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Theoretical and methodological aspects of the formation of research competence of future teachers of physical education in the process of professional training

Aspectos teóricos y metodológicos de la formación de la competencia investigadora de futuros profesores de educación física en el proceso de formación profesional

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Abstract

The purpose of the article is to analyze the theoretical and methodological aspects of the formation of research competence of future teachers of physical education in the process of professional training. The article is based on the use of both general and special pedagogical research methods. An

important role for our work was played by the use of sociological (sociological-statistical) method. The modeling method made it possible to propose a separate project-model of the curriculum. Research competence is important, with its help the future specialist will be able to conduct their own projects and develop the latest methods and ways of working and learning.

Keywords: physical education, education, research competence, professional training, pedagogy.

Resumen

El propósito del artículo es analizar los aspectos teóricos y metodológicos de la formación de la competencia investigadora de los futuros profesores de educación física en el proceso de formación profesional. El artículo se basa en el uso de métodos de investigación pedagógica tanto generales como especiales. Un papel importante para nuestro trabajo fue el uso del método sociológico (sociológico-estadístico). El método de modelización permitió proponer un proyecto-modelo independiente del plan de estudios. La competencia de investigación es importante, con su ayuda el futuro especialista podrá realizar sus propios proyectos y desarrollar los últimos métodos y formas de trabajo y aprendizaje.

Palabras clave: educación física, educación, competencia investigadora, formación profesional, pedagogía.

1. Introduction

The peculiarities of the profession of physical education teachers are that it requires the free application of acquired knowledge in practice, a range of professional competencies, and increased responsibility. Mastery of the respective specialty relies on the use of appropriate professional knowledge, skills, and abilities, as well as the acquisition of established important personal qualities in the process of training. An important part of university training is the organization and conduct of educational and pedagogical practices through which practical work skills are formed (Anisimova et al., 2020). Let us also note that it is extremely relevant to master the research competence, through which future specialists get used to conducting their own research and developing special methods of working with students in school. At the same time, the elucidation of the peculiarities of the formation of research competence remains important, which is an urgent task for modern pedagogical science. The article aims to analyze the theoretical and methodological aspects of the formation of research competence of future physical education teachers in the process of professional training. The task of the article is to investigate the conceptual aspects of the mentioned problems and to identify and consider in detail the methods of training specialists in higher education.

2. Theoretical Framework or Literature Review

The study is based on the use of modern pedagogical literature. Both Ukrainian and foreign historians were interested in the problem of research competence formation. In particular, Kryshtanovych et al., (2021) characterized the features of research experience of forming professional competence in future specialists in physical education and sports. The article focuses on the characteristics of foreign experience of training specialists in the field of physical education and sport in European countries, primarily in Italy and Spain. At the same time, the researchers highlighted the main progressive ideas to be implemented for the education system in the field of physical education and the peculiarities of the training of specialists in this sphere. Pavlyuk et al.,

(2018) characterized the importance of different types of field training for shaping the health competence of future specialists in physical education and sports. Experts paid special attention to the practical implementation of this competence among students. Matviichuk et al., (2022) characterized the peculiarities of pedagogical skills development for future physical education teachers. Kalynychenko et al., (2021) investigated the formation of a professional and pedagogical culture of future physical education specialists. In the work, the specialists explained in detail the role of professional and pedagogical culture for future specialists of physical education specialties as a key base for improving culture (however, and physical, intellectual, spiritual economic, etc.). In addition, they believe that the specified pedagogical culture acts as the main tool for the formation of other professional competencies, so it is also the basis for a high professional level. Bakhmat et al., (2022) analyzed the main aspects of modernizing the professional training of modern teachers. An improved method of teaching the theoretical component of physical education developed by Babych et al., (2022). Kononets et al., (2021) investigated the didactic basis for the formation of research competence among students in the field of physical education. Among the foreign specialists, let us highlight Cojocarui et al., (2022), who characterized the main theoretical and methodological issues of sports education. Note that general pedagogical studies analyzing the main topical issues of modern education are also valuable for our study. In particular, Tarkhova et al., (2020) analyzed the problem of using infographics in the modern educational process. At the same time Ronzhina et al., (2021) characterized the key aspects of the digitalization of modern education. An analysis of the current innovative trends in education through the prism of digitalization was made by Jarvis, Tambovceva & Virovere (2021). The peculiarities of the formation of the digital educational environment were characterized by Filipova & Usheva (2021). At the same time, the experts pointed out both the main problems of implementation and the main ways of its promotion. Although the topic of the formation of research competencies in future physical education teachers is not new, however, it remains relevant given the constant development of education, and the introduction of new teaching technologies.

3. Methodology

The article is formed based on the use of both general scientific and special pedagogical research methods. Among the general scientific logical methods, we will distinguish analysis, synthesis, induction, and deduction. The method of abstraction, which implies ascending from the abstract to the concrete, also has a significant value. At the same time with the help of the axiomatic method of research, we managed to pass from general statements to concrete conclusions and recommendations. Through this method, we were able to move from defining the importance of research competence to analyzing individual educational practices that influence the development of the latter (Kondratska et al., 2021). In addition, functional and structural methods of research were used in the article. A significant role in our work was played by the use of the sociological (sociological-statistical) method, with the help of which the actual indicators of the problematic activity of physical education teachers and other specialists in the field of sports were determined. Special pedagogical methods of research are of particular importance. For example, the modeling method allowed us to propose a separate project-model of the training program and development of research competence of future physical education teachers (Ronzhina et al., 2021). With the help of the observation method, we discovered the weaknesses and strengths of the proposed program of training and development of research competence of future teachers.

4. Results and Discussion

Research competence: to the problem of interpretation

For the purpose of defining the term research competence, the definition of “competence” is weighted. The latter is understood as an objective category that expresses the recognized level of skills, abilities, and knowledge in a particular person's activity. For this reason, competence is an integrative formation of personality, which combines the above-mentioned categories of knowledge, abilities, skills, experience, and personal characteristics affecting the desire and ability to solve certain tasks and problems. At that, competence manifests itself directly in an effectively performed activity and also includes personal attitude to the object and product of a person's activity. Since the category of competence is related to the ability and capability of a person to act successfully in typical and atypical situations, the key elements of direct research competence should correlate with the elements of research work. At the same time, the unification of theoretical and practical research skills forms a specific model of research competence (Kryshtanovych et al., 2021). It should be noted that research work should be aimed at obtaining socially important knowledge about specific subjects, phenomena, or processes. For this reason, it should have in its structure certain stages (stages): the planning of research, the period of using methods for the subject of research in order to obtain specific results, and the stage of compiling and explaining the results of the work. So, research activity consists of several components: design, informational (provides mastering the basic methods of collecting and processing of information materials), analytical (application of general scientific and special research methods), practical (formation and implementation of the obtained results). Consequently, we believe that the main basis of research work should be the ability to identify the problem, the formation of a hypothesis, the implementation of data analysis, the selection of appropriate methods, data collation, recording intermediate and final results of the research work, organizing the discussion and interpretation of key results (apply them in practice) (Kornosenko et al., 2021)). At the same time, directly the concept of research skills is a system of mental and practical skills of an individual, necessary for independent implementation of research. Consequently, the main part of the research work forms intellectual skills, practical act as a mechanism of possession of specific means of search work, which gives practical results (i.e., new knowledge, patterns, or facts).

For this reason, the term research competence is understood as an integrative characteristic of a person, which combines categories of knowledge, skills, the experience of a researcher, value characteristics, and personality traits, manifested in readiness to perform research work to obtain new skills and knowledge through the use of scientific methods, etc (Järvis et al., 2021). At the same time, research competence consists of ideas about current directions of research in modern science, awareness of philosophical theories and concepts in a particular area of scientific knowledge, understanding of the basic methodology of the scientific field, knowledge of its laws, and readiness to implement the key knowledge of the chosen field in their own practical work; ability to correctly determine the content of the topic under study, its target, object, subject or task of research. At the same time, no less important in this structure is the ability to plan an experiment of research, understand the basic methodological principles of scientific knowledge (and use them in practice), and mastery of the key general scientific or special methods of scientific research, the ability to theoretically explain and with the help of experiments to check the results obtained in the main study. In addition, the ability to synthesize the results of research work, form key conclusions (organize the so-called methodological reflection), responsibility, the activity of the

researcher, the ability to organize a scientific discussion, reasonably explain your own point of view, etc. are also important. (Bakhmatet al., 2019).

Consequently, competence is the ability to operate freely with acquired knowledge. Its basis is an activity based on previously gained experience and certain universal knowledge. To the very category of “competence”, we refer a certain set of powers, knowledge, abilities, and skills (in education and training) necessary to fulfill the goals and tasks (in our case, in particular, pedagogical activity).

Key foundations for the formation of research competence of future teachers of physical education.

According to the materials of the socio-humanitarian program “Physical education - the health of the nation” it was found that up to 90% of pupils and students have certain health problems, almost half are in poor physical shape, and almost 70% of adults do not have even mediocre values in health development. Thus, addressing the skill development of physical education teachers looks like an extremely urgent need given the realities of the times. According to research in recent days, nearly 80% of physical education teachers indicate that current education should focus not on training highly specialized teachers, but on developing effective long-term pedagogical knowledge and competencies.

Modern requirements for physical education teachers are quite high. In particular, specialists of such specialty should be educated people for whom mastery of general competencies as absolutely necessary elements: social, multicultural, informational, and communicative. This ensures the performance of certain well-established social roles, which are outside the professional qualities (Azimovna, 2022).

Thus, future teachers, specialists in physical education, are individuals who purposefully acquire their qualifications, which are determined in accordance with the educational and qualification level and are provided at a higher education institution with an appropriate accredited training program. Under the current conditions of the development of the educational system in Ukraine, such functions of training future physical education teachers are performed by scientific units based on universities (primarily, departments of physical education, physical education, and sports, etc.), institutes (separate scientific institutions working at universities, the National Academy of Sciences of Ukraine, etc.), colleges, higher teacher training colleges, instructor courses.

The formation of methods of research competence of future teachers of physical education comes from the use of integrative and research complex of academic disciplines. Modern training programs gravitate to its application, which in practice will allow the rational use of integration links between academic disciplines of a single cycle (Zhamardiy et al., 2020). This process takes place in three gradual stages: initial (motivational-analytical), basic-professional (organizational-activation), and professional-adaptive. Logical sequences of content topics show the whole essence of the research work of future teachers throughout the cycle of education in higher education institutions (Kovalenko et al., 2020). They are based on central integration and research vectors.

The initial (motivational-analytical) stage is realized by teaching the basic disciplines – “Fundamentals of Scientific Research in Physical Education” and “Motor Ability Testing

Technologies". The basic-professional (organizational-activity) level is achieved through the use of disciplines – “Physiological foundations of physical education” and “Sports metrology”. The professional-adaptive stage is achieved through the training of future physical education specialists in generalizing subjects: “Functional diagnostics and control in physical education and sports”, “Organization of scientific studios”, and “Innovative methods of physical culture and sports”. The proposed training system is focused on the first year of university education, after which the future student will receive a junior bachelor's degree. The mentioned disciplines with proper professional teaching and professional self-improvement of students are quite enough to ensure the proper development of research competence of future physical education teachers in the process of professional training (Ovcharuk et al., 2021).

For senior university students, a supplemented set of disciplines is offered, which will improve their research projects. We are talking, first of all, about teaching biomedical and socio-humanitarian academic subjects. For example, we are talking about “Theory and Methodology of Teaching Athletics” (as well as in general about theoretical aspects and methodological recommendations for sports games and swimming, gymnastics, etc.). General scientific aspects of research activities of future physical education teachers are disclosed by studying human biochemistry and physiology, and hygiene. Qualitatively, the materials of these disciplines can be supplemented by psychology and pedagogy, which allows to significantly expand the cognitive characteristics of future specialists (Babych et al., 2022). Note that an important aspect of training is the mastery of modern information technology, which will allow finding an approach for students.

Bachelor's and master's degrees are extremely important steps in gaining research competence, so important attention should be paid to the writing of qualifying papers (Klochko et al., 2022). The master's project should accumulate both theoretical and practical work skills for future physical education teachers. Therefore, attention to this element should be maximal in the preparation of specialists. It is desirable that each student prepare a scientific publication on the topic of his/her qualification project by the end of training. Such an element, let us note, will allow mastering or improving the research competence (Demchenko et al., 2021).

European universities pay close attention to the independent research initiative of future specialists - physical education teachers. Note that in Europe (in particular in Germany, France, Hungary, Sweden, and Slovenia) the organization of the direction of physical education in higher education institutions is engaged in specially formed departments (Kononets et al., 2020). For example, the Institute of Sport (Germany), the Department of Sport (France), the Department of Sport (Hungary), etc. Predominantly German universities, in particular the German Higher School of Sports (Cologne), focus on the implementation of primarily health-forming competencies (Daniel & Daniel, 2022). However, a noticeable attention is also paid to the development of research skills. In particular, there is a system of professional training here, in which students are actively involved in the organization of various science and sports conferences and individual research projects. Note also that students themselves take an active part in shaping the curriculum. For example, in Belgium, special student sports unions, which have the initiative to organize independent scientific studios under the brands of universities, have a great influence. It should be noted that the European system of physical education lectures is oriented to a combination of a number of scientific and pedagogical disciplines. They combine both subjects of the socio-humanitarian cycle and narrowly specialized disciplines (Kononets et al., 2021). We believe that this experience is extremely useful because it allows forming a future teacher of physical education as a broadly erudite person who has all the necessary knowledge and skills

to carry out educational activities.

Taking into account the Italian experience, let us characterize the Roman School of Business, where the disciplines of physical education and sports are taught. This institution focuses on the convergence of practical and academic experience, which certainly affects the development of professional careers. Note that the athletic field is an important part of the entertainment business. The graduate program course system consists of a six-month academic year and a six-month international internship. After that comes the stage of work on the main scientific project (CARTONE). Consequently, we believe that such programs promote a quality level of learning and ensure that the experiential needs of the participants in the learning process are met.

Besides, in this institution with the help of improvement of teaching materials and stable monitoring of the educational process the quality and success of educational programs are guaranteed (Kryshtanovych et al., 2021). At the same time, the educational process in Italian higher education institutions is formed based on students' responsibility for their personal learning (Filipova & Usheva, 2021). In particular, they have the right not only to form their own schedule of classes but also to choose the topic of their own research paper. We believe that this fact has a significant impact on the student's desire to research the chosen subject. Consequently, it affects the formation of research competence. In addition, we note that in Italian universities the attendance of disciplines is not mandatory, because the teacher does not record it. So, education in Italian universities is characterized by independent learning (Kryshtanovych et al., 2021). Students have ample opportunities to choose their own learning project, which in turn affects the formation of research competence. At the same time, universities in Spain are characterized by an independent teaching system. In particular, the Autonomous University of Barcelona trains all kinds of specialists in the field of physical education. The acquisition of research competence here is formed through active mobility. The Autonomous University of Barcelona has 21 research departments and 7 research institutes that provide practical training for all future specialists in the field (Kryshtanovych et al., 2021). We believe that the direct involvement of students in such research institutions significantly influences the formation of their research competence.

5. Conclusions

So, research competence is an integrative characteristic of a person, combining categories of knowledge, abilities, skills, the experience of a researcher, value characteristics, and personality traits, which are expressed in readiness to perform research work to obtain new skills and knowledge through the use of scientific methods, etc. Despite this, research competence is formed from ideas about current research directions in modern science, awareness of philosophical theories and concepts in a particular field of scientific knowledge, understanding of the basic methodology of the scientific field, knowledge of its laws, etc. We believe that the research competence of future teachers of physical education is formed in the process of professional training. It is summarized that competence in general is the ability to freely operate the received knowledge. In the system of training, a set of competencies is common and necessary for the education of a truly modern specialist. We determine that research competence is just as important, with the help of which the future specialist will be able to conduct his or her own projects and develop the latest methods and ways of working and teaching. For the best mastery of this competence, a special distribution of academic disciplines is proposed to optimize the training process. This process is supposed to take place in three stages. The initial (motivational-analytical) stage is realized by teaching the basic disciplines. The basic-professional (organizational-activity) level is achieved through the use of professional disciplines. The

professional-adaptive stage is achieved through the training of future physical education specialists in generalizing subjects. The proposed training system is focused on the first years of university education, after which the future student will receive a junior bachelor's degree. For senior university students, an augmented set of disciplines is offered, primarily the teaching of medical-biological and socio-humanitarian academic subjects. Particular emphasis should be placed on the writing of qualification works. The master's project should accumulate both theoretical and practical skills of future physical education teachers. It is desirable that each student by the end of training prepared a scientific publication on the topic of his/her qualification project.

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