

РОЗДІЛ VIII. ПРОБЛЕМИ ВІЙСЬКОВОЇ ОСВІТИ

УДК 355.23;339.19

Oleh Pavlenko

Military Institute of Telecommunications and informatization, Kyiv

ORCID ID 0000-0001-8752-1949

DOI 10.24139/2312-5993/2024.05/216-225

EXPERIMENTAL VERIFICATION OF EFFECTIVENESS OF THE SYSTEM OF FORMATION OF MANAGERIAL COMPETENCE OF FUTURE COMMUNICATION UNITS' OFFICERS

The article considers the results of organisation of experimental verification of effectiveness of the system of formation of managerial competence of future communication units' officers of the Armed Forces of Ukraine in higher educational institutions was conducted taking into account the results of the analysis of psychological and pedagogical research, the Concept of Transformation of the Military Education System, the peculiarities of the organization of the educational process in military educational institutions, the results of the expert survey, as well as the results of the analysis of the practice of professional training of future officers in military educational institutions. This led to the conclusion that these conditions are directly aimed at ensuring the effective formation of its structural components, as well as the personal qualities of future signal officers. To do this, it is necessary to create a holistic pedagogical system for the formation of managerial competence of future officers of communication units in the organization of the educational process in higher education institutions. In general, the results of the analysis indicate the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine's communication units. In the proposed research, using the Kolmogorov-Smirnov mathematical criterion, the reliability of the calculations and the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine have been proved.

Key words: *experimental verification, effectiveness, pedagogical experiment, managerial competence, officers of communications units, professional training.*

Statement of the problem. Today, in the context of the war unleashed by russia, the issue of creating a system of training officers of a new formation in accordance with the requirements of the world's advanced armies and NATO standards is becoming relevant, which is confirmed, in particular, by the provisions of the Strategic Defense Bulletin of Ukraine, the country's European integration course, its participation in international peacekeeping activities and the corresponding need to improve the command and control system of the Armed Forces of Ukraine (hereinafter - AFU) and ensure interoperability with the command and control system of foreign armies, as well as, maintaining a high level of managerial competence of officers, their readiness to manage personnel in real combat conditions (Маслій, 2010).

In general, managerial competence should contribute to ensuring a high level of professionalism of military professionals. Despite the fact that modern officers of the AFU communication units are overwhelmingly qualified specialists, many of them lack managerial competence, which is manifested in the choice of a not always effective management style, overwork, mistakes in making responsible decisions, inability to prevent and resolve conflicts, impaired adaptation to new conditions, etc. The formation of a high level of managerial competence will contribute to the solution of these problematic issues. Therefore, the study of the peculiarities of the formation of managerial competence of future officers of the Armed Forces of Ukraine is an urgent problem in the system of professional training of cadets in higher military educational institutions (hereinafter - HMEI).

Analysis of recent research and publications. Interest in managerial activities has recently increased significantly. The practical aspects of the formation of managerial culture and competence of officers were studied by T. Matsevko and R. Torchevskyi. Also, the pedagogical conditions for the formation of officers' readiness to manage military units were determined by: M. Zhylenko, L. Merzliak, I. Radvanskyi. However, despite the attention of researchers to the problem of forming the managerial competence of specialists in various fields of activity, the issues of organizing the educational process in higher military education institutions to form the managerial competence of future officers of communication units remain insufficiently studied.

The purpose of the article is to present the results of organisation of experimental verification of effectiveness of the system of formation of managerial competence of future communication units' officers of the Armed Forces of Ukraine in higher educational institutions.

Presentation of the main material. It should be noted that the system of forming the managerial competence of future officers of communication units of the Armed Forces of Ukraine is directly aimed at ensuring the effective formation of its structural components: cognitive, motivational, activity, reflective and evaluative, emotional and volitional, as well as personal qualities of future communication officers.

To test the effectiveness of the developed system for the formation of managerial competence of future officers of communication units of the Armed Forces of Ukraine, we organized a pedagogical experiment. The purpose of the experimental study was to ensure the relationship between the theoretically grounded provisions of the system of forming the managerial competence of future officers of communication units of

the Armed Forces of Ukraine in the process of professional training and the experimentally obtained results. This was organized taking into account the basic principles and requirements for the peculiarities and stages of such work, which are defined in a number of pedagogical studies, namely: the principles of efficiency, objectivity, reliability and integrity, which reflect the general requirements for the organization and conduct of research and experimental work.

For this purpose, a program of formative experiment was developed, which allowed to evaluate the effectiveness of the author's system of forming the managerial competence of future officers of the Armed Forces of Ukraine. The formative stage of the experimental study was conducted on the basis of the Kruty Heroes Military Institute of Telecommunications and Information Technology (henceforward – KHMITI).

Thus, the organization of the formative experiment included the use of traditional methods, forms and means of ensuring the educational process in higher education institutions, while the EG tested an innovative system for the formation of managerial competence of future officers of the Armed Forces of Ukraine in the process of professional training based on the author's vision.

The purpose of the formative experiment was to test the system of forming the managerial competence of future officers of communication units of the Armed Forces of Ukraine developed by the author. The essence of the experimental study was to introduce defined and substantiated organizational and pedagogical conditions for the formation of managerial competence of future officers of communication units of the Armed Forces of Ukraine.

The experimental work envisages the introduction of a system for the formation of managerial competence of future officers of communication units of the Armed Forces of Ukraine in professional training, which is ensured by the implementation of pedagogical conditions, as well as testing its effectiveness. The analysis of the effectiveness of the system of forming the managerial competence of future officers of communication units of the Armed Forces of Ukraine was carried out at different stages of the pedagogical experiment using criteria (motivational, cognitive, activity and personal) and their corresponding indicators. Obtaining quantitative results for each indicator involved the use of developed questionnaires, tests, questionnaires, etc. Subsequently, the results of the study were presented according to the

criteria for the formation of managerial competence of future officers of the Armed Forces of Ukraine.

At the formative stage of the experiment, two groups were formed from the total sample of 310 cadets: an experimental group - 155 cadets and a control group - 155 cadets.

The results of the study of the state of formation of managerial competence in CG and EG according to the motivational, cognitive, activity and personal criteria in CG and EG at the beginning of the formative stage of the experiment were obtained in the conditions of the traditional educational process.

In the implementation of research and experimental activities, a test methodology developed by Swedish sociologists and psychologists was used to determine the level of influence on people (Buber, 1937). The evaluation methodology has been adapted by scientists for use in Ukraine. According to the obtained results, the following conclusions can be drawn about the formation of the motivational criterion of the managerial competence of cadets at the beginning of the formative stage of the pedagogical experiment: according to all indicators of this criterion in CG and EG there is a tendency to the prevalence of medium and low levels - 51 (32.90 %) and 91 (58.71 %), respectively. At a high level of formation of the motivational criterion are 13 cadets, which is 8.39%.

According to the results of the formation of the cognitive criterion of the managerial competence of signal cadets at the beginning of the formative stage of the pedagogical experiment, it is clear that according to the indicator "Mastery by future communication officers of managerial knowledge, operation of military-management terminology, knowledge of the essence and content of the future managerial activity of the officer of the communication unit" both in CG, and EG cadets are at low (EG - 91 (58.71%) and CG - 92 (59.36%)) and medium (EG - 53 (34.19%) and CG - 51 (32.90%)) levels, at a high level in CG there are 12 cadets, which is 7.74%, and in EG - 11 (7.10%). The same results were obtained for the rest of the indicators of the cognitive criterion in CG and EG at the beginning of the formative experiment.

Regarding the formation of the activity criterion of cadets' managerial competence at the beginning of the formative stage of the pedagogical experiment: according to all indicators of this criterion, there is a tendency to the prevalence of medium and low levels in CG and EG - respectively 52 (33.33%) - in CG, and 51 (32.90%) - in EG. At the low level,

there are 91 cadets in the CG, which corresponds to 58.71%, and the same number of cadets in the EG. At a high level of formation of the activity criterion, 12 cadets in the CG and 13 in the EG, which is 8.39%.

According to the results of the formation of the personal criterion of cadets' managerial competence at the beginning of the formative stage in the CG and EG of the pedagogical experiment, it is clear that according to all indicators of this criterion, the cadets have formed competence at an average of 53 (34.19 %) in the CG and EG, at a low level of 92 (59.35 %). At a high level of formation of the personal criterion in CG and EG there are 10 cadets, which is 6.45%.

The next stage was the implementation of experimental measures to implement the defined and substantiated pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine.

Table 1 shows the comparative results of the formation of managerial competence of future officers of communication units at the end of the formative stage of the experiment in CG and EG.

Table 1

Comparative results of the formation of managerial competence of future officers of communication units at the end of the formative stage of the experiment in CG and EG (n=310)

Criterion for the formation of managerial competence of future officers of communication units	CG						EG					
	High level		Medium level		Low level		High level		Medium level		Low level	
	q-ty	%	q-ty	%	q-ty	%	q-ty	%	q-ty	%	q-ty	%
Motivational	13	8,39	53	34,19	89	57,42	95	61,29	50	32,26	10	6,45
Cognitive	12	7,74	53	34,19	90	58,07	99	63,87	47	30,32	9	5,81
Activity-based	12	7,74	55	35,49	88	56,77	96	61,94	49	31,61	10	6,45
Personal	13	8,39	51	32,90	91	58,71	98	63,23	46	29,68	11	7,09
Averaged values	13	8,07	53	34,19	89	57,74	97	62,58	48	30,97	10	6,45

Table 1 on the comparative results of the formation of managerial competence of future officers of communication units at the end of the formative stage of the experiment in CG and EG shows that:

- according to the motivational criterion, the levels of formation of indicators in the CG remained largely unchanged compared to the beginning of the formative stage (low - 89 cadets, medium - 53, and high - 13). However, changes were recorded in the EG, as at the beginning of the formative stage there were 91 cadets (58.71%) at the low level, and at the end - 10 (6.45%); at the medium level, there were 51 cadets (32.90%) at the beginning, and at the end - 50 (32.26%); significant changes occurred at the high level: at the beginning there were 13 cadets (8.39%), and at the end - 95 (61.29%);

- according to the cognitive criterion, significant results and positive dynamics were found in the EG at the end of the experiment: a low level of 9 cadets (5.81%), and at the beginning there were 91 cadets (58.71%); the average level of 53 cadets, which corresponds to 34.19%, and the high level from 11 cadets (7.10%) to 99 cadets (63.87%). As for the cadets of the CG, they have minor success, which in numerical terms amounts to about 3-4% of positive dynamics;

- according to the activity criterion, there are also changes, mainly in the EG cadets. In particular, at the low level, there are only 10 cadets in the EG, and at the average level - 49 (31.61%), and at the high level - 96 cadets, which is 61.94%. In the CG, the dynamics is insignificant, as the number of cadets with an average level of managerial competence increased from 51 (32.90%) to 55 (35.49%), and with a low level - from 91 cadets (58.71%) to 88 (56.77%);

- according to the personal criterion, the following changes were identified: in the EG, the number of cadets who were at a low level significantly decreased from 59.35% to 7.09%; a rather positive dynamics in the formation of indicators of a high level from 10 cadets at the initial stage to 98 cadets at the end; as for the average level in the EG, from 34.19% to 46 cadets, which is 29.68%; in the CG, no special changes were recorded between the beginning and the end of the formative stage.

In general, the results of the analysis indicate the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine's communication units. Table 2 shows the comparative results of the formation of managerial competence of future officers of communication units of the Armed Forces of Ukraine at the beginning and at the end of the formative stage of the pedagogical experiment.

Table 2

Comparative results of managerial competence formation in cadets of CG and EG at the beginning and at the end of the formative stage of the experiment (n=310)

Criterion for the formation of managerial competence of future officers of communication units	CG						EG					
	High level		Medium level		Low level		High level		Medium level		Low level	
	q-ty	%	q-ty	%	q-ty	%	q-ty	%	q-ty	%	q-ty	%
In the beginning of the experiment												
Motivational	13	8,39	51	32,90	91	58,71	13	8,39	51	32,90	91	58,71
Cognitive	10	6,45	53	34,19	92		11	7,09	53	34,19	91	58,71
Activity-based	12	7,74	52	33,55	91	58,71	13	8,39	51	32,90	91	58,71
Personal	10		54	34,84	91	58,71	11	7,09	53	34,19	91	58,71
Averaged values	11	7,09	53	34,19	91	58,71	12	7,74	52	33,55	91	58,71
In the end of the experiment												
Motivational	13	8,39	53	34,19	89	57,42	95	61,29	50	32,26	10	6,45
Cognitive	12	7,74	53	34,19	90	58,07	99	63,87	47	30,32	9	5,81
Activity-based	12	7,74	55	35,49	88	56,77	96	61,94	49	31,61	10	6,45
Personal	13	8,39	51	32,90	91	58,71	98	63,23	46	29,68	11	7,09
Averaged values	13	8,07	53	34,19	89	57,74	97	62,58	48	30,97	10	6,45

The Kolmogorov-Smirnov mathematical statistics criterion was used to verify the reliability of the results obtained in the study. According to this criterion, it is possible to compare empirical distributions and find the point (d_{max}) at which the sum of the differences between the two distributions is maximized, and to assess the degree of confidence in such a difference (Нечаєв, Берідзе, Кононенко, Рябушенко, Брадул, 2005). The fulfillment of the restrictions on the above-mentioned criterion λ made it possible to compare the distributions of the participants in the pedagogical experiment.

Thus, the comparison of all the obtained values with the help of mathematical statistics at the beginning of the formative stage showed that the qualitative and quantitative characteristics of cadets of CG and EG do not have statistically significant differences, so these groups were chosen as participants in the pedagogical experiment.

The implemented research confirmed the need to introduce new approaches to the organization of professional training of future officers of communication units in the educational process of the KHMITI. This was taken into account in the organization of further research and experimental work, substantiation of the content of the pedagogical conditions substantiated by the author.

Based on the decision-making rules for the Kolmogorov-Smirnov criterion, we determine that the differences in the distributions of future officers of communication units of CG and EG, respectively, by the levels of managerial competence formation are statistically significant, since at the level of significance $p \leq 0.05$.

The dynamics of changes that occurred in the distributions of the results of the formation of managerial competence of cadets at the end of the formative stage of the pedagogical experiment in CG and EG is shown in Figure 1. The diagram shows that at the end of the formative stage of the experiment, the level of managerial competence of cadets in EG and CG is significantly different.

According to the results of the implementation of formative influences, there were statistically significant changes in the levels of cadets' managerial competence: in EG the average dynamic increase was 38.23 %, while in CG - 1.46 %.

Thus, mathematical and statistical calculations are an additional argument in confirming the hypothesis of the research. In the proposed scientific work, using the Kolmogorov-Smirnov mathematical criterion, the reliability of the calculations and the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of communication units of the Armed Forces of Ukraine are proved.

Conclusions. Organization of experimental verification of effectiveness of the system of formation of managerial competence of future communication units' officers of the Armed Forces of Ukraine in higher educational institutions was conducted taking into account the results of the analysis of psychological and pedagogical research, the Concept of Transformation of the Military Education System, the peculiarities of the

organization of the educational process in military educational institutions, the results of the expert survey, as well as the results of the analysis of the practice of professional training of future officers in military educational institutions.

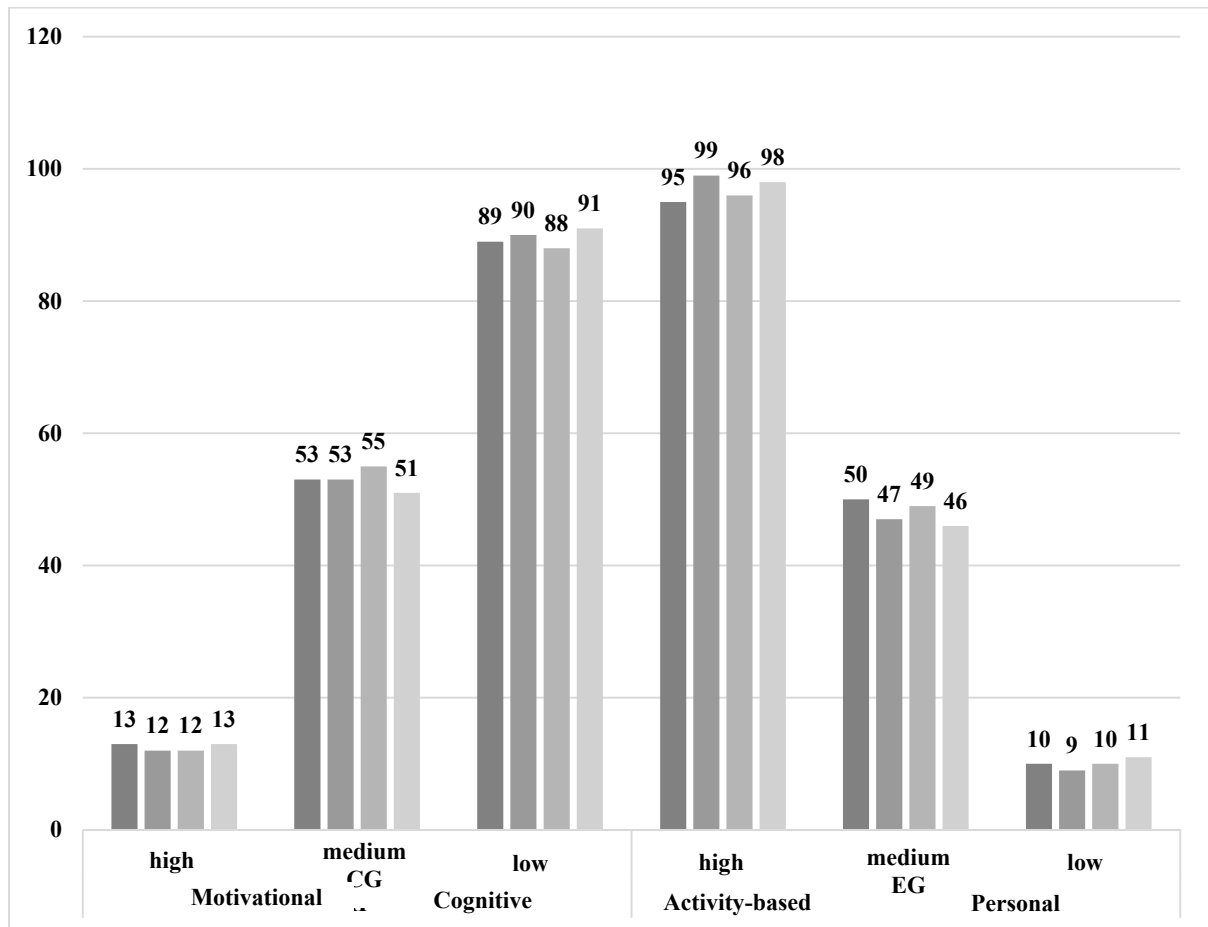


Figure 1. Comparative results of the formation of managerial competence of cadets of the control and experimental groups at the end of the formative stage of the pedagogical experiment

This led to the conclusion that these conditions are directly aimed at ensuring the effective formation of its structural components, as well as the personal qualities of future signal officers. To do this, it is necessary to create a holistic pedagogical system for the formation of managerial competence of future officers of communication units in the organization of the educational process in higher education institutions. In general, the results of the analysis indicate the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine's communication units. In the proposed research, using the Kolmogorov-Smirnov mathematical criterion, the reliability of the calculations and the effectiveness of the pedagogical conditions for the formation of managerial competence of future officers of the Armed Forces of Ukraine have been proved.

REFERENCES

- Маслій, О. М. (2010). Модель формування компетентності майбутніх офіцерів у сфері військово-економічної логістики: результати педагогічного експерименту. *Наука і освіта*, 2/LXXXIX, 102–110 (Maslii, O. M. (2010). Model of competence formation of future officers in the field of military-economic logistics: results of a pedagogical experiment. *Science and education*, 2/LXXXIX, 102–110).
- Сорока, О. В. (2019). Управлінська компетентність менеджерів соціокультурної діяльності. *Вісник Національної академії Державної прикордонної служби України. Серія: Педагогіка*, 2, 78-84 (Soroka, O. V. (2019). Managerial competence of managers of socio-cultural activities]. *Bulletin of the National Academy of the State Border Service of Ukraine. Series: Pedagogy*, 2, 78-84).
- Нечаєв, В. П., Берідзе, Г. М., Кононенко, В. В., Рябушенко, Н. В., Брадул, О. М. (2005). *Теорія планування експерименту: навч. посіб.* Київ: Кондор (Nechayev, V., Beridze, G., Kononenko, V., Ryabushenko, N., Bradul, O. (2005). *Theory of experiment planning: a textbook*. Kyiv: Condor).
- Buber, M. (1937). *I and Thou* / trans. by R. G. Smith. Edinburgh: T&T Clark.

АНОТАЦІЯ

Павленко Олег. Експериментальна перевірка ефективності системи формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку.

У статті розглянуто результати організації експериментальної перевірки ефективності системи формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку Збройних Сил України у вищих військових навчальних закладах, яка проводилася з урахуванням результатів аналізу психолого-педагогічних досліджень, Концепції трансформації системи військової освіти, особливостей організації освітнього процесу у військових навчальних закладах, результатів експертного опитування, а також результатів аналізу практики професійної підготовки майбутніх офіцерів у вищих військових навчальних закладах. Отримані результати експериментальної перевірки дозволило дійти висновку, що визначені організаційно-педагогічні умови формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку безпосередньо спрямовані на забезпечення ефективного формування її структурних компонентів, а також особистісних якостей майбутніх офіцерів підрозділів зв'язку Збройних Сил України. Для цього в рамках педагогічного експерименту було створено цілісну педагогічну систему формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку Збройних Сил України під час організації освітнього процесу у вищих військових навчальних закладах. Загалом результати аналізу свідчать про ефективність зазначених організаційно-педагогічних умов формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку Збройних Сил України. У пропонуваному дослідженні за допомогою математичного критерію Колмогорова-Смірнова перевірено достовірність розрахунків та ефективність педагогічних умов формування управлінської компетентності майбутніх офіцерів підрозділів зв'язку у вищих військових навчальних закладах.

Ключові слова: експериментальна перевірка, ефективність, педагогічний експеримент, управлінська компетентність, офіцери підрозділів зв'язку, професійна підготовка.