Partial methodology for assessing the level of learning of tactical aviation brigade personnel

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Abstract

The need to introduce new approaches to increase the level of combat and mobilization readiness of the military units of the Armed Forces of Ukraine is due to the challenges and threats to the sovereignty and territorial integrity of the state by the Russian Federation. The level of training of personnel has a direct impact on the combat and mobilization readiness of a military unit. This requires a sound approach to improving their combat training system, which is not possible without the use of appropriate scientific and methodological apparatus. Based on scientific and methodological approaches to assessing the effectiveness of combat training of military units, as well as the experience of its implementation, a partial method of assessing the level of training of tactical aviation brigade personnel is proposed, which takes into account the results of individual training and collective training of military units. This technique allows to quantify the level of training of tactical aviation brigade personnel, as one of the indicators of combat and mobilization readiness of a military unit, as well as to identify problematic issues during their combat training, which necessitates the development of recommendations. The results of the study can be used by combat training subjects in the assessment of combat and mobilization readiness of military units, as well as in further research on this issue in scientific institutions.

Key words: evaluation indicators, learning, combat and mobilization readiness, tactical aviation brigade.

Introduction

The experience of armed conflicts in recent years, the anti-terrorist operation and the Joint Forces operation in eastern Ukraine shows that the successful implementation of combat missions by military units and units largely depends on the level of their combat and mobilization readiness. In this regard, work is underway in the military administration of the Armed Forces of Ukraine to find and implement new approaches to increase the level of combat and mobilization readiness of military units.

One of the indicators that directly affects the level of combat and mobilization readiness of military units is the level of training of personnel. This encourages the search for and implementation of new approaches to the organization and conduct of combat training. Therefore, there is a need for a scientific justification for a partial method of assessing the level of training of personnel of the tactical aviation brigade. This indicates the relevance of the topic under consideration.

Material and methods

Analysis of the previous research and publications in this area (Heorhadze, O., Makalish, O., 2016; Hrom, V., Heorhadze, O., Yakimenko, I., 2016; Heorhadze, O., Ctolynets, S., Yuriev, O.,

2019; Heorhadze, O., Kharabara, V., 2019; Heorhadze, O., Barhylevych, A., 2020; Hohoniants, S., Heorhadze, O., Rudenko, E., 2020; Vynokurov, D., Heorhadze, O., 2020; Heorhadze, O., Shevchuk, V., Pampukha, I., Nikiforov, M., Barhylevych, A., 2020; Kamalov, E., Heorhadze, O., 2020) indicates that there is no single method for assessing the level of training of military personnel. The available approaches mainly concern some components of combat training or factors that directly affect its effectiveness.

Thus, in the previous article the author (Heorhadze, O., Makalish, O. 2016) a methodical approach to assessing the level of training of military authorities was considered. The analytical dependences offered in the article (Heorhadze, O., Ctolynets, S., Yuriev, O. 2019) allow taking into account the influence of training leaders on the quality of combat coordination activities in the artillery brigade.

In the article (Hohoniants, S., Heorhadze, O., Rudenko, E.2020) analyzes the architecture and classification of expert training systems for the training of military specialists, which can be used for their training.

These articles (Heorhadze, O., Kharabara, V. 2019; Vynokurov, D., Heorhadze, O. 2020) present an approach to assessing the competencies of servicemen.

The paper (Hrom, V., Heorhadze, O., Yakimenko, I. 2016) presents a methodical approach to assessing the level of motivation of servicemen during combat training. The articles (Heorhadze, O., Barhylevych, A. 2020; Heorhadze, O., Shevchuk, V., Pampukha, I., Nikiforov, M., Barhylevych, A. 2020) set out the procedure for evaluating the effectiveness of training a separate territorial defense brigade.

In the article (Kamalov, E., Heorhadze, O. 2020) developed a method for assessing the level of readiness of educational institutions for military training of citizens according to the program of reserve officers.

At the same time, the scientific and methodological apparatus developed by the predecessors is the basic basis for further improvement and can be used in part in assessing the level of training of tactical aviation brigade personnel as a component of their combat and mobilization readiness.

Thus, the aim of the article is to develop a partial methodology for assessing the level of training of tactical aviation brigade personnel as a component of assessing its combat and mobilization readiness.

Results and discussion

Assessment of the level of training of the tactical aviation brigade is proposed to determine the functional dependence, which takes into account both the results of individual training of servicemen and collective training of structural units of the military unit. Given that the individual capabilities of servicemen, which they acquire in the course of individual training, affect the coherence of structural units, which they achieve in the course of collective training, and therefore their performance is highly correlated, the assessment of the level of training of tactical aircraft $C_H(t)$ it is proposed to calculate using normalized multiplicative aggregation:

$$C_\text{H}(t) = \text{K}_\text{IC}(t)^{q_\text{ic}} \cdot \text{K}_3(t)^{q_3}, \qquad (1)$$

where $K_{IC}(t)$ – the total level of individual capabilities of servicemen at the time t;

$K_3(t)$ – the total level of coherence of structural units over time t;

$q_\text{ic}; q_3$ – weights coefficients of indicators $\text{K}_\text{IC}(t); \text{K}_3(t)$.

Assessment of the total level of individual capabilities of servicemen is determined by the dependence, which takes into account the level of individual capabilities of each serviceman, taking into account the importance of his position:

$$\text{K}_\text{IC}(t) = \sum_{i=1}^{l} \text{K}_{\text{IC}i} \cdot q_i, \qquad (2)$$

where $\text{K}_{\text{IC}i}(t)$ – level of individual abilities i serviceman on time t;

q_i – weight importance of the position i serviceman.

Assessment of the level of individual abilities i serviceman $\text{K}_{\text{IC}i}(t)$. It is proposed to determine the reserves, which take into account the level

of his competencies, length of service and the availability of refresher courses

i serviceman $K_{ICi}(t)$ it is suggested to use additive aggregation:

$$K_{ICi}(t) = M_k(t) \cdot q_k + M_c(t) \cdot q_c + M_p(t) \cdot q_p, \quad (3)$$

where $M_k(t); M_c(t); M_p(t)$ – indicators that characterize the level of his competencies, length of service and the availability of advanced training courses t;

$q_k; q_c; q_p-$ weights coefficients of indicators $M_k(t); M_c(t); M_p(t)$.

Level of competencies i serviceman $M_k(t)$ is calculated according to the dependence which takes into account his level of knowledge and skills in subjects of individual training and personal qualities. Since the knowledge and skills of a serviceman in the subjects of individual training do not depend on his personal qualities, and therefore their indicators do not depend on each other, then to assess the level of competencies i serviceman $M_k(t)$ it is suggested to use additive aggregation:

$$M_k(t) = H_{3y}(t) \cdot q_{3y} + H_{я}(t) \cdot q_{я}, \quad (4)$$

where $H_{3y}(t); H_{я}(t)$ – indicators that characterize the level of his knowledge and skills in subjects of individual training and personal qualities for the time being t;

$q_{3y}; q_{я}$ – weights coefficients of indicators $H_{3y}(t); H_{я}(t)$.

Level of knowledge and skills i serviceman $H_{3y}(t)$ of subjects of individual training is calculated according to the dependence, which takes into account his level of knowledge and skills j subject of individual training for a discrete moment of time:

$$H_{3y}(t) = \sum_{j=1}^{J} H_{3yj} \cdot q_j, \quad (5)$$

where $H_{3yj}(t)$ – an indicator that characterizes his level of knowledge and skills with j subject of individual training;

q_j – weighting factor of importance j subject of individual training;

J – the number of subjects of individual training from which its assessment is carried out.

Level of knowledge and skills i serviceman with j subject of individual training $H_{3yj}(t)$ calculated depending on:

$$H_{3yj}(t) = \frac{B_3 + B_y}{2}, \quad (6)$$

where $B_3(t); B_y(t)$ – indicators that characterize the level of theoretical knowledge and practical skills of the serviceman in the subject of individual training.

An indicator that characterizes the level of theoretical knowledge of a serviceman $B_3(t)$ it is offered to count on results of theoretical questions (testing) on subjects of individual preparation. Assessment of the level of theoretical knowledge of the serviceman $B_3(t)$ is defined by the expression:

$$B_3(t) = \frac{X_o(t)}{X_{Max}}, \quad (7)$$

where $X_o(t)$ – the number of points obtained by the serviceman on the results of theoretical questions (testing);

X_{Max} – the maximum number of points that can be obtained from the results of theoretical questions (testing).

An indicator that characterizes the level of practical skills of a serviceman $B_y(t)$ calculated based on the results of his practical tasks, standards. Assessment of the level of practical skills of a serviceman $B_y(t)$ is defined by the expression:

$$B_y(t) = \frac{Y_o(t)}{Y_{Max}}, \quad (8)$$

where $Y_o(t)$ – the number of points received by the serviceman based on the results of practical performance of tasks (standards);

Y_{Max} – the maximum number of points that can be obtained by the results of practical performance of tasks (standards).

Assessment of the level of personal qualities of a serviceman $H_{я}(t)$ it is proposed to calculate the functional dependence, which takes into account his "individual psychological qualities", "emotional and volitional qualities" and "motivation". So, as the specified indicators do not depend on each other, for calculation of personal qualities of the serviceman it is offered to use additive aggregation:

$$H_{я}(t) = \sum_{z=1}^{3} L_{z}(t) \cdot q_{z}, \qquad (9)$$

where $L_z(t)$ – indicators that characterize the level of personal qualities of a serviceman at a discrete point in time: "individual psychological qualities" $L_{IП}(t)$, "Emotional and volitional qualities" $L_{EB}(t)$, "Motivation" $L_M(t)$.

q_z – weights of indicators $L_z(t)$.

The indicators that characterize the individual psychological qualities of the serviceman are proposed to include: neuropsychological stability and personality orientation. The level of individual psychological qualities of a serviceman $L_{IП}(t)$ determined by:

$$L_{IП}(t) = \sum_{h=1}^{2} Q_h(t) \cdot q_h, \qquad (10)$$

where $Q_h(t)$ – indicators that characterize the level of development of individual psychological qualities of the serviceman at a discrete point in time: "neuropsychological stability" $Q_{НПС}(t)$ and "personality orientation" $Q_{СО}(t)$;

$q_h(t)$ – weights of indicators $Q_h(t)$.

It is proposed to determine these qualities with the help of standardized test methods "Forecast" and "Personality orientation".

The indicators that characterize the emotional and volitional qualities of a serviceman are proposed to include: initiative, determination and endurance. The level of emotional and volitional qualities of a serviceman $L_{EB}(t)$ determined by:

$$L_{EB}(t) = \sum_{w=1}^{3} Q_w(t) \cdot q_w, \qquad (11)$$

where $Q_w(t)$ – indicators that characterize the level of development of emotional and volitional qualities of the serviceman at a discrete point in time: "initiative" $Q_i(t)$, "determination" $Q_p(t)$; "mellowness" $Q_в(t)$;

$q_w(t)$ – weights of indicators $Q_w(t)$.

The indicators that characterize the motivation of servicemen are proposed to include: military-professional, social, moral and psychological, financial. The level of motivation of the serviceman $L_M(t)$ determined by:

$$L_M(t) = \sum_{v=1}^{4} Q_v(t) \cdot q_v, \qquad (12)$$

where $Q_v(t)$ – indicators that characterize the level of motivation of servicemen at a discrete point in time: "military-professional" $Q_{ВП}(t)$, "Social and household" $Q_{СП}(t)$; "Moral and psychological" $Q_{МП}(t)$; "Financial" $Q_{ф}(t)$;

$q_v(t)$ – weights of indicators $Q_v(t)$.

Appropriate rating scales have been developed to assess the values of these indicators. The values of all indicators are reduced to a dimensionless quantity.

Indicator of "seniority in office" $M_c(t)$ characterizes the ability of a serviceman to perform certain tasks. Its significance depends on the practical experience he has gained in his position.

Studies have shown that in order to achieve sustainable skills, a serviceman needs to have an average length of service of three years. Thus, to assess the length of service in the position of a serviceman, we have developed an evaluation scale, which is given in table. 1.

Table 1 – Evaluation of seniority in the position of a serviceman

Time spent in office	Rating in points
over 3 years	5
from 2 to 3 years	4
from 1,5 to 2 years	3
from 1 to 1,5 years	2
up to 1 year	1

This indicator is evaluated in points, so its value is reduced to a dimensionless value using the expression:

$$M_c(t) = \frac{Z_c}{5}, \qquad (13)$$

where Z_c – assessment in points of the time a serviceman stays in office.

Indicator "availability of advanced training courses" $M_p(t)$ characterizes the presence of a serviceman's refresher courses in the field of his activity. Its significance depends on the availability of refresher courses in the field of his activity.

To assess the availability of a serviceman's refresher courses in the field of his activity, we have developed an assessment scale, which is given in table. 2.

Table 2 – Assessment of the presence of a serviceman's refresher courses in the direction of his activities

Passing of advanced training courses on improvement of pedagogical skill	Rating in points
during the last year	5
for two years	4
for three years	3
for four years	2
over four years	1
did not participate	0

This indicator is also evaluated in points, so its value is reduced to a dimensionless value:

$$M_p(t) = \frac{Z_p}{5}, \qquad (14)$$

where Z_p – assessment in points of the presence of servicemen refresher courses in the field of its activities.

Assessment of the overall level of coherence of structural units is determined by the dependence, which takes into account the level of coherence of each structural unit of the tactical aviation brigade, taking into account its importance:

$$К_3(t) = \sum_{a=1}^{A} К_{3a} \cdot q_a, \qquad (15)$$

where $К_{3a}(t)$ – level of coherence a structural unit of the tactical aviation brigade for the time being t;

q_a – weights of indicators a structural unit of the tactical aviation brigade.

Level of coherence a structural unit of the tactical aviation brigade $К_{3a}(t)$ depends on the practical experience gained by servicemen in positions held during exercises (training). Its calculation is proposed to be carried out according to the dependence, which takes into account the experience of each serviceman in the position during the exercise (training), taking into account the importance of his position:

$$К_{3a}(t) = \sum_{i=1}^{I} R_{ПДi}(t) \cdot q_i, \qquad (16)$$

where $R_{ПДi}(t)$ – an indicator that takes into account "practical experience i serviceman in positions held during training (trainings)".

q_i – weight importance of the position i serviceman.

Numerical value of the indicator $R_{ПДi}(t)$ "Practical experience i a serviceman in positions held during training (trainings)" is calculated based on the number of trainings (trainings) in which he took part in the position he holds for the last three years:

$$R_{ПДi}(t) = \frac{D_i}{D_n \cdot e^{(\frac{D_i - D_n}{D_n})}}, \qquad (17)$$

where D_i – the number of exercises (trainings) in which he participated i serviceman in office for the last three years;

D_n – the total number of exercises (trainings), which is determined by the plan of combat training of the tactical aviation brigade during the last three years.

Conclusions

Thus, the article developed a partial method of assessing the level of training of tactical aviation brigade personnel, as one of the indicators of combat and mobilization readiness of the military unit, which allows to take into account the results of individual training and collective training of military units.

The results of the study can be used during inspections of the level of combat and mobilization readiness of military units as well as during further research on this issue in scientific institutions.

Prospects for further research in this area may be to substantiate the recommendations for improving the level of training of tactical aircraft.

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