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PHYSICAL EDUCATION IN CIVIL AVIATION EXPERTS COMMUNICATIVE COMPETENCE FORMATION

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Abstract

The process of education modernization emphasizes the need for the proper competence formation, as one of the main indicators of education quality. Activity in the field of civil aviation makes strong demands on the professional training and the competence level of future experts. The conducted study includes searching for and development of the most effective means of professionally-applied physical training, which can be used to achieve the expertise of professionals in this field. These means allow one to form the necessary professional competencies in short time periods, including the development of physical qualities, the increase in physical performance and formation of the communicative skills of students - future pilots, dispatchers, flight attendants and other members of flight and ground civil aviation personnel. The main difficulties in a professionally-applied physical training process are selection and implementation of the most effective tools, based on the physiological, social, psychological patterns of human body development, along with modern technologies. The developed methodology includes the preferential use of sports games and special physical exercises that allow improving students' both physical condition and communicative skills. This methodology is aimed at an important aspect of human activity in the high-tech civil aviation system - the human factor that remains the most vulnerable link in solving safety and reliability problems, and is therefore of great relevance.

Keywords: Physical education, civil aviation, human factor, educational technology, professionalism.

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1. Introduction

Human activity in the field of modern aviation is characteristic of high labor intensity followed by significant neuro-emotional load; it is inevitably associated with the intellectual, physical, mental efforts of workers. These qualities need constant development. The progress of labor engineering and technology requires a better training of professionals in this field.

In accordance with the Federal State Educational Standard, higher education forms the necessary professional competencies of students, determining their readiness for work (Galanina & Adamova, 2016; Politsinskaya, Sushko, & Semerenko, 2016; Raitina, Yurmazova, Plankina, & Raitin, 2016; Ulyanova et al., 2016). In the educational standard, physical culture plays an important role, contributing not only to the exerciser physical performance improvement, but also to the necessary professional competencies formation (Lubysheva, 2017), including communicative ones. It is proved that communicative skills are being formed throughout the whole life of a person, but most active periods are adolescence and undergraduate years. Communication skills are developed and adjusted using special training tools and methods (Nikolaenko, Grakhova, & Rakhimov, 2016). A large number of studies have been devoted to the problem of pedagogical technologies of physical culture means application for students' adaptation to professional activity (Bolotin, Schegolev, & Bakayev, 2014; Khasanova et al., 2016; Polovnikov, Evseev & Volkova, 2016). It is known that person's adaptation to the conditions of aviation labor without special training seizes from 1 to 5-7 years; after special training, this period is significantly reduced (Popov, Marakushin, & Breslavets, 2011).

2. Problem Statement

The progress of aviation equipment makes increased demands for personnel training, for development of the human-airplane-environment problem. Today in aviation physiology, psychology, sociology and other disciplines, a detailed study is being conducted of the civil aviation expert professional activity structure, and criteria are being developed for work reliability and effectiveness assessment. These are necessary for creating effective means and methods of managing the body state of civil aviation experts, developing diagnostic and innovative technologies (Efremova, Ivanova, Plotnikova, & Chaykovskaya, 2016; Razuvanova, Koshelskaya, Karpova, & Medvedeva, 2016; Volkov, Volkova, & Lutchenko, 2014).

3. Research Questions

Analysis of professional literature and expert materials of the Federal Aviation Service of Russia shows that transport by air is still the safest mode of transport. However, increasing aircraft fleet, creation of new air traffic control facilities put forward new requirements in civil aviation, the main of which is the reliability of the human factor. Human being is the most vulnerable link in solving air traffic safety problems. The human factor is believed to be the main cause of the accidents (79% of the total number of accidents).

Many of the human factor problems in aviation were previously caused by the effects of noise, vibration, heat, cold, acceleration forces on human. Today, human errors caused by imperfect systems are minimized by improving the interface between the pilot and cockpit equipment.

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Today, in high-tech aviation, problem solving is already focused on the relationships of people who are prone to make mistakes. Here is a typical example of a conclusion from the report on the cause of an accident: "The duties were not properly allocated and the entire crew was busy monitoring the chassis position indicator." This example shows that the human role optimization in complex work covers all aspects of human activity, including people interaction. This interaction is determined by people relationships at the workplace. The interaction concerns issues of leadership, teamwork of the crew, relationships between the minor staff and the management, the corporate climate, motivation, attitude to risky behavior, self-confidence, skills of communicating and making decisions, and others. Communicative relations include all the factors of the individual social system, which can cause an additional burden: quarreling with the chief, labor conflicts, death of a family member, personal and family problems. These factors influence the work situation approach, the ability to overcome stress (Makasheva et al., 2016) and to act professionally in case of unforeseen circumstances (Kolodii, Kolodii, Goncharova, & Ivchik, 2016).

Today, the communicative relation receives much more attention, what contributes to better interaction and correction of ordinary human errors. Analysis of the literature shows that a two-fold approach is needed to reduce human errors. The first aspect deals with error minimizing via ensuring high qualification of personnel (including the physical condition level) and reducing stress stimuli (noises, vibrations, extreme temperatures). The second aspect implies the flight and ground aviation personnel interaction and communication improvement. In both of these aspects, usage of special means of physical culture helps to mitigate the mistakes of civil aviation experts.

To fully characterize the working conditions of a civil aviation expert, job specification studies have been carried out, which results provided the basis for the requirements to student's professionally-applied physical training. The expert survey conducted among the representatives of civil aviation structures and students - future pilots, shows that the most important qualities in aviation are ability to predict the situation development, stress resistance, risk appetite, humane and tolerant attitude towards people, mutual understanding, smarts, responsibility.

4. Purpose of the Study

The purpose of the study is to develop the methodology of professionally-applied physical training with the predominant use of sports games, performing of special exercises in order not only to enhance physical performance, but also to develop the communicative competence of future civil aviation experts.

5. Research Methods

Research methods include analysis of scientific and methodological literature, pedagogical observations, testing, questioning and expert interview, job specification research, pedagogical experiment, mathematical statistics methods.

Object of research: students of the 1st and 2nd grade of the St. Petersburg State University of Civil Aviation, of following specializations: “Aircraft operation and airspace management”, "Flight work organization", aged 18 to 25; the total amount in the sample is 157 people.

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To examine communicative skills, following tests were used: "Self-assessment of communicative and organizational skills" (Fetiskin, Kozlov, & Manuilov, 2005), the test of communicative tolerance (Boyko, 2008), based on the principle of subjects' assessing of one's behavior characteristics in various situations.

Physical condition diagnosis included the characteristics of anthropometric data, physical fitness (speed, strength and speed-strength performance, flexibility, motion coordination, endurance) and the functional state of the body (function of cardiovascular system at rest and post-exercise, respiratory system, vestibular apparatus, orthostatic reactions).

The testing of students in experimental and control groups was carried out at the beginning and at the end of academic year. The experimental groups followed the training methodology developed by the authors with an emphasis on communicative competence formation and physical performance improvement; control groups ran in accordance with the previously adopted curriculum of professionally-applied physical training.

The developed means and methods of professionally-applied physical training for the professions of flight and ground aviation personnel included following directions:

1.1. To develop organizational skills, initiative, teamwork, tolerance, sports games were mainly used (football, volleyball, basketball, rugby, tennis). The greatest effect was given by the use of sophisticated options of ball games (for example, game with 2-3 balls at once, throwing the ball into the wall and fishing after a 360° rotation, keeping the ball with simultaneous counting the number of partner strikes, etc.). An important part of the training was instructor and judge practice, acting as a teacher during the part of the lesson, organization of mass recreational activities and competitions.

1.2. Courage, resolution, firmness, ability to mobilize in a difficult situation were developed through: springboard and tower diving, running and walking with closed eyes, complicated obstacle course, acrobatic exercises, trampoline, mountain slalom, jumping over obstacles, boxing fight with a strong opponent, climbing, long-distance running in adverse weather (wind, rain, snow, high or low temperature), cross-country running, long-distance swimming, long-range diving, hiking and skiing trips, etc.;

1.3. To develop the mobilization ability in conditions of emotional strain, the following methods were used: track relay races, running along a complex route, exercises in high and limited support, downhill skiing, sports and outdoor games, participation in competitions in public, emotional state self-regulation skills development, mastering the methods of taking mind off the emotions and autosuggestion, performing isometric exercises.

1.4. To development vestibular stability, special exercises were used on sports equipment:

- to influence the otolith apparatus: squats and jumps at different rates;
- to influence the semicircular canals: rotation around the vertical axis, head and trunk turns to the left and to the right; rotation in the forward tilt position, etc.;
- to influence the vestibular apparatus as a whole: turns on a low crossbeam, flip-flops, swing exercises, bosu balance trainer exercises, two-plane loping spins, fitball exercises, Barani rotation chair, German wheel.

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Figure 01. Exercises for development of vestibular sustainability

6. Findings

The proposed methodology effectiveness testing in the experimental groups of students of University of Civil Aviation shows (Figure 01) that the methodology contributes to an increase of communicative skills index in the experimental groups from the average level base (0.57 units) to high level (0.73 units). At the same time, students - future pilots were noted to get a very high level of communication (up to 0.87 units). In the control group, this index change from 0.57 units up to 0.59 units is not statistically significant ($P> 0.05$).

In the study, the authors interpreted tolerance as being in comfort with all possible variations in other people outlook, behavior and appearance, taking into account the fact that such features are not relevant for the subject himself (Surovtsev & Syrov, 2016). Today, tolerance is seen not only as a characteristic of individual consciousness, but also as a special personality trait, which can be formed to a certain extend by appropriate training influence (Dryga, Aleksandrova, Goncharova, & Sanfirova, 2016).

The communicative tolerance test has revealed a kind of tolerance for different outlook and behavior of people, which is an important competence in the work of civil aviation expert. The calculation of the conducted survey points amount shows that students of both experimental and control groups have come within the block of moderate tolerance before the experiment (64 and 65 points respectively with a range of 42-85 points); at the end of academic year the experimental group changed to the block of high tolerance (46 points), with the statistically significant differences ($P<0.05$). The students of the control group demonstrated approximately the same results on tolerance as before the experiment (64 and 61 points) and went on within the block of moderate tolerance.

Testing through the above-described method (Boyko, 2008) allows assessment of relations aspects in which a certain student is most likely to be engaged in conflict, and thereby better understanding of what

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behavioral reactions in students' interpersonal communication should be adjusted. Attention should be paid to such behavioral reactions of students as categorical judgement of people, inability to hide or smooth out unpleasant feelings when interacting with a partner, inability to forgive mistakes, inability to adapt to communication participants.

Comparative analysis of test results on indices of professionally important physical qualities indicates the reliability of changes during the experimental period in 8 tests (out of 11) in the experimental group, and only in 2 tests in the control group. The most significant changes occurred in strength and speed-strength performance, vestibular stability of the organism.

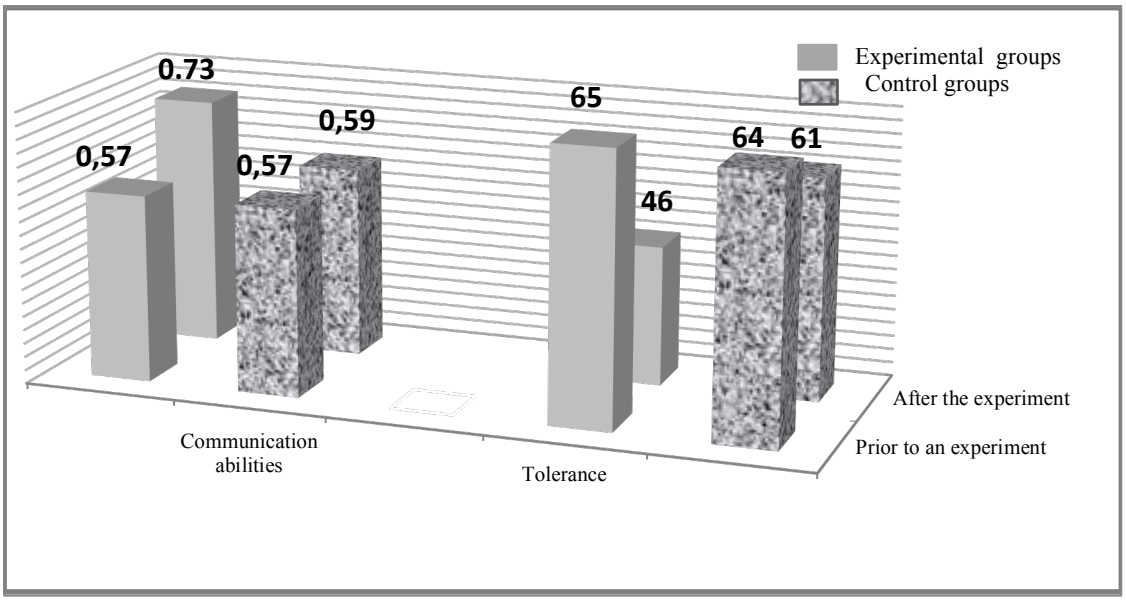

Figure 02. Dynamics of communicative relations

7. Conclusion

Professional literature analysis shows that the forced rhythm of activity, tight time limits, multiple interactions with people combined with massive information flow make the work of civil aviation expert rather tense. These factors result in a significant increase in a functioning level of not only human body physiological systems, but also social processes in terms of transformation of requirements in modern aviation.

The results of the pedagogical experiment testify the effectiveness of the developed methodology involving special means of professional-applied physical training to enhance the communicative skills and professionally important physical qualities of students - future experts in civil aviation. Sports games offer great opportunities to improve the function of attention, the abilities to act within the time limit, to extrapolate situation development, to interact with partners, to be on the team. Psycho-physiological, social characteristics of human activity in sports games are close to those involved in studied profession. This methodology application allows accounting of the student's individual interests, significant improvement of emotional atmosphere of training, and increasing the effect of physical exercises and overall physical performance. It is the teacher's task to choose teaching methods that promote each student to reveal his

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creativity, to activate not only motor, but also communicative skills, what determines the social readiness for the forthcoming professional activity.

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