

Influence of Physical Education Classes on the Level of Health and Fitness Competencies of Students

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Abstract

After Ukraine gained independence in 1991, the country underwent a complete reorganization of all aspects of life, and accordingly, the education system. There is an urgent need to restructure the system of physical education, especially at higher education institutions (HEI), which has accumulated a large number of unresolved problems in the field of physical education of young students in a short period of historical independence. The article forms a new scientific direction that defines a comprehensive solution to the problem of introducing the methodology for students' physical education, which provides guaranteed achievement of the projected results in the discipline "Physical Education" into the educational process of agricultural HEI, namely: knowledge, skills, physical qualities, general and special physical fitness, motivational and value-based attitude to a healthy lifestyle and one's own health, the acquisition of physical culture and health competencies by students. One of the criteria for the effectiveness of the methodology for physical education is the formed health and fitness competencies of students. The purpose of the article is to study the effectiveness of classes conducted according to the developed methodology for physical education for students to acquire health and fitness competencies. The results of the research showed high efficiency of the methodology for physical education, in comparison with the traditional system: the motivational, cognitive, and activity components in the experimental groups revealed the vast majority of students with high and sufficient levels of readiness for physical activity, and in control groups - with average and low levels.

Keywords: physical education, methodology, health and fitness competencies, student.

1. Introduction

The socio-historical and economic development of each country is aimed at changing the physical, moral, and spiritual capabilities of people in the right direction and the system of organizational measures that determine and regulate the development of physical education in society and education. The development of the system of physical education at higher education institutions (HEI) is determined by the needs of society and its individual members and is defined by the level of development of material production, social ideas about its purpose, objectives, means, content, and methods. At the same time, the



system of physical education at the HEI of Ukraine is in a deep crisis and has not been able to meet the needs of physical development and physical fitness of young students during the years of Ukraine's independence. The level of health of students and the quality of educational and sports activities at HEI suffered irreparable harm. Despite numerous scientific studies, recommendations of government agencies, and industry experts, involved in improving physical education at domestic educational institutions, no drastic changes have been made. Physical education teachers of HEI have been guided in their activities by the Instruction on the Activities Organization and Content of Physical Education Departments of Higher Education Institutions and the All-Union Basic Curriculum for Higher Education Institutions for more than ten years after Ukraine has gained independence. It is known, the feature of this university discipline was the predominance of utilitarianism, the dominant development of physical qualities, motor skills, and abilities in the days of totalitarianism [1, 2].

Therefore, the system of physical education in Ukraine was in a deep crisis and could not meet the needs of physical development and physical fitness of young students. The process of teaching physical education in the first years of Ukraine's independence was stagnant. The number of teachers and hours allotted for compulsory and optional classes has decreased, the number of sick students and students with disabilities has increased, sports clubs have ceased to function in a number of HEIs, and the number of competitions and funds for equipment and uniforms has decreased. Many leading Ukrainian specialists in the field of physical education and sports changed their profession and went abroad to work. The analysis of the state of sports, health and fitness activities at HEI shows its complete decline. This is conditioned by a number of both objective and subjective factors in the development of the existing system of physical education. On the way to building Ukraine as an independent state, many difficulties had arisen, which negatively affected all aspects of life - social, economic, spiritual, and cultural. Therefore, the modern system of physical education has experienced a period of finding strategic solutions for its development, which has prompted the beginning of methodical understanding and reform of the subject "Physical Education", development of new pedagogical technologies, which have a new perspective on tasks, content, and methods of teaching, other approaches to students, interpretation of their needs and interests [3, 4].

Only a comprehensive solution to the problem of theoretical and methodical principles of improving the system of physical education of young students will be able to ensure guaranteed achievement of the projected results in the discipline "Physical Education", namely: knowledge, skills, physical qualities, general and special physical fitness, motivational and value-based attitude to a healthy lifestyle and one's own health, the acquisition of health and fitness competencies by students.

2. Literature Review

The transformation of goals and objectives of the discipline "Physical Education" to meet modern requirements related to the restructuring of the national education system in the direction of its integration into the European educational space should be based on two philosophical principles, namely: 1) the principle of epimelia (from the Greek - self-care), which implies that the motivation for rational human behavior is, first of all, self-care and self-change, in the case of physical education - care for one's own health and following the general principles of a healthy lifestyle; 2) the principle of kalokagathia (from the Greek - beautiful and good), which emphasizes that the education should be aimed at forming the harmony of body and soul, the creation of a physically and spiritually perfect personality [5]. To keep physical education as a discipline at HEI, it should be considered not as an additional academic burden on a student, but as a means, positively influencing the activation of mental activity, the restoration of intellectual and physical performance [6, 7]. The use of physical education in the education process significantly increases mental activity. If we study the physiological load curve, the greatest effect occurs in the middle of the class, when emotional factors are used (games, relay races, functional music, etc.). Planned and rational use of physical exercises in the educational activities of the HEI students has a positive effect on mental development and intellectual activity [8, 9].

Currently, physical education of the HEI students is characterized by: 1) the lack of a specific social requirement of employers for the physical readiness of graduates and, as a consequence, incomprehension of the expediency of physical education by the HEI direction and students, inefficient management of this process; 2) insufficient humanistic and professional orientation of the process of physical education; 3)



ineffective theoretical and methodical training of students on personal physical culture; 4) a limited range of practical components that provide a set of functions of physical culture; 5) low efficiency of didactic content of practical sections of the curriculum on physical education; 6) the inadequacy of the organization forms of the process of physical education to the modern mentality and motivational maturity of students; 7) the lack of proper effective conditions for its effective functioning (sufficient personnel, scientific, methodological, medical, equipment, and financial support); 8) insufficient motivation of students to their own physical education and its improvement; 9) the lack of a scientifically sound model of further development of the system in the near and distant future in the country [10, 11].

Along with the organizational aspects of physical education in Ukraine, there was a continuous process of development of theoretical, methodological, psychological and pedagogical, physiological and hygienic, and valeological principles of improving physical education as a university discipline [12, 13]. At the same time, the theoretical and methodological developments of Ukrainian scientists in the field of physical education and sports were not inferior to the achievements of foreign scientists. There was a large amount of special literature (mostly translated) and journals, which revealed the problems of physical activity and the health industry, pointed to promising ways to radically restructure the system of physical education, bringing it into line with real human needs [14, 15]. Due to the high scientific potential of Ukraine in the field of physical culture and sports, scientific achievements in the field of physical education of young students are an opportunity to improve the quality of physical education without high expenses. Thus, it is necessary to take a number of organizational measures at the state level, namely: 1) to develop modern physical education curricula for the HEI students, which should have a focus on health, take into account the interests and preferences of students, meet the material, climatic, natural, and regional traditions, take into account the features of future professional activity; 2) to coordinate state programs with curricula and instruction letters of ministries and departments; 3) to achieve the implementation of state programs in physical education; 4) to involve scientists in the development of new methodologies for physical education in various sectoral HEI, which would be adequate to current trends in social development, aimed at implementing active forms of interaction between the subjects of educational and health-improving processes.

An analysis of literature sources [1, 3, 9, 16, 17] showed that currently the theoretical and methodological foundations of the system of physical education of students in such aspects studying, personality, activities, development, regulation, self-regulation, etc., often and most dramatically face the need to identify and cover their functioning. Almost every teacher often faces the fact that it is impossible to provide qualified and high-quality help for a student, using the same tools, one specific method – almost no real education applies just one approach. On the other hand, every teacher knows from experience that one should teach a student according to a certain scheme or model. Such a model is a model of the methodology for physical education of the students of agricultural universities with its structural components.

The aim of the study is to investigate the effectiveness of classes conducted according to the developed methodology for physical education for students to acquire health and fitness competencies.

3. Method

To achieve the aim of the study, a pedagogical experiment was organized. The main pedagogical experiment was carried out at the Polissia National University in 2013-2019, which involved sixteen student groups (369 people, including 195 males and 174 females) of economic, agronomic, environmental, agricultural management, technological faculties and the faculty of agricultural mechanization. All students were divided into control and experimental groups by the method of even distribution. Thus, the experimental groups included 188 students (105 – males, 83 – females), the control groups, respectively, 181 students (92 – males, 89 – females). According to the schedule, physical education classes in all groups were held once or twice a week in the first part of the day. The purpose of the experiment was to substantiate and introduce a model of the methodology for physical education of agricultural students into the educational process of the experimental group students. The students of the control groups were engaged in the classes conducted according to the curriculum of "Physical Education" traditional for higher educational institutions of Ukraine of III-IV accreditation levels.



In order to identify the effectiveness of the methodology model for the physical education of students, the criteria as signs that indicate the degree of high-quality health and fitness training of young students were identified. The efficiency of the methodology was assessed by the formed health and fitness competencies and the levels of students' readiness for health and fitness activities during their professional work in the agricultural sector. The aim of the pedagogical experiment was to establish how the developed methodology ensures the achievement of the goals of physical education of students in comparison with the traditional one. Thus, the experiment was comparative.

The methods of the research:

- *theoretical*: 1) the method of conceptual and comparative analysis, which compared the existing theoretical approaches to solving the issues of the current state of the physical education system at HEI on the basis of generalization of philosophical, methodological, psychological, pedagogical, and educational literature, archival materials, innovative experience, as well as generalization of many years of our own experience;

2) the method of structural and system analysis made it possible to systematize and generalize information about the object under study and create a model of the methodology for physical education of the students of agricultural universities and identify patterns and features of its functioning based on quantitative and qualitative analysis of pedagogical experiments;

3) the method of modeling, on the basis of which the theoretical principles of the educational and health-improving process in physical education were substantiated and introduced in higher agricultural educational institutions of Ukraine;

- *empirical*: questionnaires and surveys, pedagogical observations, testing, self-assessment, and credit rating were used to confirm the importance of factors that determine the features and trends of physical education at HEI and to diagnose physical fitness, professionally applied physical fitness, and the level of mastery of health and fitness competencies by students;

- *pedagogical experiment* (ascertaining, formative) was conducted in order to verify the effectiveness of the developed model of the methodology for physical education of the students of agricultural universities;

- *the methods of statistical data processing* were used for the correct processing of the obtained results and their display in tabular forms.

4. Results and Discussion

The original model of the methodology for physical education of the students of agricultural universities combines a set of components of a holistic pedagogical process – from goals to the end result – and focuses on the personality of the future specialists in agriculture who has competencies and a high level of skills in health and fitness activities and sports. The functioning of the methodology for physical education of students is conditioned by the following factors: 1) social requirements for the training of specialists for the agricultural sector; 2) the purpose and objectives of the modern system of physical education; 3) the principles and content of physical and professionally applied physical readiness for professional activities. In contrast to the traditional methodological system, which is based mainly on improving the level of physical fitness and taking an exam on physical education by students, the new system is based on the principle of "*physical education and physical activity throughout life*".

The model of the methodology for physical education of the students of agricultural universities is based on the following provisions:

1) the educational process of physical education is designed as a methodology that has its own purpose, objectives, content, methods, forms, and means of students' training;

2) the discipline "Physical Education" is mandatory in the curriculum of agricultural universities throughout the period of study at a HEI, is considered in the unity of content and procedural components of the training of future farmers;

3) one of the leading principles of the methodology for physical education of the students of agricultural universities is comprehensive training aimed at solving socio-economic problems and problems in rural infrastructure and the agricultural sector, namely: a) ensuring the educational level of rural youth in terms of a healthy lifestyle and its implementation in life; b) prevention of bad habits (alcohol, drugs, smoking); c) rational use of free time and active leisure; d) improving the psychological climate in the



production teams and increasing the activity of young people in the public life of the village, its consolidation in the agricultural sector;

4) the content of physical education is the fundamental knowledge of the basics of anatomy and physiology, hygiene and ecology, biochemistry and the basics of nutrition, psychology and pedagogy of sports, ethics, and aesthetics, etc.;

5) the content of practical material includes traditional and non-traditional means of physical education;

6) methods, forms, and means of physical education, both traditional and innovative, must be adequate to the activities of the specialist of the agricultural sector.

From the standpoint of a systematic approach, a sound model of the methodology for physical education of the students of agricultural universities consists of the following components: purpose, objectives, content, principles, methods, forms, tools, control and evaluation measurements, and tests (Table 1). In the methodology, these components are subordinated to the goals of formation and development of the student's personality through training (the process of physical education), which provides a fully developed personality as a subject of life.

Table 1. *The components of the methodology for physical education of the students of agricultural universities*

Methodology components	Meaning
Aim	Meeting the needs of the students of agricultural universities and society as a whole in the formation of a spiritually and physically developed personality and helping to improve one's living standards
Objectives	<ol style="list-style-type: none"> 1. Strengthening the health, increasing vital functions, and resistance of the body to the effects of adverse environmental factors. 2. Promoting the proper formation and comprehensive development of the organism, physique, disease prevention, ensuring good physical condition. 3. Improving the functional capabilities of the body for the required level of physical fitness (development of physical qualities) and working capacity. 4. Mastering the system of motor skills and practical skills that ensure a safe living and psychophysical readiness for professional activity. 5. The formation of a system of knowledge on physical culture and a healthy lifestyle to use it during the study, work, family life, etc. 6. The formation of motivational and value-based attitude to physical culture, a healthy lifestyle, physical and spiritual self-improvement. 7. Gaining experience in the creative use of sports, health and fitness activities to achieve personal and professional goals. 8. The formation of worldview, aesthetic, and moral education (beautiful movements, aesthetic ideal, muscular pleasure, etc.)
Content	Theoretical section Practical section Professionally applied physical training Independent work Methodical preparation
Principles	<ol style="list-style-type: none"> 1) humanistic orientation and democratization of the pedagogical process; 2) the priority of the needs, motives, and interests of the individual; 3) harmonious and comprehensive development of the individual for labor and socially important activities; 4) health orientation; 5) connection of physical education with vital activity (educational, labor); 6) general methodical principles: consciousness, activity, accessibility, individualization, systematicity, consistency, clarity; 7) specific principles of physical education: alternation of activities and rest, a gradual increase of pedagogical influences, the adaptive balance of activities dynamics, a progression of training activities, cyclic classes, age, gender and general adequacy of the physical education directions

Methods	1. Aimed at mastering knowledge: story, conversation, description, characteristics, explanation (accompanying, instruction). 2. Aimed at mastering motor skills: segmented and holistic studying. 3. Aimed at the development of physical qualities (physical and professionally applied physical training): steady, alternating, repeated, interval, game, competitive, circular
Forms	Classes: theoretical (lectures, consultations), practical (special, general physical education, training, professionally applied, treatment and rehabilitation-orientated, methodical, collective, and individual). Extracurricular activities: in different sports groups, independent health-improving and sports activities, hiking, sports competitions, morning hygienic gymnastics, introductory, preventive and restorative gymnastics, sports breaks, physical activity breaks, micro-breaks, etc.
Means	Traditional and non-traditional means of physical education taking into account sports interests, future professional activity, state of health, individual features, level of students' physical fitness, supply maintenance, ecological and meteorological environment (except means connected with risk to health and life that do not meet ethical requirements and form violence and cruelty)
Control and evaluation measurements, tests	Tests on physical training, tests on professionally applied physical training, a credit-unit system of assessment of the knowledge, skills in physical education, and physical fitness state of students

The methodology for physical education presupposes the understanding of the system as a multidimensional multistage structure with many parameters, as a complex internally integrated social organism that can be analyzed and explained; as a set of developing and interacting elements, properties, and relationships. The main features of systematicity include integrity, purposefulness, and structuring, i. e. the composition of elements, internal division, ordering, classification; the relationship between external and internal; the integration of individual elements and connections. The essence of the methodology for physical education is the hierarchical dependence of the following subsystems: 1) didactic and methodical principles of physical education aimed at comprehensive and professionally-oriented training; 2) the unity of general physical and special training for future professional activity; 3) the content, structure, and functions of physical education considered in the context of professionally applied physical training of agricultural students; 4) the whole process of physical education, along with professional tasks, aimed at maintaining and strengthening the health of students and their acquisition of skills and abilities to maintain a healthy lifestyle, active leisure, and involvement of others.

The functioning of each of these subsystems is aimed at achieving the main goal of physical education - to meet the needs of the students of agricultural universities and society as a whole in the formation of spiritually and physically developed personalities. The category "competence" occupies one of the first places in designing and organizing the educational process at HEI. The concept of "competence" is interpreted as a complex integrated characteristic of the individual, associated with a set of knowledge, skills, attitudes, and experience, which make it possible to effectively conduct activities or perform certain functions, ensuring problem-solving and achieving certain standards in profession or type of activity. From the standpoint of personality-oriented health and fitness education, the competency approach provides a dialectical combination of personal, activity, and social factors in the system of health and fitness activities of future agricultural specialists. In the field of physical education of future agricultural specialists, *the competence* can be considered a complex system of personal education, which contains motivational and value-based orientations to a healthy lifestyle; emotional and volitional components that ensure the readiness of a specialist for physical self-improvement and self-development through the means of physical culture and sports; the availability of systematic health and fitness knowledge, subjective experience, skills, and abilities to solve health and fitness issues in the social infrastructure of the village or in the production team.

Semantic and systemic analysis of the competence approach to educational activities in physical education and physical culture and health activities in agricultural universities allowed identifying the components of physical culture and health competence of future agricultural specialists. The basic idea is that the health and fitness competencies of agricultural students provide the process of self-development and self-improvement, maintaining health, a high level of physical fitness and efficiency, a healthy lifestyle, the ability to involve others in professional activities. The *health and fitness competencies* of future agricultural specialists include:

- *designing competence* – the ability to design one's own motor activity, lifestyle, maintain good health, high physical fitness and efficiency, and the ability to communicate it to others;

- personal (individual psychological) competence – the ability to establish interpersonal relationships: "student – teacher", "student – team of students", "future agricultural specialist – co-workers", "agricultural specialist – management and administrative apparatus";

- *managerial competence* – knowledge, skills, and abilities to organize and manage sports, health and fitness activities in the field of production and in the village matters;

- *methodical competence* is characterized by the level of theoretical knowledge in the field of sports, health, and fitness activities, skills to perform physical exercises and physical activities, knowledge of life safety and first aid, maintenance of a healthy lifestyle in the family or team. The methodical competence of agricultural specialists in the field of physical education and sports is considered as a result of the methodical training of a graduate of an agricultural university, who must be able and ready to perform basic health and fitness functions, determined by the functional structure of methodical thinking. This is a crucial component of physical culture and sports competence (readiness) of an agricultural specialist, which characterizes the development level of methodical competence and methodical thinking, which are necessary for productive, creative, and practical solving of physical culture and health problems in different living conditions. The success of an agricultural specialist in solving the problems of health and fitness activities in the agricultural sector is the criterion for assessing one's methodical competence;

- *reflexive competence* is related to the ability to perform self-analysis and self-assessment of the health and fitness activities, physical development, physical fitness, efficiency, physical activity and set new sports or health and fitness tasks for oneself and colleagues.

The analysis of approaches to the study of health and fitness activities in other spheres of human life shows that the *competency approach* combines the leading ideas and principles of the implementation of the activity, personality-oriented, personal activity, acmeological, and andragogical approaches. The competence approach integrates the principles of the activity approach, as competence is directly manifested in the activity and is associated with the identification, acceptance, and solution of many problems and tasks; the *personality-oriented approach* is aimed at the individual, one's needs, capabilities, goals, values, and the formation of physical, aesthetic, and spiritual traits of the individual; the principles of the *acmeological approach* are considered as an indispensable attribute or readiness that determines the desire of the individual to carry out health and fitness activities; *andragogical approach* is based on encouraging a student to acquire knowledge, skills, and abilities on one's own, to follow a healthy lifestyle, construction and correction of one's own health and fitness activities, flexible adaptation to changing conditions of professional activity.

The methodical system also has *functional components* (organizational, designing, communicative, gnostic, constructive) of the system of physical education of future agricultural specialists, which act as stable basic connections of structural components and ensure the functioning of educational, health and fitness activities of students. The functional components of the pedagogical system are stable basic connections of the main structural components: between the initial state of the structural elements of the system and the expected final result. Structural and functional elements of the pedagogical system are the most significant elements that determine the achievement of the expected final result, which must be laid down in the system itself and in all its subsystems so that the final and intermediate results are positive.

The components of the methodical system also include the *semantic structure* (components), *organizational structure*: subjects (teachers) and objects (students), as well as the results of their interaction. The interconnected and interdependent activity of the subjects and objects of the methodical system is determined by the tasks of physical education. Each of the elements of the function and semantic structure of

the methodical system is, in essence, a relatively independent subsystem, which has its purpose, objectives, content, patterns, principles, methods, forms, and means, as well as the results that characterize it. This model of the methodical system also allows clarifying the relationship between the terms "learning technology" and "pedagogical system". Learning technology is a subsystem of the pedagogical system and affects only the qualitative characteristics of all other subsystems.

Having scientifically substantiated the theoretical bases of the formation methodology for physical education of students, having revealed levels of its functioning, motivation-oriented, organizational and semantic, procedural activity and diagnostic blocks were introduced into the structure of the original model.

The motivation-oriented block of the methodology model for physical education of agricultural students is system-forming, it defines the functions of all other components of the system and includes the purpose and hierarchy of tasks, functions, structure of physical training, a system of skills, the main of which is to promote the training of harmonious highly-qualified specialists in the agricultural area through the formation of students' motivation for a conscious attitude to the process of physical education and its means. The partial tasks are:

- 1) the formation of motivational and value-based attitude to one's own health, a healthy lifestyle, means of physical culture and sports, physical activity, etc.;
- 2) increasing the level of physical fitness and efficiency;
- 3) the formation of psychophysical professionally applied qualities, skills, and abilities;
- 4) mastering the technique and methods of improvement in one of the sports or motor activity;
- 5) mastering the knowledge, skills, and abilities of life safety. At this level, the introduction of the methodology in the educational process of physical education is projected.

In the motivation-oriented block, it is possible to distinguish the following functions of physical education: *general pedagogical* (educational, upbringing) and *specific* (organizational, health-improving, preventive, restorative). *The educational function* is aimed at meeting the needs of students in the acquisition of special theoretical knowledge, professionally significant, organizational, and methodical skills, i. e. mastering a certain amount of knowledge in the field of physical culture and sports, a healthy lifestyle, etc.

The function of upbringing includes, first, the formation of health and fitness orientation of the individual; secondly, the formation of motivational and value-based attitude to physical education; third, the formation of an idea about the importance of systematic physical improvement in ensuring a high level of efficiency and improving professionally applied physical qualities. *The organizational function* implies organizing classes in the pedagogical process of physical education, which affect the successful solving of the objectives of the educational process. It should be noted that classes are held with different contingents, in different conditions and with different orientations, each lesson has its own content and form. *The health-improving function* includes the improvement of physical abilities, special qualities, health promotion, and improvement of anthropometric and morphofunctional indicators, and in general - physical performance. *The preventive function* of physical education is aimed at the prevention of injuries, it includes a set of organizational and methodological measures aimed at improving physical education. *The restorative function* of physical education is achieved through the use of physical culture provided that the following principles of class organization and conducting are considered: individualization, regularity, gradualness, accessibility, focus on certain amounts and intensity of physical activity. Preventive and health-improving classes are aimed at preventing diseases, restoring physical performance, and endurance.

The organizational and semantic block consists of fundamental laws, concepts, health and fitness technologies aimed at improving health, physical fitness and efficiency, training students on the basis of continuity, acceptability, and complementarity of the physical education process. It is based on general didactic and partly didactic principles, and also meets the criteria for the selection of means and forms of physical education. The content of the educational process helps to achieve the goals and objectives of physical education. The purpose and content of the discipline "Physical Education" for agricultural universities are implemented in the educational process within the semantic component of the methodology model, which includes methods, forms, and means of physical education. Knowledge, skills, and abilities are reflected in teaching methods. An intensive creation of "developmental formations" and, first, the motive of educational activity - health and fitness interests is achieved with the help of the technology of forming

meaningful generalizations of educational material, following from the abstract to the concrete, as well as specially organized educational activities.

The block of procedural activity includes the introduction of developed methods, used organizational forms and means of physical education. It provides students with the acquisition of theoretical knowledge, the formation of physical culture and sports skills. The basis of this block is an educational and methodical complex in the "Physical Education" discipline (lectures, practical classes, consultations, independent classes, manuals, methodical recommendations, sets of tasks, tools for self-preparation, test sets, evaluation criteria for students in physical education). The technology of teaching physical education reveals the conditions of the methodical system functioning, determines the ways of its implementation (design) in the educational process in accordance with the set goals.

The diagnostic and reflexive block of the methodology provides regular monitoring and diagnostics of the formation level of the students' knowledge, practical skills, abilities, and level of physical fitness. This block involves monitoring and evaluating the effectiveness of physical education in terms of the application of methodologies that establish levels of development (poor, low, medium, above average, high). It is implemented through a credit rating system for assessing knowledge, skills, physical fitness, professional physical training, and independent work and a system of tests that allow checking the formation of motivation-oriented, organizational and semantic, and procedural activity components of the methodology.

The introduction of the methodology in the process of physical education in the experimental groups affected the overall level of the motivational component significantly, in comparison with training according to the traditional system (Table 2). Thus, a high level of health and fitness competencies formation in the experimental groups was 22.5 %, sufficient – 32.4 %, medium – 30.1 %, and low only 15.0 %. Regarding control groups, 7.4 % of subjects were observed to have a high level of health and fitness competencies formation, 17.9 % – sufficient, 29.0 % – medium, and 45.7 % – low.

Table 2. The level of formed health and fitness competencies in the motivational component of future agricultural specialists after the pedagogical experiment (%)

Competency level	Experimental group	Control group	Difference in %
High	22.5	7.4	15.1
Sufficient	32.4	17.9	14.5
Medium	30.1	29.0	1.1
Low	15.0	45.7	30.7

Monitoring in the cognitive direction during training according to the methodology for physical education revealed a positive dynamics of acquired knowledge and skills necessary for the organization of health and fitness activities during professional activities, in comparison with the traditional system of the educational process organization. The analysis of average indicators of the formation level of knowledge and skills was carried out according to the following indicators: 1) general theory and methods of health-improving physical culture; 2) organizing and conducting sports competitions and health and fitness events; 3) competition refereeing; 4) maintenance of a sports base and its equipment supply. Thus, a high level of knowledge and skills was 19.1 % in the experimental group and 6.8 % in the control group. The sufficient level of acquired knowledge and skills accounted for 29.5 % in the experimental group and 18.5 % in the control group. The average level of knowledge and skills was also the best in the experimental groups – 33.5 %; in the control group, it was 26.5 %. A large difference was observed in low-level indicators, where significant differences were found between students in the experimental groups – 17.9 % and in control groups at the level of 48.2 % (Table 3). The general formation level of the cognitive component of the health and fitness activity of future agricultural specialists had a positive dynamic during the introduction of the methodology for physical education. Moreover, physical education had a positive effect on the formation of worldview and the general cultural level of students.

Table 3. The level of formed health and fitness competencies in the cognitive component of future agricultural specialists after the pedagogical experiment

Competency level	Experimental group	Control group	Difference in %
High	19.1	6.8	12.3
Sufficient	29.5	18.5	11.0
Medium	33.5	26.5	7.0
Low	17.9	48.2	30.3

The results of the study on the activity component showed the improvement of results in the experimental group in terms of the acquisition of special knowledge, skills, abilities to control fitness and health, to apply the means and methods of physical education for the development of physical qualities in the process of life correctly, to carry out the planning of health and fitness activities in work collective. At the same time, just 24.3 % of students in the experimental groups and only 8.0 % of students in the control groups had a high level of readiness to introduce means of physical culture and sports while at work. The students of the experimental groups also prevailed in terms of a sufficient level of knowledge and skills – 31.2 % and 19.1% – in the control groups. The number of students with an average level accounted for 33.5 % in the experimental group, and 27.8 % in the control group. A low level recorded in the experimental and control groups was 11.0 % and 45.1 % respectively, which indicated the high efficiency of the methodology for physical education of agricultural students (Table 4). It should also be noted that the quality of knowledge, skills, and abilities of students in the experimental groups was improved every year during the introduction of physical education means, which was carried out with a teacher-researcher.

Table 4. The level of formed health and fitness competencies in the activity component of future agricultural specialists after the pedagogical experiment

Competency level	Experimental group	Control group	Difference in %
High	24.3	8.0	16.3
Sufficient	31.2	19.1	12.1
Medium	33.5	27.8	5.7
Low	11.0	45.1	34.1

The results obtained in this study expand the conclusions of many scientists [2, 7, 14, 17, 18] and complement them.

5. Conclusions

The analysis of theoretical research data and experimental work highlighted the general patterns of functioning of the methodology for physical education of the students of agricultural universities. Its leading feature was that students who had studied only according to the developed methodology for educational process organization adapted to it better than those who had gained knowledge, skills, and abilities through the traditional technologies. This was confirmed by the positive dynamics of the health and fitness competencies formation in comparison with the traditional system. This was evidenced by the analysis of the dynamics at which the high level of agricultural specialists' readiness for health and fitness activities, which was assessed by three components (motivational, cognitive, and activity), was higher in the experimental group than in the control one.

The results of the pedagogical formative experiment show that the methodology for physical education of students, implemented in the process of physical education, improves the quality of the students' physical education, which is revealed by a set of health and fitness competencies required in professional activities. Experimental work, determining the effectiveness of the developed model of methodology for the students' physical education confirms the efficiency, functionality, and adaptability of the presented model to be used in the system of physical education of agricultural higher education institutions of Ukraine.

Prospects for further research are aimed at improving the model of the methodology for physical education and studying ways to transform it into physical education for the HEI students of other specialties.

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