29.89	38	43.68		6	33.33	7	38.89	
	low	28	32.18	5	5.75		5	39	3	16.67	

An important criterion that reflects the understanding of the essence of professional endurance and ways of its development is the intellectual criterion. Table 3 shows the results of input and output diagnostics of this component. The indicators of the intellectual criterion for assessing the levels of professional endurance of future military specialists also showed more significant statistical changes in the EG than the CG. Thus, EG's high level of knowledge on methods, technologies, and methods of developing professional endurance increased from 10.34% to 27.58%, knowledge on the organisation of self-development of professional endurance taking into account age and individual characteristics – from 0% to 33.33%. These results are statistically significant for EG at the level of $p \leq 0.01$. The high level of intellectual criterion in CG increased only in the indicator of knowledge on the organisation of self-development of professional endurance, taking into account age and individual characteristics – from 2.22% to 16.67% at $p \leq 0.05$, another indicator of this criterion with a high level remained unchanged. These changes show that in training the EG, considerable attention was paid to the problem of professional endurance and the peculiarities of its actualisation in professional military activity [44-47].

The vast majority of EG officers could clearly answer questions on this issue, especially on the organisation of self-development of this quality, taking into account age and individual characteristics. In the CG, this material was covered in practical classes only in the following sections: accelerated movement and athletics, gymnastics and athletic training, swimming and overcoming obstacles. In these sections, attention was paid to cardiorespiratory and strength endurance

only in the practical part of their implementation, with the subsequent development of control standards, as evidenced by the respondents' answers from CG. Therefore, the analysis of the results of the indicators of the intellectual criterion shows that the level of knowledge acquisition in EG is much higher in both absolute and percentage terms. It is important to note that the officers in EG were the most prepared to transmit knowledge of the basics of professional endurance [48, 49].

Table 4 shows the results of diagnosing the development of the indicators of the subject-performance criterion before and after the experiment. The data obtained during the experiment clearly shows a significant increase in the levels of development of this criterion in EG compared to CG, especially indicators of professional subjectivity and endurance of the nervous system – at the level of significance $p \leq 0.01$. In CG, only professional subjectivity has a significant difference in the level of significance $p \leq 0.05$. There is also a significant increase in physical endurance ($p \leq 0.01$) due to increased levels of strength and cardio endurance (pull-ups and running at 3000 m), a high level of which was reached by 37.93% of officers of the operational level of training.

In EG, the dynamics of cardio endurance indicators improved, which was accompanied by well-being and positive attitude, proper training, which contributed to the appearance of a feeling of "lightness" when performing physical exercises. It is worth noting that for EG, the improvement of strength endurance of officers was associated with the need to properly and effectively tense muscles or maintain the desired posture for a long time (for static strength endurance),

Table 3: Dynamics of Development of Intellectual Criterion Indicators of Officers' Professional Endurance (W0.05 = 47, W0.01 = 32)

Indicators	Levels	Stages of the experiment									
		EG					CG				
		start		end		Wexp	start		end		Wexp
		qty	%	qty	%		qty	%	qty	%	
knowledge of methods, technologies and means of developing professional endurance	high	9	10.34	24	27.58	18.5	8	8.89	13	14.44	53.7
	average	35	40.23	48	55.17		43	47.78	49	54.44	
	low	43	49.43	15	17.24		39	43.33	28	31.12	
knowledge of the organisation of self-development of professional endurance, taking into account age and individual characteristics	high	-	0	29	33.33	14.3	2	2.22	15	16.67	38.5
	average	53	60.92	49	56.32		51	56.67	46	51.11	
	low	34	39.08	9	10.35		37	41.11	29	32.22	

Table 4: Dynamics of Development of Subject-Performance Criterion Indicators of Officers' Professional Endurance (W0.05 = 47, W0.01 = 32)

Indicators	Levels	Stages of the experiment									
		EG					CG				
		start		end		Wexp	start		end		Wexp
		qty	%	qty	%		qty	%	qty	%	
professional subjectivity of officers	high	4	4.59	19	21.84	14	5	5.56	10	11.11	39.6
	average	42	48.28	53	60.92		46	51.11	49	54.44	
	low	41	47.13	15	17.24		39	43.33	31	34.44	
physical endurance	high	14	16.09	33	37.93	21.3	14	15.56	25	27.78	48
	average	42	48.28	45	51.72		43	47.77	52	57.78	
	low	31	35.63	9	10.35		33	36.67	13	14.44	
endurance of the nervous system	high	8	9.19	28	32.18	16.8	7	7.78	19	21.11	51.8
	average	17	19.54	43	49.43		15	16.67	36	40.00	
	low	62	71.27	16	18.39		68	75.55	35	38.89	

as well as with the characteristic dynamic strength endurance during performing cyclic exercises. The increased professional endurance of officers' bodies was facilitated by the performance of physical exercises against the background of systematic fatigue due to the stimulation of recovery processes [50-55].

DISCUSSION

Studies on the problem of professional endurance in various fields show that the professional endurance of the individual is closely related to such a property of the body as fatigue. Thus, depending on the nature of the work, scientists W.W.K. Hoeger and S.A. Hoeger [13], N.M. Samolyuk [14], T.Yu. Krutsevich [15], S. Prysiashnyuk, O. Pryimakov, D. Oleniev, E. Ejder, M. Popov, and O. Kolenkov [9] distinguish four main types of fatigue: mental (when solving mathematical problems or other intellectual activities); emotional (during the performance of monotonous work, strong feelings, etc.); sensory (as a result of intense activity of the analysers, for example, fatigue of the visual analyser while shooting or working with a computer); physical (occurs during prolonged or intense muscle activity). This division is to some extent conditional, as all four types of fatigue occur simultaneously.

Researcher I.I. Marionda [16] proved the physiological value of the predominant development of professional endurance as one of the main professionally important qualities that improve trainees' functional and physical capabilities and also determined that physical education has the greatest

cumulative impact on professional endurance. S.O. Sychoy [17] substantiated that during the development of professional endurance, the exercises of long-term motor activity of cyclic character have the greatest practical value, and the interrelation between a functional condition of an organism, its working capacity, and separate indicators of physical fitness is defined.

S.M. Zhebrowsky [18], during the introduction of an optional course of endurance and survival on the battlefield for operational officers, found that, despite significant differences in service and combat activities, all of them are united by general hyperdynamic nature of work and significant mental stress. Therefore, the acquired high level of professional endurance of military specialists during physical training contributes to developing broad functional reserves, maintaining high efficiency, and positively impacting further professional military activities. In the textbook "Endurance and Survival on the Battlefield" [19], it is noted that "physical endurance" is extremely important for the survival of servicemen in combat. It allows to perform a significant amount of motor activity, maintain a high level of motor activity for a long time, and quickly regain strength after heavy physical activity.

Thus, the authors performed a mathematical substantiation of the levels of professional endurance of officers for each indicator of the considered criteria in EG and CG before and after experimental implementation of pedagogical conditions for its development and confirmed the statistical significance of the results using Wilcoxon rank-sum test [22]. From

the presented data, it becomes obvious that the developed and implemented pedagogical conditions during the pedagogical experiment significantly impact the positive dynamics of the professional endurance of officers of the experimental group. Thus, during the experimental study, the number of officers corresponding to low level has decreased, and to medium and high – increased. In EG this tendency is expressed much more strongly than in CG [55-59]. Since the initial level of professional endurance of officers in EG and CG was almost the same, the difference can ultimately be explained by the effectiveness of the organisation of the educational process.

Many researchers noted that burnout in officers affects the motivational sphere and is expressed in a decrease in work motivation, degree of interest in the results of work and focusing on the effective and high-quality performance of tasks. Burnout is reflected in the state of the energy resources of military personnel and manifests itself in the sphere of social interaction [6, 14]. Stress levels and burnout indicators are closely related to personality characteristics that play an important role in social interaction and the regulation of human behaviour. Among them, the most significant are neuroticism, poise, sociability, shyness, openness and emotional lability [41-42].

CONCLUSION

The authors conducted a pedagogical study based on the developed programme, the purpose of which was to investigate the effectiveness of pedagogical conditions for the development of professional endurance of officers and to study the changes in levels of professional endurance. As a result of the study, it was found that the problem of professional endurance of military specialists is relevant in professional pedagogy, is essential in combat activities, develops depending on the nature of the tasks and the conditions in which they are performed. However, research does not pay much attention to the development of professional endurance in officers. In clarifying the current state of development of their professional endurance and analysing the educational process, certain contradictions in their training were identified, and directions for their improvement were determined by solving the next research task – determining the pedagogical conditions for the development of professional endurance in officers. The analysis of scientific sources, taking into account the peculiarities of professional military activity of officers of

military administration bodies, made it possible to single out the following pedagogical conditions for the development of professional endurance: pedagogical modelling of professional endurance development of officers; application of author's professionally-oriented methods of development of professional endurance; improvement of evaluation criteria and indicators of its development.

The professional endurance of officers is the knowledge and ability to overcome fatigue (weariness, exhaustion) in service and professional activity. This endurance is important for all spheres of a serviceman's life, which allows him to: perform his professional military activity for a long (long) time, restore emotional, intellectual and motor work after vigorous physical activity, maintain his combat readiness at the appropriate level and remain emotionally stable, ready for intellectual activity. One of the consequences of low professional endurance is burnout syndrome. It can be prevented by servicemen and their educators and psychologists by controlling their level of stress and their behaviour in difficult situations. It is necessary to convey important information about the degree of danger of stress and the burnout syndrome itself to each serviceman.

The study results on the implementation and substantiation of pedagogical conditions for developing their professional endurance confirmed that the proposed measures contributed to more effective training for the development of this quality. Thus, mathematical statistics confirm that as a result of experimental work in EG, there were statistically significant changes in the components of professional endurance. Comparison of the development of professional endurance in EG at the beginning and end of the experiment using the Wilcoxon rank-sum test confirmed the effectiveness of the implementation of appropriate pedagogical conditions for the development of professional endurance. The study does not cover all the issues related to the development of the professional endurance of officers. Theoretical and methodical bases for developing professional endurance in cadets at tactical and officers at strategic levels of preparation require further scientific research.

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