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Formation of competitiveness of graduates of military aviation universities by means of integral teaching technology

Formación de la competitividad de los graduados de las universidades de aviación militar por medios de tecnología de enseñanza integral

Angela Rekhlova

aryabkina68@inbox.ru

<https://orcid.org/0000-0002-2358-8367>

Senior teacher of the Department of foreign languages, Military Educational-Research Centre of Air Force "Professor N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (branch in Syzran)

Olga Donina

aryabkina68@inbox.ru

<https://orcid.org/0000-0003-0841-9394>

Doctor of pedagogical sciences, professor of the Ulyanovsk State University, Russian Federation Senior teacher of the Department of foreign languages, Military Educational-Research Centre of Air Force "Professor N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (branch in Syzran)

Alexander Kuznetsov

aryabkina68@inbox.ru

<https://orcid.org/0000-0001-8690-3582>

Colonel, candidate of Pedagogic Sciences, head of the military training center, Ulyanovsk Institute of Civil Aviation named after Chief Marshal of Aviation B. P. Bugaev

Lydia Nabatova

aryabkina68@inbox.ru

<https://orcid.org/0000-0002-4545-452X>

Candidate of Pedagogic Sciences, docent, associate professor of the Department of Methods of Mathematical and Information Technology Education, Ulyanovsk State Pedagogical University named after I. N. Ulyanov

Roman Goriunov

aryabkina68@inbox.ru

<https://orcid.org/0000-0003-0430-7774>

Teacher of the Department of flight aerodynamics and navigation, Military Educational-Research Centre of Air Force "Professor N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (branch in Syzran)

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Abstract

The article considers the content and structure of the competitiveness of a military pilot as the purpose of studying Aviation English at a military aviation university. The analysis of the literature on the competitiveness of a specialist allowed us to form our own idea of its components. The article shows the stages of implementation of the Integral technology of studying Aviation English as the most effective technology, its pedagogical principles and components of this training technology. Practical results of experimental training are presented.

Keywords: competitiveness, Aviation English, Integral training technology, criteria, indicators, levels, pedagogical conditions.

Resumen

El artículo considera el contenido y la estructura de la competitividad de un piloto militar como el propósito de estudiar inglés de aviación en una universidad de aviación militar. El análisis de la literatura sobre la competitividad de un especialista nos permitió formarnos una idea propia de sus componentes. El artículo muestra las etapas de implementación de la tecnología Integral de estudiar inglés de aviación como la tecnología más efectiva, sus principios pedagógicos y componentes de esta tecnología de entrenamiento. Se presentan los resultados prácticos del entrenamiento experimental.

Palabras clave: competitividad, inglés aeronáutico, tecnología de formación integral, criterios, indicadores, niveles, condiciones pedagógicas.

1. Introduction

The current stage of socio-economic and political development of Russia, the ongoing reform of the Armed Forces of the Russian Federation, impose increased requirements on the officer corps, its professional and personal qualities, put forward new tasks for the universities of the Ministry of Defense in the training of military specialists.

Development of anti-terrorist and military cooperation, multilateral military exercises conducted by Russia together with Collective Security Treaty Organization, Commonwealth of Independent States and Shanghai Cooperation Organization partner countries, peacekeeping operations under the auspices of the UN, cooperation in the training of military personnel require officers to be fluent in foreign languages.

At present, when the solution of many geopolitical issues is impossible without the participation of the Military Space Forces, the range of tasks of military aviation is increasing. In solving these tasks, military pilots, making long flights, both in the airspace of the Russian Federation and beyond, must be ready to conduct radio communication not only in Russian, but also in English, according to the requirements of the Air Code of

the Russian Federation (Air Code of the Russian Federation, 2020) and taking into account the standards and recommendations of general and aviation English proficiency by pilots established by the International Civil Aviation Organization (ICAO) (ICAO Document 9835: Manual on the Implementation of ICAO Language Proficiency Requirements, 2004).

However, as practice shows, not all military pilots speak English, corresponding to the levels of international requirements of ICAO. The Advisory and Analytical agency "Flight Safety" has published the results of the project "Killers in Aviation". It analyzed the most serious problems that claim hundreds of human lives every year. In the list of the most common causes of plane crashes in seventh place is the problem of insufficient level of proficiency of pilots in Aviation English (Shelkovnikov, 2014).

The need to improve the competitiveness of the country's human resources potential is indicated in the "Forecast of socio-economic development of the Russian Federation for the period up to 2036" (Forecast of socio-economic development of the Russian Federation for the period up to 2036, 2020). In this regard, there is a need to find ways to improve the pedagogical process of professional training (Donina et al., 2020; Kuznetsov et al., 2016; Nabatova et al., 2017), the formation of the competitiveness of a military pilot.

Numerous scientific studies in the field of military pilots training indicate the need to form their competitiveness directly in the process of their training in universities. Thus, D. V. Gander asserts that the modern military pilot is characterized by the realization of professional and personal resources, a high level of motivation for self-development and adaptation to changing conditions of flight activity (Gander et al., 2015).

According to the research conducted at the Lobachevsky Nizhny Novgorod State University (Russian Federation), among the sixteen competencies necessary for a pilot to effectively perform his professional activity, the most significant are equally flight operation of an aircraft and knowledge of Aviation English (Prokhorova et al., 2017). Consequently, the knowledge of Aviation English is one of the main indicators of the formed competitiveness of the pilot.

The concept of "competitiveness" has come into active use relatively recently. Initially, it was synonymous with the concept of "competition", "rivalry" and was an economic category. At the end of the XX century, the term "competitiveness" came to pedagogy. Competitiveness becomes the subject of purposeful formation and development in the training of students at the university. I. A. Bibik believes that one of the tasks of modern higher education is to train a competent, mobile, competitive specialist (Bibik, 2010).

One of the important conditions for the formation of the competitiveness of a military pilot in a University is to choose an effective pedagogical technology for this purpose. The analysis of pedagogical technologies used in the practice of teaching from the point of view of ease of adaptation to a military aviation university, the possibility of using a variety

of teaching methods and forms of conducting practical classes in Aviation English allowed us to identify the V. V. Guzeev Integral technology of training. This technology combined into a single system the main concepts of integration in education: consolidation of didactic units; three-level planning of learning results; extensive use of computer technologies; a wide range of organizational forms of classes; psychologization of the educational process. Based on personal-activity and didactocentric approaches, this technology provides the development of personal qualities of cadets on the basis of well-learned subject content (Guzeev, 2001).

When considering Integral technology as a means of forming the competitiveness of a military pilot, we have consistently identified the aims of this technology:

- general pedagogical aim is the formation of the competitiveness of a military pilot;
- subject's aim (reflects the specifics of the academic discipline "Aviation English") is the formation of the competitiveness of a military pilot through the formation of a foreign-language professional and communicative competence;
- operational aims are the ability to perform professional actions within a certain block of activities.

Some aspects of competitiveness as a pedagogical phenomenon have been considered in a number of scientific studies. The scientific researches of many modern scientists are devoted to the study of the formation of a specialist's competitiveness. The authors consider the formation of a competitive personality in relation to various areas of professional activity (teacher, engineer, manager of physical culture, trade and economic specialists, gunner) (Angelovsky, 2004; Bibik, 2010; Grishin, 2010; Kara, 2012; Khazova, 2011; Shirobokov, 2015). Scientific papers deal with the problem of increasing the intensification of the process of training flight and control personnel in professionally oriented English in accordance with ICAO standards and recommendations (Alekseenko, 2011; Astasheva, 2001; Matveeva, 2019; Sivash, 2009; Sochnev, 2005; Suslova, 2015; Shcherbakova, 2011). The ideas of Integral learning technology have been developed in the research of many scientists (Vinokurov, 2008; Gerasimova, 2003; Gerasimova, 2009; Lopukhina, 2007; Shoshtaev, 2003). However, despite certain steps taken in this direction, the stated research perspective has not yet become the subject of special scientific development, which is the justification for the relevance of this study.

2. Methodology

The experimental work on the formation of the competitiveness of a military pilot by means of Integrated learning technologies have been based on Military Educational-Research Centre of Air Force "Professor N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (branch in Syzran). The experiment involved the 3rd, 4th and 5th years 180 cadets, training in the specialty 25.05.04 "Flight operation and application of aviation complexes".

The following methods were used: theoretical (analysis and synthesis, generalization of experience, abstraction, modeling); empirical (observation, survey, testing, praximetric method, experiment); statistical (quantitative and qualitative processing of materials by methods of mathematical statistics, pedagogical measurement, multiple comparison).

At the different stages of the experimental work we used:

1. Methodology for the diagnosis of educational motivation (Badmaeva, 2005).
2. Sociometric methodology (Nemov, 2001).
3. Diagnostics of the dominant perceptual modality (Badmaeva, 2005).
4. The method "Group roles" (Nekrasov, 2016).
5. The method of self-actualization test (SAT) (Sazonov, 2015).

For the experimental work non-variable and variable conditions were created.

The following experimental conditions were determined as non-variable:

- the same duration of experimental training in the control and experimental groups;
- the same forms and types of pre-and post-experimental control;
- approximately the same initial level of formation of foreign-language professional and communicative competence of cadets in the control and experimental groups;
- studying of the same number of educational information for the control and experimental groups;
- the same didactic tasks for the control and experimental groups, which are solved during the classes.

The variable conditions include:

- testing in the experimental groups the effectiveness of the implementation of Integral technology in the training of a competitive military pilot against the background of pedagogical conditions for the formation of its competitiveness.

Classes in the control groups were conducted according to the standard methodology without taking into account the identified conditions.

The experimental work was carried out in three stages: ascertaining, forming and generalizing. For each stage of the experiment, its own tasks were formulated, and the intermediate results of the experimental work were determined.

At the ascertaining stage, a theoretical and analytical basis for conducting experimental work has been prepared. Diagnostic tools were developed, including methods, tests for diagnosing the level of formation of foreign-language professional and communicative competence (FIPCC), as a component of the competitiveness of a military pilot.

An important task of the ascertaining stage of the experimental work was to determine a set of criteria, indicators and methods for diagnosing the level of formation of foreign-language professional and communicative competence, as a component of the competitiveness of a military pilot in the process of teaching cadets the Aviation English in a military university during the implementation of Integrated training technology.

As indicators that determine the level of formation of foreign-language professional and communicative competence, we have identified personal and educational criteria.

The personal criteria reflects the formation of professional cognitive and operational - technological competencies. The educational criteria reflects the formation of professionally oriented linguistic, socio-cultural, pragmatic and strategic competencies.

Each criteria has a number of indicators. Thus, the indicators of linguistic competence are pronunciation, knowledge of the grammatical structure of the language, and the cadet's vocabulary. The indicator of professionally-oriented socio-cultural competence is fluency of speech. Understanding is an indicator of professionally-oriented pragmatic competence. The indicator of professionally-oriented strategic competence is the ability to communicate.

Indicators of the personal criterion: the ability to set the aim of their own activities and choose an individual educational trajectory; the ability to independently search for professionally relevant information in English; the ability to summarize and highlight key information within the discipline "Aviation English"; the ability to organize cooperation in the preparation, interpretation and presentation of professional information in English; the ability to program their activities: build a plan, anticipate its results; be aware of and justify the actions performed, transfer knowledge to a new professional situation; the ability to reflect on their own activities.

Analysis of the levels of proficiency in professionally-oriented English specified in the ICAO Qualification Scale and in the "STANAG 6001" (NATO Standardization Agreement) derived from the Language Proficiency Scale (ICAO Document 9835: Manual on the Implementation of ICAO Language Proficiency Requirements, 2004; STANAG, 2010), as well as the fact that today the Russian military education system does not have an officially defined clear description of the levels of foreign language proficiency, we have identified four levels of formation of foreign-language professional and communicative competence of a military pilot: critical, reproductive, reconstructive and variable.

Diagnostics showed that 10 % of cadets have a critical, 56% of cadets have a reproductive initial level of FIPCC formation according to the educational criterion; according to the personal criterion, 2% of cadets have a critical and 66% of cadets have a reproductive initial level. This fact indicates an insufficiently high level of formation of cadets ' FIPCC as a component of competitiveness, which is due to the lack of

effectiveness of the traditional approach to the implementation of professional training of future military pilots.

Based on statistical processing of experimental data (Pearson's consent criterion) tested the hypothesis that there is no significant difference in the levels of formation of FIPCC of cadets of experimental and control groups.

At the formative stage of the experiment, the Integral technology of training and pedagogical conditions for the formation of the competitiveness of a military pilot were tested. There were four stages of the implementation of the technology: Analysis of the formation of modules, Practical implementation, Introspective reflection.

At the stage Analysis the formation of modules, a unified system of sub-block structure was adopted (4 classes following in a certain order) and the program of the discipline "Aviation English" was adjusted taking into account the implementation of Integral technology.

The second stage is Practical implementation of the Integral technology. As part of the experimental work, we tested the effectiveness of exposure the totality of pedagogical conditions.

Differentiation of training is based on the identification of cadets with a tendency to different ways of mastering the language, depending on their cognitive style. To determine the cognitive style of the cadets in the experimental groups there was a diagnostic. The result of the diagnostic showed that from 76% to 88% of cadets of experimental groups have equally developed channels of perception of information. But from 6 to 13 % of cadets are kinesthetics, 6-7 % - visuals, 6-12% - audials and 6% of cadets are digitals. These information helped us to achieve to organize the training of cadets more efficiently. Working in small groups allows most of the cadets to study in their preferred style for most of the school time. The ability of cadets to choose a task in accordance with their channel of perception and assimilation contributes to the effectiveness of mastering the educational material.

Professional compliance and motivation of cadets is implemented in the content of the methodological manual "Educational role-playing games in Aviation English classes" (this manual contains tasks that model the future professional activity of a military pilot), as well as in the correlation of grammatical and lexical material with possible situations (or components of situations) its use in the military-professional sphere, which ensures the readiness to use lexical and grammatical means in certain speech situations.

The presence of info-communication support for classes is realized in the wide use of multimedia tools, computer programs and an Aviation simulator in the classroom. During the hours of self-training, cadets can always use the resources of the Information and Educational Environment of the Department of Foreign Languages. Each computer of the

Department is equipped with electronic reference materials, training versions of control works and tests.

Monitoring of success and gradation of knowledge by levels is implemented in the gradation of knowledge (reproductive, reconstructive and variable levels), gradation of the presented educational material and multi-level tasks. To monitor the success of the cadet, the teacher keeps a Control Record Sheet, which notes the success of the cadet in all types of educational activities and educational elements of the sub-block (checking the studied material, learning new material (mandatory level), learning new material (general level), learning new material (advanced level), fixing, control.

The third stage of forming the competitiveness of a military pilot is an Introspective reflection. At this stage, the cadets conducted a self-assessment of the changes that occurred, correlated the results obtained with the planned ones, and made adjustments to the activities carried out.

The purpose of the Generalizing stage of the experimental work is to analyze and evaluate the effectiveness of the formation of the competitiveness of a military pilot by means of integrated technology on the example of the educational field of Aviation English and to develop practical recommendations for the implementation of the results of the experiment.

The task of the stage was to generalize and analyze the final results of the pedagogical experiment.

3. Results

Based on the theoretical analysis of scientific, methodological and pedagogical literature, regulatory documents and existing educational practice, the concept of "competitiveness of a military pilot" was clarified as an integral characteristic, which is a cluster of multicomponent components: professionally important qualities and professional competence that ensure the mastery and successful performance of all types of professional activities that meet the requirements of ICAO. The authors identified the following components of the components of the competitiveness of a military pilot: professionally important qualities - personal, intellectual, psychophysiological, physiological, physical; professional competence - professional mobility, professional independence, personal competence, extreme professional competence, managerial competence, pedagogical competence, autopsychological competence, communicative competence; information competence (Rekhlova, 2018).

The formation of the competitiveness of a military pilot requires the implementation of an Integral technology in the educational process, adapted to the conditions of a military aviation university. By "adaptation of educational technology" we mean making changes

and additions to the technology that do not contradict the conceptual basis of the technology and correspond to the specific conditions of activity of cadets and teachers.

The activities of military university cadets are regulated not only by normative legal acts on education and the status of students, but also by normative legal acts on military service and the status of military personnel. Cadets are active employees of the Air and Space Forces of the Russian Federation, who, in addition to training activities, perform official and professional duties, that is, they are involved in official and professional activities already during their studies at the university, although not in full.

The analysis of the official rights and duties of cadets, as well as the curriculum of the university, allowed us to identify a number of features that distinguish the conditions for training a military pilot. First, the features of training associated with the strict regulation of the educational process of the military aviation university: the separation of cadets from classes and self-training to carry out work orders and perform household chores; the ability to use the services of the library of the military university only at the definite time; lack of time for independent work outside of school hours; limited access to the Internet; an increase in the number of academic disciplines; long breaks in classes (up to 6 months) due to flight practice. Secondly, the peculiarity of subject training, and in particular training in a foreign language, is the professional orientation of training.

The Integral technology adapted by us to the conditions of training a military pilot is a professionally-oriented technology, which is provided by:

- creating conditions for the formation of a number of competencies and professionally important qualities that are components of the competitiveness of a military pilot: communicative, informative, personal and other competencies, professional mobility and professional independence;
- orientation of the educational material to solve the problems of professional training of cadets;
- integration of the discipline "Aviation English" with other professional disciplines;
- performing tasks necessary for the cadet to master the future profession in practical classes;
- taking into account the cognitive characteristics of the cadet.

Developed and tested a Structural and Functional model of formation of competitiveness of a military pilot by means of Integrated learning technology integrates as a component: a Conceptual part, the essence of which is to specify the purpose and objectives of the technology, identify approaches to implementation of integrated technology in the training of a military pilot; the Substantive part defines the didactic content, laid the basis of this technique and elaborate on methodological support of educational process; the Procedural part, which includes a description of the organization of the educational process, as well as the means, forms and methods of training; the Diagnostic and Effective part of the Integrated technology, which assumes the presence of a guaranteed

result. The result of the implementation of this technology is to improve the quality of subject training of cadets, and as a result, they master a certain level of formation of foreign-language professional and communicative competence, which is one of the components of the competitiveness of a military pilot (Rekhlova, 2017).

The experience of practical implementation has shown that this model is characterized by:

- the interconnection of its constituent parts and integrity, since all components are interconnected and work to achieve a higher level of quality of subject training of cadets in the discipline "Aviation English", and as a result, the formation of the competitiveness of a military pilot;
- flexibility, since the technology is a dynamic product that takes into account the realities of the modern development of the global aviation community.

The effectiveness of the implementation of the technology is confirmed by the comparative data analysis of the initial, intermediate and control tests of the level of FIPCC as a component of the competitiveness of a military pilot received during the experimental work.

By the end of the experimental learning, there were no cadets with a critical level of formation of foreign language professional and communicative competence in the experimental groups; the number of cadets with a reproductive level significantly decreased. There is an increase in cadets with reconstructive and variable levels of IPCC formation. In the control groups, the changes occurred are approximately 5-7 %.

A comparative analysis of changes in the level of formation of FIPCC at the beginning and end of the experimental work was carried out using statistical processing of the results according to standard methods of mathematical statistics for psychological and pedagogical research.

The effectiveness of the Integral technology was evaluated using the coefficient of evaluation of the formation of foreign language professional and communicative competence K_e , which was calculated by the formula:

$$K_e = K_e / K_c, \quad (1)$$

where K_e is the number of cadets of experimental groups studying using integrated technology adapted to the conditions of training in a military aviation university;
 K_c - the number of control group cadets who are traditionally trained.

The value of the coefficient $K_e = 4.1$, which is more than "one", therefore, the use of Integral technology in the educational process is more effective than the use of traditional training.

The formation of other components of the military pilot's competitiveness during the implementation of the integrated training technology was carried out passively. Changes in the level of formation were checked by the self-actualization test (SAT) technique. This method allowed us to determine the formation of such qualities as creativity, cognitive ability, communication skills, cooperation, flexibility of behavior, self-acceptance, self-esteem, value orientations in respondents, reflecting the formation of the above-mentioned military pilot's professionally important qualities and competencies(Galkina.2001).

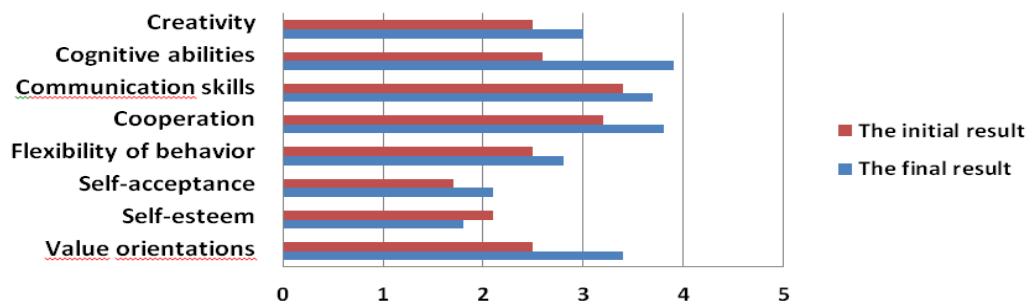


Figure 1. Comparative histogram of data obtained using the SAT technique according to the results of the initial and final tests in the experimental groups

The comparative histogram shows the positive dynamics of the development of qualities that make up such components of the competitiveness of a military pilot as personal and intellectual professionally important qualities, professional mobility and independence, information and autopsychological competence.

4. Conclusions

The study does not exhaust the entire content of the problem raised in it, allowing us to identify possible directions for its further study. However, the scientific novelty of the study lies in the formulation and solution of the problem of scientific justification, modeling and implementation of the process of forming the competitiveness of graduates of military aviation universities. The results of the study complement the theory and methodology of professional education in the field of training a competitive specialist. In the work clarified the concept of "competitiveness of a military pilot" from the point of view of its essence and content; developed Structural-functional model of formation of competitiveness of a military pilot by means of Integral technologies, which develops ideas competence-based education and allows you to model the objectives and content technology, providing a predictable result of formation of foreign language professional communicative competence as a component of competitiveness, in accordance with the current requirements of companies. Developed and theoretically substantiated criteria unit of study that includes academic and personal criteria, levels, and speakers descriptions as their performance.

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