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A COMPETENCE APPROACH IMPLEMENTED IN TRAINING OF FUTURE PILOTS AT HIGHER EDUCATION MILITARY INSTITUTES TO APPLY PROFESSIONAL KNOWLEDGE INTO PRACTICE

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Issue definition: *The experience in student pilots' training in the professional education system confirms that education goals and essence should be reconsidered.* ***The purpose of the research*** *is to substantiate organizational and pedagogical conditions of competency development in student pilots' training.* ***Materials and methods of the research:*** *The research methodology is based on philosophical ideas about the unity of pilot's personal and professional development; certain provisions of the information theory; principles of the theory and practice unity, democratization of military education. Methods of the research: theoretical; empirical; mathematical statistics.* ***The results:*** *The philosophical, scientific and psychological and pedagogical literature was analyzed in our research. Different approaches to understanding the competence approach and to understanding "competence" and "expertise" terms were clarified. These concepts are revealed not have a single definition or hierarchical component. The study of theoretical issues of the competence approach in pedagogy and the competence place in the pedagogical process has revealed that the competence approach is being intensively studied and serves as a basis for the educational process at higher military educational institutes. It is determined that the pedagogical process is based on the competence approach, involving development of different types of students' competences. Pedagogical aspects of development of student pilots' competence at HEMIs have been studied. It has been determined which teaching stages and steps of contribute to development of students' competences at the military educational institutes of the Ukrainian Air Force.* ***Conclusions:*** *The idea of competence education is one of the responses of the education system to global transformations in the international community.*

Keywords: competence; competence approach; expertise; student pilot training

1. Problem definition

Education goals and essence should be reconsidered, it was confirmed by the experience in student pilots' training in the vocational education system. The attention to the student pilots' vocational training at HEMIs seems to be natural and objectively needed for modern professional education and caused by the following: an integrative multi-level approach to studying and education ensuring a continuous professional growth of servicemen; introduction of innovative educational processes; definition and scientific substantiation of invariant and variational parts of the studying content during the curricula development, etc. The curricula content plays an important role for pilot training and consists in a common system of integration and variable professional skills, abilities, job duties, formation of competences. One of the problems is an insufficient elaboration of the actual scientific and methodological support of the educational process at the military higher educational institutes.

2. Analysis of recent researches and publications

The competence approach in education is actualized by O. Bermus, B. Gershunsky, I. Zimnya, O. Khutorsky, and V. Bespalko, V. Bogolyubov, T. Ilyina, G. Selevko, M. Clark, G. Ellington, P. Mitchell, and others [2]. Modern scientists pay particular attention to information and communication technologies of competence and distance learning, such as O. Andreyeva, H. Becker, R. Berger, V. Bykova [4]. N. Bezhanova, I. Gavrik, O. Bodaļova, V. Buryak, I. Gavrish, Yu. Pelekh actualized in their papers an idea of professional

self-development. L. Bekirova, O. Demchenko, R. Motsyk, I. Medvedev, M. Rogozina dedicated their researches to pilot training organization [5]. Certain scientists believe that readiness for professional activity under education informatization is considered to be a significant component of quality education.

3. The purpose of the research

The purpose of the research is to substantiate organizational and pedagogical conditions of competency development in student pilots' training.

4. Materials and methods of the research

The research methodology is based on philosophical ideas about the pilots' personal and professional development; synergetics; certain provisions of the information theory; principles of the theory and practice unity, democratization of military education.

Methods of the research: *theoretical:* analysis of literature and documents regulating flight operations, in order to study the issue and to determine the theoretical and methodological principles of the research; specification, induction and deduction of theoretical knowledge; abstraction, classification and systematization of theoretical and experimental data on the research issue; *empirical:* studying and forecasting the current state of student pilots' readiness to combat flights; data collection methods (observation, questionnaires and interviews) to determine student pilots' attitude to actions in combat; pedagogical experiment to check effectiveness of the competence approach implementation in training student pilots at HMEIs to apply professional knowledge in practice; *methods of mathematical statistics:* (Student's t-test) to analyze results of the experimental work.

5. Results of the research

New quality of training of future military personnel is the main purpose of its reform. However, improvements or fundamental changes in the education content, forms and methods, transition to an innovative development - all make sense only if it results in an ability of a military person to perfectly perform duties, and in healthy moral and psychological climate in a military team. A competitive approach helps solving this problem in preparing future pilots at HEMIs.

The task of the global aviation community is to attract and retain competent personnel, to train a new generation of aviation specialists, and to create an advanced modern system for pilot training. We pay attention at preparation of future military pilots. Formation of their readiness for professional work is considered to be crucial for their professional development, providing development of socially and professionally important qualities - their integration, searching for high-quality and creative task performance under the individual's psychological characteristics.

A competence approach has been discussed for several decades, however, state regulatory documents consider this approach as a benchmark for the pedagogical process at educational institutions.

The modern period is characterized by a new understanding of the education goals, a new system of value orientations, new conceptual approaches to the technology development and research, and most importantly, to changes of the pedagogical paradigm and understanding of the need for continuous education.

One of the modern approaches to the continuous education is the competence approach. Considering the specifics of this approach ensuring effectiveness of the development of students' competence, its orientation upon the connection between theoretical and practical training can be determined.

The competence approach is aimed at increasing the effectiveness of learning through:

- an emphasis upon the "how" way of the actions instead of "what" way;
- strengthening individual, motivational characteristics of the student.

The competence-based process of studying at HEMIs is aimed at formation of various competences and skills.

The competence approach at education organization at higher educational military institutes allows more specifically to focus on the education system as required by the state and society, helps modify the traditional education system, extends the educational process. The goal of modern education during training under educational standards – to develop competence. It explains why this approach has been selected to be a strategic guideline in education, recommended in such documents as: "On the National Strategy for Development of Education in Ukraine for the period till 2021" [10].

The competence approach is widely implemented in Ukrainian education due to the European and world integration tendency and the world economy globalization. In terms of the competence approach in education, development of student pilots' competencies seems to be more relevant and important for the development of professional skills in general, vocational readiness for combats.

Many attempts to find a single definition of the "competence" term have not succeeded. In generalized form, the competence and expertise terms are compared in Table 1.

Table 1

Comparison of the competence and expertise terms

No.	Expertise	Competence
1	system of certain abilities	personality features, reflecting the competence development
2	personal experience well-informed	result, the individual's common ability to solve professional and life problems
3	fundamental behavioral aspect	generalized ability, integrative nature
4	cognitive system of rules	mobility of knowledge; method flexibility, criticality

Even a small list demonstrates various descriptions both in the single concept of "competence" and "expertise" and in comparison of the definitions of these concepts.

There is no clear interpretation in scientific researches. Table 2 shows a list of the definitions of the "competence" term by certain domestic and foreign scholars.

Table 2

Main characteristics and types of "competence"

No.	Definition	Types of competencies
1	The "competence" term is determined as being informed, awareness, credibility [2, p. 560]	key, basic, universal, trans-disciplinary, metaprofessional, super-professional, academic
2	Competence is "an individual characteristic of the level of compliance with the professional requirements; an individual's capacity and ability to perform certain job functions" [8, p. 31]	information competence
3	The "competence" term is considered in the social and educational context and means that "competence as existential human right is a product of own life-giving activity, initiated by education; it exists as an individual's property in various forms - as a high level of skills, as a way of personal self-actualization (habit, life style, hobbies), as a result of an individual's self-development, a form of abilities discovering, etc." [6, p.17]	pedagogical competence, methodical competence
4	The competence term is considered as a high skill level and "the ability to effectively and creatively apply knowledge in interpersonal relationships, to discover personal abilities and skills" [9, p. 56]	general cultural competence, educational-informative, informational, communicative and socio-labor competence
5	"Traditionally, the American approach is aimed at discovering behavioral characteristics of competency, and the main problem is to determine personality features demonstrating successful actions (superior	key competencies, main competencies, wide competencies

No.	Definition	Types of competencies
	performance). In this case, competence is understood as a fundamental behavioral aspect or characteristic that can be shown in an effective and/or superior action, which also depends on the context of the action, organizational factors and environmental factors, as well as characteristics of the professional activity." Another approach, European, focuses on the activity properties" [7, p. 47]	

We understand herein the competence as the subject's ability to solve problems (in the State educational standards, all key competencies are treated as "an ability").The pilot's competence can be considered as the ability to solve specialized tasks, and the psychological readiness and resources as certain features in the psychological process, functions.

Having considered the competence term, we formulated, basing on the scientific and pedagogical literature we studied, the organizational and pedagogical requirements of the competence approach to the development of key competencies of a student pilot: his integral involvement in various activities (creative, productive, heuristic, etc.); his openness and freedom of choice of actions; focus upon creative self-development and self-actualization; formation of a reflexive position to himself as a subject of activity; actualization of the pedagogical process upon independent work.

That is why the professional competencies are developed through self-development, self-regulation, self-examination, self-evaluation, self-control, self-actualization, etc. The result of the relationship of self-education and self-development of skills in students is professional competence, based on training of future pilots at military institutes of the Air Force of Ukraine.

Let's consider peculiarities of formation of the professional readiness of future military pilots. Thus,

in most Air Force upon the main stage of ground training, the students usually have to do from 10 to 30 hours in single-engine training airplanes, available at the flight clubs. Sometimes these training flights are considered as a part of the initial flight training.

At the main stage of training, the students perform flights at any time of the day and develop skills in navigation, piloting and flying in combat. At the stage of improved flight training, the students fly in combat aircrafts (Alpha Jet, Hawk, MB-339, TA-41, T-38), upon which they are awarded a military pilot certificate.

Particular attention is paid to development of the pilot training system. For this purpose, the new material is first explained at classroom, later it is worked over in the complex simulator. A flight instructor demonstrates it in airplanes in flight. Thus, the theoretical training subjects have only a general relation to flights and therefore do not fit into this scheme, and some aerobatic figures cannot be worked over in simulators.

From the point of the psycho-physiological features of development of flying skills, this approach to initial training allows to allocate some positive moments of this phase of pilot training: incapable of flying are withdrawn for a relatively short period (2-3 months); the flight base is formed during real flights which serves as a basis for formation of mechanisms for the psychological regulation of pilot's actions; due to the low flight speeds of the training airplanes and their dynamic stability, it is possible to form gradually students' skills compared to training in jet fighter aircrafts; due to simulators, it is possible to implement the principle of the individual approach to studying. Thus, in the International Civil Aviation Organization (ICAO) documents, the competence approach implementation is demonstrated by development of the new pilot training program in Multi-Crew Pilot License (MPL). The development of the MPL program is the first fundamental revision of the pilot training methodology since 1944 [13, p. 579].

The main features of the MPL program are transfer of the main part of practical training to simulators, paying more attention of the pilot to work in a crew of a modern aircraft with electronic indication [10]. Despite the benefits and development by 22 countries of regulations to support MPL, the qualification training system has not applied yet [12, p. 451].

Unlike the traditional three step training system (theoretical, simulating and flight training), four stages with appropriate levels of competence are determined within the competence approach: basic piloting skills; base level (level 1); intermediate (level 2); advanced (level 3).

Detailed guidance on how to use the competence approach to develop the MPL program is outlined in the ICAO Training methodology. The document contains principles and procedures to be used during development of the competence approach to training crews, and four levels of competence and technical means of training and studying are detailed as well (Figure 1).

The document focuses on standards of operations and development of the training course on the basis of the efficiency standards. The qualification means a combination of skills, knowledge and attitude required for performance of tasks in accordance with the standards [14].
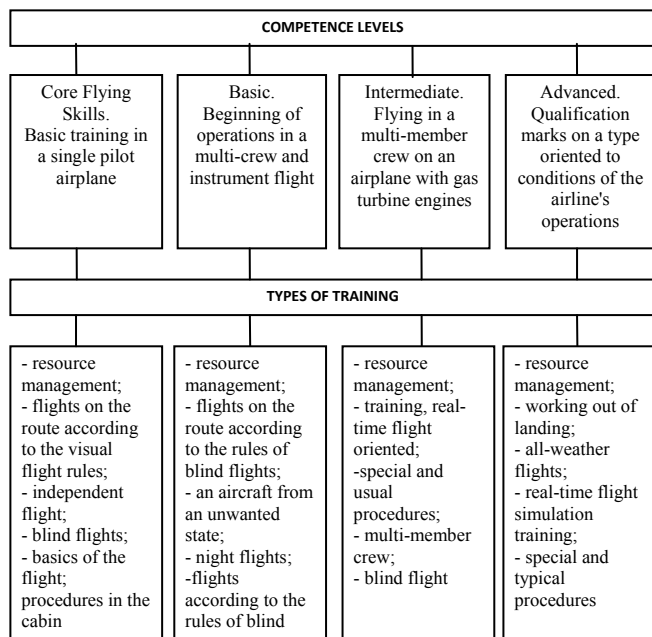

Fig. 1. Level of competence and technical means of training and studying required for flight programs using the competence approach

Thus, the pilot's professional knowledge and practical activities and readiness for combat missions (performance of different types of combat flights) make his professional competence.

6. Discussion of the results

To verify the effectiveness of the proposed pedagogical conditions regarding formation of pilots' professional competencies during the training, we have conducted summative and formative experiments. The research was conducted for 2012-2016 basing on the flight department of the Kharkov Air Force University. 100 4th year student pilots (21-22 year aged) have been trained. Implementing each of the above-mentioned stages, some pedagogical experiments were conducted, in addition, a permanent collection of empirical data was arranged, with proper statistical processing. To check the effectiveness of experiments aimed at forming the pilots' professional competence, the use of professional knowledge in practice, a criteria list was prepared (Table 3).

Table 3

Criteria for assessing the student pilots' professional readiness to apply professional knowledge in practice

Criteria	Methods	Levels and main indicators	
Motivational-personal	Method of expert assessments; testing to determine interest in mastering professional knowledge	Self-assessment of formation of psychological readiness for future professional activity; purposefulness	
Cognitive	Test of intellectual potential, studying outcomes	Formation of professional knowledge, skills and abilities that make up the pilot's professional competence; ability to apply this knowledge in practice	
Axiological	Questionnaire of teachers, psychological observation	Interest in obtaining professional knowledge; knowledge of the principles of professional disciplines	
Effective	Scores of professional disciplines	High	90% positive assessments, at least 50% of which are

Criteria	Methods	Levels and main indicators	
			good and excellent
		Average	80% of positive assessments, at least 50% of which are good and excellent
		Poor	Not suitable for average value

As a result of the experiment in treatment and control groups of student pilots, the following results were obtained (Table 4).

Table 4

Results of the summative experiment in treatment and control groups of pilots (n = 100, %)

Criteria	Group	High	Average	Poor
Motivational-personal	EG	10	30	60
	KG	10	30	60
Cognitive	EG	10	35	55
	KG	10	35	55
Axiological	EG	10	35	55
	KG	10	40	50
Effective	EG	10	30	60
	KG	10	30	60

The most common mistakes before the experiment were: late conceptual model of a combat flight; improper function performance in special and critical situations of a combat flight; constrained actions; missing signals, instructor's commands; wrong decisions, as a result - wrong implementation of the decision.

The summative stage of the experimental study allowed us to make the following conclusions: firstly, student pilots feel stresses and tiredness, they do not understand the purpose of the course and the practical content of the assignments. So they do not interest in the process, therefore, to show their activity in the learning process, the students have to study thoroughly the most problematic spheres. Secondly, quite high results can be explained by perfect professional motives in students, their understanding of the importance of the course material during studying.

Basing on the analysis of information obtained during the summative stage, and on other our conclusions, we determined the priority areas for improvement of the method of formation of the students' ability to apply their professional knowledge in practice. Accordingly, the theoretical approaches were substantiated, and later tested during the main summative stage of the experiment in the studying process. At the beginning of the study stage, several lessons systematized the knowledge of the course materials, the most difficult sections, crucial for learning, were explained. The problem issues were discussed during these classes.

Practical classes were conducted upon lectures, the main purpose was: to expand the knowledge gained at the lectures; to detail the knowledge; apply theoretical knowledge in practice; quality of the knowledge was checked.

The analysis of the results of the program effectiveness criteria and indicators (quality of the special knowledge, skills and abilities) demonstrates that its substantial growth was due to an increased group with high level of studying, which scope in the treatment group was amounted to 60% of the total number of people, which is more by 15% compared to the control group. At the end of the studying, the formation of students' educational and professional motives was explored in the treatment group as well.

Based on the data in the table, we can make conclusions on increased intensity of both educational and professional motives. The increase in the mean value of educational motives was 0.3, and professional ones - 0.2, which indicates an increase in the cadets' interest in the cognitive process, which confirms the purposefulness of further implementation and application of the special course program.

Table 5

Results of the summative experiment in treatment and control groups of pilots (n = 100, %)

Criteria	Group	High	Average	Poor
Motivational-personal	EG	25	70	5
	KG	15	35	50
Cognitive	EG	25	65	10
	KG	15	40	45
Axiological	EG	30	60	10
	KG	15	45	40
Effective	EG	35	65	5
	KG	15	40	45

Student's t-test was used to assess the statistical significance of the differences between the control and treatment groups. The obtained Student's t-test $t_{emp} = 3.984$. For $n_1 = 68$ and $n_2 = 67$, the theoretical value of this criterion at statistical significance p <0,05 is $t_{cr} = 1,656$.

The levels of formation of the subject knowledge by the students in the treatment and control groups significantly differ from each other. In the control group, a level of formation of professional knowledge was proved to be unchanged.

Thus, the analysis of the data obtained during the pedagogical experiment shows that the use of the pedagogical conditions and means of formation of the student pilots' professional competence in our models is quite effective. This is also confirmed by an independent expertise.

7. Conclusions

The idea of competence education is one of the responses of the education system to global transformations in the international community.

The competence approach based education, which serves as the methodological basis for the pedagogical process, is aimed at formation of different competencies or skills of student pilots.

Different groups of key competencies are distinguished in modern literature, but these groups do not differ much. Key competences of cadets - the integration system of knowledge, skills, abilities, aimed at solving various educational and cognitive tasks and gaining experience of independent learning activity, required for social and professional adaptation and urgent professional activity in the future.

Competence has an integral character and should reflect the pilot's ability to apply not only the professional potential, but also readiness to self-development in the future, taking into account the ranking of the value and semantic tasks.

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Р. В. Невзоров

Реалізація компетентністного підходу в процесі підготовки майбутніх льотчиків у ввнз до використання професійних знань на практиці

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Постановка завдання. Досвід підготовки студентів-пілотів у системі професійної освіти підтверджує необхідність переосмислення цілей і суті освіти. **Мета дослідження** – обґрунтування організаційно-педагогічних умов розвитку компетенцій у навчанні студентів-льотчиків. **Матеріали і методи дослідження.** Методологія дослідження базується на філософських уявленнях про єдність особистісного і професійного розвитку льотчиків; початкових позицій синергетики; окремих положень теорії інформації; принципів теорії і практики єдності, демократизації освіти. Методи дослідження: теоретичні; емпіричні; методи математичної статистики. **Результати.** У дослідженні проаналізована філософська, наукова та психолого-педагогічна література. Були роз'яснені різні підходи до розуміння компетентнісного підходу до розуміння понять "компетентність" і "експертиза". Виявлено відсутність єдиного визначення цих понять, а також ієрархічного компонента. Вивчено теоретичні питання компетентнісного підходу в педагогіці і місця компетентності в педагогічному процесі. Показано, що компетентнісний підхід інтенсивно вивчається і служить основою навчального процесу у вищих військових навчальних закладах. Визначено, що педагогічний процес заснований на компетентісний підхід, що передбачає розвиток у студентів різних видів компетенцій. Вивчені педагогічні аспекти розвитку компетенції майбутніх льотчиків у ВВНЗ. Визначено, які етапи навчання сприяють розвитку компетенцій студентів у військово-навчальних закладах Військово-повітряних сил України. **Висновки.** Ідея компетентнісного освіти є одним з відповідей системи освіти на глобальні перетворення в міжнародному співтоваристві.

Ключові слова: компетентенція; компетентність; компетентнісний підхід; курсант-льотчик; професійна підготовка

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Реализация компетентностного подхода в процессе подготовки будущих летчиков в нем до использования профессиональных знаний на практике

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Постановка задачи. Опыт подготовки студентов-пилотов в системе профессионального образования подтверждает необходимость переосмысления целей и сути образования. **Цель исследования** – обоснование организационно-педагогических условий развития компетенций в обучении студентов-пилотов. **Материалы и методы исследования.** Методология исследования основана на философских представлениях о единстве личностного и профессионального развития летчиков; начальных позиций синергетики; отдельных положений теории информации; принципов теории и практики единства, демократизации военного образования. Методы исследования: теоретические; эмпирические; методы математической статистики. **Результаты.** В исследовании проанализирована философская, научная и психолого-педагогическая литература. Были разъяснены различные подходы к пониманию компетентностного подхода и к пониманию понятий "компетентность" и "экспертиза". Выявлено отсутствие единого определения этих понятий, а также иерархического компонента. Изучены теоретические вопросы компетентностного подхода в педагогике и места компетентности в педагогическом процессе. Показано, что компетентностный подход интенсивно изучается и служит основой учебного процесса в высших военных учебных заведениях. Определено, что педагогический процесс основан на компетентностном подходе, предполагающем развитие у студентов различных видов компетенций. Изучены педагогические аспекты развития компетенции будущих летчиков в ВВНЗ. Определено, какие этапы обучения способствуют развитию компетенций студентов в военно-учебных заведениях Военно-воздушных сил Украины. **Выводы.** Идея компетентностного

образования является одним из ответов системы образования на глобальные преобразования в международном сообществе.

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