

УДК 378.04:796]:378:001.895

DOI: <https://doi.org/10.33989/2524-2474.2023.82.295106>

OLENA SOHOKON

ORCID: <https://orcid.org/0000-0001-9442-6616>

(Полтава)

Place of work: Poltava V.G.Korolenko National Pedagogical University

Country: Ukraine

E-mail: elena.sogokon@gmail.com

OLEXANDER DONETS

ORCID: <https://orcid.org/0000-0002-6265-8508>

(Полтава)

Place of work: Poltava V.G.Korolenko National Pedagogical University

Country: Ukraine

E-mail: donec84@ukr.net

VASYL FAZAN

ORCID: <https://orcid.org/0000-0002-9823-3704>

(Полтава)

Place of work: V. G. Korolenko Poltava National Pedagogical University,

Country: Ukraine

Email: Fazanvv@gmail.com

OLEG SHERSTIUK

(Полтава)

Country: Ukraine

INNOVATIVE APPROACHES OF NATURAL SCIENTIFIC TRAINING OF FUTURE TEACHERS OF PHYSICAL EDUCATION

Annotation. The presented article analyzes and characterizes innovative approaches to the natural science training of future physical education teachers. Modernization of education prioritizes the formation of a specialist of high quality and competence, capable of innovative search for ways of self-realization in the conditions of continuous integration of Ukraine into the European educational space. Strengthening the health potential of youth, providing a differentiated approach to groups of children of different ages, forecasting their needs and motivation for physical development and self-improvement depends on the physical culture specialist.

We have developed an integrated system of medical and biological education to improve the quality and competitiveness of a physical culture specialist in the labor market. Thus, we made an attempt to construct the content of integrated natural science educational disciplines and built an end-to-end logical-didactic structure, updating knowledge in accordance with the new achievements of the disciplines of the natural science cycle; strengthening the relationship between fundamentality and professional orientation of education; ensuring variability and alternative, humanization and democratization of the educational process; improvement of natural science education and establishment of a close connection with sports and specialized training. In this study, the main directions, factors, indicators and criteria for the intensification of student learning with the use of innovative and information and communication technologies were identified.

The modernizing ideas of the philosophical interpretation of human value are at the basis of this research, the humanitarian significance of natural scientific knowledge is actualized, which opens up wide possibilities of interdisciplinary and transsubjective integration for use in the process of training modern specialists and achieving high sports results. We have proven the effectiveness of scientific competence, which is ensured by creating an innovative educational environment characterized by openness and autonomy, information saturation and integrability, flexibility and synchronization, multi-vector and creativity.

Thanks to the use of innovative approaches in the training of future teachers of physical education, cognitive activity increases, creative thinking and professionalism develop, innovative technologies of physical education are much better assimilated, and most importantly, the mastering of the professional competencies of pedagogues-scientists, pedagogues-innovators takes place. We have proven that the concept of training physical culture specialists of a new type requires mastering an end-to-end multivariate cycle of creative work, from the search for new principles and ideas to the development and implementation of new technologies based on the maximum automation of information processing processes and their practical implementation.

We recommend that when planning the educational process in higher education institutions of the physical culture profile, clearly choose and take into account the relationships with previous and subsequent disciplines, adjust the content of the disciplines being studied in order to prevent duplication of educational material. The integrative approach is the most predictable and necessary, we will see the solution to the problem of integration in a close combination of natural science and sports-specialized training. Natural science disciplines in general should include professionally oriented knowledge, peculiarities of teaching and education methods. With such an approach, the assimilation of professionally oriented disciplines takes place through the principle of connecting theory with practice, thus actualizing knowledge and forming skills in professional and pedagogical activities.

Keywords: *innovative approaches, natural science training, future teacher, physical culture, implementation, competence, professional training.*

Statement of the problem in a general form. In today's conditions, the need to improve physical education is especially acute, in particular, we highlight the natural science training of future physical education teachers, who depend on the strengthening of the health potential of the nation, a differentiated approach to different age groups of children and adults, forecasting their needs and models of life creativity. Institutions of higher education are entrusted with the responsibility of training a new generation of teachers, the content and level of qualifications of which are adequate to the innovations taking place in the field of physical culture and sports and educational activities.

The effectiveness of the formation of the components of scientific competence, readiness to solve socio-educational tasks and the development of pedagogical skills of future teachers is ensured by the creation of an innovative educational environment characterized by openness and autonomy, information saturation and integrability, flexibility and synchronization, multi-vectority and creativity, scientific and professional and pedagogical orientation. This enables students of higher education to increase their cognitive activity, develop creative thinking and professionalism, become aware of and assimilate innovative technologies of physical education, and master the competences of teacher-scientists and teacher-innovators.

Analysis of recent research and publications. The relevance of teacher training is in the center of attention of pedagogical science. The formation of the personality of the future teacher in the process of learning is presented in the works of: O. Azhippo, O. Akimova, G. Balakhnycheva, N. Belikova, N. Byshevets, G. Vasyanovich, R. Gurevich, A. Gurzhiy, M. Yevtukh, I. Isayev (Azhippo, 2012; Balakhnycheva, 2013; Belikova, 2013; Brizhatyi, 2011; Hrynchenko, 2014; Voskoboynik, 2014; Konovalchuk, 2015; Serhienko, Serhienko, Byshevets, 2015; Serhienko, Byshevets, 2017; Bergier, Bergier, Tsos, 2017; Byshevets, 2017).

Scientists emphasize the high effectiveness of modern teaching methods in physical education, but their application to the study of natural science disciplines is insufficiently covered. In general, the problem of increasing the effectiveness of natural science training of future teachers of physical education in pedagogical institutions of higher education remains understudied. A holistic, theoretical-methodological, empirically grounded and methodically developed concept is necessary, on the basis of which anticipatory professional and personal development of subjects of education can be carried out.

The purpose of the article is the need for scientific substantiation of innovative approaches to natural science training of modern physical culture specialists and the ability to apply European learning experience in the modern educational process.

Presentation of the main research material. The natural science training of future teachers of physical education should provide high professionalism, opportunities for self-realization of the individual and the formation of humanistic value attitudes. Improving the natural science training of the future physical culture teacher at the current stage requires more effective mechanisms for organizing the educational process. Therefore, the modernization of the system of professional education in higher education institutions in the field of physical culture and sports consists in the creation of a developmental pedagogical system based on the active use of innovations and innovative technologies in the educational environment and allows to achieve the necessary quality of training of physical education teachers.

We believe that raising the level of natural science training of future physical education teachers is possible on the basis of the developed theoretical foundations and methodological aspects of the system, namely: methodological foundations, models of the system of natural science training, psychological and pedagogical conditions for improving professional training, concepts of natural science and professional training, methods and technological support of professional-pedagogical and natural science training of future teachers of physical education. This requires consideration of the research problem at four methodological levels (philosophical-methodological, general scientific, pedagogical and sectoral) and substantiation of specific principles of physical education teacher training; taking into account the best foreign experience of training specialists in physical education and sports; study of modern pedagogical and methodical approaches to the training of physical education teachers.

The general pedagogical conditions for the formation of a synergistic system of integration of natural science and professional-practical training of future physical education teachers are defined by us as follows:

- use of historical and interdisciplinary information for motivation and formation of interest in natural science knowledge;
- ensuring the thoroughness of the results of the development of natural science knowledge and the sustainability of the training system for the future teacher of physical education based on the use of integrative concepts and an integral vision of a holistic system;
- the connection between learning and life, identifying integral problems of a natural and scientific nature in future professional activity;
- integration of subsystems into a holistic system of natural science and professional-practical training;
- complex use of integrated forms and methods of learning in accordance with the integrated content;
- specification of the content of natural science training for a certain sports specialization;
- creation of appropriate scientific-methodical and educational support for natural science training of future teachers;
- creation of integrated disciplines and their blocks;
- formation of a knowledge base in the creation of a system based on professionally oriented natural science knowledge;
- formation of integrative subsystems of knowledge, skills and values based on the content of the main and elective disciplines of future physical education teachers. It is the focus on the future profession that determines the psychological composition of the personality of the future specialist, through it «needs, goals, motives of the individual, his subjective attitude to various aspects of activity, to his characteristics and qualities are revealed» (Akimova, 2007, p.98).

The feasibility of integration is based on the following psychological principles:

- formation of motives for assimilation of natural and scientific knowledge followed by mastery of professional skills and awareness of professional values by means of integration, respectively, of knowledge, skills and values;
- consolidation and concentration of educational material, which eliminates overloading of students;
- formation of cognitive interest in natural science topics by means of integration of problematic professionally significant topics, special courses, etc.;
- formation of the integrative thinking of the future physical culture specialist as the basis of his professional value orientations;
- reliance on integrated associations, which are the most complex types of connections of psychological processes that ensure the completeness and integrity of knowledge;
- formation of psychological readiness of students to perceive integrated knowledge;
- integration of pragmatic and spiritual values of future specialists;

the use of analogy as an integrative means of forming a training system for future physical education teachers. New approaches to the teaching of natural science disciplines due to the transition to credit transfer training demonstrate problems with the adaptation of students in pedagogical institutions of higher education to new conditions. Today, the system of higher education provides for a significant part of the material necessary for assimilation to be taken out for independent study by future teachers. And at this stage, most of the problems appear related to the inability to organize one's time, the inability to work with scientific sources, the inability to summarize, choose the main and secondary, compare information obtained from different sources, make generalizations and conclusions. A significant problem of adaptation is the impossibility of transferring the knowledge gained at school in the process of studying the disciplines of the natural cycle to the explanation of biological phenomena occurring in a living organism or with it under the influence of various factors. At the same time, difficulties arise during the analysis of problematic situations related to future professional activity. In addition, adaptation problems include the inability to transform the knowledge, skills and abilities acquired in lectures and practical classes when solving tasks with a professional content.

Conditionally, three main approaches can be distinguished that characterize the content of the concept of «individualization»: from a psychological and pedagogical point of view - the organization of education, based on the creation of optimal conditions for the identification of aptitudes, development of abilities and interests of each student; from social - purposeful influence on the formation of creative, intellectual, professional potential of society; didactic - solving the actual problems of a higher pedagogical educational institution by creating a strategy, building an innovative system of the educational process or a special form of its organization.

We believe that the role of a natural science teacher is to make those objects that are of real importance for future professional activity personally significant for the needs of students of higher education. The current reform of the higher education system is aimed at the formation of a specialist not according to a single model, it has a completely different target vector. The tasks of education are more complex and global: to create such learning conditions, in which every student would receive inexhaustible opportunities for full self-realization of established vocations and sports abilities.

The quality of education is determined by the following criteria: the degree of correspondence between goals and learning outcomes at the level of a specific education system and at the level of a specific educational institution; the correspondence between various parameters in the assessment of a particular student's learning outcome (quality of knowledge, degree of formation of relevant abilities and skills, development of relevant creative and individual abilities, personality qualities and value orientations); the degree of correspondence of theoretical knowledge and skills to their practical use in life and professional activity with the development of a person's need for their constant updating and continuous improvement.

Conceptually, it is important to determine the main methodological principles of the integration of natural science and professional and practical training of the future teacher of physical education. The new paradigm of education is based on the fact that the problem of its fundamentalization can be solved only by ensuring the integrity of education, the deep need for which is determined by the interests of personality development. The task of fundamental education is to provide optimal conditions for the interaction of different types of thinking and to create an internal need for self-development and self-education throughout a person's life.

In order for an educational problem to be a stimulus for the activation of thinking, it must be subjectively important and significant for a student of higher education. Information that a future teacher receives when studying fundamental natural science disciplines, in particular biochemistry, physiology, human anatomy and biomechanics, in addition to generally recognized properties (thoroughness, completeness, awareness), must also meet the following criteria: selection of a certain amount of information necessary for conscious selection (which will then shape the creative professional activity of a specialist based on fundamental knowledge); identifying the fundamental component of knowledge. In practice, the fundamentalization of education is implemented at the level of the content of the cycles of disciplines, and the intellectual potential of the fundamental disciplines is currently not fully utilized, and «the educational and cognitive activity of students is mainly empirical in nature without a theoretical and methodological analysis of the very process of translating the logical form of fundamental scientific knowledge into practical life and vice versa» (Dragnev, 2013, p. 156).

Therefore, the fundamentality of knowledge presupposes its integrability. By fundamental we will understand the concepts that determine the structure of the model of real reality. The fundamental knowledge of graduates of a pedagogical university should be organically combined with professional and practical training, with high professional training. Therefore, it is obviously necessary to look for ways to intelligently combine the fundamentalization of education with its professionalization.

No less important is «the use of an integrative approach at the level of fundamentalization of education, first of all, at the level of content development. Overcoming the diversity of individual academic disciplines through their integration is a significant contribution to the fundamentalization of education in its modern sense. The search for separate fundamental knowledge in each of the academic disciplines is replaced by the task of forming a holistic system of fundamental knowledge of a specialist, which is formed under the influence of fundamental ideas of basic sciences. The content of the fundamental knowledge of the future physical culture teacher should reflect not only the professional principles and fundamental laws on which professional knowledge is based, but also the fundamental component of natural sciences.

Natural science training of future physical education teachers is a basic system-building link in the formation of their professional knowledge and skills. Undoubtedly, the introduction of a system of integration of natural science and professional-practical training of specialists will eventually form a galaxy of specialists, researchers, scientists who will create these modern technologies and work according to the latest work methods.

Conclusions from this research and prospects for further research.

So, we came to the conclusion that for the training of physical education teachers it is necessary:

1) adapt educational programs from fundamental disciplines to the needs of a modern competitive physical education teacher;

2) to develop training programs for teacher-researchers that correspond to the current state and trends in the development of fundamental medical and biological sciences. Such attempts have already been made at the Faculty of Physical Education at the Pereyaslav-Khmelnitskyi Pedagogical University and at the Kharkiv Academy of Physical Culture. However, this idea then did not find adequate support either among official state officials or in the pedagogical community.

A modern specialist in physical culture should possess a significant stock of knowledge and skills integrated on the basis of natural and sports disciplines, be able to replenish, develop and creatively apply them in his professional activity. Awareness of the leading role of biological sciences in the system of natural and scientific knowledge, mastering modern technologies of educational activities and the methodology of systems thinking will help to purposefully prepare students of higher education for future professional activities and will ensure the study of professional disciplines at a qualitative level, since their study depends significantly on the extent to which the quality and level organization of natural science training corresponds to the systemic role of these disciplines in the structure of scientific knowledge and professional training.

REFERENCES

- Azhyppo, O. Yu. (2012). *Pidhotovka maibutnikh uchuteliv fizychnoi kultury do porfesiinoi diyalnosti v zahalnoosvitnikh navchalnykh zakladakh (teoretychni i metodychni aspekty) [Preparation of future physical education teachers for professional activities in post-secondary educational institutions (theoretical and methodological aspects)]*. Kharkiv: Tsyfrova drukarnia № 1 [in Ukrainian].
- Akimova, O. V. (2007). *Teoretyko-metodychni zasady formuvannia tvorchogo myslennia maibutnioho vchytelia v umovakh universytetskoi osvity [Theoretical and methodological principles of the formation of creative thinking of the future teacher in the conditions of university education]*: monohrafiya. Vinnytsia: Vinnytska miska drukarnia [in Ukrainian].
- Balahnicheva, G. V. (2013). *Profesiina maisternist uchytyela fizychnoho vihovannia [Professional skills of a physical education teacher]*. Skhidnoievrop. nac. un-t im. Lesi Ukrain-ki [in Ukrainian].
- Bergier, J., Bergier, B., & Tsos, A. (2017). Variations in physical activity of male and female students from the Ukraine in health-promoting life style. *Ann Agric Environ Med*, 24 (2), 217-221.
- Byshevets, N. (2017). Express estimation of the user's working posture in learning process. *Journal of Education, Health and Sport*, 7(8), 1628-1641.
- Bielikova, N. O. (2013). Suchasni tendencii profesiinoi pidgotovky maibutnih fahivciv z fizychnoho vihovannia ta sportu [Modern trends in the professional training of future specialists in physical education and sports]. *Visnik Chernigivs'kogo nac. ped. un-tu im. T. G. Shevchenka. Pedagogichni nauky. Fizichne vihovannia ta sport [Visnik Chernigivs'kogo nac. ped. un-tu im. T. G. Shevchenka. Pedagogical science. Fizichne vihovannia ta sport]*, 112, 2, 52-56 [in Ukrainian].
- Brizhatyi, O. V. (2011). *Osnovy naukovo pidgotovky maibut'ogo vchytelya fizychnoi kultury [Basics of scientific training of the future teacher of physical culture]*: navch. posib. dlya spec. «Fizychno vihovannia». Gluhiv: RVV GNPU im. O. Dovzhenka [in Ukrainian].
- Dragnev, Yu. V. (2013). *Progressio professionalis futuri doctoris physicae culturae in condicionibus spatii informationis-educationis: theoria et praxis: monographus* Lugansk: DZ «LNU eos. Taras Shevchenko» [in Ukrainian].
- Hrynchenko, I. B. (2014). Profesiina pidhotovka maibutnikh uchyteliv fizychnoho vykhovannia : dosvid yevropeiskykh krain [Professional training of future teachers of physical education: experience of European countries]. *Zasoby navchalnoi ta naukovo-doslidnoi roboty [Means of educational and research work]*, 42, 39-50 [in Ukrainian].
- Konovalchuk, I. I. (2015). *Teoretychni ta tehnologichni zasady realizatsii innovatsii u zagalnoosvitnih navchalnykh zakladakh [Theoretical and technological ambushes for the implementation of innovation and behind-the-scenes initial foundations]*. (D diss.). Zhytomyr [in Ukrainian].
- Serhiienko, I. R., Serhiienko, K. M., & Byshevets, N. G. (2015). Profesiina dialnist fahivtsia fizychnoi kultury v umovakh informatyzatsii osvity [Professional dialnist of a physical culture specialist in the conditions of informatization of education]. In *Materialy III Vseukrainskoi elektronnoi konferentsii, prysviatchenoj 85 richiu NUFSSU [Materials of the 3rd All-Ukrainian electronic conference, dedicated to the 85th anniversary of NUFSSU]* (pp. 102-106). Kyiv [in Ukrainian].
- Serhienko, K. M., & Byshevets, N. G. (2017). Informatsiini tehnologii u pidgotovtsi fahivtsiv z fizychnoi kultury i sportu [Information technologies in the training of specialists in physical culture and sports]. In *Suchasni biomechanichni ta informatsiini tehnologii u fizychnomu vihovanni i sporti [Modern biomechanical and information technologies in physical education and sports]*: materialy V Vseukrainskoi elektronnoi konferentsii (pp. 81-83). Kyiv [in Ukrainian].
- Voskoboinyk, T. A. (2014). Profesiino-pedahohichna kompetentnist maibutnikh uchyteliv fizychnoi kultury [Professional and pedagogical competence of future physical education teachers]. *Pedahohika formuvannia tvorchoi osobystosti u vshchii i zahalnoosvitnii shkolakh [Pedagogy of the formation of a creative personality in higher and advanced educational schools]*, 34, 120-124 [in Ukrainian].

OLENA SOHOKON
OLEXANDER DONETS
VASYL FAZAN
OLEG SHERSTIUK

INNOVATIVE APPROACHES OF NATURAL SCIENTIFIC TRAINING OF FUTURE TEACHERS OF PHYSICAL EDUCATION

Abstract. The presented article analyzes and characterizes innovative approaches to the natural science training of future physical education teachers. Modernization of education prioritizes the formation of a specialist of high quality and competence, capable of innovative search for ways of self-realization in the conditions of continuous integration of Ukraine into the European educational space. Strengthening the health potential of youth, providing a differentiated approach to groups of children of different ages, forecasting their needs and motivation for physical development and self-improvement depends on the physical culture specialist.

Keywords: innovative approaches, natural science training, future teacher, physical culture, implementation, competence, professional training.