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Vocational and applied physical training in the system of physical education of the railway profile

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Abstract

This article analyzes the attitude of railway students to basketball classes, which reveal a certain list of characteristic physical qualities of future railway specialists. The proposed means and methods of physical education, which should be implemented in the educational process and determine the level of professional and applied physical training, the degree of necessary physical qualities of students of railway profile universities.

Keywords: Professional and applied physical training, railway workers, basketball, physical qualities, general physical training, special physical training

Introduction

Currently, in the conditions of economic growth and increased labor productivity, higher requirements are being put forward for the training of representatives of labor professions. In connection with this, the requirements for professional and applied physical training of specialists are also changing.

The educational discipline "Physical education" is studied in institutions of higher education as a separate subject and is mandatory for full-time students.

The study of the educational discipline "Physical Education" presupposes the preliminary mastery of knowledge and skills that are provided by the curriculum of a comprehensive school. This is a necessary condition for the perception of the educational discipline "Physical education". The purpose of studying the educational discipline "Physical education" is the consistent formation of the physical culture of an individual who is able to independently organize and adhere to a healthy lifestyle.

The main tasks of the educational discipline "Physical education" are:

1. Understanding the role of physical culture in personality development and preparing it for professional activity, motivational and valuable attitude to physical culture, establishing a healthy lifestyle, physical improvement and self-improvement.
2. Formation of a system of knowledge on physical culture and a healthy lifestyle, necessary in the process of life, education, work, family upbringing.
3. Strengthening health, promoting the correct formation and comprehensive development of the body, prevention of diseases, ensuring the proper level of physical condition, working capacity throughout the entire period of study.
4. Mastering the system of practical abilities and skills of the main types and forms of rational physical activity, ensuring, preserving and strengthening health, developing and improving psychophysical capabilities, qualities and properties of the individual.

Requirements for student knowledge and skills

1. Knowledge and observance of the basics of a healthy lifestyle.
2. Knowledge of the basics of organization and methods of the most effective types and forms of rational motor activity and the ability to apply them in practice in one's physical activity.
3. Knowledge of the basics of methods of recovery and physical improvement using traditional and non-traditional means and methods of physical culture.
4. A persistent habit of systematic exercise in various rational forms.
5. Knowledge of the basics of physical education of different population groups.

6. Knowledge of the basics of professional and applied physical training and the ability to apply them in practice.

Connection of work with scientific programs, plans, topics

The study was conducted in accordance with the Thematic Plan of the Kharkiv State Academy of Physical Culture of the scientific topic “Improving the process of physical education in educational institutions of various profiles” for 2020–2025 (state registration number 0115U006754).

The purpose and objectives of the research

To determine the attitude of students of higher education institutions of the railway profile to basketball classes in the system of professional and applied physical training. Based on the analysis of scientific and methodological literature and sources of information on the Internet, investigate the state of the issue being studied.

Research material and methods

Research was conducted based on the Ukrainian State University of Railway Transport in Kharkiv. 62 students of the 1st and 2nd years took part in it.

The following methods were used to solve the tasks: analysis and generalization of scientific and methodical literature and sources of information on the Internet, pedagogical observations, questionnaires, methods of mathematical statistics, methods of researching physical development and physical performance, discussion and generalization of research results.

Research results and their discussion. Currently, interest in working specialties is growing on the labor market, and in conditions of economic growth and increased labor productivity, higher requirements are being put forward for the training of representatives of working professions. A socially significant task – the training of highly qualified professionals with in-depth special knowledge and a high level of professional training – becomes a priority. Today, production with its mechanization and automation of production processes is characterized by an increase in its complexity and intensity, which inevitably leads to overstrain of mental, mental and physical forces, high concentration of attention of specialists. However, it is known that the more complex the production technology, the more perfect and prepared the person managing them should be [2]. The issue of organization and training of specialists taking into account the profile of the chosen professions is not a fundamentally new direction in the domestic theory and methodology of physical education [3, 5]. In this work, the tasks of professional and applied physical training are defined, aimed at comprehensive development, achieving a high level of physical fitness of young people, as well as at the development of qualities necessary for the chosen professional activity. According to the author, the content of applied physical training should include ordinary physical exercises and sports, but organized in full accordance with the tasks. Since 1971, professional and applied physical training (PAPhT) has been presented in the physical education programs of university students, and physical education has been more deeply and widely agreed with the industrial sphere, as one of the effective means of preparing young people for productive work [14].

In the 1990's in connection with the changed socio-economic conditions, the requirements for professional and applied

physical education also changed. In the specified period, traditionally formed ideas did not fully correspond to modern trends in the development of pedagogical science, which is oriented not only to the creation of favorable external and internal conditions of activity, but also mainly to the education of a professional as an individual. Purposeful use of means and methods that ensure the comprehensive and most complete satisfaction of social and personal requests and needs of a person determined by the requirements of professional education is expected. At the current stage of society's development, the problem of the formation and professional growth of an individual is brought to the fore as a strategic task of the educational process. According to V. Kabachkov, the formation of a specialist's personality is the formation of professional competence, the development and improvement of socially significant and professionally necessary qualities. The search for optimal methods of high-quality and creative performance of activities in accordance with the individual and psychological characteristics of a person.

One of the requirements for the training of specialists in higher education institutions is a clearly expressed professional focus of the educational process on the development and improvement of students' qualities and skills directly related to the nature of future work, in particular in railway transport. Under professionally important qualities, it is customary to understand the characteristic features of the subject, included in the activity process, which ensure the effectiveness of its performance according to the parameters of labor productivity and its reliability. It is known that the level of development of professionally important qualities, work skills and abilities is a criterion for assessing the readiness of any specialist for work [9].

When organizing the educational process, higher education institutions are faced with the task of training specialists at a high level. It is obvious that the full use of the professional knowledge and skills of the future specialist is possible only with good health and high work capacity, which are formed during regular and specially organized physical education classes with a professional orientation. Therefore, the quality of training, including physical culture, for future professional activity for each young specialist acquires not only personal, but also socio-economic significance [8].

The general physical training of specialists cannot fully solve the tasks of physical development of students, and modern highly qualified work requires profiling of physical education, that is, it is determined by the specifics of the profession [2]. Therefore, the content of physical education of students is determined by the requirements of the specialty for which the student is being prepared, which means that it has elements of professional and applied physical training. Modern data confirm the relevance of PAPhT in the structure of professional training [3, 12]. However, the problem in new conditions is insufficiently researched and requires further study, as:

- In the process of PAPhT, the development of physical qualities necessary for labor activity takes place;
- PAPhT ensures a high level of efficiency;
- PAPhT is considered by researchers as a means of preventing occupational diseases;
- PAPhT contributes to the improvement of the specialist's personality.

The analysis of scientific and methodical literature allows us to highlight the following tasks of PAPHt: targeted development of physical abilities and professionally important mental qualities (willpower, operational thinking, qualities of attention, emotional stability, speed of perception); formation and improvement of professional and applied skills and abilities; increasing the body's functional resistance to adverse factors (hypokinesia, high and low temperature, changes in environmental temperature, being at high altitude, etc.); transfer of special knowledge necessary for successful work in a specific profession ^[14].

PAPHt requires a well-founded selection of applied physical exercise complexes. It involves the rational use of means, methods and organizational forms, which can be used to solve both general and profession-specific physical training tasks ^[13].

Means of PAPHt are physical exercises that correspond to the specifics of professional activity. They can be conditionally divided into several groups according to the pedagogical tasks to be solved.

1. Exercises for speed, strength, endurance, coordination, and flexibility are used to develop professionally important physical qualities. Mostly these are exercises from gymnastics, athletics, sports games and specially created. Applied sports belong to the latter.
2. Common movements (jumping, throwing, swimming, rowing), as well as other means (riding horses, motorcycles, applied tourism exercises) are widely used to form and improve applied auxiliary motor skills. In-depth mastery of these skills is a prerequisite for effective activity that ensures occupational safety.
3. Purposeful use of physical exercises and participation in certain sports are of great importance for improving mental qualities (willpower, attention, response to signals). Moreover, their influence on the development of mental qualities is not the same. All types of martial arts, sports games, jumping into water and gymnastic exercises that contain elements of danger contribute to the improvement of willpower.
4. Increasing resistance to the adverse effects of the external environment (lack of oxygen, overheating) is achieved by appropriate exercises, which not only improve any quality, but also at the same time give a non-specific training effect. In certain types of PAPHt, in addition to the main means – physical exercises, natural factors (water, air, sun) are used to increase the body's resistance to cooling and overheating ^[10].

Solving these tasks is possible only in the process of implementing the program material on physical education, taking into account the future professional qualities of railway transport specialists. Therefore, the authors turned to the professional profile of railway specialists. It should be recalled that the professional profile of students of railway specialties is compiled based on a systematic approach and a comprehensive study of the psychological, physiological, and biomechanical aspects of their intended work ^[7].

The specialties of future railway workers are characterized by high physical loads and the performance of motor actions of

a high-speed and force nature. Specialists of this profession perform labor actions associated with the manifestation of significant muscle effort and high-energy expenditure. The authors analyzed the content of labor operations and came to the conclusion that with dynamic, heavy, energy-intensive work, strict regulation of the time of execution of work operations, general and strength endurance, speed and strength abilities, local strength of individual muscle groups, dexterity, ability to quickly react to changes in the situation. In addition, when working on railway tracks, the body is affected by environmental conditions, such as temperature changes, vibration and noise effects of tools, pollution of the inhaled air, which directly affects work capacity, so they must be provided for in the content of PPHF [1; 15]. According to the results of the 2015 survey on the importance of physical qualities, students ranked them in the following order: endurance - 41.8% (36.4% of boys and 47.7% of girls), strength - 14.9% (26.0 % of boys and 3.8% of girls), agility – 13.7% (10.4% of boys and 16.0% of girls), flexibility – 12.2% (5.2% of boys and 19, 1% girls) and speed 7.6% (11.7% boys and 3.4% girls). In addition, their own level of physical fitness was assessed as follows: strength - 22.3% (31.2% of boys and 13.5% of girls), speed - 16.1% (22.1% of boys and 10.1% of girls.), flexibility – 15.3% (10.4% boys and 20.2% girls), dexterity – 14.9% (14.2% boys and 15.7% girls) and endurance – 11.9% (10.4% boys and 13.5% girls) ^[4].

When developing the content of PAPHt for this specialty, the authors assumed that the working actions of specialists are carried out in a standing or sitting position, in rare cases in a semi-squat. To detect a breakdown on the roads, the specialist has to cover considerable distances with a step at an average pace. In the process of direct performance of labor functions, the work is static in nature with a small amplitude and simple movements along its coordination structure. During work, the muscles of the back and lower limbs are used to maintain the posture. The main load involves keeping the hands in a certain position for a long time. Thus, the monotony of work leads to rapid psycho-functional fatigue, which leads to a decrease in the motor response, the tension of the visual analyzer.

Analyzing the working actions of railroad specialists, mainly monotonous, static, time-regulated performance of labor operations, it was found that in the process PAPHt of they need to purposefully develop strength endurance, special endurance of the muscles of the upper limbs, coordination abilities, as well as form the body's resistance to numerous adverse factors. In the content of physical education of students, it is advisable to include gymnastics, sports games, athletics, various types of moving games, relay races, etc. The use of these physical exercises contributes to the development of such qualities as strength and speed-strength endurance, dexterity, as well as quick response to a change in the situation. As a result of the survey conducted in 2015, it was also revealed which sports students prefer: table tennis - 18.15%; volleyball – 13.5%; football – 12.8%; aerobics – 11.55%; martial arts – 10.05%; swimming – 8.2%; basketball – 6.55%; athletic gymnastics – 5.55%; athletics – 5.2%; badminton – 3.05%; recreational gymnastics - 3.45%; handball – 1.95% ^[4].

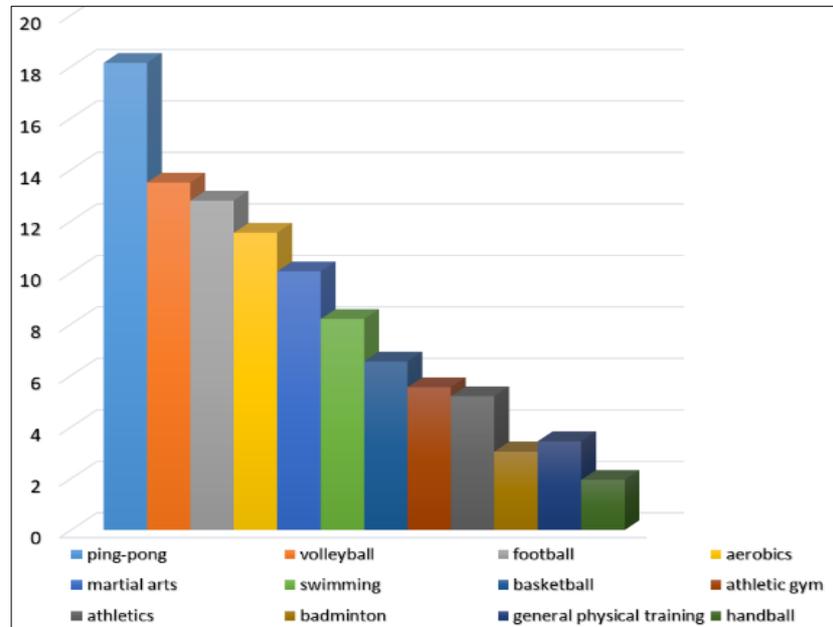


Fig 1: Priority of sports that students prefer

It should be noted that the development of this program was carried out based on a detailed study of specialties of a railway nature by researching the content and structure of professional activity. The analysis of literary sources made it possible to identify a certain list of characteristic physical qualities of future specialists ^[11].

This program is designed for teaching students of higher education institutions of the III-IV level of accreditation. The program presents the main sections on the discipline "Basketball" for first- and second-year students. These sections are compiled based on the latest data in the field of the theory of physical culture and sports. Special attention is paid to the impact of classes on future professional activity. The subject of study of the academic discipline "Physical education" is the specialization "Basketball", which is determined by the social order of modern society for a comprehensively developed harmonious personality of a specialist who has a high level of health, the necessary physical education and physical fitness, capable of physical improvement in order to meet the requirements educational and qualification characteristics.

Basic principles:

- **Complexity:** Implies a close relationship between all sides of the educational and training process (physical, technical-tactical, psychological and theoretical training, educational work and restorative measures, pedagogical and medical control);
- **Continuity:** Determines the sequence of presentation of the program material by stages of training and compliance of means and methods of training, volumes of training and competitive loads, growth of indicators of the level of physical and technical-tactical preparedness;
- **Variability:** Involves the inclusion of various classes in the curriculum to increase professional activity.

Despite the apparent simplicity of the game, the technique and tactics of basketball are very complex. The game itself requires the player to quickly solve complex motor tasks in every game situation. All these difficulties require the student to have special physical fitness, technical and tactical

training. Speed, strength, dexterity and endurance play a leading role in basketball.

The main forms of organization of educational work are: theoretical and practical classes, mobile and sports games according to simplified rules, training games for the score, competitions.

The training place must be well lit and comply with the norms established by the rules of the competition, the light must be uniform over the playing field, without direct light falling into the eyes of the players. The room should be well ventilated. The floor in the sports hall should have a wooden or special covering.

Group theoretical classes are held in the form of conversations, demonstrations of visual aids, watching competitions and studying educational videos.

Material and technical support: sports hall, steps, sports equipment, stopwatch, gymnastic bench, jump ropes, balls, etc.

Competencies that students should master when studying the academic discipline:

- Ability to learn and apply acquired skills in practice;
- Ability to work in a team;
- Understanding the factors influencing physical education on life and health;
- The ability to characterize the essence of the concept, goals and tasks of physical education;
- Possession of the methodological base of physical education.

Students should know

- The basics of a healthy lifestyle;
- The basics of organization and methods of the most effective types and forms of rational motor activity and being able to apply them in practice in one's physical activity;
- The basics of physical education of different strata of the population;
- Methods of skill formation for daily physical exercises in various rational forms;
- Ways of carrying out systematic physical training with a health or sports orientation;

- The main values of physical culture and sports.

Students should be able to

- To form an understanding of the role of physical culture in the development of the personality and its preparation for professional activity, motivational and valuable attitude to physical culture, physical improvement and self-education, the need for regular physical exercises and sports;
- To form a system of knowledge on physical culture and a healthy lifestyle, necessary in the process of life, study, work, family physical education;
- Strengthen health, contribute to the correct formation and comprehensive development of the body, prevention of diseases, ensure a high level of physical condition, work capacity throughout the entire period of study;
- To possess a system of practical skills and occupation skills, the main types and forms of rational physical activity, to preserve and strengthen health, to develop and improve psychophysical capabilities and personality properties;
- Acquire a base of motor skills and skills, which ensures general and professional-applied physical fitness;
- To gain experience in the creative use of physical education and sports activities to achieve personal and professional goals;
- To be able to perform state or departmental tests and standards at the level of requirements of educational and qualification characteristics and educational and professional programs of the relevant specialist.

Basketball is one of the most popular games in our country. Various movements characterize it: walking, running, stopping, turning, jumping, catching, throwing and dribbling the ball, carried out in single combat with an opponent. Such a variety of movements helps to strengthen the nervous system, the motor apparatus, improve metabolism, and the activity of all body systems. Basketball is a means of active recreation for various categories of humanity, especially for persons engaged in mental activity.

Basketball has not only health and hygiene significance, but also propaganda and education - the game makes the audience want to become as agile and hardy as the athletes. Playing basketball helps to form perseverance, courage, determination, honesty, and self-confidence. However, the effect of education depends primarily on how purposeful the relationship between physical and moral education is carried out in the pedagogical process.

Basketball, as a means of physical education, has found wide application in various branches of the physical education movement. In the education system, basketball is included in the physical education programs of preschool, general secondary, secondary, vocational-technical, secondary special and higher education. For children of preschool and primary school age, various mobile games and mini-basketball are widely used. Schoolchildren of middle and older age play basketball in lessons and in basketball sections, as well as in children's and youth sports schools.

In institutions of higher education, basketball is used in academic classes and optional. The working program on sports games involves students studying the theoretical and practical basics of basketball.

In the process of classes, the following tasks are solved:

- Formation of practical skills, mastery of basic game techniques;
- Mastering skills and abilities when performing motor game actions;
- Formation of abilities and skills in the organization of refereeing competitions;
- Formation of skills in the use of basketball to solve the problems of improving the health of students, involving them in a healthy lifestyle, optimizing the movement regime, independent physical education classes.

Lessons according to the basketball program are conducted in the form of:

- Lecture and methodical classes;
- Practical classes;
- Educational and training classes;
- Control classes.

The lectures reveal the role and place of basketball in the system of physical education of young people, the features of using the means of one or another game in the development of basic motor qualities, the basic rules of the game, the organization and conduct of sports competitions. Methodological and practical lessons involve mastering the basic methods and means of forming skills and abilities for independent basketball lessons [6; 9].

Educational practical classes are built according to the traditional scheme, which includes preparatory, main and final parts. In the preparatory part, exercises for stretching, moving at a low speed, jumping without excessive muscle effort, exercises with balls in groups (passing, throwing, dribbling, tackling, etc.) are given. In the main part, the game is based on simplified rules or the training of the game elements of the game. In the final part - restoration of all body functions.

Practical basketball classes at the main department are aimed at developing general and special physical qualities, mastering simple and complex game skills in combination with various tactical schemes of play in attack and defense, as well as the formation of professional skills by means of basketball.

The focus of work in sports improvement groups is improvement of technical and tactical skills and further development of motor and functional readiness.

Teams of the university participate in the championship of the city among institutions of higher education, in student leagues, and for students studying at the preparatory department, competitions for the championship of courses and university faculties are systematically held. Control classes and assessments provide operational current and final differentiated information about the degree of mastery of theoretical and methodical knowledge and skills, about the state and dynamics of physical development and professional-applied preparedness of each student.

General physical training (GPhT). General physical fitness is extremely important. The main task of classes in general physical training is to strengthen the health and comprehensive physical development of students. It is advisable to develop such qualities as flexibility, dexterity, coordination, speed-power abilities and pay special attention to endurance. For this, a wide range of general developmental exercises, mobile games, running and jumping exercises are used:

- Exercises for the development of mobility in the joints: rotation in the carpal, elbow, and shoulder joints, flexion and extension of the feet; turns, tilts and rotations of the body in different directions; from the position of hanging on the gymnastic wall (or crossbar) lifting bent and straight legs to a right angle; from the position of lying on the back, lifting the legs behind the head, with the toes touching the floor behind the head;
- Raising the body from the position;
- Slow running for time; running on short distances for a time of 20-30 m., shuttle run 3x10 m.;
- Jumps from a place with a push of both legs; jumping over the gymnastic bench (through a line drawn with chalk on the floor); sideways jumps to the right and left; kangaroo jumps with knees pulled up to the chest; jumping on one and two legs; jumping over the gymnastic bench for time; squat jumps forward, back, left, right;
- Walking on toes, heels, on the outside and inside of the foot;
- Mobile games with and without the ball.

Students should be able to: perform exercises on the spot and in motion; perform a complex of warm-ups independently. Special physical training (SPhT). For the development of special physical qualities (speed, playing endurance, speed and speed-strength qualities), a wide range of exercises aimed at training the most important muscles of the trunk, legs and arms is used. The following exercises can be recommended to develop the strength of these muscles:

- Running short distances from 15 to 30 m.;
- Jumping with one or two legs in different directions; multiple jumps; squat jumps forward-backward, left-right; side steps and lunges;
- Running cross step in different directions;
- Jumping over the gymnastic bench; simulation of movements in the game rack to the right-left and forward-backward;
- Squatting; jumping out of a squatting position; jumping out with the knees pulled up to the chest; turns, rotations and tilts of the body in different directions; lifting the legs behind the head from the position of lying on the back; raising the body from the position of lying on the back;
- Bending and straightening of the arms in the focus while lying on the floor;
- Exercises with stuffed balls of different weights (throwing with two and one hand in different directions); throwing a tennis ball on the range and accuracy of hitting the target;
- Exercises for the development of movement speed and jumping;
- Exercises for the development of game dexterity;
- Exercises to develop endurance;
- Exercises for the development of speed and strength qualities;
- Exercises with weights.

Students should be able to: perform exercises independently and with the help of a partner; with a change in speed, amplitude; with and without encumbrance; develop special abilities (flexibility, speed, dexterity and endurance). Technical training. The main pedagogical principles of a

teacher's work are the sequence and succession of tasks and exercises, the transition from simple to complex. Students should be able to: perform basic technical and tactical game techniques in training sessions. Individual homework. Individual approach according to the studied material.

Conclusions

Professional and applied physical training is an important component of physical education of student youth. It involves the rational use of means, methods and organizational forms. It should be combined with general physical training and include testing and assessment of students' readiness.

Prospects for further research

It is planned to be carried out in search of ways to increase the level of physical condition of railway students of higher educational institutions by means of PAPH.T.

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