Partial methodology for assessing the younger specialists competence level in the training center

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Abstract

The experience of the employment of troops (forces) during the Anti-Terrorist Operation (ATO) and Joint Forces Operation (JFO) on the East of Ukraine shows us that the most effective result in combat operations achieved by units equipped with personnel that received appropriate trainings and has an experience in combat actions. Therefore, the successful accomplishment of combat tasks of unit will directly depend on the level of competence of the individual soldier. This encourages the research and establishment of new approaches to the organization and preparation of their training, which requires the development of a scientific and methodical apparatus for evaluation the competence level of training center junior specialists. In the article presents a partial methodology for assessing the younger specialists competence level in the training center. Moreover, which is built on the basis of multicriteria task calculation, which allows not only to evaluate the results of serviceman preparation and training on the subjects of study, but also to take into account personal qualities. This it possible to quantify the serviceman competence level, as well as to identify the "weaknesses" in the organization and conduct of the educational process.

Keywords: methodical approach competence, training center, younger specialists, indicators.

Introduction

With the advent of armed struggle new means, forms and ways of troops (forces) application, the range and content of the tasks that military personnel are involved in has significantly expanded, which requires carrying out a set of measures aimed at improving their training system. One of the components of the training of the Armed Forces of Ukraine is preparation in training centers, which consists of the training, retraining and advanced training of military personnel of variable composition of training centers and individual training of military personnel of permanent staff [1]. Unfortunately, the existing junior specialists training system in training centers (TC) at its core

(structure, qualification requirements, terms of training, the main content of curricula and assessment methods) has not undergone significant changes and remains at the level of 2012 – 2014. All this leads to the search for and implementation of new approaches to the organization and conduct of their preparation. This can be done based on their preparation results evaluation. Therefore, there is a need for a scientific substantiation of the partial methodology for assessing the younger specialists competence level in the TC's, which indicates the relevance of the topic under consideration.

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Material and Method

Training at training centers is being considered as a servicemen military professional and technical training systematic process, which is aimed at acquiring them with the knowledge, skills, and personal qualities – the competencies necessary to fulfill their responsibilities in the relevant "military occupational specialty code" (MOS code), which involves multicriteria evaluation. The multicriteria problem can be reduced to a single-criterion by method of convolving partial indicators. These indicators of all levels may be of equal or different significance or weight. Therefore, during their convolution, appropriate weight coefficients will be applied [2].

The commission carries out the evaluation of the military personnel competence level after the end of the training term during the final control - the complex examination. Within it, are evaluated the serviceman's gained knowledge, skills and competences in the scope of the training program and personal qualities that enable to fulfill responsibilities in the relevant MOS code. Commission for each MOS code determines the list of subjects for the complex examination.

As an evaluation generic indicator of the younger specialists competence level in training centers, we use a value $M_C(t)$, that characterizes their ability to fulfill their responsibilities in the relevant MOS code.

The generalized indicator $M_C(t)$ is probabilistic, so we take its value from 0 to 1 and represent as:

$$0 < Mc(t) \leq 1 \qquad (1)$$

It is proposed to have a system of indicators that will consist of a generic indicator, partial indicator and indicators that are also probabilistic, so their values are also taken from 0 to 1.

To the partial indicators of evaluation of the younger specialists competence level in the training center are proposed to include: the serviceman training level $L_{STL}(t)$ and his personal qualities $L_{PC}(t)$.

Due to, the fact that the military personnel's training does not depend on their personal qualities, and therefore their performance is not dependent on each other, it is suggested to use additive aggregation to evaluate their level of competence [3]:

$$\mathrm{M}_C(t) = L_{STL}(t) \cdot q_{STL} + L_{PC}(t) \cdot q_{PC} \qquad (2)$$

where, q_{STL}, q_{PC} – indicators coefficients weight of the serviceman training level and personal qualities.

The calculation of weights is carried out by the method of expert evaluation.

A partial indicator of the younger specialist's level in the TC $L_{STL}(t)$ is proposed to be calculated by functional dependence, which takes into account the level of training from the j subject of training at a discrete time point:

$$L_{STL}(t) = \sum_{j=1}^{J} L_{STLj}(t) \cdot q_j \qquad (3)$$

where, $L_{Hj}(t)$ – an indicator that characterizes the level of training in the j subject of study;

q_j – importance weighting of the j subject of study;

J – the number of subjects for which it is evaluated.

The weight of indicators that characterize the importance of training subjects for younger specialists tank troops in the specialization of "the tank commander" is determined using the method of expert evaluation and is given in Table. 1.

Table 1. – **The weight of indicators that characterize the importance of training subjects for younger specialists tank troops in the specialization of "the tank commander"**

Training subjects	Weight of indicators
Tactical preparation	0,22
Shooting preparation	0,13
Phisical training	0,15
Psychological preparation	0,15
Tactical medicine	0,1
Engineering training	0,07
Military topography	0,1
Intelligence training	0,08

Evaluation of the younger specialist study level in the j subject of study, that is taken in the complex examination $L_{STLj}(t)$ is proposed to determine as the dependence, which takes into account the level of his theoretical knowledge and practical skills in the subject [4].

$$L_{STLj}(t) = \sum_{x=1}^{2} B_{jx}(t) \cdot q_x \qquad (4)$$

where, $B_{jx}(t)$ – an indicator, that characterizes the program achievement level by an younger specialist in the j subject of training, for a time t: "theoretical knowledge" $B_{tnj}(t)$, "practical skills" $B_{psj}(t)$;

q_{ci} – indicators weight coefficients $B_{jx}(t)$.

The indicator that characterizes the level of the younger specialist theoretical knowledge in the j subject of training $B_{tnj}(t)$ is proposed to calculate on the test results by providing answers to theoretical questions about the subject of training. The total number of questions should provide an objective and comprehensive level evaluation of his or her theoretical knowledge of this discipline.

Evaluation of the younger specialist theoretical knowledge level in the j subject of training is determined by the formula:

$$B_{tnj}(t) = \frac{X_{corj}(t)}{X_{tqj}} \qquad (5)$$

where, $X_{corj}(t)$ – number of correct answers provided by younger specialist in the j subject of training;

X_{tqj} – the total number of theoretical questions that younger specialist was tested in the j subject of training.

An indicator that characterizes the level of a younger specialist practical skills in the j subject of training $B_{psj}(t)$ is calculated on the basis of completed practical tasks (exercises, standards) results. The number and content of tasks should take into account the functional purpose of the serviceman in accordance with the military occupational specialty in which he / she is trained. Evaluation for exercises (standards) performance is determined in accordance with courses of shooting (driving), collections of standards, etc.

Younger specialist practical skills level evaluation in the j subject of training $B_{psj}(t)$ is determined by the formula:

$$B_{psj}(t) = \frac{X_{comj}(t)}{X_{tasj}} \qquad (6)$$

where, $X_{comj}(t)$ – number of completed tasks by younger specialist in the j subject of study

X_{tasj} – the total number of tasks the younger specialist was tested in the j subject.

A partial indicator of the younger specialist tank troops personal qualities level in the specialization of "the tank commander" in the TC $L_{PQ}(t)$ is proposed to be calculated by functional dependence, which takes into account his "individual-psychological qualities", "emotional-volitional qualities" and "motivation". As these indicators are not dependent on each other, it is proposed to use additive aggregation to calculate the younger specialist personal qualities:

$$L_{PQ}(t) = \sum_{y=1}^{3} C_y(t) \cdot q_y \qquad (7)$$

where, $C_y(t)$ – indicators that characterize the younger specialist personal qualities level at a discrete moment of time: "individual-psychological qualities" $C_{IPQ}(t)$, "emotional-volitional qualities" $C_{IVQ}(t)$, "motivation" $C_M(t)$.

q_y – indicators weight coefficients $C_y(t)$.

To the indicators that characterize the individual-psychological qualities of the younger specialist it is proposed to include: nervous mental stability and personality orientation. The individual-psychological qualities level of the younger specialist $C_{IPQ}(t)$ is determined by the dependence of:

$$C_{IPQ}(t) = \sum_{h=1}^{2} Y_h(t) \cdot q_h \qquad (8)$$

where, $Y_h(t)$ – indicators that characterize the achievement level of the younger specialist individual-psychological qualities at a discrete point of time: "nervous mental stability" $Y_{NMS}(t)$ and "personality orientation" $Y_{PO}(t)$;

q_h –indicators weight coefficients $Y_h(t)$.

It is proposed to determine these qualities using standardized test methods "Forecast" and "Personality orientation".

The indicators that characterize the emotional and volitional qualities of the younger specialist are suggested to be: initiative, determination and endurance. The younger specialist emotional and volitional qualities level $C_{EVQ}(t)$ is determined by the dependence of:

$$C_{EVQ}(t) = \sum_{w=1}^{3} Z_w(t) \cdot q_w \qquad (9)$$

where, $Z_w(t)$ – indicators that characterize the achievement level of younger specialist emotional and volitional qualities a discrete moment of time: "initiative" $Z_i(t)$, "determination" $Z_d(t)$ "endurance" $Z_e(t)$.

q_w – indicators weight coefficients $Z_w(t)$.

The indicators that characterize the younger specialist motivation are proposed to include [5]: military-professional, social-household, moral-psychological, financial. The younger specialist motivation level $C_{M}(t)$ is determined by dependency:

$$C_{M}(t) = \sum_{s=1}^{4} D_v(t) \cdot q_v \qquad (10)$$

where, $D_v(t)$ – indicators that characterize the younger specialist motivation level at a discrete point of time: "military-professional" D_{MPr}, "social-household" $D_{SH}(t)$, "moral-psychological" $D_{MPs}(t)$, "financial" $D_F(t)$;

q_v – indicators weight coefficients $D_v(t)$.

To evaluate the values of these indicators the appropriate rating scales have been developed.

The values of all indicators we convert to a dimensionless value.

Conclusions

To conclude, presented partial methodology for assessing the younger specialists competence level in a training center, which is built on the basis of multicriteria dimensionless evaluation calculation, which allows not only to evaluate their level of training, but also to take into account their personal qualities.

This partial methodology for assessing makes it possible to quantify the younger specialist competence level, as well as to identify "weaknesses" in the organization and conduct of the educational process. The results of the study can be used at the evaluation of the younger specialists competence level in training centers.

Prospects for further scientific research in this area may be the substantiation of the recommendations for the organization of the younger specialists tank troops educational process of specialization "the tank commander" in the TC.

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