THE PROBLEM OF PEDAGOGICAL EVALUATION OF THE MOTIVATIONAL AND VOLUNTARY COMPONENTS OF PROFESSIONAL READINESS OF FUTURE PILOTS OF TACTICAL AVIATION FOR COMBAT FLIGHTS

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Summary

The work is dedicated to the problem of professional readiness of future military pilots as an indicator of high-quality higher education in the field of military aviation under the conditions of increased intellectual, physical, psychological and psychophysiological requirements to pilots of modern tactical aviation. The author's approach to the scope and structure of the specified professional readiness is revealed and substantiated. The basic components of its structure are defined as cognitive, activity, operational, motivational-volitional, physical and psychophysiological. The importance and significance of the motivational and volitional components as a special integral psychological complex of the personality, which actualizes the implementation of professional activity and largely determines its productivity, has been reasonably justified. Furthermore, its consideration as a planned pedagogical goal within the educational process of future military pilots is substantiated, which necessitates its pedagogical evaluation. With the aim of the latter, the author has elaborated an appropriate criterion apparatus (axiological criterion, its indicators and levels) and developed a comprehensive method of pedagogical evaluation (based on existing diagnostic methods by K. Zamfir (in modification of A. Rean) to assess motivational indicator and by N. Stambulova to evaluate emotional and volitional indicators of the specified criterion. The results of the author's experimental measurement are presented. The obtained empirical data indicate the effectiveness and potential of the proposed approach.

Keywords: aviation, military pilot, readiness for professional activity, qualimetric assessment, psychological readiness.

DOI https://doi.org/10.23856/5012

1. Introduction

The intense scientific and technological progress of military aviation over the past thirty years, given its strategic role in modern military confrontations *(America's Air Force, 2014)*, puts forward high qualification requirements for the professional readiness of military pilots. This challenge is common to all countries with aviation in the world and is especially relevant for Ukraine, because the combat capabilities of Ukrainian tactical aviation largely depend on the level of national security in the face of undeclared aggression against our country.

Extreme intellectual, physical, psychophysiological and psychological loads that a military pilot has to withstand professionally in the process of piloting a modern fighter objectively require a powerful psychological resource, the core of which is the motivational and volitional complex of the individual. It is not unexpected that the formation of

relevant qualities and skills shall take place in the process of professional training at a higher military educational institution (HMEI) – during the educational process. Thus, the developed motivational and volitional components of professional training of future military pilots should be considered as a planned pedagogical result of the indicated process, and this result has to meet the requirements of pedagogical assessment *(Nevzorov, 2021a: 1758-1759; Nevzorov, 2021в: 144)*.

The purpose of our research is to present and substantiate the results of the author's pedagogical empirical assessment of the motivational and volitional components of professional readiness of future tactical pilots for combat flights. Within the strategic purpose, the tactical objectives of the article are to substantiate the author's understanding of these components and the developed criterion apparatus.

The empirical study was conducted using the method by K. Zamfir (in modification of A.A. Rean) to measure the motivational component and the diagnosis by N.E. Stambulova to measure the volitional component.

2. Primary (Basic) Concepts of the Problem

For a better understanding of the essence of the problem we have raised, it is necessary to explain and clarify the meaning of a number of concepts that are of primary importance for the disclosure of the problem.

Tactical aviation of Ukraine is the main component of the Air Force of the Armed Forces of Ukraine (AF of the AF of Ukraine), which is designed to perform a wide range of combat missions during tactical operations *(The doctrine "The Air Forces of the Armed Forces of Ukraine", 2020)*.

Future military pilots of tactical aviation – cadets of HMEIs (in this case, the only aviation university of Ukraine – Ivan Kozhedub Kharkiv National Air Force University), who receive higher education in military aviation majoring as "Bachelors of Military Management of Air Units, Tactical Level Officers" and assigned after the second year of training in the ranks of tactical aviation.

Combat flights – the main type of professional activity of military pilots, which is aimed at performing a combat mission; flights to perform combat missions (assignments) *(Rules of state aviation flights.., 2015)*.

Professional readiness of future tactical aviation pilots for combat flights – a set of flight-related theoretical, practical, special psychological, physical and psychophysiological qualities of a graduate of aviation HMEI that allow them to carry out their core professional activities (performance of combat flights) confidently and effectively immediately after obtaining the relevant profession *(Nevzorov, 2021c)*. According to the author's approach, which is substantiated by the author in the doctoral thesis research, the basic structural components of the above professional readiness are cognitive, activity, operational, motivational, volitional, physical and psychophysiological ones.

Pedagogical assessment – a scientific and pedagogical technique, the essence of which is that numerical values characterizing some features of pedagogical objects or phenomena are experimentally determined, or the class to which they belong is indicated on the basis of a previously obtained numerical system (or system of classes) and isomorphic empirical system with relationships *(e.g., Annyenkova et al., 2021: 6-8; Xrykov, 2018: 65)*. It consists of quantitative (qualimetric) evaluation and qualitative interpretation of its results.

3. Essence of the Motivational and Volitional Components

The psychological component of professional training of future military pilots is focused on the formation of a stable state of psychological resources of the individual, which provides systematic regulation of internal processes of the human psyche before, during and after performance of professional activities, especially the combat flights. A key feature of this condition is a comprehensive ability to mobilize and adjust the motivational, emotional, cognitive, operational and physical resources of the individual at the right time to perform professional tasks. In this context, the author agrees completely with the view that the psychological readiness to which psychological training at higher educational institutions is directed is in its essence the management of their own professional behavior *(Ganderatal., 2000: 128)*. This condition is especially relevant in the case under consideration because the profession of a military pilot is associated with a high degree of risk and stress and is one of the most emotionally exhausting.

In military psychology, this type of readiness for combat activity is interpreted, in general, as "a holistic, collective manifestation of personality, which indicators are the internal orientation to certain behavior and appropriate mobilization of all forces for active combat", and the psychological readiness for professional activities of military pilots is understood as "orientation to flight, mobilization, confidence and concentration"*(Djachenko et al., 1985: 13)*. In this regard, Yu.V. Bolenko points out that the psychological readiness of a professional determines the quality, stability and success of professional activity *(Bolenko, 2012: 5)*. At the same time, this type of professional readiness of military pilots for professional activities is considered in military psychology as one of the defining and dominant on a par with flight-practical readiness.

The vast majority of special studies on this problem indicate the presence of a kind of the core of psychological readiness consisting of motivational and volitional components. For example, V.A. Bodrov understood them as the so-called "subjective evaluative basic component" of the individual in the profession and noted that it "is a regulator and an indirect link in determining the nature of the dependence of performance indicators on individual psychological characteristics of the subject of labor"*(Bodrov, 2001: 286)*.Besides, the emotional andvolitional sphere of the individual is responsible for the sensual attitude to the activity and overcoming of various obstacles, which is very important for the professional activity of a military pilot.

Thus, the motivational and volitional components of professional readiness of future pilots of tactical aviation for combat flights can be considered as a psychological complex of the individual that maintains professional activity.

4. Criterial Apparatus of Assessment

The motivational and volitional components are considered in this work as an axiological criterion, which is an indicator of the psychological readiness of future military pilots to direct flight activities as intended.

Within its limits, the author has developed an appropriate set of indicators and levels:

1) Motivational indicator – a system of guidelines and ideas that causes the activity of the individual, determines the orientation and nature of their behavior and activities; at the same time, it not only determines the latter, including professional activity, but also permeates all areas of human mental life, which includes the following motivators and goals of a developed internal motivation:

– the tendency to professional self-actualization (the need for the fullest realization of the individual self in the profession) and self-expression (the presence of professional aspiration, ambitions, desire to make a career in the military aviation);

– involvement in the protection of one's own state and its people (national and patriotic motivator);

– affiliative (social) needs of the individual professional expression in the military professional environment (military unit);

– belonging to a socially prestigious and well-paid profession;

– flight work as a matter of life.

2) Volitional indicator (associated with the conscious regulation of behavior and activities by the individual, which is expressed in the ability to overcome internal and external difficulties in carrying out targeted actions, mainly in difficult life and professional circumstances) expressed by the following qualities:

– proactivity;

– self-consistency;

– determination;

– persistence;

– self-control.

The research provides three levels of diagnosis of these indicators:

– High – characterized by their harmonious development, which combined provides optimal psychological readiness for professional activities;

– Sufficient – diagnosed in the presence of the formedness of all components of the axiological criterion;

– Insufficient – expresses insufficient formedness and/or absence of some of these indicators, which indicates the psychological unpreparedness of the person to perform combat flights.

5. Methods of Empirical Research

Pedagogical assessment of the motivational and volitional components of professional readiness of future military pilots for combat flights was conducted as part of an empirical experiment to test the effectiveness of the introduction of the pedagogical system of provision of quality of professional training of future military tactical aviation pilots for combat flights to the educational process at Ivan Kozhedub Kharkiv National Air Force University. The level of psychological readiness (axiological criterion) was diagnosed at the beginning (2019) and at the end (2021) of the experiment.

From the total number of future military pilots of 2017 and 2018 of admission (a total of 44 people), two groups were formed: experimental (EG, 22 people) and control (CG, 22 people) ones. The first group was directly exposed to the experimental influence during the research process, and the second group did not participate in the experiment itself, but its results were compared with the results of the first group to determine the extent of the influence, validate the results and calculate the effectiveness of the introduced measures. The main characteristics of the experimental group (sampling criteria) are: age limits 18-22 years; gender – male; primary professional selection.

Determining factors in the formation of assessment methods:

1) Definition of the motivational complex of the individual as an indicator of satisfaction with the chosen profession of a military pilot:

– on the basis of the study of the correlation of satisfaction with the profession and the type of motivational complex of the individual (positive significant relationship, $r = +0.409$);

– on the basis of scientific ideas about three types of motivation – internal, external positive and external negative;

– diagnostics according to the method by K. Zamfir (in modification of A.A. Rean);

2) Determination of the content and expression of volitional qualities of future military pilots on the basis of decision-making in difficult situations (according to the method of diagnosis by N.E. Stambulova).

According to the content of the "Motivation of Professional Activity" methodology (developed by Kathleen Zamfir in modification of A.A. Rean), the EG and CG cadets were asked to assess the importance for themselves on a 5-point scale of such motivators of professional activity as 1) money earnings, 2) the desire to promotion (military career), 3) the desire to avoid criticism from the head or colleagues, 4) the desire to avoid possible punishments or troubles, 5) the need to achieve social prestige and respect from others, 6) the satisfaction with the process and the result of work, 7) the possibility of the most complete self-realization in this activity.

The results were evaluated according to the indicators of internal (IM), external positive (EPM) and external negative (ENM) motivation according to the following formulas:

– internal motivation = (score of cl. 6 + score of cl. 7) / 2;
– external positive motivation = (score of cl. 1 + score of cl. 2 + score of cl. 5) / 3;
– external negative motivation = (score of cl. 3 + score of cl. 4) / 2, where the indicator of the severity of each type of motivation is be a number that is in the range from 1 to 5.

The obtained results allow establishing the motivational complex of personality (the type of relationship between the three above types of motivation), which directly correlates with job satisfaction (positive meaningful relationship, r = +0.409), which is relevant for military pilots whose profession is permanently connected with high emotional and nervous tension and stress and needs significant motivational stimulation. At the same time, the more optimal the motivational complex, the more the personality is motivated by the content of the activity and the desire to achieve certain positive results in it, accordingly, the lower is the emotional instability of the individual. The optimal motivational complexes in terms of their compliance with the chosen professional activity are considered to be two types of combinations: IM > EPM > ENM and IM = EPM > ENM.

Volitional qualities of this component of professional readiness of future military pilots of tactical aviation for combat flights were measured using the method of self-assessment of volitional qualities by N.E. Stambulova, which allows diagnosing two key parameters of volitional qualities – expressiveness (presence and stability of the main features of the quality) and generalized nature (flexibility of the quality as a manifestation of the breadth of manifestation of the quality in different situations and activities). Such potency of this technique (it was originally developed for students in sports-oriented training) is especially valuable for this research, as it allows identifying not only superficial features but also deep (basic) foundations of the volitional sphere of future military pilots during their studies at HMEI in dynamics.

Cadets from EG and CG were offered five signs of volitional qualities (purposefulness, persistence and perseverance, courage and determination, initiative and independence, self-control and endurance) expressed in twenty affirmations from each (100 affirmations in total), which they had to answer with one of the five possible answers ("totally incorrect", "rather incorrect", "probably so", "rather correct", "certainly correct").

Taking this into account, the following "key" is used (for all qualities):

– affirmations 1, 6, 8, 9, 11, 12, 16, 17, 18, 20 reveal the expression of volitional qualities;
– affirmations 2, 3, 4, 5, 7, 10, 13, 14, 15, 19 reveal the generalization of volitional qualities.

The results were calculated in points (each affirmation is accompanied with a point scale with pints -2, – 1, 0, + 1, +2) by their algebraic addition (20 points were added to the final amount to transfer the result into a positive evaluation scale) separately for the parameters of expression and generalization for each indicator.

Interpretation of results by three levels (tables 1, 2):

– high level (31–40 points) – harmonious development of qualities, which together provides optimal psychological readiness for professional activities;

– sufficient (20–30 points) – the formation of all components of the volitional indicator within the axiological criterion;

– insufficient (0–19 points) – insufficient formation and/or lack of some parameters of the volitional indicator, which allows assuming the psychological unpreparedness of the person to perform combat flights.

6. Empirical Research Results

Table 1

The results of the assessment of the motivational indicator of the motivational and volitional components (according to the method by K. Zamfir) in EG and CG during the initial and final control evaluation

Groups	Indicator Formation Levels		
	high	sufficient	insufficient
initial control evaluation			
EG (22 persons)	3	11	8
CG (22 persons)	4	10	8
Total result (in %)	**13.6**	**50**	**36.4**
	18.1	**45.5**	**36.4**
final control assessment			
EG (22 persons)	8	12	2
CG (22 persons)	5	11	6
Total result (in %)	**36.4**	**54.5**	**9.1**
	22.7	**50**	**27.3**
deviation according to the results of initial (“-”) and final (“+”) control evaluations (in %)			
EG (22 persons)	**+22.8**	**+4.5**	**-27.3**
CG (22 persons)	**+4.6**	**+4.5**	**-9.1**

Table 2

The results of measuring the volitional indicator of the motivational and volitional component (according to the method by N.E. Stambulova) in EG and CG during the initial and final control evaluation

Groups	Indicator Formation Levels		
	high (31-40 points)	sufficient (20-30 points)	insufficient (0-19 points)
initial control evaluation			
EG (22 persons)	6	12	4
CG (22 persons)	7	11	4
Total result (in %)	**27.3**	**54.5**	**18.2**
	31.8	**50**	**18.2**
final control assessment			
EG (22 persons)	8	13	1
CG (22 persons)	7	12	3
Total result (in %)	**36.4**	**59**	**4.6**
	31.8	**54.5**	**13.7**
deviation according to the results of initial (“-”) and final (“+”) control evaluations (in %)			
EG (22 persons)	**+9.1**	**+4.5**	**-13.6**
CG (22 persons)	**-**	**+4.5**	**-4.5**

The calculation of the level of significance according to the Student's t-test based on the results of the initial control evaluation was 5.71, with the average sample differing slightly; according to the results of the final control evaluation – 18.10 – the average sample differs significantly.

The calculation of the level of significance according to the Student's t-test based on the results of the initial control evaluation was 4.21, with the average sample differing slightly; according to the results of the final control evaluation – 15.8 – the average sample differs significantly.

7. Conclusions

The obtained empirical data (results of qualimetric assessment) of the motivational indicator within the axiological criterion showed the following:

1) The basic level of formation of this indicator in cadets of EG and CG during the initial control evaluation was statistically equal;

2) Significant differences in the level of formation of the indicator were manifested in the cadets of EG, subjected to experimental influence, according to the results of the initial control evaluation:

– the number of cadets with a high level increased by 22.8% (in CG – by 4.6%);

– the number of cadets with a sufficient level increased by 4.5% in both EG and CG;

– the number of cadets with unsatisfactory level decreased significantly by 27.3% (in CG – by 9.1);

3) Both groups showed the dynamics of improving the level of formation of the motivational indicator, but:

– increase in EG precedes similar growth in CG by an average of 25%;

– the number of calculated optimal motivational complexes IM > EPM > ENM and IM = EPM > ENM among EG cadets exceeds the number among CG cadets on average by 23%, which indicates greater motivation of the former by the content of the future professional activity.

The obtained empirical data (results of qualimetric assessment) of the volitional indicator within the axiological criterion showed the following:

1) The basic level of formation of this indicator in cadets of EG and CG during the initial control evaluation was statistically equal;

2) Significant are the positions that were identified by the results of the initial control assessment:

– increase in the number of EG cadets with a high level by 9.15% (in the CG, such an increase is not recorded);

– reduction of the number of EG cadets with unsatisfactory level by 13.6% (in CG – 4.5);

3) In EG cadets, a predominance of generalized volitional qualities over their expression is observed, which is more relevant for their future professional activities, as it indicates the potential of the permanent stable volitional act in all aspects and manifestations of the latter, including combat flights.

The specified conclusions are indirectly confirmed by the opinions and impressions of the pilots-instructors of the HMEI (agreement amounted to 88.6%), which, in general, contributes to the validation of the pedagogical assessment.

Thus, the proposed method of assessment of the motivational and volitional component of professional readiness of future tactical pilots for combat flights in combination with the

author's criteria apparatus allows objectively assessing the significant psychological qualities of future military pilots as an important indicator of domestic education in the field of military aviation. In the future, it is planned to continue empirical research in this area in order to improve the technique under consideration.

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