

## **Fundamentals of the Model of Implementation of the Pedagogical System For Ensuring the Quality of Ground Training of Future Tactical Aviation Pilots in Ukraine**



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**ABSTRACT:** The article is devoted to the still unresearched problem of modern didactic theory (within the framework of professional, military and professional aviation pedagogy) - the system of ensuring the quality of ground training of future tactical aviation pilots in the institution of Higher Military Education (SVVO) of Ukraine. Since the current system of training cadets-military pilots in the Russian military educational institution is essentially a post-Soviet pedagogical relic, which has its roots in the morally outdated Soviet method of flight training, a systematic search for the latest alternative seems relevant and timely. Comprehensive author's research of the last five years on the problem of professional training of future tactical aviation pilots, as well as personal experience and observations of the author, allow us to confidently state that the theory of this problem clearly requires a thorough revision and addition of the pedagogical component. The most significant gap, according to the author, is the lack of a complete modern pedagogical system for ensuring the quality of professional training of future military aviation specialists in terms of ground training. The latter plays no less important role in all training than direct flight training in the sky. At the same time, ignoring the didactic features and propaedeutic function of ground training in the SVVO often leads to insufficient technical, physical, psychological, and most importantly competent readiness of cadets for flight training. The author has developed his own pedagogical system for ensuring the quality of ground training for future tactical aviation pilots, which is currently being tested experimentally on the basis of the Ivan Kozhedub Kharkiv National Air Force University (Ukraine) and offers a structural and functional model of its implementation. This article reveals the basics of this pedagogical model and substantiates its content.

**KEYWORDS:** Future Military Pilot, Tactical Aviation, Ground Training, Pedagogical System, Quality of Education, Model.

### **I. INTRODUCTION**

Global changes and challenges of the XXI century have affected all spheres of social existence, regions and sectors of the economy, changing the life of society. Significant progress in scientific and technological progress, especially the rapid development of social communications using the internet, communications and digital technologies, has also affected the military sphere and the global educational space.

In the first one, radical changes have taken place: real military power today is provided not by the quantitative composition of the armed forces, their ground equipment and ground maneuvering, but by the qualitative and quantitative characteristics of the air forces, the capabilities of global satellite communications, technologies for masking from electronic means of detection and high mobility. In this regard, the 2014 concept of the US Air Force notes that "in modern conditions, aerospace power has become the dominant element of combat power" [1]. In fact, the basis of the defense-deterrent doctrines of modern states (with the exception of aggressor countries) is tactical aviation, the level of development of which determines their real defense capability. This circumstance is especially important for Ukraine, which almost seven years ago found itself in an extremely difficult geopolitical situation. Therefore, the development of modern high-tech military aviation, and especially the training of regular military pilots, is one of the priorities of the reform of the defense and national security sector of our state. Confirmation of this thesis is the plan of the Supreme Military Command of the Air Forces of the Armed Forces of Ukraine for the next fifteen years regarding the fundamental re-equipment of the domestic military fleet with a single type of multirole fighter of Generation 4 закордон of foreign production (such as Saab JAS-39E/F Gripen, F-16 Block 70/72 or others) [2]. Under such conditions, the quality of professional training of future tactical aviation pilots in general and their ground training in the structure of this training in particular in the institution of Higher Military Education become a significant factor in defense and educational reforms in Ukraine.

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The educational sphere is also undergoing drastic changes and transformations. The modern educational space, as one of the global world MetaSystems (according to the classification of General Systems Theory [3]), over the past decades has confidently demonstrated the preservation and strengthening of a number of key trends – dynamism, openness, digitalization of the educational process, the existence and pluralism of pedagogical concepts. Higher military education, as a lower-level educational system (one of the subsystems within the above-mentioned metasystem), cannot objectively fail to respond to these trends, even taking into account the understandable level of conservatism and closeness inherent in them. Advanced training technologies, primarily information educational technologies and interactive training methods, are gradually entering the process of professional training of military personnel. All this makes it necessary for scientific and theoretical revision, modernization, renewal, addition, and sometimes the development of an appropriate theoretical apparatus for professional training of cadets-future pilots. The latter is especially relevant for ground training of future tactical aviation pilots, as a separate subject of pedagogical research, which still does not actually have a special theory and has not been comprehensively studied.

Within the framework of the developed author's pedagogical system for ensuring the quality of ground training of future tactical aviation pilots in the conditions of VVZO, there is an urgent need to implement it as fully as possible. To this end, on the basis of the Ivan Kozhedub Kharkiv National Air Force University (KHNUPS), the only VVZO in Ukraine that trains career officers-military pilots, pedagogical conditions, educational and information environment and organizational, methodological and information-technical capabilities for implementing this system were studied. The result of their study was a structural and functional pedagogical model for implementing a pedagogical system for ensuring the quality of ground training for future tactical aviation pilots. This article reveals its content and justifies it.

## TOOLS AND METHODS

The foundation of the methodological tools of this study was laid by the general scientific method of modeling. The choice of a model approach to solve our problem is determined by several arguments.

First, the scientific model, according to a generally accepted fact, always identifies a real object or process with a system, which is fundamentally important for our research. The process of ground training of future military pilots as a component of the educational process of modern Ukrainian higher education is appropriate and should be considered in the context of a specific didactic system that has its own pedagogical patterns and conditions, uses a specific training methodology aimed at a certain designed pedagogical result. In this sense, the application of the modeling method is able to accurately describe the features of this process and build an optimal, from the theoretical and practical sides, pedagogical model of its implementation in the VVZO. Taking into account the multifactorial nature of the modeled pedagogical system, and also fully falls under the influence of K.'s logical theorems. Godel about the incompleteness and inconsistency of formal systems, the application of a model approach in the study of our subject of research seems to us the most successful methodological choice: we get the opportunity to independently select the initial (initial) conditions depending on our own understanding of the tasks, which is especially important for the process of professional training of cadets-military pilots in the VVZO, which for a long time remains unchanged and does not meet modern socio-economic, scientific-technical and military-tactical requirements.

Secondly, models are more convenient for research than the original objects/processes, since they are their epistemological and homomorphic maps [4], which reduces and simplifies the structure of the original (in some cases, research is possible only through the prism of the model).

Third, modeling makes it possible to study the most essential aspects of the original, which contributes to a deeper knowledge of reality.

The theoretical basis for the instrumental application of the model approach in this pedagogical research is the development of V. A. Shtoff [5], E. A. Lodatko [6], J. R. Chao [7] and some others.

## RESEARCH RESULTS

### *Basic concepts and their correlation*

The initial concepts that form an idea of the subject of research and without which it is impossible to solve the problem are: "future tactical aviation pilot", "ground training", "pedagogical system for ensuring the quality of ground training", "pedagogical model". Based on the preliminary results of the author's dissertation research of the doctor of Sciences, which is currently at the stage of implementation, publications of its individual results in various scientific publications, as well as relying on the main sources of study of the issue, we offer the following meaningful definitions of the above concepts.

A future tactical aviation pilot is a cadet of the VVZO in the specialty (specialties) of combat piloting of military aircraft (tactical aviation), who receives a higher military education simultaneously with training in the military profession of a pilot and who, upon completion of the institution and successful development of the corresponding educational program, is awarded a military officer rank, flight Category III class. Such a person studies exclusively at the expense of the state budget under a state educational order and upon completion of training is distributed to a military unit (Aviation Brigade) for further military service

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under a contract. Tactical aviation of independent Ukraine includes fighter, bomber and assault types of military aviation and is the most highly maneuverable and combat-ready part of the armed forces of the armed forces of Ukraine. Military experts distinguish several groups of military tasks that it performs: 1) the main ones are the destruction of enemy aircraft; destruction or suppression of enemy ground forces, its layered defense, communications and infrastructure; tactical aerial reconnaissance; implementation of joint raids of highly maneuverable forces; 2) additional – destruction of the enemy at sea together with the Navy (Air and sea targets); protection of sea communications and others. Such a wide range of complex combat flight tasks, combined with the rapid technological progress of military aviation technology, requires high professional training and psychological readiness for combat flights from military pilots. According to an unspoken tradition, tactical aviation pilots are considered the elite of the Air Forces of the Armed Forces of Ukraine.

We propose to understand ground training as a component of professional training of future tactical aviation pilots in the VVZO, carried out on the ground by means of specially theoretical and tactical-theoretical, simulator, physical and psychophysiological training [8]. Its pedagogical goal is propaedeutic training of cadets to perform combat tasks in flight conditions, "introduction" to the military profession. By the nature of the tasks set, ground training can either precede the actual flight training (in junior years - before the first flights with an instructor), or take place in parallel with it (for mastering and honing more complex aerobatics and other flight tasks, improving the technique of independent piloting, etc.). The main content of ground training is the applied consolidation of the previous theoretical foundation, the development of key professional skills on the ground (bringing them to automatism, establishing stable connections in the operator-equipment system) and the formation of psychological readiness to independently perform flight combat tasks. In fact, Ground-Based Training acts as an instrumental bridge between theoretical and actual flight training, combining all stages and stages into a single didactic structure. To date, there is no official separate special theory of ground training of future tactical aviation pilots in the VVZO in Ukraine, unlike the leading aviation powers of the world (USA, Great Britain, France).

The pedagogical system of ensuring the quality of ground training should be understood as an autonomous part of the educational process in the VVZO (a separate pedagogical construct), which is a complex of regulatory, organizational and methodological, operational-technological and diagnostic-verification measures aimed at the formation of professionally significant competencies, physical and psychological readiness for professional activities (combat flights). This system is developed by the author in accordance with the modern defense needs of the state in terms of tactical aviation and the requirements for the profession of a military pilot (the content core of which is the "man-machine" system, where the first acts as an operator of complex systems based on the concept of a risky profession), has a projected character and a strictly planned pedagogical result. Within its framework, the author suggests separating the subsystem of ground training in combat flights as the basis for the professional activity of a military pilot into a separate section of military pedagogy with its own pedagogical theory [9].

The analysis of scientific literature on the problem of applying models in science in general and in pedagogy in particular allows us to assert that the scientific model is in the general (philosophical) understanding mentally imagined or materialized system, which, reflecting or reproducing the object of research, is able to replace it so that its study will give us new information about this object (classical in the Eastern European scientific tradition interpretation proposed in the 1960s by V. A. Shtoff). Accordingly, a pedagogical model is an ideal extrapolation of a specific pedagogical phenomenon, process, phenomenon or other, expressed in the form of an imaginary pedagogical system. It allows you to know the object of research in a comprehensive way, even before it is expressed in reality.

Thus, under the model of implementation of the pedagogical system for ensuring the quality of ground training of future tactical aviation pilots in Ukraine here and in the future, we will understand an organized set of ideal (simulated) conditions and factors of the educational process in the VVZO, which are able to optimally (taking into account real financial, material and technical, personnel and other resources) provide a sufficient level of professional knowledge, skills and abilities, as well as professionally significant competencies of cadets-military pilots. Sufficient means a level that allows graduates of the VVZO to be immediately ready to perform combat tasks as part of an active Aviation Brigade upon its completion.

### **Problem hypothesis**

Starting to develop our model, we proceeded from the assumption that the existing practice of ensuring the quality of ground training of future tactical aviation pilots in the Ukrainian aerospace forces is imperfect for a number of reasons:

- the content of training and its components, expressed in the formal and normative structure of the algorithm of the educational process (current educational program, curricula, programs of academic disciplines and courses, information and methodological support, sources of up-to-date information), do not sufficiently correspond to the current level of development of military aviation, are focused on the outdated training fleet and are inflexible and conservative in nature;
- imperfect diagnostic tools for identifying the level of quality of acquired professional knowledge, skills and abilities (focusing only on external quantitative digital indicators-evaluation criteria); there is no methodological apparatus for cutting the level of formation of professionally significant competencies (for illustration purposes - in the current KHNUPS educational and

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professional program "flight operation and combat use of aircraft" of the first (Bachelor's) level of higher education in the specialty 253 "military management (by Types Of Armed Forces)", branches of knowledge 25 Military Sciences, national security, state border security, specializations flight operation and combat use of aircraft generally lack information competencies in the list of program competencies (general, special (professional, subject) and military-special by specialization); at the same time, the list of program training results indicates the use of computer technology and a high-level programming language, the main systems and devices of computers in the general training block and a number of results in the specialization block (determining the spatial position of the aircraft with the integrated use of flight navigation devices, flight task modeling, operation of aircraft systems and equipment in flight and during combat use, etc.);

- a formal approach to monitoring the quality of cadets' assimilation of the relevant educational program (only external educational indicators are diagnosed without identifying the level of formation of professional competencies, there is no cross-section of the motivational component of training at all stages of ground-based training, a superficial study of psychological readiness for further training).

These reasons are directly correlated with the lack of an appropriate modern scientific and theoretical base in the educational process-a pedagogical system for ensuring the quality of ground training for future tactical aviation pilots, which actualizes the development and testing of a model for ensuring the corresponding author's pedagogical system.

### ***Justification and basis of the model for ensuring the quality of ground training of future tactical aviation pilots in the Ukrainian military military enlistment office.***

Modern generalized theory of modeling defines the model approach as a method of research (cognition) of the surrounding world, in which a certain phenomenon that is being studied is put in line with the model in the form of an object, phenomenon, process that can replace nature in the process of research, and the model itself considers as a mentally imaginary or material implemented system that in the process of cognition, analysis replaces the real object (system), preserving some of the most important features for the study, and its study gives us new information about the object, as a conditional image (simplified image) of a real object (process), created for a deeper study of reality [4]. Back in the middle of the twentieth century, the pedagogical theory established a kind of instrumental norms for the use of modeling, the main of which should be considered the following: - the "correct" model reflects the most significant features of a real object, phenomenon or process; - the degree of schematization in modeling depends on the purpose and objectives of the study, the expected completeness and accuracy of the result; - permissible simplifications in modeling should not be excessive, so as not to underestimate its validity. In recent decades, they have been expanded and refined: - universality (the possibility of using similar systems with comparable functioning for analysis); - accuracy (the degree of coincidence of modeling results with the projected results); - validity and reliability (validity of the model); - adequacy (compliance of the model with the original real system, first of all, its basic and essential features, qualities and characteristics).

When developing our model, we were guided by the above standards. It has four basic features:

- imaginary system – the model is a structured form (system) with the relationships inherent in the latter between its components (projected pedagogical result → pedagogical conditions → educational and information environment → structural and logical scheme of training (list and sequence of academic disciplines, courses, trainings, special forms of training) → current and control measurements of the level of mastering professional knowledge, skills → diagnostics of the level of formation of professionally significant competencies → study of psychological motivation of each component of ground training → initial study of psychological readiness for professional activity (combat flights) → comparison of the results obtained with the projected ones, correction of the educational process); at the same time, this approach allows you to identify hidden problems of the future functioning of the pedagogical system for ensuring the quality of ground training of future tactical aviation pilots and eliminate them in a timely manner;

- reflects the object of research – model-system allows you to plan and calculate the effect of the entire arsenal of training tools and methods of ground training (according to the generic criterion – means of technical and tactical-technical, physical and physiological, special psychological, simulator, pre-flight (virtual) training; according to the specific criterion – methods of practicing basic aerobatics (take-off and landing, day-night flights, group-single flights, etc.), methods of conducting aerial reconnaissance, methods of conducting air combat (remote detection of the enemy, tactics of combat collision, pointing weapons at the target, avoiding attack, etc.), general tactical maneuvering; according to military tactical training technologies - simulation of situations on aviation simulators, training battles, case analysis and others); at the same time, for each criterion, their diagnostic requirements are set and an expanded assessment scale;

- the ability to replace the object of research at the stage of experimental verification of the pedagogical system for ensuring the quality of ground-based training, which is very convenient for correcting the results of the experiment; вивчення моделі дає нову інформацію про об'єкт.

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It is important to note that each of the components of the model is in close didactic and methodological connection with the others, while taking its own place in the overall structure, which is coordinated in a certain way by the purposefulness of the model. So, our model by type should be attributed to structural and functional.

The superstructure of the core of the model is the educational and information environment of the VVZO and the features of the pedagogical conditions of the domestic higher military school, which act as catalysts for the motivational and value attitude of cadets to future professional activities and are designed to harmonize it with the primary expectations and attitude to the future specialty after "immersion" in it within the framework of ground training.

Compliance with a number of pedagogical principles is designed to strengthen the validity of our model. In the framework of this article, we will omit the description and justification of their general group regarding the pedagogical system for ensuring the quality of ground training of future tactical aviation pilots (scientific, unity of training, upbringing and education, expediency, variability and others), but we argue for a number of significant specific principles: contextuality (maximum "immersion" of cadets in the space of the didactic process for the implementation of the appropriate forms and content of pedagogical interaction between cadets and teachers), reflexivity (improvement of cognitive activity through self-knowledge and critical self-awareness), manageability (implementation of a holistic management cycle based on pedagogical monitoring), polyphonicism of content (ensuring objectivity and impartiality, stimulating pluralism of views and approaches), subject-object-subject positions of training participants as equal partners in the process of cognitive activity.

### **CONCLUSIONS**

The model approach is constantly used in numerous modern pedagogical studies, so its use to test the pedagogical system for ensuring the quality of ground training of future tactical aviation pilots in the VVZO of Ukraine as a separate pedagogical construct (autonomous subsystem) is quite justified and appropriate. This method has a number of invaluable advantages for our subject of study, in particular, such as the formation of ideal conditions for the implementation of the model, which allows us to compare them more fully and critically with real conditions, the ability to identify problematic moments of the pedagogical process/phenomenon that is being studied, even before its implementation, and systematic extrapolation.

The author's model is a theoretical pedagogical model of a structural and functional type in terms of content and character.

### **REFERENCES**

- 1) America's Air Force: A Call to the Future. 2014. Secretary of the Air Force.
- 2) Vision of Aircrafts 2035. 2020. Command of Aircrafts of the Armed Forces of Ukraine.
- 3) Bertalanfi fon, L. 1969. General Systems Theory: A Critical Review. Moscow. Publishing house "Progress".
- 4) Kononiuk, A. 2012. Generalized theory of modeling. Book 1 Beginnings. Part 1. Kiev. Publishing house "Education of Ukraine".
- 5) Shtoff, V. 1966. Modeling and philosophy. Moscow; Leningrad. Publishing house "Science".
- 6) Lodatko, E. 2010. Modeling of pedagogical systems and processes. Slavyansk. St. Petersburg Pedagogical University.
- 7) Chao, Y. R. 1962. Models in linguistic and models in general. Logic, methodology and philosophy of science. Stanford.
- 8) Nevzorov, R. 2020. Ground training in combat flights as a condition for high-quality professional training of future tactical aviation pilots. Pedagogical sciences: theory, history, innovative technologies (No. 1), 248-256.
- 9) Nevzorov, R. 2020. Main components of the pedagogical system of ground-based training for combat flights of future pilots of tactical aviation. Education in the 21st century. Yerevan (No. 1 (3)), 247-257.