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Пути и средства обеспечения качества повышения квалификации руководящего состава инженерно-авиационной службы в системе дополнительного профессионального образования

Введение. Обеспечение качества повышения квалификации руководящего состава инженерно-авиационной службы является важнейшим фактором обеспечения безаварийности и высокой эффективности применения авиации. В условиях перевооружения авиационных частей на новую (модернизированную) авиационную технику, а, следовательно, перехода на новую систему повышения квалификации авиационных специалистов, прежде всего, руководящего состава ИАС, не снято противоречие между объективной потребностью практики дополнительного профессионального образования в обеспечении высокого качества повышения квалификации и недостаточной разработанностью методико-технологического сопровождения исследуемого процесса. Разрешение данного противоречия представляет проблему исследования.

Материалы и методы. В констатирующем и формирующем эксперименте приняли участие 110 офицеров руководящего состава инженерно-авиационной службы ВУНЦ ВВС «Военно-воздушная академия имени профессора Н.Е. Жуковского Ю.А. Гагарина» (г. Воронеж), филиала ВУНЦ ВВС «ВВА» в г. Челябинске, Государственного центра подготовки авиационного персонала и войсковых испытаний Минобороны России им. В.П. Чкалова (г. Липецк). В контексте теоретико-методологического обоснования исследуемой проблемы использован понятийно-терминологический анализ. Результаты эмпирического материала основаны на педагогическом наблюдении, методе экспертных оценок и самооценки, сравнительной характеристике, качественно-количественном сравнении, математической статистике (критерий χ^2 -Пирсона).

Результаты. Организация образовательного процесса реализуется с позиции двуединства личностного и компетентностного компонентов, составляющих интегральную характеристику профессионального развития руководящего состава ИАС. Как результат, предложенный авторами подход к решению проблемы, позволяет значительно повысить уровень качества квалификации руководящего состава инженерно-авиационной службы в системе ДПО.

Выводы. Авторы видят решение проблемы обеспечения качества образовательного процесса в обогащении его содержания за счет целенаправленного включения личностного блока посредством таких методов, форм, средств, которые способствуют формированию системно-прогностического мышления, определяющего эффективность принятия управленческих решений и совершенствованию личностных качеств офицера руководящего состава ИАС, позволяющих выполнять должностные обязанности на высоком уровне.

Ключевые слова: руководящий состав, инженерно-авиационная служба, двуединство личностного и компетентностного компонентов, интегральная характеристика, системно-прогностическое мышление

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Ways and means of quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system

Introduction. Quality assurance of aviation engineering service leadership qualification improvement is one of the most important factor of wrecklessness and high effectiveness of aviation application. Under conditions of aviation units rearming to new (modernized) aviation equipment, and therefore moving on to a new system of aviation specialists qualification improvement, first of all leaders of aviation engineering service, the contradiction between the objective need of supplementary vocational education practice in high quality assurance qualification improvement and insufficient development of methodical and technological support of the process is not removed. To solve the contradiction is the problem of the research.

Materials and methods. 110 aviation engineering service leadership officers of Military Educational and Scientific Center of the Air Force "N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (Voronezh), the branch of MESC AF "N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (Cheliabinsk), Chkalov State Center of Aviation Personnel Training and Military Testing of the Russian Ministry of Defence (Lipetsk Flight Center) are involved into the ascertaining and formative experiment. In the context of theoretical and methodological justification of the problem conceptual and terminological analysis is used. The results of the empirical evidence are based upon pedagogical observations, expert evaluation methods, self-estimation, comparative characterization, comparison of qualitative and quantitative characteristics, mathematical statistics (Pearson's χ^2 test).

Research result. The organization of the educational process is implemented from the viewpoint of personality and competency components which make up the integral characteristics of professional development of an officer of aviation engineering service leadership. As a result, the authors' approach to the problem solving allows to increase significantly the level of quality of aviation engineering service leadership qualification improvement in the supplementary vocational education system.

Discussion and conclusion. The authors consider the problem solving of the quality assurance of the educational process as enriching its content with purposeful involving of personal component through methods, forms, means which promote system and prognostic thinking development influencing the effectiveness of making management decisions and improving personal features of an aviation engineering service leadership officer that allow to do the duty at high level.

Key words: leadership, aviation engineering service, two-component unity of the personality and the competency, integral characteristics, system and prognostic thinking

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Introduction

Geopolitical challenges in the 21st century create conditions for development of new approaches to Arial Space Forces (ASF) building. During the briefing with the leaders of Russian Federation Ministry of Defense and defense and industrial enterprises in 2019 President V.V. Putin noted that the equipping the Army and Navy with new weapons and vehicles has lately been increasing dramatically: contemporary Arial Space Forces weaponry makes up 74%.

Therefore, one of the paramount tasks of Arial Space Forces building in RF is step-by-step aviation units rearming to new (modernized) aviation equipment, moving on to a new system of aviation specialist's qualification improvement, first of all leaders of aviation engineering service. Quality assurance of aviation engineering service leadership qualification improvement is a vital factor of wrecklessness and high effectiveness of aviation application.

In this aspect the supplementary vocational education system plays a very important role. It seeks to substantiate rational ways of aviation engineering service leadership qualification improvement supplementary vocational program mastering. Therefore, quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system is a question of vital importance.

At present the problem of supplementary vocational education of the military, the power departments' employee is widely studied. In the context of the problem investigated it is purposeful to pay attention to A.M. Nekrasov's works [7]. The scientist states that arranging assurance of military specialists' qualification improvement should be focused on definition and meeting the military's requirements, in other words, right implementation of every military specialist to general and professional development during the whole life.

As I.N. Danilova [3] notes, supplementary vocational education is a significant resource in Russian Federation Ministry of Defense military institutions since the contemporary paradigm makes the military for long life education. The same viewpoint is supported by R.A. Klimov [6] who believes that qualification improvement at the contemporary stage of pedagogical science and practice development is a phenomenon the significance of which is no doubt, it is one of the main resources of vocational education development under conditions of modernization.

In his article "Modernization of education as a condition of progressive socio-economic country development" A.A. Derkach [4] writes that educational process in the different sphere specialists' qualification improvement system should contribute to enlarging cognition activity, intensifying their thinking skills, cultural and moral values and behavior standards, personality of a modern leader formation. To overcome professional mistakes and to fulfill a leader's duty at any level it is necessary to master professional and manage competence.

Thus, the scientific literature analysis shows that the problem of qualification improvement is urgent and demands thorough development. I.C. Alatortseva [1] and A.B. Borisyk [2] reveal the peculiarities of the retired military self-definition and economic culture formation in civil professions. In the pedagogical science a technique of reserve

officers retraining on civil specialties is thoroughly developed [8]. The problem of life orientation of a reserved officer is one of the most vital problems in professional retraining [13], where socio-pedagogical aspect plays an important role [14]. Much attention is paid to technologies of the e-study course implementation in the process of military men retraining [10].

As we see a lot of researches on the problem are related to the military that has been transferred to the reserve or is at risk of it. Very few researches seek to active officer staff qualification improvement system. The problem of quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system is not properly investigated in scientific literature; as a result there is an insufficiency of procedure and technological knowledge in the field.

The aim of the article is to define the most effective ways and means of quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system.

The problem is solved in several stages. The first stage is devoted to analysis of contemporary state of the problem in theory and practice of supplementary vocational education system, terminology formation, methods and experimental base choosing. The second stage deals with ascertaining and formative experiments, psychological and pedagogical conditions, studying technological peculiarities of quality assurance of aviation engineering service leadership qualification improvement. The third stage aims at analysis of the results, processing results with methods of mathematical statistics, making conclusions.

Materials and methods

The object of the research is the process of aviation engineering service leadership qualification improvement in the supplementary vocational education system.

During the scientific research the following methods are used: conceptual and terminological analysis, an ascertaining and formative experiment, pedagogical observations, expert evaluation methods, self-estimation, comparative characterization, comparison of qualitative and quantitative characteristics, mathematical statistics (Pearson's χ^2 -test).

The experimental bases of the research are Military Educational and Scientific Center of the Air Force "N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (Voronezh), the branch of MESAC AF "N.E. Zhukovsky and Y.A. Gagarin Air Force Academy" (Cheliabinsk), Chkalov State Center of Aviation Personnel Training and Military Testing of the Russian Ministry of Defense (Lipetsk Flight Center). 110 aviation engineering service leadership officers take part in the research. The experimental group consists of 56 officers; the control group is made up of 54 officers.

The diagnostic monitoring is carried out at an ascertaining and control stage according to competency and personal criteria. The indicators of competency criterion are competences defined by qualification requirements of the qualification improvement supplementary vocational program and appreciated in the form of a mark credit on the discipline "Organization of aviation engineering assurance".

The personal criterion is appreciated according to such indicators as continuous self-development and self-education (test "Personal values" by K. Harskyi, the category

“Material values” (career, qualification, education, profession)); improvement of leaders’ features (the method of revealing communicative and organizational inclinations (“COI-2”)); spiritual and moral improvement (test “Personal values” by K. Harskyi, the category “Ideological values” (belief, duty, patriotism, spirituality, morals)).

Test “Personal values” is an automated testing that offers in-pairs comparison of personal values. Sometimes you have to compare two values none of which is less important. The method “COI-2” is designed to reveal communicative and organizational inclinations.

There are *three levels* of aviation engineering service leadership qualification: high, good and sufficient. The description of competency criterion levels is contained in the qualification requirements program.

Personal criteria. High level. Leadership characteristics development. Skillful behavior in difficult situations; initiative, prefer to make independent decisions; opinion defense, they do their best to make others take their decision; they seek to meet the demands in the communicative and organizational activity.

Self-development and self-education. Aspiration to self-improvement, building an educational route, clear understanding stages, aims and means of reaching the aims.

Spiritual and moral improvement. Personal need in continuous, active and many-sided activity on consolidation of belief, the feeling of military duty and patriotism.

Good level. Leadership characteristics development. Such people don’t lose their nerve in new circumstances; find friends quickly; carry out public activity; help relatives and friends; manifest the initiative; take part in public events organization with pleasure; have ability to make an independent decision in difficult situations; they do it all informally, according to the inner wishes.

Self-development and self-education. Pragmatic search for self-improvement and building an educational route; sufficient understanding stages, aims and means of reaching the aims.

Spiritual and moral improvement. Sufficient understanding the value of belief, the military duty and patriotism in military and professional activity.

Sufficient level. Leadership characteristics development. Respondents possess the average indicators; seek to deal with people but limit the acquaintances circle, defend the opinion, plan the work. However, the potential of the inclinations is not steady.

Self-development and self-education. Search for self-improvement is exceptionally within their professional activity; incomplete understanding stages, aims and means of reaching the aims.

Spiritual and moral improvement. Understanding of inner connection of belief, the military duty and patriotism is not systematic.

Research result. On the basis of conceptual and terminological analysis of scientific literature on the problem studied we formulate the authors’ definition of the term “the quality of aviation engineering service leadership qualification improvement”, that is *correspondence of the educational process focused on the improvement of the integral characteristics of aviation engineering service leadership professional development to the contemporary requirements to effectiveness of new (modernized) aviation equipment intended application.*

At the same time the integral characteristics of aviation engineering service leadership professional development is considered for the first time as *a description of a set of aviation engineering service leadership personal features and professional competences*

influencing the ability to do the functional duties to improve the level of aviation engineering assurance organization of aviation units combat training and conduct combat actions.

The ascertaining stage demonstrates approximately the same testing results in the experimental and control group. According to the competency criterion the testing results out of the total number of respondents in the experimental group are the following: the high level makes up 8,5 %, the good level is 41,5 %, the sufficient level is 50 %. According to the competency criterion the testing results out of the total number of respondents in the control group are the following: the high level makes up 6,6 %, the good level is 43,4 %, the sufficient level is 50 %.

According to the personal criterion the testing results out of the total number of respondents in the experimental group are the following: the high level makes up 8,5 %, the good level is 44,3 %, the sufficient level is 47,2 %. According to the personal criterion the testing results out of the total number of respondents in the control group are the following: the high level makes up 8,5 %, the good level is 43,4 %, the sufficient level is 48,1 %. The Pearson criterion χ^2 on the "axis of relevance" is 0,106.

After receiving the results experimental teaching in the experimental group starts. During the formative experiment special psychological and pedagogical conditions are created, such as: 1) ensuring systematic implementation of the method and technology aspect and problematic demonstration of the studying materials; 2) involving highly qualified educators with the experience of aviation engineering organization of aviation units combat training and conduct combat actions; 3) application of contemporary information and method, material and technical support of aviation engineering service leadership qualification improvement process.

The main tasks of the experimental teaching are: 1) to improve theoretical knowledge and practical skills of organization of aviation units combat training and conduct combat actions; 2) to form system and prognostic thinking [15] influencing the effectiveness of management decision making; 3) to improve the personality characteristics of an aviation engineering service leadership officer allowing to do the functional duties.

In order to solve the tasks we involve personality component [11] into the aviation engineering service leadership qualification improvement process. The changes of the theme-based plan content are made. The changes are concerned with the authors' handbook on personality self-development of an aviation engineering service leadership officer. It contains different tasks, trainings aimed at leadership characteristics and spiritual and moral improvement, continuous self-development and self-education. The handbook is designed for independent work of an officer. The knowledge and skills obtained are demonstrated then in the process of military professional tasks solving at problem seminars, practice, group lessons.

During the experimental work in the control group officers of aviation engineering service leadership educational process is based exceptionally upon mastering theoretical and practical aspects of the latest developments in the field of aviation units combat training and conduct combat actions organization. In other words, the learners' competency component only is improved.

The educational process content of the experimental group learners is based upon the following: 1) studying the latest developments in the fields of management, exploitation and technical, evaluation and prognostic aspects of aviation units combat training and conduct combat actions organization; 2) teaching effective management decision making

methods in professional activity; 3) developing the ability of professional development strategy independent building and implementing and communicating with subordinates; spiritual and moral position improvement.

During consultations, independent work, practical lessons on disciplines “Organization of aviation engineering assurance”, “AF Tactics”, “Combat training and flight safety” methods of TRIZ [13] are studied and applied in practice, such as: “pre-actions”, “overjumping”, “subdivision”, “association”, “turning the harm to the good”, “beforehand pillow”. Creative projects are written [9]. During group lessons and problem seminars the methods “case-study” and “brainstorming” are used. These methods are focused on theoretical knowledge and practical skills of organization of aviation units combat training and conduct combat actions improvement; system and prognostic thinking development influencing the effectiveness of management decision making.

Implementation of an aviation engineering service leadership officer personality aspect of professional development is carried out during consultations and independent work when the learners make up their reflexive portfolio. This work aims at personality features of an aviation engineering service leadership officer which allow to do the functional duties at high level. At the lessons on the discipline “Troops management in combat actions” graduates’ military professional features necessary for leading subordinates are formed, so are independence, initiative and creative abilities.

After the forming experiment is over another diagnostic monitoring is carried out. According to the competency criterion the testing results out of the total number of respondents in the experimental group are the following: the high level makes up 11,3 %, the good level is 53,8 %, the sufficient level is 34,9 %. According to the competency criterion the testing results out of the total number of respondents in the control group are the following: the high level makes up 7,6 %, the good level is 48,1 %, the sufficient level is 44,3 %.

According to the personal criterion the testing results out of the total number of respondents in the experimental group are the following: the high level makes up 11,3 %, the good level is 54,7 %, the sufficient level is 34 %. According to the personal criterion the testing results out of the total number of respondents in the control group are the following: the high level makes up 9,5 %, the good level is 44,3 %, the sufficient level is 46,2 %. After the purposeful pedagogical activity the Pearson criterion χ^2 is 23,132. The truly distinction and quantity superiority of the experimental data are proved by the Pearson criterion χ^2 ($0,3356 > 0,1894$, $R_{ex} > R_c$). As a result of implementation of the offered approach to methodical and technological support of the process of quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system the number of officers with high level of professional development after experimental teaching increases by 57,5 % in comparison with the control group, with good level – by 76,5 %, the number of officers with sufficient level decreases by 37,7 % (Figure 1).

The analysis of qualitative and quantitative results through the mathematical statistics method proves the fact that a set of methods, forms and means offered by the authors allows to increase significantly the level of quality of aviation engineering service leadership qualification improvement in the supplementary vocational education system.

Figure 1 The implementation result of method and technology aspect of quality assurance of aviation engineering service leadership qualification improvement in the supplementary vocational education system

Discussion

The novelty of the research carried out is that for the first time professional development is considered *as a two-component unity of the personality and the competency components*.

The personality component focuses on personality features development such as continuous self-development and self-education of an aviation engineering service leadership officer, leadership characteristics and spiritual and moral improvement. The competency component aims at professional competences improvement such as management, exploitation and technical, evaluation and prognostic competences. It is necessary to note that all the components of the blocks are interrelated and interconnected; they function within their blocks and simultaneously interacted with each other. The quality of aviation engineering service leadership qualification improvement depends on how whole-value and effective the work on all the components of professional development improvement is carried out, how fully they undergo pedagogical influence.

The methodology essence of the process investigated is improvement of personality and competence component on the basis of competency, activity, subject and system approaches which allow to carry out the problem principle, the principle of connection of aviation engineering service leadership theoretical knowledge and practical skills of aviation units combat training and conduct combat actions organization, the principle of military professional situations modeling, the principle of subject development, the principle of two-component unity of the personality and the competency an officer aviation engineering service leadership professional development components. The mechanism of personality block is personality self-development of learners, in the competency block the mechanism of an officer aviation engineering service leadership professional competency improvement is carried out.

Thus, one of the most important ways of the educational process quality assurance we consider in *enriching its content with purposeful involving of personal component* influencing in its turn the competency block quality and professional development as

a whole. The problem of quality assurance of aviation engineering service leadership qualification improvement is solved through methods, forms, means which promote *system and prognostic thinking* development influencing the effectiveness of making management decisions and improving *personal features* of an aviation engineering service leadership officer that allow to do the duty at high level. In other words, we improve not only the competency component of an aviation engineering service leadership officer professional development as it is accepted in a traditional approach but personality professional one.

Conclusion

On the basis of the research carried out the following conclusions are made. Quality assurance of aviation engineering service leadership qualification improvement is one of the most important factor of wrecklessness and high effectiveness of aviation application. However, the problem is not properly investigated in scientific literature; as a result there is insufficient knowledge concerning the development of ways and means in practice.

The process studied is considered for the first time as a two-component unity of the personality and the competency components which make up the integral characteristics of an aviation engineering service leadership officer professional development. The experiment carried out proves that quality of aviation engineering service leadership qualification improvement is ensured by educational process focusing on not only theoretical knowledge and practical skills improvement concerning aviation engineering service assurance organization of aviation units combat training and conduct combat actions but on *system and prognostic thinking* development influencing the effectiveness of management decision making and on improving *personal features* of an aviation engineering service leadership officer that allow to do the duty at high level.

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