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INFORMATION TECHNOLOGY TOOLS IN THE TRAINING OF PHYSICAL EDUCATION AND SPORTS SPECIALISTS

HERRAMIENTAS DE TECNOLOGÍAS DE LA INFORMACIÓN EN LA FORMACIÓN DE ESPECIALISTAS EN EDUCACIÓN FÍSICA Y DEPORTE

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ABSTRACT

The article explains the current state of training specialists in physical culture and sports for the use of information technologies in professional activities. The electronic educational resources, and digital technologies that we recommend to use in the training of specialists in the field of physical culture and sports are characterized for their use in professional activities. The key categories of electronic educational resources are highlighted, the use of which in a higher education institution is necessary. The advantages of using electronic educational resources and development factors and the core trends in the practice of information technologies in education are highlighted for their use in the qualified activities of specialists in physical culture and sports; the main directions of educational activities of using computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work to usage current information skills in the professional activities of specialists in physical culture and sports are shown. The grades of statistical data study approve the success of the implemented pedagogical conditions of modern innovative training, increasing the professional competence of future specialists in physical culture and sports in graduate education, their further development, and professional training through the use of information technologies in professional activities.

Keywords:

Information technologies, Specialists in physical culture and sports, Professional competence, Professional activity, Training of future specialists.

RESUMEN

El artículo aclara el estado actual de la formación de los futuros especialistas en el campo de la cultura física y el deporte para el uso de las tecnologías de la información en las actividades profesionales. Se describen recursos educativos electrónicos y tecnologías digitales que recomendamos utilizar en la formación de futuros especialistas en el campo de la cultura física y el deporte con el objetivo de su aplicación en actividades profesionales.

Se destacan los principales tipos de recursos educativos electrónicos, cuyo uso es necesario en una institución de educación superior. Se destacan las ventajas del uso de recursos educativos electrónicos y los factores de desarrollo y principales tendencias en el uso de las modernas tecnologías de la información en la educación con el objetivo de su aplicación en las actividades profesionales de los especialistas en educación física y deporte; Se muestran las principales direcciones de las actividades educativas de uso de tecnologías informáticas, equipos informáticos en la educación superior, programas informáticos para controlar el trabajo independiente de los estudiantes con el objetivo de utilizar las tecnologías de la información modernas en las actividades profesionales de los especialistas en educación física y deportes. Los resultados del análisis de datos estadísticos confirman la eficacia de las condiciones pedagógicas implementadas de la formación innovadora moderna, el aumento de la competencia profesional de los futuros especialistas en cultura física y deportes en la educación de posgrado, su desarrollo profesional posterior y la formación profesional mediante el uso de modernas tecnologías de la información en actividades profesionales.

Palabras clave:

Tecnologías de la información, Especialistas en educación física y deporte, Competencia profesional, Actividad profesional, Formación de futuros especialistas.

INTRODUCTION

One of the key trends in the modernization of higher education in the world is the increased attention to improving its quality. The problem of forming the educational process, which is focused on high-quality qualified training of applicants, a student-centered approach to teaching, mastering creative potential, innovative professionally oriented skills, abilities, knowledge, professionally significant and personal qualities, which will allow students in their future activities to effectively apply modern methods and means of educational and research work, which will contribute to the self-improvement of students, competitiveness and professional mobility. A modern graduate of a higher education institution, therefore, must constantly improve physical and psychological training, and professional mobility, develop their creative abilities, prove their competitiveness, and enrich their professional and personal competencies and experience; to work creatively in an advanced educational and information space and to introduce new technologies into the educational and professional development.

The reform of the physical education sector is aimed at training such a specialist who would have broad professional competence, would be able to quickly adapt to the new realities of professional development, make adequate modern decisions, that is, would master not only practical skills in sports and deep sports and pedagogical knowledge but would also have the facility to apply them competently in professional activities. The requirements of modern society for competitive experts in the field of physical education and sports require the search for new ways of their comprehensive improvement (Dyshko, 2023).

That is why information technologies in the training of specialists significantly expand the possibilities of processing and obtaining various information and today are an vital section of education, which is needed for refining the superiority of learning, developing the cognitive abilities of the individual, the effectiveness of learning program material, the ability to form professional competencies of future specialists and mobile learning (Bezkopylnyi, 2020).

Today, information technologies are considered a means of increasing the competence and output of work, and information is considered on a par with labor activity as a source of resources. When preparing future specialists in the field of physical culture and sports for the application of information technologies in professional activities, higher education graduates must possess certain personal qualities, and not only basic skills and knowledge. These are the following personal qualities: the capacity to autonomously get the necessary knowledge, flexibly adapt to changing life situations, skillfully apply knowledge in practice to solve various problems; think critically and independently, notice difficulties that arise in the real world, and look for ways to overcome them; generate new ideas using modern technologies, think creatively; be sociable, competently work with information (Bykov, 2005). The success of the functioning of the education system for training specialists in the field of physical culture and sports to use information technologies in qualified events is determined by the pedagogical staff that implements the tasks set for this system. The reduction in the amount of laboratory hours and a important movement of information, the growth of the role of independent work of students, the shortage of study time, the essential for dynamic contact among all members in the educational process in the circumstances of the quick growth of information technologies needs a change in the progress of suitable organizations and methods of learning, the part of the educator, which actualizes the importance of the computer-generated educational space, automatic educational incomes in the training of future specialists in the field of physical culture and sports.

Literature Review

The study of the works allows us to say that a large number of publications highlight various aspects of the use of modern information technologies.

Thus, in the process of training of future specialists in physical culture and sports, the main effective innovative technologies were shown, their content was revealed, and ways of their use were suggested by Babalich et al. (2023). The methodological basis for high-quality professional training of future specialists in physical culture to use information technologies and innovative types of motor activity is described.

The study of the experience of using ICT in training future specialists in the field of physical culture and sports for the application of information technologies in professional activities is demonstrated by Henseruk & Romanyshyna (2013). The formation of professional competence using the Moodle information environment in future specialists in the field of physical culture and sports occurs through the following areas: the educational process, methodological and research work, sports competitions, training of instructors in new sports, and areas of health-improving physical culture, sports training, health-improving physical culture, monitoring the health and physical condition of various population groups.

The theoretical foundations of professional training of future specialists in the field of physical culture and sports were analyzed by Udina (2024). Particular attention was paid to taking into account the needs of the modern sports market and the specifics of the physical development of the individual, the preparation of future specialists in the field of physical culture and sports for the use of information technologies in professional activities, the need to adapt curricula to modern trends and requirements in this field, innovative teaching methods, the use of modern technologies in the learning process, the importance of the ability to analyze information and independent search, as well as the development of communication skills in future specialists, critical thinking. Similar issues are considered by Chukhlantseva (2024), and she also presents the results of research aimed at implementing modern information technologies in the field of physical culture and sports.

Methodological principles of research on training future specialists in physical culture and sports are considered by Atamaniuk (2022). Attention is paid to the use of innovative types of motor activity in professional activities.

Bezkopylnyi (2020) characterized the system of training future specialists in the field of physical culture and sports for the use of information technologies in professional activities, and their role in health-preserving activities in primary school. The concept of the system of professional training for health-preserving activities of future teachers of future specialists in the field of physical culture and sports in primary school was developed.

Karasievych (2018) analyzed the problematic of training future specialists in the field of physical culture and sports for physical culture and sports activities in secondary education institutions; developed and tested a model of training future specialists in the field of physical culture and sports for physical culture and sports activities in secondary education institutions.

Fisseha (2011) proves that the practice of information and communication technologies in the educational process of higher education and in the training of future specialists in the field of physical culture and sports to use them in professional activities allows manipulating available information to create a new "product" that promotes creative learning and emphasizes the need to provide the necessary electronic resources for the information content of the educational space, such as distance education services, electronic libraries, electronic books, educational portals, etc.

Thus, the study of literary foundations on the topic of our research allows us to state that scientists have analyzed the theoretic foundations of training of future specialists in the field of physical culture and sports. Particular attention is paid to taking into account the needs of the modern sports market and the specifics of the physical development of the individual, the preparation of future specialists in the field of physical culture and sports for the use of information technologies in professional activities.

PURPOSE OF THE ARTICLE: to show the effectiveness of the implemented pedagogical conditions of modern innovative training, increasing the professional ability of future specialists in physical culture and sports in graduate education, their further expert development and professional training through the use of modern information technologies in professional activities.

MATERIALS AND METHODS

To realize the goal of the study, general scientific methods are used:

- **theoretical**: analysis, systematization, and generalization of scientific and methodological, psychological and pedagogical, special literature on the research problem; method of structural and system analysis; method of conceptual and comparative analysis, modeling – to substantiate the structure, clarify the essence of the levels of professional training and the formation of professional competence of future specialists;
- **empirical**: methods of mass collection of empirical material; diagnostic methods – to determine the structures of qualified training and the formation of professional competence of future specialists in physical culture and sports; pedagogical experiment – to verify the usefulness of the developed pedagogical situations;

- **statistical**: the method of averages, Pearson's consistency criterion, Student's t-criterion, as well as methods of analyzing empirical data using modern information technologies – to evaluate and procedure the experimental data obtained.

The pedagogical experiment lasted from 2021 to 2024 and was carried out in the next steps: ascertaining, and formative stages. The formative experiment included the control stage of the experimental study.

The participants of the experimental study were higher education applicants in the 1st year of bachelor's degree and the last year of master's degree. Therefore, the experiment was complicated by the duration of the study. So, it had a longitudinal form.

In the experimental study, we defined criteria (motivational, activity), and indicators (level of motivation; level of physical fitness; academic success).

The creation of qualified ability of specialists in physical culture and sports in the graduated system of education through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, continuity of professional training to use current material skills in the professional actions of specialists in physical culture and sports, respectively, the criteria and indicators are defined at three levels: low, medium and high.

The data obtained at the ascertaining stage of the experiment are almost the same, with a small difference of a high level, and indicate the lack of development of professional ability of future specialists in physical culture and sports. Using the Student's t-test, the reliability of changes in the CG and the EG was checked (the TTEST function of the Microsoft Excel program). We emphasize the identity of the sample of respondents in the EG and CG.

The basis of qualified innovative training of future specialists in physical culture and sports in graduate education in the EG is the provisions of such methodological approaches as activity, synergistic, systemic, anthropological, competency, personal, and technological, which require the implementation of the following principles: general – gradualness, systematicity, continuity, scientificity, humanism, accessibility, purposefulness, interdisciplinary, consistency, individualization and differentiation; special: coordination, integration, unity of self-government and management, dialogization, humanization.

The generalization of the obtained marks of the control point of the formative experiment gives grounds to speak about significant changes in the EG in the levels of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, and the continuity of professional training to use recent information technologies in the professional events of physical education and sports specialists of the experimental group according to all criteria.

To verify the obtained results, prove their reliability, and identify differences (statistically significant) in the stages of development of professional competence of physical culture and sports specialists in undergraduate education of EG and CG, the Pearson criterion was used.

Two statistical hypotheses were proposed to verify the reliability of the obtained data: the main hypothesis (H0) and the competing hypothesis (H1).

The Pearson distribution consistency criterion was applied to accept the correct hypothesis. 95% is the possibility of the consequences of the empirical study. The critical value of the Pearson consistency criterion for the proposed sample according to the probability table indicators was 7.815.

The consequences of statistical data analysis check the success of the implemented pedagogical conditions of modern innovative training, the continuity of professional training of future specialists in physical culture and sports in terms of increasing the professional competence of future specialists in physical culture and sports in graduate education, their further professional development and professional training through the use of modern information technologies in professional activities.

RESULTS AND DISCUSSION

The current state of training of future specialists in the field of physical culture and sports for the use of information technologies in professional activities.

One of the most priority areas for improving pedagogical systems at the current stage of training future specialists in the field of physical culture and sports to use information technologies in professional activities is the use of higher education achievements in the educational process, its informatization, and the development of didactic tools based on modern ICT.

Examination of the current state of the problematic demonstrates that modern ICT in the system of higher physical education, despite significant potential, has not yet received proper application. The main reason for this state is the absence of generalized approaches of modern pedagogy to the implementation of ICT capabilities in specific subject areas, which requires the progress of pedagogical situations for the application and creation of ICT tools in various disciplines and specialties and the conduct of advanced experimental research. The use of information technology tools in the educational process of future specialists can solve significant tasks in the preparation of

future specialists in the field of physical culture and sports to use information technologies in professional activities: demonstration of illustrative material in both statics and dynamics; communication of professional knowledge, monitoring of the progress of their assimilation; comparison of biomechanical characteristics of a reference motor action when performed by an athlete, student or higher education student; writing course and qualification papers, creating control and educational programs, modeling the educational, training and pedagogical process, etc. (Shkirta et al., 2022).

Thus, the preparation of future specialists requires the creation of new teaching aids in higher education based on the use of modern information technologies, improving the quality of physical education. Recently, there has been a significant increase in attention in the use of computer programs and their development in the educational and training process, but despite this, the subjects of their implementation and growth persist problematic. This is due to: the state of development of communication and information technologies and bringing the education system into line with the needs of methodical and scientific progress and time (Shuliak et al., 2022).

To overcome professional incompetence and form a high level of professionalism, the basis is the content of education. The content of education in the preparation of future specialists in the field of physical culture and sports for the application of information technologies in qualified actions becomes multifaceted, flexible, taking into account the level of professional competence of the student and the growing role of the individual, in particular, his (Kuchai et al., 2022): self-identification, high self-esteem of one's own professional competence, interprofessional and intra-professional mobility, awareness of potential opportunities and readiness for professional development; ability to self-control, reflect, correct the result and process of professional activity; positive attitude towards objects and subjects of professional activity; readiness for constant improvement of qualifications, critical self-analysis and motivation to demonstrate competence; readiness and focus on socially significant productive professional activity; value-semantic ideas about the result of professional activity and its content; desire for self-improvement and self-knowledge.

That is why the development of general qualified competencies in future specialists in the field of physical culture and sports in preparation for the use of information technologies in professional activity is a pedagogically oriented, complex, innovative training process based on a combination of educational activity and training (Udina, 2024).

Electronic educational resources, and digital technologies that we recommend to use in the training of future specialists in the field of physical culture and sports with the aim of their application in professional activities.

We hold the opinion that the basis of higher education is electronic information properties. Today, electronic information resources are transformed into electronic educational resources, because their use requires computer electronic devices that are effective when used in education. So, today, in higher education institutions, the use of electrical educational properties corresponds to the main trends in the development of society and is natural (Svatiev, 2020). They are an important component of the educational process and information content of higher education in the development of reference materials, in the use of educational and methodological support, in scientific research, etc. (Alsentali, 2022).

Electronic educational resources should correspond to the typical curriculum, and specialty, combine developed and implemented learning tools based on computer technologies, and provide the student with the occasion to principal the educational course with the help of a teacher or independently.

Electronic educational resources that are important when used in a higher education institution include text files, video materials, audio materials, and presentations that can be recorded on conventional media (Sulym et al., 2023).

Let's name the key forms of electronic educational resources, the use of which is a higher education institution is needed:

- virtual educational resources, the basis of which is cloud technologies, are distinguished by the speed of processes, scalability, and a powerful ability to perform movements that are impossible in the factual world;
- text graphic educational resources, in which the material is presented on a computer screen, as in a regular book, the author groups the arrangement of the material; electronic educational resources do not have important changes from the printed form, printing, and translation of educational material into paper form is possible;
- multimedia educational resources containing video, animation, sound, illustrations, texts, and other capabilities of digital technologies are built on video materials;
- hypertext educational resources are built using hypertext technology. In an arbitrary order, determined by a hypertext link, you can view fragments of text. In electronic educational resources of this type, terms or other important facts and concepts can be links that make it possible to obtain information for clarification under the conditions of choosing a phrase or keyword (Lytvynova, 2011).

When training future specialists, we recommend using electronic educational resources, and digital technologies that can be used in professional activities. In particular, we use electronic textbooks, electronic libraries, multimedia lectures, electronic educational and methodological complexes in professionally oriented disciplines, electronic testing, official websites of higher education, information resources of Internet sites, the «Educational Portal», as well as the «G Suite for Education» cloud system in the educational process of higher education. It is precisely such educational electronic resources that have both the capabilities of traditional educational resources and such technological features as virtual reality, interactivity, illustrativeness, hypermedia elements, a high level of visibility, various forms of structuring information and knowledge, ensuring the effectiveness of the educational process and a high methodological level of teaching (Starchenko, 2014).

Modern learning management systems Learning Management Systems (LMSs) are the main technological base that allows for the widespread use of blended learning technology in educational practice. They are a set of software and hardware tools founded on executive events, teaching methods, and Internet technologies that allow for the implementation of electronic forms of learning (Bezkopylnyi, 2020).

Google's service for educational institutions (G Suite for Education) is an example of a modern platform – an open service with which a teacher can create his own unique educational course. According to the type of "Software as a Service", an educational course can be providing free of charge to educational institutions – a service that is available through an Internet browser for providing software (Voitovych & Trofymenko, 2018). Today, one of the most unified e-learning tools is G Suite for Education, which stands out among others for its simplicity, functionality, and accessibility. It is for managing the educational process (Google Classroom) that it combines file and data storage (Drive), several useful services, email (Gmail), planning (Calendar), working with tables (Sheets), working with office files (Docs), developing test tasks, creating presentations (Slides), testing and assessing the quality of learning material (Forms), interactive communication and video conferencing (Hangouts), and sites (Sites) (Kulyk et al., 2023).

A positive and important feature of the G Suite for Education cloud system is: the ability to organize high-quality e-mail with a developed system of filters for incoming and outgoing messages, and spam filters; provided that the higher education institution has its own domain to access the environment, which allows sorting mail automatically and preventing the sending of confidential data (Knysh et al., 2023). The presence of a set of mobile applications and services is an advantage of this system, which makes it possible to use mobile learning technologies; provides a significant amount of disk space for storing educational materials, mail; the ability to organize a student's portfolio using the system, implement a system for assessing learning success; convenience in the shared access system; provides a flexible administration system; a high level of data protection and security, which is based on two-factor authentication; provides the possibility of a network community and integration with third-party applications; creates effective technical support (Dzhurynskyi et al., 2023).

The usage of the presented electronic educational resources, and digital skills in the training of future specialists in the field of physical culture and sports, which we recommend using in education and which can be used in professional activities, provides varied occasions for the implementation of the educational process in a higher education institution and improving the quality of the educational process of professional training of future teachers of physical culture and sports (Alieksieiev et al., 2023).

Organization and stages of the pedagogical experiment.

Stating stage.

The area is to analyze the state of use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, the creation of professional competence, and the continuity of professional training to use modern information technologies in the professional activities of physical culture and sports specialists.

Tasks:

- carrying out a theoretical analysis of the works on the problem under study;
- outlining the problem area of research into the state of use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, the formation of professional competence, the continuity of professional training in order dern information technologies in the professional activities of physical culture and sports specialists;
- developing an experimental program;
- analyzing the initial level of theoretical preparedness of future physical culture and sports specialists in the higher education system based on a comparison of the knowledge of first-year university students and university graduates;
- analyzing the content of university curricula;
- collection of materials for further research;

- formulation of the goal and objectives of the experimental work;
- putting forward a research hypothesis;
- selection of experimental methods;
- creation of EG and CG groups;
- argumentation of the selection of efficiency indicators and assessment criteria;

Formative stage.

Purpose – to regulate the principles and indicators of the use of students' professional training and the levels of formation of their professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, continuity of professional training to use current information technologies in the professional activities of physical culture and sports specialists; to outline and verify the effectiveness of pedagogical conditions for modern innovative training, continuity of professional training.

Tasks:

- improvement of programs of disciplines of the qualified cycle;
- expansion and application of pedagogical environments for modern innovative training, continuity of professional training of future physical culture and sports specialists;
- identification of development factors and key tendencies in the use of modern information technologies in education with the aim of their application in the professional activities of physical culture and sports specialists;
- implementation and carrying out of organizational measures for the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work to use modern information technologies in the professional activities of physical culture and sports specialists;
- generalization and processing of experimental data, qualitative and quantitative analysis;
- to confirm the reliability of pedagogical circumstances of modern innovative training, continuity of professional training of future physical culture and sports specialists, interpretation of mathematical statistics data;
- comparison of the outcomes of the experimental study with the goal and hypothesis;
- proving the success of the planned pedagogical situations of modern innovative training, continuity of professional training of future physical culture and sports specialists;
- formulation of conclusions.

The pedagogical experiment lasted from 2021 to 2024 and was conducted in the following stages: the ascertaining stage and the formative stage. The formative experiment included a control stage of the experimental study.

The participants of the experimental study were higher education students in the 1st year of their bachelor's degree and the last year of their master's degree. Therefore, the experiment was complicated by the duration of the study. Therefore, it had a longitudinal form.

The operation of certain educational conditions of modern advanced training, and continuity of professional training of future specialists in physical culture and sports was accompanied by the training of students in the experimental group:

1. ensuring continuity of the innovative content of professional training from the 1st year of bachelor's degree to the last year of master's degree or higher school;
2. ensuring continuity of innovative methods, forms, development factors, and main trends of the education;
3. use of computer technologies, computer equipment in higher education, and computer programs for monitoring students' independent work to use modern information technologies.

By rationalizing, modernizing, and optimizing the content of practices and professional disciplines, each of the specified pedagogical conditions was implemented, which provides for adjusting the content of professional education in the EG. CG students studied according to the usual program.

Ensuring the continuity of the innovative content of professional training of future physical culture and sports specialists from the 1st year of undergraduate studies to the last year of the master's degree of higher education and innovative methods, forms, development factors, and main trends of the educational process in the training of physical culture and sports specialists provided in the EG:

- introduction of project, interactive, problem-based, forms and methods of training in classroom and extracurricular training of specialists;
- use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work to use modern information technologies in the professional activities of physical education and sports specialists;
- introduction of specialized distance courses;
- introduction of adaptability training using computer technologies, computer equipment in higher education, computer programs;
- creation of an adaptive educational environment;

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- introduction of elements of dual education;
- special training of teachers.

All of the above methods and forms were characterized by the following properties:

- compliance with the age characteristics of higher education applicants;
- implementation of resource, cross-cutting, adequate requirements of different degrees of higher education;
- ensuring the effectiveness of professional degree education from the 1st year of bachelor's degree to the last year of master's degree;
- compliance with the requirements of the future professional activities of physical education and sports specialists, be contextual;
- ensuring the activation of self-educational activities of physical education and sports specialists, stimulating their need for continuous professional development, and continuing professional education throughout life;
- ensuring the development of adaptability of future physical education and sports specialists, their ability to quickly enter new conditions of educational and professional activity using computer technologies, and computer equipment;
- being interactive, learning should take place using information technologies, in constant, active interaction of all participants in the educational process, as mutual learning, co-learning, in which both the teacher and the student are equivalent, equal subjects of the educational process.

In the experimental study, we defined criteria (motivational, activity), and indicators (level of motivation; level of physical fitness; academic success).

The creation of professional readiness of future physical education and sports specialists in the graduated education system through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, and the continuity of professional training to use current info technologies in the professional actions of physical education and sports specialists is determined according to criteria and indicators at three levels: low, medium, and high.

The formative stage of the experiment included the introduction of formative measures for the professional training of future physical culture and sports specialists into the educational process of the higher school.

This concerned: the coordination, and updating of university curricula; the introduction of problem-based, interactive, project-based methods and forms of training in the professional training of specialists; the introduction of distance special courses; introduction of training that ensured the formation of professional competence in students through the use of computer technologies, computer equipment in higher school, computer programs for monitoring students' independent work, continuity of professional training to use modern information technologies in the professional activities of physical culture and sports specialists, development of student adaptability; creation of an innovative educational environment and special training of higher school teachers.

During the formative stage of the experiment, we in the EG took into account the development factors and main trends in the use of modern information technologies in education to apply them in the professional activities of physical culture and sports specialists. In the context of informatization of education, we have linked the development of an innovative system of training in sports and pedagogical disciplines with modern factors:

- in connection with the transition to an information society – changing needs of society in the field of information culture of the individual, regardless of specific specialties;
- increasing the motivation of future specialists in physical culture and sports to study modern information and communication technologies to use them in professional activities;
- increasing the requirements for the level of information training of specialists;
- improving the educational process based on the use of modern communication and information technologies in sports and pedagogical disciplines;
- increasing the informatization of the entire educational process in higher education, in particular, at the faculties of physical culture (Shkirta et al., 2022).

During the formative period of the experiment, we in the EG took into account the main directions of educational activity of the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work to use modern information technologies in the professional activities. Due to the relevance of the possibility of using modern information technologies in various areas of physical culture, we took into account promising directions of using information technologies in the general system of higher education. The main directions for using modern information technologies and computer equipment in higher education institutions were considered to be the following:

- computerization of higher education;
- use of contemporary information technologies and computer equipment during practical work and laboratory work, execution of graphic constructions;
- organization of studying computer disciplines using modern information technologies;

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- fragmentary use of modern information technologies and computer equipment during seminar classes, and lectures;
- development of electronic texts of lectures, practical classes, seminar classes and transition to the organization of perception and comprehension of the material using ready-made texts, elimination of mechanical recording of lecture material by higher education applicants;
- computerization of control sections (automation and individualization of work verification);
- priority use of computer technologies, development of educational software for the assimilation of knowledge, to improve the efficiency of studying professional disciplines;
- psychological and pedagogical substantiation of the core of modern information technologies of education, features of their application during the organization of the assimilation of professional disciplines;
- technical support and psychological and pedagogical application of modern information technologies for distance learning;
- free search using the Internet for professional information;
- computerization of library work (Knysh et al., 2024).

When preparing future specialists in professional activities, we used automated diagnostic systems and computer programs in the EG to obtain high-efficiency professional training of higher education applicants based on the use of modern means of information and communication technologies.

Computer programs for monitoring the independent work of higher education applicants were developed and are used by us in the educational process, which allowed:

- to individualize (for any number of higher education applicants) the control of independent educational activity;
- to ensure active self-preparation of students for classes and its effective automated control;
- to promptly receive complete information about the state of academic activity of each higher education student;
- to create for each future specialist a feasible pace of processing the material for independent work, subject to the constant control of the degree of its assimilation and understanding;
- to automate the registration of the results of monitoring the fitness of each future specialist in the field of physical culture and sports throughout the entire training period (Shkirta et al., 2022).

In the EG, the use of computerized diagnostic schemes, and computer programs is justified to obtain high efficiency of professional training of higher education applicants based on the use of modern means of information and communication technologies in the system of training of specialists in the field of physical culture and sports. This allowed to improve the organizational forms and methods of training of specialists in physical culture and sports in the EG and, through the use and creation of new generation software, to improve the quality of training of higher education applicants in the EG.

The purpose of the control stage of the formative experiment is to generalize and process the experimental data, their qualitative and quantitative analysis; and interpretation of mathematical statistics data to verify the effectiveness of the pedagogical conditions we have determined for modern innovative training of future specialists; and formulation of conclusions.

So, during the experiment to verify the effectiveness of the specified pedagogical conditions of modern innovative training of future specialists in physical culture and sports: the curricula of the courses were synchronized and coordinated, the content of professional disciplines was differentiated and optimized, the methods and forms of professional training of education seekers were coordinated, an innovative educational environment was created for the effectiveness of professional training of students, the formation of their professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, and the continuity of professional training to use modern information technologies in the professional activities of specialists.

The basis of professional innovative training in graduate education is the provisions of such methodological approaches as activity, synergistic, systemic, anthropological, competency, personal, and technological, which require the implementation of the following principles:

1. **general** – gradualness, systematicity, continuity, scientificity, humanism, accessibility, purposefulness, interdisciplinary, consistency, individualization and differentiation;
2. **special** – coordination, integration, unity of self-government and management, dialogization, humanization.

The system-forming principle, their professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, continuity of

professional training to use modern information technologies in the professional activities of specialists, which integrates all others, is considered to be the principle of continuity.

Analysis of the results of the pedagogical experiment.

The experimental data obtained according to the results of control diagnostics at the formative stage of the experiment indicate a positive overall dynamics of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, continuity of professional training to use modern information technologies in the professional activities of physical culture and sports specialists in undergraduate education of EG participants according to all criteria.

As for the participants of the control group, no significant dynamics of the formation of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, continuity of professional training to use modern information technologies in the professional activities of physical culture and sports specialists in undergraduate education were detected.

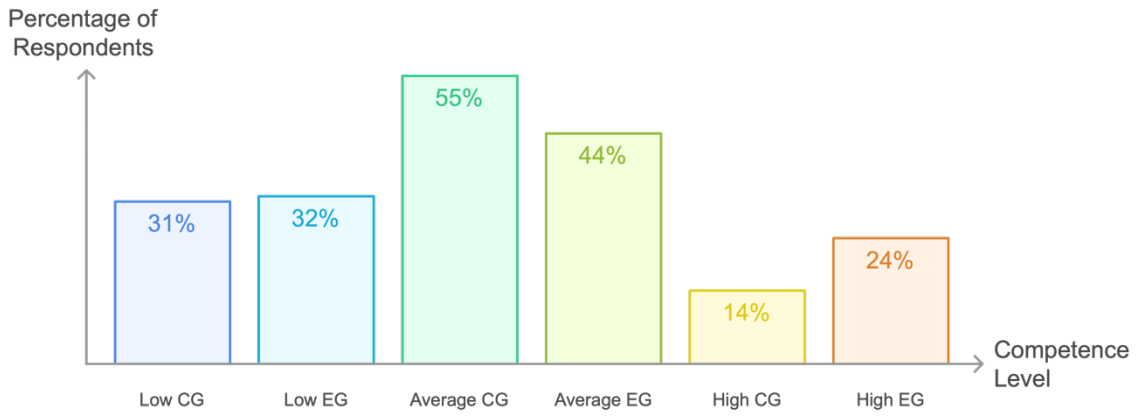
We will consider the results obtained according to each of the criteria of professional training.

According to the motivational criterion (motivational criterion – covers professional motives, needs, values, awareness of the need for professional development of the individual, the essence of the chosen profession, the desire to carry out effective professional activity, motivates the improvement of professional competence through the use of computer technologies, computer equipment, computer programs, continuity of professional improvement through the use of modern information technologies in professional activity, continuation of professional training throughout life) at the ascertaining stage of the experiment, the following data were obtained (Fig. 1).

In the CG, the following data were found:

- 31% of respondents with a low level of professional competence;
- 55% of respondents with an average level of professional competence;
- 14% of respondents with a high level of professional competence.
- In the EG, the following data were found:
- 32% of respondents with a low level of professional competence;
- 44% of respondents with an average level of professional competence;
- 24% of respondents with a high level of professional competence.

Fig 1: Comparison of Competence Levels in CG and EG (Motivational Criterion).



Source: developed by the authors

Therefore, it can be stated that the data obtained at the ascertaining stage of the experiment are almost the same, with a small difference of a high level.

Using the Student's t-test, the reliability of the differences in the CG and the EG was checked (the TTEST function of the Microsoft Excel program).

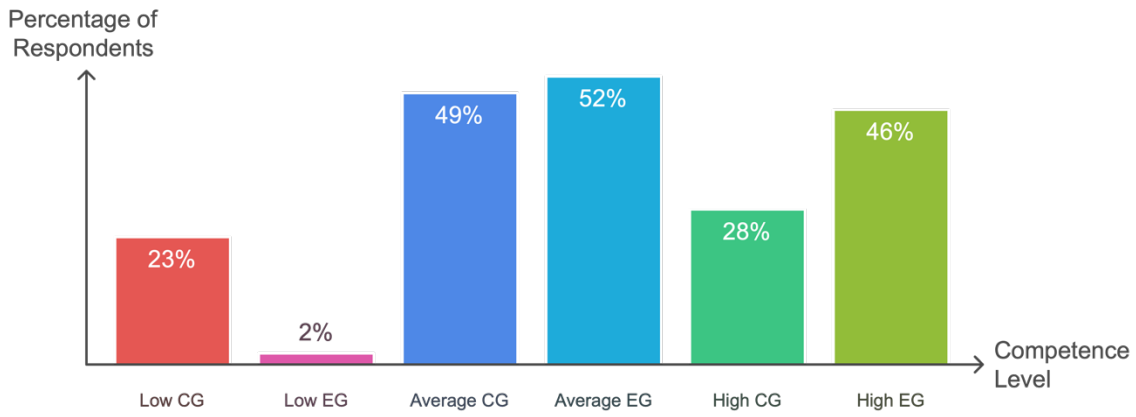
According to the motivational criterion, the average value of the indicator in the CG is 29%, and in the EG – 30%. We emphasize the identity of the sample of respondents in the EG and CG.

According to the results of the control measurement at the formative stage of the experiment, the following data were obtained according to the motivational criterion (Fig 2.).

Among the CG students, the following were found:

- 23% of respondents with a low level of professional competence;
- 49% of respondents with an average level of professional competence;
- 28% of respondents with a high level of professional competence.
- Among the EG students, the following were found:
- 2% of respondents with a low level of professional competence;
- 52% of respondents with an average level of professional competence;
- 46% of respondents with a high level of professional competence.

Fig 2: Comparison of Professional Competence Levels in CG and EG Students (Motivational Criterion).



Source: developed by the authors

In the EG, we see significant positive dynamics in increasing professional competence through the use of computer technologies, computer equipment, and computer programs, continuity of professional improvement through the use of modern information technologies in professional activities according to the motivational criterion, while in the CG the data has almost not changed.

Therefore, it can be stated about the effectiveness of the implemented pedagogical conditions of modern innovative training, the continuity of professional training of future physical culture and sports specialists in terms of increasing the motivation for professional activity of future physical culture and sports specialists in graduate education, as well as the motivation for their further professional development and professional training through the use of modern information technologies in professional activity.

According to the activity criterion (which reflects the level of their own physical fitness of specialists, characterizes the ability of future physical culture and sports specialists to use acquired theoretical knowledge in practical professional activity, the level of increasing professional competence through the use of computer technologies, computer equipment, computer programs, the continuity of professional improvement through the use of modern information technologies in professional activity), the following data were obtained at the ascertaining stage of the experiment (Fig. 3).

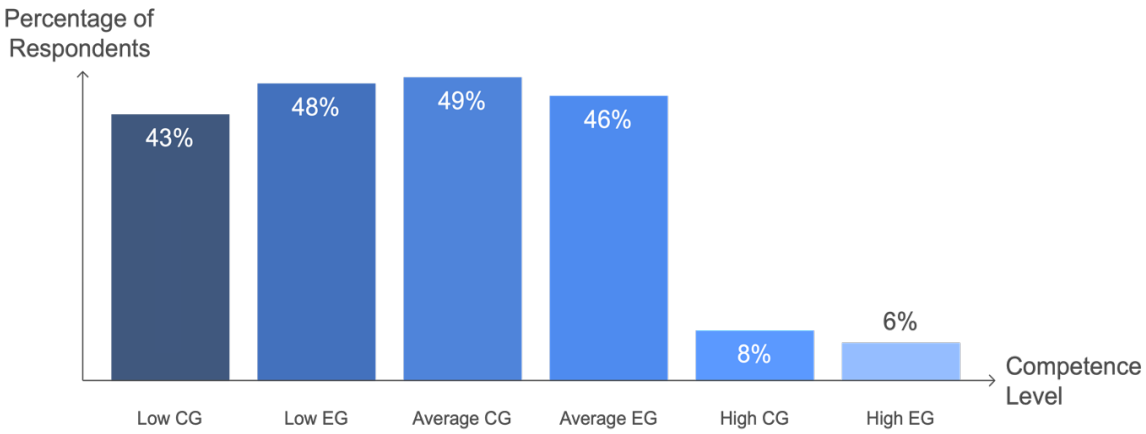
In the CG, the following data were found:

- 43% of respondents with a low level of professional competence;
- 49% of respondents with an average level of professional competence;
- 8% of respondents with a high level of professional competence.

In the EG, the following were found:

- 48% of respondents with a low level of professional competence;
- 46% of respondents with an average level of professional competence;
- 6% of respondents with a high level of professional competence.

Fig 3: Comparison of Competence Levels in CG and EG (Activity Criterion).



Source: developed by the authors

Therefore, it can be stated that the data obtained at the ascertaining stage of the experiment according to the activity criterion are almost the same.

Using the Student's t-test, the reliability of the differences in the CG and the EG was checked (the TTEST function of the Microsoft Excel program).

According to the activity criterion, the average value of the indicator in the CG is 30% and in the EG – 30%. We emphasize the identity of the sample of respondents in the EG and CG.

According to the results of the control measurement at the formative stage of the experiment, the following data were obtained according to the activity criterion (Fig. 4.).

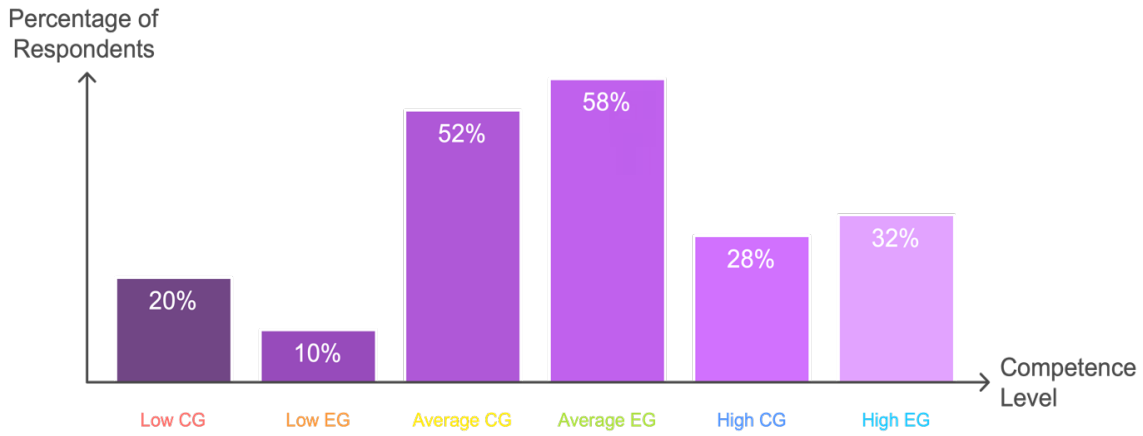
Among the CG students, the following were found:

- 20% of respondents with a low level of professional competence;
- 52% of respondents with an average level of professional competence;
- 28% of respondents with a high level of professional competence.

Among the EG students, the following were found:

- 10% of respondents with a low level of professional competence;
- 58% of respondents with an average level of professional competence;
- 32% of respondents with a high level of professional competence.

Fig 4: Comparison of Competence Levels in CG and EG Students (Activity Criterion).



Source: developed by the authors

We observe a positive trend in the indicators of the activity component in the EG during control diagnostics and observe minor changes in the CG students.

In particular, in the EG, the number of respondents with a low level (to 10% – from 48%) with an average level (to 58% – from 46%) increased with a high level (to 32% – from 6%).

So, in the EG we see significant positive dynamics of increasing professional competence through the use of computer technologies, computer equipment, computer programs, continuity of professional improvement through the use of modern information technologies in professional activities according to the activity criterion, while in the CG the data has almost not changed.

Thus, it can be stated about the usefulness of the implemented pedagogical conditions of modern innovative training, the continuity of professional training of future physical culture and sports specialists in terms of improving the professional activity of future physical culture and sports specialists in graduate education, their further professional development and professional training through the use of modern information technologies in professional activity.

We have determined a general coefficient for comparing the obtained data. The above indicates the efficiency of the established pedagogical conditions of modern innovative training, pedagogical measures for the formation of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work, the continuity of professional training to use modern information technologies in the professional activity.

The generalization of the obtained results of the control stage of the formative experiment gives grounds to speak about significant changes in the levels of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for controlling students' independent work, continuity of professional training to use modern information technologies in the professional activities of the experimental group according to all criteria.

We present the undercurrents of the coefficients of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for controlling students' independent work, continuity of professional training to use modern information technologies in the professional activities according to the results of the control stage of the formative experiment.

The total coefficient of professional competence of future physical culture and sports specialists in the EG has significantly increased and is equal to 0.68.

We assumed that if the coefficient is in the range from 0.00 to 0.32, then the overall level is low, but if the coefficient is in the range between 0.33 to 0.66 – the overall level is average, if the coefficient is in the range between 0.67 to 1.00 – the overall level is high, then we see the following results:

- the overall coefficient of professional competence of physical culture and sports specialists at the ascertaining stage of the experiment in the EG and CG was found to be at a low level (EG – 0.324; CG – 0.318);
- the total coefficient of professional competence of physical culture and sports specialists at the control stage of the formative experiment in the CG was at an average level of 0.478, and in the EG it was at a high level of 0.68.

To verify the results obtained, prove their reliability and identify differences (statistically significant) in the levels of formation of professional competence of physical culture and sports specialists in graduate education in the EG and CG, the Pearson criterion was used.

Two statistical hypotheses were proposed to verify the reliability of the obtained data: the main hypothesis (H0) and the competing hypothesis (H1).

The main hypothesis (H0) is about the absence of differences in the levels of formation in the graduate education of professional competence of physical culture and sports specialists from the CG and EG according to the specified criteria.

Competitive hypothesis (H1) – about the significance of differences in the levels of formation of professional competence in the undergraduate education of future specialists in physical culture and sports with CG and EG according to the specified criteria.

The Pearson distribution consistency criterion was applied to accept the correct hypothesis. 95% – the probability of the results of the empirical study. The critical value of the Pearson consistency criterion for the proposed sample according to the tabular probability indicators was 7.815.

The main hypothesis is accepted if the practical value of the calculated criterion is equal to or less than the critical one. In the levels of formation, there are no differences in the professional competence of future specialists in physical education and sports through the use of computer technologies, computer equipment, computer programs, continuity of professional improvement through the use of modern information technologies in professional activities with CG and EG with a probability of 95%.

However, the competing hypothesis is accepted if the practical value of the calculated criterion is greater than the critical one.

The calculated value is less than the tabular critical value (7.16<7.815), therefore, the null hypothesis is accepted at the ascertaining stage of the study.

The calculated value is greater than the tabular critical value (152.14>7.815) and greater at the ascertaining stage than the obtained value (152.14>7.16). Therefore, the competing hypothesis is accepted and the null hypothesis is rejected after the formative stage.

The results of statistical data analysis confirm the effectiveness of the implemented pedagogical conditions of modern innovative training, the formation of professional competence, and the continuity of professional training of future specialists in physical culture and sports in terms of improving their professional activity and further professional development and professional training through the use of modern information technologies in professional activities.

CONCLUSION

The current state of training of future specialists in the field of physical culture and sports for the use of information technologies in professional activities has been clarified. Electronic educational resources, and digital technologies that we recommend to use in the preparation of future specialists for their use in professional activities have been characterized. The main types of electronic educational resources, the use of which in a higher education institution is necessary, have been highlighted.

When preparing future specialists for the use of information technologies in professional activities, the advantages of using electronic educational resources and development factors and the main trends in the use of modern information technologies in education have been highlighted for their use in the professional activities of specialists in physical culture and sports; the main directions of educational activities of using computer technologies, computer equipment in higher education, computer programs for monitoring students' independent work to use modern information technologies in the professional activities of specialists in physical culture and sports have been shown.

The generalization of the obtained results of the control stage of the formative experiment gives grounds to speak about significant changes in the EG in the levels of professional competence through the use of computer technologies, computer equipment in higher education, computer programs for controlling students' independent work, the continuity of professional training to use modern information technologies in the professional activities of physical culture and sports specialists of the experimental group according to all criteria.

To verify the obtained results, prove their reliability, and identify differences (statistically significant) in the levels of formation of professional competence of physical culture and sports specialists in undergraduate education of the EG and CG, the Pearson criterion was used.

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Further research requires the disclosure of the role of video materials when using digital video cameras, and digital video information, which allows the output of video information to various media in the innovative provision of the educational and training process of future specialists in physical culture and sports.

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