

Theoretical and Conceptual Aspects of Forming the Methodical System of Physical Education of the Students of Agrarian Higher Educational Institutions

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Abstract

The paper considers the theoretical and conceptual aspects of forming the methodical system of the students' physical education. Modern society requires the theory and practice of higher education institutions to direct the accumulated scientific experience at the basis of the formation of a new structure of competent professionals who can think creatively, navigate in the information space, master worldview paradigms on their own and systematically maintain their health and high mental and physical capacity. As a result, the need for effective preparation of students for independent creative and research activities and the ability to maintain their physical condition has significantly increased. It developed in a need to update the educational process in higher education institutions owing to its focus on the model of the future professional activity of graduates under conditions of introducing effective technologies for organizing the educational process, which will promote the formation of personality with creative thinking and a healthful mind. The aim of the study is to substantiate the theoretical and conceptual aspects of the methodical system of physical education of the students of higher educational agricultural institutions, to introduce it into the educational process, and verify its efficiency. The methodical system of physical education of the students of higher educational agrarian institutions is included in the uniform system of pedagogical education and represents an integral formation which allows providing school and university students with special knowledge, vital motor abilities and skills, harmonious development of the forms and functions of an organism, good health, volitional, spiritual, and aesthetic qualities of the individual. Updating the methodical system of physical education of the students of agricultural educational institutions is essential to ensure the transition from traditional to the innovative educational process, aimed at developing practical skills and values of their own health and the health of others. The study was conducted at the Polissia National University in 2013-2019, and 369 students, including 195 males and 174 females took part in it. The evaluation of the effectiveness of the methodical system was carried out on the basis of the testing results of

the students' level of theoretical knowledge, motivation, and the amount of motor activity. Checking the effectiveness of the developed methodical system showed its greater efficiency in comparison to the traditional program of physical education at higher education institutions. The students (both males and females) of the experimental groups were recorded to have significantly ($p < 0.001$) better indicators than the CG students, according to the following criteria: the level of theoretical knowledge about the role and importance of physical education in strengthening health, longevity, improving the working capacity, ensuring the efficiency of the future professional activities; the students' motivation to regular exercises and sports; the amount of physical activity of students while studying at university (physical education classes, independent classes, sports sections, morning exercises, etc.). The practical aspect of the study is determined by a comprehensive solution to the problem of introducing the methodical system of physical education, which ensures the achievement of the projected results in the discipline of Physical Education into the educational process of agricultural higher education institutions.

Keywords: methodical system, physical education, system approach, student.

1. Introduction

The modern system of physical education in Ukraine and other post-Soviet countries does not meet the natural biological needs of students in physical activity, does not provide students with the necessary level of health, physical fitness, working capacity, scientifically sound educational and health technologies that can be used later in life [1, 2, 3]. There is a contradiction between the student's needs for worldview, spiritual, cultural, intellectual enrichment and the need for physical improvement. To resolve the contradictions between the level of social requirements and the efficiency of pedagogical actions in the process of the students' physical education, various scientific studies, which are presented in fundamental works, have been conducted in Ukraine and in the post-Soviet countries [4, 5, 6, 7, 8, 9, 10]. The strategy for the implementation of these studies is obvious, but mechanisms for the further implementation of relevant results are not provided. Instead, there are only some reflections of the need to create a new methodical system of physical education in some studies [11, 12]. However, these studies were performed beyond the model of the methodical system of physical education of the students of higher education institutions (HEI).

The generalization of experience made it possible to identify a number of controversial issues to resolve:

- *at the conceptual level of modern education*, controversies between the objective need of society for competitive civic-minded professionals with the state of special professional and applied physical fitness, focused on the formation of the functional readiness of agricultural universities graduates to work in the agricultural sector; between the new social needs for training the specialists to provide the basics of fitness and health education of rural youth, their involvement in a healthy lifestyle and the underestimation of this process in the modern system of higher agricultural education;

- *at the level of determining the special physical fitness and health state of the future agricultural specialist*, controversial issues between the new requirements for the physical fitness and health state of future agrarians and the current state of their motivational and value-based attitude to a healthy lifestyle and performance of their professional duties; between the amount of theoretical knowledge, practical skills, the level of physical fitness and the constant reduction of the number of hours for the discipline of Physical Education; between the need to use innovative sports and health technologies of training in combination with traditional ones and the lack of teaching methods and equipment supply;

- *at the level of determining the motivational and value-based attitude of future agricultural specialists to their own health and the health of others*, controversies between the need for the purposeful formation of motivational and value-based attitude to health and healthy lifestyle and the lack of appropriate technologies.

The efficiency of the physical education system of agrarian students at the present stage of education development in Ukraine and other countries is determined by the adequate choice of goals and objectives, organizational forms, methods and means of teaching, and their rational combination. The focus on the innovative technologies of physical education leads to significant changes in its content and procedural components, determines the modernization of the traditional system of physical education, the development and modernization of a new methodical system, which serves as the theoretical and methodological foundation of the educational process. The development of a model of the physical education methodical system should be based on systemic and integral, personality-oriented, culturological, and other approaches

taking into account the specifics of the professional activity of future specialists and their readiness for an active life. The complex integrative nature of the concept of the methodical system of physical education of the students of agricultural universities determines the scientific search in terms of the methodological, theoretical, and practical aspects.

The leading idea of the study, the main provisions of the concept are concentrated in the general hypothesis that the methodical system of physical education of the students of agricultural universities as a synthesis of theoretical and methodological provisions, methodical and practical complexes, methods, techniques, and tools can ensure the readiness of future agrarians for the efficient capacity not only in the educational environment but also in the process of future professional activity. The general hypothesis is concretized in a number of partial hypotheses, the content of which is that a significant improvement in health, physical fitness, and working capacity of future agrarians is possible subject to the development of modern theoretical and methodical principles of physical education and the introduction of a new methodological system, the basis of which is the principle of fundamentality and fitness and health orientation into the educational process of agricultural universities. This leads to:

- bringing the content of physical education means of agrarian students in line with modern achievements of physical education, theory and methods of physical education and current needs of personal development;
- the integration of the traditional means of physical education and innovative ones that helps to increase the intensity and efficiency of the physical education process, as well as the intensification of fitness and health activities in extracurricular activities;
- the compliance with the principles of individualization and differentiation of physical activity, strengthening motivation and interest in active exercise, the implementation of personality-oriented approach;
- the diversification of the forms, methods, and means of engaging students in fitness and health activities;
- raising the level of fitness and health education, general and special physical fitness, improving health, acquiring skills of a healthy lifestyle that in general will ensure a high level of physical fitness and general life activities;
- engaging students in independent physical exercises and sports that contributes to the expansion of health potential, acquisition of new skills and motor abilities, physical development, and physical fitness.

Applying theoretical analysis, historical and logical methods of scientific knowledge, it is necessary to investigate the genesis, clarify the theoretical and methodological foundations and prospects for creating a methodical system of physical education of agrarian students. To this end, we conducted an analysis of the organization and management of the physical education system, which revealed the ideological, normative, scientific, methodological, and organizational foundations of the physical education development; determined the methodological, psychological, and pedagogical dimensions and valueological principles of physical education; revealed the role of the system approach in the educational process and formed the original definition of the content of the methodical system of physical education of the students of agricultural universities.

2. Literature Review

The functioning of the methodical system of physical education can be effective only if a systemic approach is used, i.e. a systematic analysis of physical education at schools and higher educational institutions, and systematic synthesis of the methodical system. On the basis of a systemic approach to the concept of teaching methods, in which all components of the educational process form a unity with certain internal connections, V. Zhamardiy et al. [12] defined the methodical system of education as a set of five hierarchically related components: learning goals, the content, methods, tools, and organizational forms of learning that form an integral functional structure focused on achieving learning goals. However, M. Nosko et al. [13] noted that the traditional methodical system is fruitful under conditions of the complete management of the educational process at the educational institution and its strict regulation, and the stability of curricula, full methodical support of subjects, which does not correspond to the current system of physical education in Ukraine nowadays. The educational process of physical education at HEI of Ukraine is characterized by instability, rapid development, and deterioration in some cases, so the concept of the

methodical system of education in the traditional form is inadequate to the situation of physical education and needs to be developed in accordance with the changes in the social, economic, scientific, and cultural spheres.

The creation of theoretical and methodological foundations for the construction of a methodical system of physical education requires the use of systematic and integrated approaches to the educational process. It is necessary 1) to identify the components of the system and find out their content; 2) to justify the need for the functioning of each component of the system; 3) to define system-forming connections; 4) to show the conformity of components within the system and the functional existence of the system.

Referring to the research of M. Nosko et al. [13], it is safe to say that the creation of a methodical system of physical education also requires mandatory consideration of the "teacher-student" and "student-teacher" relationship through modern approaches: systemic, complex, structural, activity, differentiated, individual, subject-subject, creative, competence, and personality-oriented. A technological approach does not allow the trial-and-error method: all the actions of a teacher must purposefully lead a student to a predetermined goal.

The theoretical basis for creating a methodical system of physical education is

1) the concept of the integrity of the educational health-improving process at educational institutions, which combines the actions of all levels (administration, academic council, sports club, student fraternity, and other structures and units of HEI), which contribute to the improvement of the educational and sports base; the preservation of physical education as a compulsory discipline; the introduction of innovative technologies of physical education; the implementation of extracurricular activities of fitness and health orientation (fitness programs of aerobic, power, and gymnastic orientation), the formation and education of the student's personality;

2) the concept of the educational, sports, health and fitness activities intensification among school and university students, which combines educational, extracurricular and independent classes and all sports and health-improving activities to develop motivation and interest of students in the increase of motor activity and a positive attitude to the means of physical education;

3) the concept of flexible pedagogical, psychological, physical education, medical and hygienic, life safety, environmental, organizational, and managerial health technologies.

Considering the set of components of the traditional methodical system of education [14, 15, 16, 17, 18] we can claim that they form a certain subsystem, called a *learning technology*. The key concepts of the methodical system of physical education are the didactic system, the system of physical education, and the methodical system of physical education. On the basis of this structure, it is possible to determine the *target, content, organizational, technological, and evaluation* components of the methodical system of education. The modern model of the methodical system of physical education can correspond to the principles proposed by N. V. Morze [19], adapted to the specifics of its operation, namely:

1. *The subjectivity of the model.* The model of the methodical system of physical education may include different sets of components that may be in a specific relationship with each other, which works only for this model. Thus, the methodical system may differ from other systems and have some unique features.

2. *The locality of the model.* Significant differences in the system of physical education in different educational institutions, the features of the educational process, and the infrastructure of educational institutions require the model of the methodical system to take into account not only differences in the educational process but also the peculiarities of its functioning in a particular educational institution. Thus, the improved model of the methodical system should take into account the local features of the educational process of a particular educational institution that is to predict the adjustments of the model that will be implemented in the educational process of another educational institution.

3. *The dynamics of the model.* The components of the methodical system of physical education are constantly developed; their connections that are conditioned by the development of the social and economic system are often changed. There is some instability in physical education especially in recent years: the number of hours in programs and curricula are changed, physical education is removed from HEI, low or high level of equipment supply that causes rapid changes in the content of the educational process, which affect the purpose, content, methods, means, and forms of education. Therefore, in the methodological system as a model of physical education, it is necessary to provide for the general development of the discipline, to identify components with possible developing content and restructuring structural relationships.

When designing a methodical system of physical education at certain educational institutions it is necessary to take into account that 1) the object of research is the system of physical education of students, and the methodical system is not the same, that is several systems can be distinguished in this object depending on research goals; 2) when separating out the methodical system of physical education, the problem under study is artificially singled out from the environment; 3) when separating a methodical system, it is necessary to clearly establish a) the components of the system, b) the components of its environment, c) significant (system-forming) connections between system components, d) significant connections with the environment; 4) each component (subsystem) can be considered as an independent system. It is necessary to realize and strictly comply with the chosen level of difference between them; 5) the high-quality functioning of the methodical system depends on the quality of its structural components, the nature of their relationships and relations between the system and the environment; 6) the introduction of a new model of the methodical system of physical education into educational institutions should not cause destructive changes in the modern education system, should preserve national achievements and historical traditions of education.

In addition, taking into account the study of other scientists [20, 21], when designing a methodical system of physical education one must take into account its specific features: *integrity* – the dependence of each component of the system on its place and functions in the system; *structure* – the functioning of the methodical system is conditioned not by the characteristics of its individual components but the properties of its structure; *interdependence* of the system and the environment – the system is formed and revealed in the process of interaction with the environment; *hierarchy* – each component of the methodical system can be considered as a system, and the methodical system itself is an element of a broader system (the system of physical education as a set of social and pedagogical subsystems); *the plurality of descriptions* – the complexity of each system and their adequate acquiring require the construction of different models, each of which describes only a certain aspect of the methodical system.

The process of designing and reforming the methodical system of physical education complies with fixed regularities [22].

1. *Regularities connected with the internal structure of the system* imply that the change of one or more of its elements necessitates a change in the whole system. For example, the appearance and widespread use of innovative health technologies of physical education expand the possibilities of organizing the educational process; revise the content, forms, and methods of teaching.

2. *Regularities of the external relations of the system* are determined by the fact that the methodical system of physical education operates in a certain social, economic, and cultural environment, which has a direct impact on its existence. Either all components of the system as a whole or its individual elements can be exposed to such influence. The greatest influence is directed at the main component of the methodical system – the aim of physical education. Therefore, it becomes clear that the methodical system of physical education is a *complex dynamic formation*. In addition, to record a particular component of the system and identify the dynamics of its change in the educational process (physical education system), it is necessary to settle on such a fixed component as *the aim of physical education* as the most specific and clearly defined element.

The methodology of physical education implements a developed modern theory of studying the process of physical education, aimed at the formation of various motor actions as a consistent transition from knowledge and ideas about actions to the ability to perform them, and then to skills [22]. The process of teaching motor actions is based on *didactic principles* – the basic regularities of teaching, which constitute the methodical basis of the pedagogical process, in particular, these are the principles of consciousness and activity, clarity, accessibility, individualization, systematicity, and consistency. The organization of the educational process should begin not with the communication of knowledge (ready scientific information) but with the identification of subjective experience of students, the content of which consists of the following components: environment, formed ideas and concepts; techniques, actions, methods; formed values, emotions, attitudes and styles of activity.

The analysis of literature sources showed that there is no comprehensive research aimed at modernizing the methodical system of physical education of the students of HEI nowadays. In Ukraine and other countries, the problem of updating the methodical system of physical education of the students of agricultural universities has not been developed enough. At the same time, physical education as a

discipline allows solving educational and health-improving problems, which are able to provide a balanced pedagogical impact on a student in accordance with the modern requirements of creative, intellectual, morally stable, and physically perfect personality.

The aim of the study is to substantiate the theoretical and conceptual aspects of the methodological system of physical education of the students of agricultural higher educational institutions, to introduce it into the educational process and verify its efficiency.

3. Method

To achieve the aim of the study, we organized a pedagogical experiment. The main pedagogical experiment was carried out at the Polissia National University in 2013-2019. Sixteen groups of students (369 students, including 195 males and 174 females) of economic, agronomic, ecological, 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 involved 181 students (92 males, 89 females) respectively. According to the schedule, physical education classes in all groups were held once or twice a week in the first half of the day. The purpose of the experiment was to substantiate and introduce the methodical system of physical education of agrarian students into the educational process of the students of experimental groups. The students of the control groups were training according to the curriculum of the Physical Education discipline which is traditional for the higher education institutions of Ukraine of III-IV accreditation levels. The evaluation of the methodological system efficiency was carried out on the basis of the testing results of the students' level of theoretical knowledge, motivation, and the amount of motor activity.

Theoretical knowledge of students was tested by the original questionnaires, which contained 20 questions and were aimed at clarifying the students' understanding of the role and importance of physical education in strengthening their health, increasing longevity, improving performance, and ensuring the effectiveness of the future professional activity. The motivation of students for regular physical exercises and sports was studied according to the method of "Educational activity motives" by A. Rean, V. Yakunin in the original modification. The amount of the students' physical activity while studying at the university was investigated by an interview method in order to determine the time devoted to physical activity of students during the week activities (physical education classes, independent classes, sports sections, morning exercises, sports events, other types of physical activity).

Research methods:

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

2) the method of structural and systemic analysis allowed to systematize and generalize information about the studied object and create a model of the methodical system of physical education of the students of agricultural universities and identify patterns and features of its functioning on the basis of quantitative and qualitative analysis of the pedagogical experiment;

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

- *empirical*: questionnaires and surveys, pedagogical observations, testing, self-assessment, and module-rating assessment were used to confirm the importance of factors that determine the features and trends of physical education at HEI and to diagnose theoretical knowledge, motivation, and motor activity of agrarian students;

- *pedagogical experiment* (summative and formative) was carried out in order to test the efficiency of the developed methodical system of 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 displaying them in tabular forms.

4. Results and Discussion

Physical education can give the expected results only when it is carried out according to a certain model with the right choice of methods, tools, and forms of the educational and extracurricular processes organization that accurately meet the goals and objectives of society in this area. The study of these components allowed developing an appropriate methodology that makes it possible to solve problems purposefully and obtain reliable results. The presented methodology is the doctrine of the scientific method of cognition as a system of scientific principles on which the research is based and a set of its cognitive means, methods, and techniques is selected. To develop the research *methodology*, the systematic approaches of social sciences, pedagogy, psychology, the theory and methods of physical education, the principles of systematic approach and functional systems, the theoretical provisions of pedagogical research were used, which allows considering the methodical system of physical education of agrarian students as an opened methodical system which has many interconnected and interdependent components. The elements, connections, and components of the methodical system are influenced by environmental factors, the quality of life, the system of pedagogical influences, which should correspond to the gender, age, functional abilities of students, and their interests and preferences.

In addition, different volumes of educational activities at agricultural universities, different staff and equipment supply, educational process features, the ambiguity of the investigation results of the student's personality, etc. require theoretical and methodological substantiation of physical education and the use of a set of modern methods, mutually verifying and complementing, adequate to the nature of the process of physical education study at different educational institutions.

The characteristic features of the newly created methodological system of physical education include:

- scientifically sound planning of the physical education process;
- the unity and interrelation of theoretical, methodical and practical training of students;
- high but accessible level of difficulties in classes, fast and high-quality acquirement of the technique of performing exercises and mastering of a technique of their improvement;
- maximum activity and independence of students during classes;
- a combination of individual and collective fitness and health activities of students;
- providing the educational process with sufficient quantity and quality of technical and sports equipment;
- extensive use of innovative technologies of physical education.

The methodical system of physical education functions only when the aim, tasks, methods, forms, and means of training and the content of the educational process are defined, and educational activity is managed. The aim and objectives of physical education are developed by a teacher for each class. The content of the educational process is determined by the curriculum and adjusted by a teacher depending on the aim and objectives of classes. The planning of the physical education process at agricultural HEI is a complex set of actions of the administration, academic council, educational and methodical center, the department of physical education, dean's office, sports club, teachers, which influences the number of hours, time and place of training and independent classes. Control, analysis, and adjustment of the educational process are carried out by a teacher, the head of the department, the dean's office, rector's office, and the Ministry of Education and Science of Ukraine.

The conception requires taking into account all the variety of possible connections and relationships of the subject of research to build a scientifically sound theory. There is a close dialectical connection between the theory, methodology, and technology of teaching. Thus, the theory of physical education teaching reveals the patterns of the developmental nature of the educational process, related to the peculiarities of the activities of a teacher and a student, the functioning of the methodical system of physical education, which is based on development goals. On the other hand, one of the main aspects of physical education, as well as any other pedagogical process, is teaching, which didactics considers as a process of interrelated activities of a teacher and a student, aimed at acquiring theoretical knowledge, practical skills, the development of physical, mental, and spiritual qualities of students. In physical education, the modern scientific approach assumes that the methodological basis of the theory of motor actions teaching are the laws and positions of such sciences as didactics (in the field of pedagogy), the theory of activity and knowledge management, the formation of actions and concepts (in the field of psychology), the theory of construction and control of movements, physiology of activity, principles of the system approach.

Thus, the activation of the physical education process is based on practical experience, theoretical, conceptual, and operational components of achieving the objectives, and is carried out taking into account the personal factors of the educational process. The personal position of the subjects (student-teacher) of educational and pedagogical activities is the factor that makes it possible to solve the problems of creating a new methodical system of physical education of agrarian students.

The modern agricultural sector's need for specialists who are ready not only for professional self-development but also for the restoration of rural labor resources requires the creation of flexible, adaptive education systems that provide opportunities for the reorientation of professional activities towards the activities that ensure a high standard of living. Therefore, it is necessary to form a system of knowledge, skills, organizational qualities, to develop the ability to build an individual strategy of physical education, motor activity, motivational and value-based attitude to a healthy lifestyle, recovery system, the ability to use the means of physical education for the rehabilitation of physical and mental condition after diseases, etc in the physical education process of the future agrarian specialists. Therefore, the graduates of an agricultural university must not only master high professional skills but also find their place in the social environment of the rural population, have certain personality traits, and be an example in the production team and the place of residence.

Accordingly, personality-oriented education, in which a student is in the center of the teacher's attention, serves as the strategic direction of methodical system development. In this case, the learning activity is a cognitive activity but not teaching. The traditional paradigm of teaching "*teacher-student*" should be replaced by the paradigm "*student - physical and health-improving environment - teacher*" in physical education. This is how the system of physical education is built in developed countries. Obviously, there should be a number of intermediate links between theory and practice, and one of them is learning technology, which is a projection of learning theory on the activities of teachers and students. That is, learning technology is associated with the optimal construction and implementation of the educational process, taking into account the guaranteed achievement of didactic goals. This statement is key because determining the most rational ways to ensure the achievement of goals is the main idea of the educational process technologization. Thus, the technological approach involves the educational process design which ensures the achievement of didactic goals arising from the initial settings (social order, educational guidelines, purpose, and content of education). Therefore, the technology of learning reveals conditions of the methodical system functioning, defines the ways of its realization (designing) in the educational process according to the set purpose.

The innovative original idea of the conception is to create a methodical system of physical education, which helps to increase the educational health-improving, motivational and value-based attitude of young students to the means of physical education and physical activity by creating a microenvironment at HEI, which develops interests and motives for active physical activity, encourages to have a healthy lifestyle, forms a positive attitude to the physical education process. In addition, the idea of the conception is aimed at improving the efficiency of the educational process by differentiating teaching aids and individualizing styles of work with students in order to create equal comfortable conditions and mobility of stylistic behavior studying the discipline of Physical Education.

The goals and objectives of the methodical system of physical education require the use of a system of *general didactic and original principles and the principles of teaching*, modified for physical education, namely:

- *integration* – the essence of this principle is that it systematically integrates all components of the methodical system, as well as reveals its interaction with the environment. It is manifested at several structural levels: between the general physical and methodical readiness of students; between the aim of training and the mechanism of its implementation; between all blocks of the methodical system. A methodical system can reveal its system properties only if its constituents interact on the basis of the integrating bases system. In the theory and methodology of physical education, the principle of integration was not considered, so it is original and innovative for the methodical system of physical education;

- *cultural conformity*, which is a process of personality formation on the basis of universal, aesthetic, and spiritual values of physical culture and sports, Ukrainian folk traditions, and respect for the historical heritage of other countries and peoples. Culturological approach in the physical education of the students of agricultural universities is one of the determining factors in increasing the social activity of the future

specialist as a highly cultured person, capable of implementing a healthy lifestyle and promoting physical culture and sports in the social infrastructure of the village;

- *support of health and fitness initiatives*, which is manifested in the successful development of motivational and value-based attitude to active physical activity, the individual choice of content and forms of training;

- *variability and alternativeness*, aimed at achieving the goals of the educational process at HEI (developmental, educational, upbringing), for which it is necessary to apply a variety of approaches and methods that are theoretically justified and tested in practice. The variety of forms, methods, teaching aids, the communicative side of education allows teachers to be constantly engaged in creative search in order to form their own pedagogical activities, original didactic system;

- *differentiation* - this principle reveals the mechanism of developing the systems of different levels and ranks, from primary integrity to intra-differentiated structures. The principle of differentiation substantiates the implementation of the methodical system on the basis of development laws and system analysis. It makes it possible to view the efficiency of the methodical system of physical education in the event of complications and differentiation into the subsystems of lower levels, maintaining its integrity;

- *optimality*, which implies the development of such norms and requirements, which in the case of their application in the process of physical culture and sports activities, provide the optimal cost of funds and resources with a high health-improving effect;

- *independent actions* (physical education classes without external coercion, bringing pleasure and joy);

- *self-organization* (the formation of operational and activity component of the educational process, based on the ability to exercise independently);

- *development*, which involves the organization of the educational process in the area of immediate development, in cooperation of a student with a teacher, taking into account the level of physical development, physical fitness, and health, in accordance with the achieved level of current development;

- *responsibility* (self-analysis, self-control, and self-assessment of educational activities, recording of sports results and their analysis and evaluation);

- *individual approach* (taking into account individual psychological characteristics, the level of physical fitness of each student in the educational process);

- *the principle of personal development in the team*, according to which the personal development of a student is determined by the activity-mediated type of relationships developed in study groups, in a specially organized environment, when a group of students becomes the main reference group with the common purpose, united by socially significant goals and personally meaningful content, with intentions for educational or training activities, achieving certain sports results, winning group competitions, joint health-improving activities, etc.

Pedagogical conditions for the effective functioning of the methodological system (educational strategies, innovative technologies, methods, tools, conditions, activities evaluation) supplement the conception with the original vision of prospects and opportunities for its further development, determine its place in the educational system, and its adaptation to real conditions of the system of pedagogical relationships and interactions. The conditions for the formation and development of the methodical system of physical education of the future agrarians should be divided into three groups: *external conditions* that create an active fitness and health-preserving environment that ensures the development of the system; *internal*, which depend on the student's potential (motivation, individual psychological qualities, physical fitness level, health status, etc.); *material and technical* (the availability of sports facilities and equipment), which create comfortable conditions for physical education classes, organizing health and fitness activities of students.

The features of the conception realization in the process of physical education are carried out under certain conditions. The conception implementation in the physical education process is carried out in several directions. *The psychological direction* implies taking into account the students' individual psychological and typological qualities, styles of activity in the process of physical education. The methodologies designed for an average student can not meet modern requirements for the physical development and physical fitness of the future agricultural specialists. Therefore, the intensification of the learning process, its efficiency are directly dependent on the study, development, and implementation of differentiated and individual techniques and forms of work with students. Searching for the ways to individualize the process of physical education, the criteria that reveal the individual characteristics of students come to the fore. These features

can be both of a group nature and purely individual for each student. In this regard, the presentation of the educational material took place in different forms according to the psychological characteristics of students.

Organization of the system of classes. Traditional forms of physical education classes are lectures, practical, individual, and independent classes and consultations. The predominant method of presenting the material in lectures is informative. It is based on the formation of the students' need to master the system of knowledge in the field of physical culture and to achieve the general goal - the technology of physical education. To be a *subject of educational activity* means, firstly, to treat it with value; secondly, to master cultural ways of its realization; thirdly, to be able to set goals independently, to plan their achievements, to evaluate results.

Therefore, we can conclude that to teach students to acquire knowledge, skills, and abilities of motor activity, to improve their physical condition on their own, to maintain health, to be a subject of fitness and health activities and mass sporting events, to follow the principles of a healthy lifestyle, to form a universal ability to actively implement these principles in life is the main goal of the methodical system of physical education. To achieve this goal it is necessary to identify the main factors that contribute to its implementation under conditions of the modern educational process. The process of mastering information has three aspects: *conceptual* (understanding the importance of physical culture, its structure, and functions); *categorical* (mastering the conceptual apparatus and definitions of the main categories), and *gnoseological* (mastering the principles and methods of cognition). In the technology of educational and cognitive activities, various forms of abstract thinking are used: concepts (selection of features), judgments (assertion or denial of the subject's properties), and conclusion.

The main form of physical education classes is practical classes that implement the section of the Physical Training program. Practical classes also provide information material. The newly created methodical system of physical education implies forms of learning that dictate the relationship between a teacher and students in terms of solving educational problems. These relations determine the consideration of frontal, collective, group, individual, and joint forms of studying. The joint form of education is characterized by the relationship between a teacher and students, between students of different courses and faculties within the general subject or training. Individual forms of education are based on quantitative characteristics of students (the level of volitional development, physical fitness, health status, anthropometric data, etc.).

The realization of the general purpose of physical education of the students of agricultural universities should be carried out on the basis of the created methodical system, directed on solving a complex of tasks that should provide sufficient educational level, necessary motivational and value-based attitude to physical culture and a healthy lifestyle, harmonious development of the organism, high physical efficiency, and steady need for physical improvement in the process of further life after graduation. Solving the system of pedagogical tasks involves three implementation stages. The principle of multilevel presentation of educational material in physical education forms fundamental knowledge, skills, and professionally-applied psychophysical qualities and organizational abilities of students.

At the first stage (adaptive, the 1st year of study) the solution of the following fundamental pedagogical tasks is provided:

- adaptation to the educational process (intensive mental activity) at HEI and activation of the students' mental processes speed by means of physical education;
- developing students' stable interest, motives, positive attitude and need for motor (physical) activity;
- an increase in the general level of physical fitness, the development of physical abilities, reserve functional capabilities of the body, health improvement, promotion of comprehensive development;
- formation of knowledge on a healthy lifestyle and involvement in independent physical exercises, active leisure;
- mastering the skills and abilities of life safety in the field of physical culture and sports.

At the second stage (achievement of comprehensive development, the 2nd year of study) the solution of the following pedagogical tasks is provided:

- developing students' socially significant qualities;
- the use of various forms of physical education and mastering health programs;
- mastering innovative technologies of physical education;
- the formation of professionally applied psychophysical qualities.

At the third stage (forming the need for a healthy lifestyle, the 3rd-4th years of study) the solution of the following pedagogical tasks is provided:

- harmonious development of an organism and a significant increase in physical performance;
- developing students' stable need for physical self-improvement, self-cognition, and self-assessment;
- defining a system of physical exercises or a sport to create a system of personal physical improvement;
- the acquisition of skills and abilities to conduct independent training and health-improving activities, dosing of physical activity;
- gaining experience to use physical culture and sports activities to get professional and life skills and qualities;
- mastering the methodology of organizing and conducting mass sporting events and fitness and health activities in the social infrastructure of the village.

At this stage, the principle of professional orientation and designing of the educational material content were carried out to use in future professional activities, taking into account the chosen specialty. On the basis of approaches and the state of the developed concept of the methodical system of physical education of agrarian students, we can state that 1) it should be formed according to a block-hierarchical principle and motivationally purposeful, organizational, content, procedural, activity, and diagnostic components; 2) it must be built on the basis of the integration of innovative, competency, activity, modular, and differentiated approaches that contribute to the formation of students' comprehensive readiness; 3) methods, forms, and means that create a methodical system may be traditional but should correspond to the methodical orientation of the educational process and be supplemented by innovative fitness and health technologies.

In order to identify the effectiveness of the methodical system of physical education of future agrarians, we identified the criteria that indicate the level of health and fitness readiness of young students. The efficiency of the methodical system model is assessed by specific indicators that increase the effectiveness of the physical education process. The conducted pedagogical experiment showed that the level of theoretical knowledge of students who studied according to the new methodical system had a clear dynamics of growth during the study period. In addition, the level of theoretical knowledge of students in the experimental groups was significantly better throughout the period of experimental training. The traditional system of physical education does not contribute to the effective acquisition of theoretical knowledge in the field of physical culture, which in the future negatively affects the attitude of students to physical education. The difference in the experimental and control groups at the end of the experiment was 5.38 points for males and 6.15 points for females (Table 1). The acquired knowledge allowed students of experimental groups to understand the natural and social processes of physical culture better, to be able to use them for professional and personal development, self-improvement, healthy lifestyle, leisure, professional and socio-cultural needs.

Table 1. The indicators of the theoretical knowledge general assessment after the introduction of the methodical system into the physical education process (in points)

Gender	Experimental groups	Control groups	Difference	Difference significance	
	$X \pm m$	$X \pm m$		$\Delta X \pm m$	t
Male	20.12 \pm 1.43	14.74 \pm 1.09	5.38	4.39	≤ 0.001
Female	19.93 \pm 1.12	13.78 \pm 1.27	6.15	4.86	≤ 0.001

The study of the students' motivation for fitness and health activities was carried out by surveying students that determined four levels of motivation. The first level included students who were characterized by a small number of positive motives. The second level included students who were aware of the importance of physical culture and sports for the life of a modern individual. The third level was characterized by students' sense of duty, cognitive interests, motives, and needs for physical education. The fourth level of motivation was characterized by a deep awareness of the necessity of physical education,

certain goals, and specific practical ways of achieving them. The introduction of the methodical system into the educational process of the students of experimental groups radically changed their attitude to physical culture, contributed to the formation of motivation for fitness and health activities (Table 2). The study of the dynamics of motivation formation in the process of physical education showed a significant increase in the number of students with the fourth level of motivation from 6.7 % to 17.7 % in the experimental groups. The increase in the number of students who reached the third level of motivation from 18.1 % to 23.9 % was also noticeable due to a significant decrease in the number of students with the first level from 20.0 % to 7.3 %, i.e. due to those students who were not interested in physical education. The number of female students with the third and fourth levels of motivation increased from 10.9 % and 3.6 % to 22.1 % and 14.3 % respectively.

Table 2. The dynamics of the agrarian students' formation of motivation for health and fitness activities

The level of motivation	Experimental groups				Control groups			
	Initial		Final		Initial		Final	
	Number of people	%	Number of people	%	Number of people	%	Number of people	%
Males								
First	21	20.0	7	7.3	18	19.6	14	16.7
Second	58	55.2	49	51.1	53	57.6	46	54.8
Third	19	18.1	23	23.9	16	17.4	17	20.2
Fourth	7	6.7	17	17.7	5	5.4	7	8.3
Females								
First	23	27.7	11	14.3	25	28.1	19	24.4
Second	48	57.8	38	49.3	54	60.7	47	60.3
Third	9	10.9	17	22.1	8	9.0	10	12.8
Fourth	3	3.6	11	14.3	2	2.2	2	2.5

Note. The number of students does not match in the "initial" and "final" indicators owing to their expelling from the university.

The indicators of motivation for health and fitness activities were increased due to the introduction of the methodical system in the educational process that activated the internal motivation of the students of experimental groups. In the male control groups, there was a slight increase in the number of students with the third and fourth levels, and in the female groups, there were almost no significant changes. The obtained data allow us to state that the motivation for physical culture and sports of students can be successfully formed in the physical education process, carried out according to the new methodical system.

The research also confirmed that only purposeful methodical work on the formation of motivational and value-based attitude to the physical education process and the means of physical culture and sports contributes to the activation of the motor activity of young students. Experimental data show that the traditional system of physical education is not able to cause significant changes in the structure of the students' budget of time in favor of physical activity. The comparison of the time spent by the students of control and experimental groups on educational and independent physical exercises, sports training, mass sporting events, fitness and health activities, morning hygienic gymnastics, etc. indicates a huge gap between groups (Table 3). The students of experimental groups miss fewer physical education classes, attend classes in sections and groups of physical training more often, pay more attention to the implementation of morning hygienic gymnastics and sports events held at the university. Accordingly, such differences in the

time spent on physical activity encourage students of experimental groups to successful physical culture and sports activities and a positive result in physical education.

Table 3. Weekly physical activity of agrarian students as a result of the introduction of the methodical system of physical education (in h, min)

The types of physical activity	Groups	The year of study								Average data	
		1st		2nd		3rd		4th			
		time	%	time	%	time	%	time	%	time	%
Scheduled classes	exper.	2:51	1.70	2:54	1.73	2:49	1.68	2:46	1.65	2:50	1.69
	contr.	2:45	1.64	2:39	1.58	2:31	1.50	2:14	1.33	2:33	1.52
Independent extracurricular classes	exper.	2:16	1.35	2:43	1.62	3:32	2.11	3:36	2.15	2:57	1.76
	contr.	2:04	1.23	2:18	1.37	2:06	1.25	3:47	2.26	2:44	1.63
Training in sections, groups	exper.	3:21	2.00	4:07	2.45	3:44	2.23	3:41	2.20	3:54	2.33
	contr.	2:34	1.53	2:48	1.67	2:30	1.49	1:52	1.12	2:16	1.35
Morning exercises	exper.	0:54	0.54	1:51	1.11	1:48	1.08	1:43	1.03	1:26	0.86
	contr.	0:43	0.43	0:56	0.56	1:13	0.73	0:52	0.52	0:56	0.56
Sports events	exper.	0:21	0.21	0:29	0.29	0:35	0.35	0:31	0.31	0:29	0.29
	contr.	0:18	0.18	0:15	0.15	0:18	0.18	0:14	0.14	0:17	0.17
Fast walking	exper.	2:26	1.45	2:19	1.38	2:24	1.43	2:37	1.56	2:27	1.46
	contr.	2:38	1.57	2:47	1.66	2:53	1.72	3:09	1.88	2:52	1.71
Other physical activity (dancing, physical work)	exper.	1:15	0.75	1:38	0.98	1:47	1.07	1:56	1.15	1:39	0.99
	contr.	1:27	0.87	1:46	1.06	2:03	1.22	2:18	1.37	1:54	1.33
In total	exper.	13:24	7.98	16:01	9.54	16:39	9.91	16:50	10.02	15:46	9.36
	contr.	12:29	7.43	13:29	8.03	13:34	8.08	14:26	8.60	13:32	8.06

The improvement of the methodical system of physical education should also take into account that any change in one of the components of the system will inevitably affect others. Therefore, when improving the methodical system, it is necessary to follow *the principle of interconnectedness*, which requires a clear establishment and consideration of the consequences of changes in the individual elements for all other components. The principle of interconnectedness is supplemented by the requirement to consider all interconnections in the system, i.e. compliance with *the principle of completeness*. This principle requires paying attention to each component while improving the methodical system of physical education. These principles are projected into specific guidelines aimed at improving physical education at educational institutions.

5. Conclusions

The implementation of theoretical and conceptual aspects of creating a methodical system of physical education for the students of agricultural higher education institutions is the result of theoretical generalization of specific pedagogical and methodical material, which is obtained by defining and developing specific content of the methodical system and its components, namely:

- the concept of the methodical system of physical education of the future agricultural specialists, which contains theoretical and methodical basis, original idea, conceptual and methodical design, the system of principles, pedagogical conditions of the methodical system functioning, as well as features and the ways of realization of the concept, was developed and substantiated;
- the principles of integration between physical and methodical training, variability and alternativeness, differentiation and individualization, optimality and self-organization of students' education on the basis of a pedagogically balanced and relevant combination of the means, methods, and forms of methodical preparation were revealed;
- the content of the physical education process and a system of educational and methodical complexes for agricultural HEI were developed;

- the establishment and development of fitness and health education at agricultural HEI of Ukraine and foreign countries were analyzed;

- the conceptual bases and scientific theoretical conditions of designing, functioning and development of the methodical system of physical education of the students of agrarian universities were improved; the methodical support for the effective realization of the methodical system of physical education was created; the realization stages of solving pedagogical tasks in physical education were revealed;

- the physical education organization of agrarian students, the structure and content of the process of physical education at agricultural HEI, the ways to integrate classical physical education means with innovative ones were further developed, the pedagogical technologies of improving the process of physical education at agricultural universities were introduced.

The check of the efficiency of the developed methodical system showed its greater efficiency in comparison to the traditional program of physical education at HEI. The students (both males and females) of the experimental groups were recorded to have significantly ($p < 0.001$) better indicators than the control group students, according to the following criteria: the level of theoretical knowledge of students about the role and importance of physical education in strengthening their health, longevity, improving the efficiency, ensuring the effectiveness of their future professional activities; motivating students for regular exercise and sports; the amount of physical activity of students while studying at the university (scheduled classes, independent classes, sports sections, morning exercises, etc.).

The theoretical significance of the study lies in the conceptual substantiation of the need to improve the methodical system of physical education on the basis of a rational combination of traditional and innovative forms of organization, methods, and tools of the educational process; in expanding scientific ideas about the content and structure of the educational process; in determining the principles of designing the structure and content of the methodical system. The physical culture and health competence of an agrarian are considered an integrative multifactorial state of the specialist, characterized by gnostic, designing, engineering, modeling, technological, communicative, organizational knowledge, skills, and abilities that ensure high standards of living.

The practical aspect of the study is determined by a comprehensive solution to the problem of introducing the methodical system of the students' physical education, which ensures the achievement of the projected results in the discipline of Physical Education, into the educational process of agricultural HEI.

The prospects for further research are aimed at developing physical education curricula, lecture courses, and practical classes for the students of HEI of sports orientation in the course of professional development of teaching staff, writing manuals and textbooks on the problems of training specialists in physical education.

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