RESEARCH AND EXPERIMENTAL WORK ON MANAGERIAL COMPETENCES FORMATION IN FUTURE BORDER GUARD OFFICERS

INTRODUCTION

The main purpose of the formative stage of the research and experimental work was to test the validity of the hypothesis concerning the possibility of increasing the effectiveness of managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented module under certain conditions (use of the opportunities of military and border oriented academic subjects in the development of cadets’ motivation to managerial competencies formation; promotion of managerial competencies self-improvement in future border guard officers by means of interactive technologies; introduction of a comprehensive methodology for managerial competencies formation in future border guard officers ("Project group of the future chief of the unit").

The relevance of the research lies in the feasibility of an experimental approach using a number of methods of the proposed pedagogical conditions for managerial competencies formation in future border guard officers in terms of the possibility of their further application in practice. This will allow improving the research process.

Since the managerial competencies of future border guard officers are one of the components of professional competence, it is important to take into account the experience of solving the problem of forming the professional competence of future specialists in pedagogical theory and practice (V. Bezpakho, I. Ziaziun, D. Ishchenko, O. Ovcharuk, O. Pometun, V. Semychenko, S. Sysoeva). Various aspects of pedagogical research in military formations are reflected in the works of modern military educationists: Halimov (2004), Didenko (2009), Miroshnichenko (2012), Stavytskyi (2014), Tushko (2020) and others. The scientific provisions, conclusions and recommendations contained in the aforementioned and other scientific papers are of great value for solving the tasks of our research. At the same time, the results of the analysis of pedagogical sources make it possible to recognize that despite the significant interest of researchers in the possibilities of improving the professional competence of military specialists, no experimental research has been carried out in terms of managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module.
AIM AND TASKS
The aim of the article is to analyse the results of the research and experimental work on managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module. The following tasks were set and solved to achieve the aim of our research in the process of the formative stage of the experiment:

- to check the effectiveness of the developed methodology for managerial competencies formation in future border guard officers at the “School of Managerial Excellence” in the process of studying the academic subjects within the military and border oriented training module;
- to identify a set of forms and methods of training that are optimal for managerial competencies formation;
- to explore the potential of the academic subjects within the military and border oriented training module concerning managerial competencies formation in future border guard officers.

Achieving the aim and accomplishing the tasks were aimed at testing the hypothesis of our research. For this purpose, the formative stage of the experiment was conducted at the NASBGS (hereinafter referred to as the Border Academy) in the 2019–2020 and 2020–2021 academic years. 344 cadets of various faculties such as the Faculty of Security of the State Border, the Faculty of Law Enforcement Activities, the Faculty of Operational and Service Activities were involved in it. The control group included 176 cadets and the experimental group, respectively, 168 cadets of the total number of the cadets. The research was preliminarily approved by the ethics committee. All participants agreed to participate in the research.

The developed diagnostic tools were used to assess managerial competencies formedness in future border guard officers of the experimental and the control group. i.e. we developed and substantiated criteria as well as their indicators that allow to determine the level of managerial competencies formedness in future border guard officers in the process of studying the academic subjects within the military and border-oriented training module. Such criteria are: motivational-cognitive (indicators: conscious attitude to mastering the practical component of the course of the academic subjects within the military and border oriented training module; awareness of the special importance of managerial competencies in future professional activities; striving for managerial competencies self-improvement), cognitive (indicators: mastering the content of the educational programs of the academic subjects within the military and border oriented training module; awareness of the forms and methods of applying managerial skills and abilities; the ability to make managerial decisions in everyday activities), activity-behavioural (indicators: skills of self-realization and self-improvement of managerial competencies in professional activities; the ability to assess one’s own managerial competencies and junior colleagues’ ones, the ability to form managerial competencies in junior colleagues). Three levels of these competencies’ formedness were developed: high, medium, low. We recorded the changes in the structure of the studied phenomenon before and at the end of the formative stage of the experiment.

RESEARCH METHODS
We used the following research methods in the process of solving experimental tasks: study of school documentation, pedagogical observation, surveys (questionnaires, generalization of independent characteristics), comparison, evaluation (expert assessment, self-assessment), and creation of professional situations close to real ones.

In order to solve the tasks of the research, we organized and conducted the pedagogical experiment, which provided a scientific-objective and evidential verification of the correctness of the formulated research hypothesis. The pedagogical experiment was carried out in two stages: the ascertaining experiment and the formative one.
DISCUSSION

The experimental work on the quantitative and qualitative composition of the participants was organized in accordance with the regulatory requirements for such studies. The experiment involved 344 cadets of the Border Academy. The sampling population of the experiment participants was formed by quota sampling, when the cadets were selected in accordance with the parameters of quotas. The criteria for the quota sampling of the cadets were their majors (law, state border security, philology), gender (male), year of training (3rd and 4th).

The experimental group used the author’s method of managerial competencies formation. The process of studying the academic subjects within the military and border-oriented training module in the control group was organised according to the traditional method, no additional conditions for the educational process were created.

The following results of the cadets’ managerial competencies formedness were obtained according to the results of the formative stage of the experiment (see Tables 1-3).

Table 1 – assessment of managerial competencies formedness in future border guard officers by the results of the formative stage of the experiment

| No | Criteria and indicators | EG1 | EG1 | EG2 | EG2 |
|----|------------------------|-----|-----|-----|-----|
| 1  | Motivational-cognitive criterion | 1.62 | 1.62 | 1.99 | 1.80 |
|    | I Conscious attitude to mastering the practical component of the course of the academic subjects within the military and border-oriented training module | 1.62 | 1.68 | 1.9 | 1.9 |
|    | II awareness of the special importance of managerial competencies in future professional activities | 1.65 | 1.6 | 2 | 1.8 |
|    | III striving for managerial competencies self-improvement | 1.6 | 1.6 | 2.08 | 1.7 |
| 2  | Cognitive criterion | 1.61 | 1.66 | 2.01 | 1.80 |
|    | I mastering the content of the educational programs of the academic subjects within the military and border-oriented training module | 1.6 | 1.7 | 2 | 1.80 |
|    | II awareness of the forms and methods of applying managerial skills and abilities | 1.6 | 1.6 | 2.03 | 1.80 |
|    | III the ability to make managerial decisions in everyday activities | 1.65 | 1.68 | 2.01 | 1.80 |
| 3  | Activity-behavioural criterion | 1.60 | 1.62 | 2.02 | 1.81 |
|    | I Skills of self-realization and self-improvement of managerial competencies in professional activities | 1.6 | 1.6 | 2.02 | 1.8 |
|    | II the ability to assess one’s own managerial competencies and junior colleagues’ ones | 1.6 | 1.6| 2.03 | 1.8 |
|    | III the ability to form managerial competencies in inferiors | 1.6 | 1.6 | 2.01 | 1.85 |
|    | Integral criterion | 1.61 | 1.63 | 2.01 | 1.80 |

Source: Search data.

Table 2 – Distribution of the control and the experimental groups cadets according to the levels of managerial competencies formedness by the results of the formative stage of the experiment

| Levels of managerial competencies formedness | Control group | Experimental group |
|--------------------------------------------|---------------|-------------------|
|                                           | assessment of the expert group | assessment based on the results of the questionnaire | average | assessment of the expert group | assessment based on the results of the questionnaire | average |
| q-ty % | q-ty % | % | q-ty % | q-ty % | % |
| High | 16 | 9.1 | 16 | 9.1 | 9.1 | 29 | 17.3 | 31 | 18.5 | 17.9 |
| Medium | 98 | 55.7 | 89 | 50.6 | 53.1 | 108 | 64.3 | 109 | 64.9 | 64.6 |
| Low | 62 | 35.2 | 71 | 40.3 | 37.8 | 31 | 18.5 | 28 | 16.7 | 17.6 |

Source: Search data.
The final data of the formative experiment presented in Table 3 turned out to be more obvious.

**Table 3 - Generalized results of the formative experiment**

| Groups | Actual points | Dynamic points |
|--------|---------------|----------------|
|        | 1st measuring | 2nd measuring  | 1-2nd measuring |
| EG     | 1.61          | 2.01           | 0.4             |
| CG     | 1.63          | 1.80           | 0.17            |

**Source:** Search data.

The results of the formative experiment confirmed the correctness of the hypothesis and creative generalizations made by the author in the second section of the research. The average dynamic points in the experimental group made 0.4 points, while it was at the level of 0.17 points in the control group. Therefore, the experimental group obtained higher results according to the selected criteria and indicators, which confirms the effectiveness of the experimental work.

**Figure 1 - Distribution of the EG and the CG cadets according to the levels of managerial competencies formedness by the results of the formative stage of the experiment**

**Source:** Search data.

The generalized results of the formative stage of the experiment confirmed the assumption that the level of managerial competencies formedness depends on:

- the development of the cadets’ motivation to form managerial competencies by mastering the system of knowledge and skills in the academic subjects within the military and border oriented training module;
- implementation in the process of studying the academic subjects within the military and border oriented training module of:
  - forms and methods of interactive learning;
  - updated content of the academic subjects within the military and border oriented training module in accordance with modern challenges and threats to operational and service activities;
  - orientation of the cadets’ activities on managerial competencies self-improvement in the process of studying the academic subjects within the military and border oriented training module.

The methods of managerial competencies formation in future border guard officers in the educational process while studying the academic subjects within the military and border oriented training module were implemented (it contained target, organizational, content and resultative components and was based on theoretically substantiated...
pedagogical conditions: use of the possibilities of the academic subjects within the military and border oriented training module to develop cadets’ motivation in terms of managerial competencies formation; promotion of professional managerial competencies self-improvement in future border guard officers by means of interactive methods of studying the academic subjects within the military and border oriented training module; monitoring the process of managerial competencies formation).

Despite significant changes in the level of managerial competencies formedness in the experimental group cadets, the statistics presented in Tables 1-3 need to be verified and confirmed in terms of the differences significance of the compared samples according to the registered result of the formative experiment. Such a verification can be performed using a multifunctional criterion, which is called the Fisher’s angular transformation or the $\varphi^*$ criterion (SIDORENKO, 2002).

The essence of the application of the $\varphi^*$ criterion is to compare the relative frequencies, expressed as percentage shares, in which the effect of the experiment is registered. These percentage shares are transformed into angular values according to the formula

$$\varphi_i = 2 \arcsin \sqrt{p_i},$$  \hspace{1cm} (1)

where $p_i$ is the relative frequency of the effect, expressed in shares observed, with the following determination of the significance or insignificance of the differences between the angles found, i.e. whether these differences are caused by the factor being studied in the experiment, or these differences are within the random errors of the experiment.

The evaluation conclusion is made on the basis of calculation of empirical value of the criterion

$$\varphi^*_{\text{emp}} = (\varphi_1 - \varphi_2) \sqrt{\frac{n_1 n_2}{n_1 + n_2}},$$  \hspace{1cm} (2)

where $\varphi_1$ – an angle corresponding to a higher relative frequency (percentage share); $\varphi_2$ – an angle corresponding to a lower relative frequency; $n_1, n_2$ – sample sizes.

The value calculated by formula (3.2) $\varphi^*_{\text{emp}}$ is compared with the critical values of the $\varphi^*$ criterion:

$$\varphi^*_{\text{critical}} = \begin{cases} 1.64 (p \leq 0.05) \\ 2.31 (p \leq 0.01) \end{cases},$$

which correspond to 5% and 1% significance levels $p$ (probabilities which reject $H_0$ correct null hypothesis). If $1.64 < \varphi^*_{\text{emp}} < 2.31$, then the difference observed in the results of the experiment is significant, and we reject $H_0$ hypothesis at the level of $0.01 < p < 0.05$.

Let’s turn to the statistics of Table 3.1 and Table in applications F, G and formulate hypotheses: the level of managerial competencies formedness $H_0$ in the experimental and the control groups cadets does not differ; $H_1$ indicates significant difference.

According to formulas (1) and (2), at the percentage shares for the experimental and the control groups we find:

1. For high level:

$$\varphi_{cg} = 2 \arcsin \sqrt{0.62} = 1.82, \hspace{0.5cm} n_{cg} = 176.$$

$$\varphi_{eg} = 2 \arcsin \sqrt{0.74} = 2.06, \hspace{0.5cm} n_{eg} = 168.$$
Замініть в цифрах коми на крапки; ЕМП - EMP

We see that $1.64 < 2.12 < 2.31$. Therefore, $H_0$ hypothesis is rejected at the level of $p = 0.05$ according to the vision of Ye. Sidorenko (Sidorenko, 2002). We accept $H_1$ hypothesis: the share of the experimental group cadets with a high level of managerial competencies formedness differs significantly from the number of the control group cadets with a high level of the quality of interest.

2. For medium level:

$\varphi_{cg} = 2 \arcsin \sqrt{0.55} = 1.67$, $n_{cg} = 176$.

$\varphi_{eg} = 2 \arcsin \sqrt{0.65} = 1.87$, $n_{eg} = 168$.

$\varphi_{emp} = (1.87 - 1.67) \sqrt{\frac{176 \cdot 168}{176 + 168}} \approx 1.89$.

We see that $1.64 < 1.89 < 2.31$. Therefore, the empirical value of the $\varphi^*$ criterion falls into the zone of significance, so we accept $H_1$ hypothesis: the share of the experimental group cadets with an average level of managerial competencies formedness differs significantly from the number of the control group cadets with a high level of the quality of interest.

3. For low level:

$\varphi_{cg} = 2 \arcsin \sqrt{0.43} = 1.43$, $n_{cg} = 176$.

$\varphi_{eg} = 2 \arcsin \sqrt{0.56} = 1.89$, $n_{eg} = 168$.

$\varphi_{emp} = (1.89 - 1.43) \sqrt{\frac{176 \cdot 168}{176 + 168}} \approx 2.41$.

We see that $2.31 < 2.41$. Therefore, the empirical value of the $\varphi^*$ criterion falls into the zone of significance, so we accept $H_1$ hypothesis: the share of the experimental group cadets with a low level of managerial competencies formedness differs significantly from the number of the control group cadets with a high level of the quality of interest.

**RESEARCH RESULTS**

Summarizing the results of the comparative analysis and the statistical testing of hypotheses using the Fisher’s angular transformation, it can be ascertained that the pedagogical conditions and methods in terms of managerial competencies formation proposed in the research have quantitatively and experimentally proven advantages over the existing teaching methods, therefore, they can be recommended for practical use in the educational process of the Border Academy.

Thus, having asserted the existence of significant differences in the average values of the levels of managerial competencies formedness in future border guard officers before and after the experiment, we have thus proven the effectiveness of our work in terms of their managerial competencies’ improvement.

**CONCLUSIONS**

As can be seen from the above, the pedagogical experiment proved that the use of the author’s method of managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module contributes to the effective improvement of cadets’ training during their learning in the higher military educational institution. The experiment shows a sufficient degree of their
reliability and suitability for practical application in the educational process of the higher military educational institution.

The experimental work was carried out on the basis of the higher military educational institution, its results are important for the theory and practice of future border guard officers training. We believe that the practical significance of the research is that the introduction of methods for managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module in higher military educational institutions will improve the process of interest.

This confirms the authors’ own contribution to improving the theory and practice of military training. The method of managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module proposed by the authors can be useful at the international level.

The prospect of further scientific research of the problem is to develop ways to implement pedagogical conditions for managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border oriented training module, which could become a part of the proposed methodology.

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Research and experimental work on managerial competences formation in future border guard officers

Pesquisa e trabalho experimental sobre formação de competências gerenciais em futuros oficiais da guarda de fronteira

Investigación y trabajo experimental sobre la formación de competencias directivas en futuros agentes de la guardia de fronteras

Resumo
Os autores analisam os resultados da pesquisa e do trabalho experimental sobre a formação de competências gerenciais em futuros oficiais da guarda de fronteira no processo de estudo dos temas acadêmicos dentro do módulo de treinamento militar e orientado para fronteiras. A atenção especial às condições e fatores que garantem a representatividade da amostra e a representatividade dos resultados. A partir dos resultados da pesquisa e do trabalho experimental, os autores concluem que seus métodos propostos e condições pedagógicas para a formação de competências gerenciais em futuros oficiais da guarda de fronteira no processo de estudo dos sujeitos acadêmicos dentro do módulo de treinamento militar e orientado à fronteira são eficazes e permitem otimizar esse processo. Convencidos pelos resultados da pesquisa e do trabalho experimental na presença de diferenças significativas nos valores médios dos níveis de competências de gestão formados antes e depois do experimento, os autores comprovaram a eficácia do trabalho em termos de melhoria de competências gerenciais em futuros oficiais da guarda de fronteira.

Palavras-chave: Pesquisa experimental. Futuros oficiais da guarda de fronteira. Cadetes. Competências gerenciais em formação. Condições pedagógicas.

Abstract
The authors analyse the results of the research and experimental work on managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border-oriented training module. Particular attention is paid to the conditions and factors that ensure the representativeness of the sample and the representativeness of the results. Based on the results of the research and experimental work, the authors conclude that their proposed methods and pedagogical conditions for managerial competencies formation in future border guard officers in the process of studying the academic subjects within the military and border-oriented training module are effective and allow to optimize this process. Convinced by the results of the research and experimental work in the presence of significant differences in the average values of the levels of management competencies formedness before and after the experiment, the authors proved the effectiveness of the work in terms of managerial competencies improvement in future border guard officers.

Keywords: Experimental research. Future border guard officers. Cadets. Managerial competencies formedness. Pedagogical conditions.

Resumen
Los autores analizan los resultados de la investigación y el trabajo experimental sobre la formación de competencias gerenciales en futuros oficiales de la guardia de fronteras en el proceso de estudio de las materias académicas dentro del módulo de capacitación militar y orientada a la frontera. Se presta especial atención a las condiciones y factores que aseguran la representatividad de la muestra y la representatividad de los resultados. Los autores concluyen que sus métodos propuestos y las condiciones pedagógicas para la formación de competencias gerenciales en futuros oficiales de la guardia de fronteras en el proceso de estudio de las materias académicas dentro del módulo de capacitación militar y orientada a la frontera son efectivos y permiten optimizar este proceso. Convencidos por los resultados de la investigación y el trabajo experimental en presencia de diferencias significativas en los valores promedio de los niveles de formación de las competencias de gestión antes y después del experimento, los autores demostraron la efectividad del trabajo en términos de mejora de las competencias gerenciales en los futuros oficiales de la guardia de fronteras.

Palabras-clave: Investigación experimental. Futuros agentes de la guardia fronteriza. Cadetes. Formación de competencias directivas. Condiciones pedagógicas.