

Digital Technologies in the Activities of Physical Culture and Sports Specialists: Features of Professional Training

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Abstract - The article is devoted to the problem of training specialists in physical culture and sports (PhC&S) for the use of digital technologies in professional activities. Digital technologies characteristics by the professional activity of PhC&S specialists are given. Attention is focused on modern digital health tools. The authors characterize digital technologies in the professional activity of PhC&S specialists and describe the features of training PhC&S specialists for the use of digital technologies in professional activities. The authors argue that the training of future PhC&S specialists for the use of digital technologies in professional activities should be carried out purposefully according to a methodology that integrates specific forms, methods, and means of training. The content of the methodology is the disciplines "Information and communication technologies in the field of PhC&S" (the goal is to form ideas about digital technologies in the field of PhC&S in general) and "Digital health technologies in the field of PhC&S" (the goal is to form: knowledge about health and a healthy lifestyle, digital technologies for maintaining and controlling their health and the health of others; ability to use digital health tools in professional activities; reflection skills about the use of digital health tools). The results of the statistical analysis of the pedagogical experiment are presented, confirming the developed methodology's effectiveness.

Keywords - *specialists of physical culture and sports, digital technologies in the field of PhC&S; digital health facilities; training of PhC&S specialists; professional training.*

I. INTRODUCTION

Globalization and digitalization of all spheres of activity, particularly in the field of physical culture and sports (PhC&S), determine the emphasis on the professional training of its specialists. And if the development of physical qualities is carried out, as a rule, at the expense of training, then specialists' self-improvement in the field of PhC&S today is impossible without the involvement of digital technologies and tools. PhC&S specialists today have the opportunity to use specialized software, social networks, and health care services, as well as specialized tools, the indicators of which can be used to monitor the physical state of the body. Therefore, the problem of learning and mastering

such tools becomes relevant for PhC&S specialists already at the stage of their professional training.

Analysis of scientific and methodological works in the field of professional training of PhC&S specialists confirms researchers' interest in: problems of using information technologies in the professional training of specialists in the field of physical education and sports, in particular specialized software [1], mobile-oriented fitness technologies [2], innovative technologies [3], information technologies [4; 5], etc.; introduction of courses aimed at developing skills to use IT in professional activities in the educational programs of training of PhC&S specialists in the USA [6], Germany, and Poland [7]; problems of development of PhC&S specialists' information and digital culture [8].

The survey of employers proved the importance of using digital technologies in the professional activity of PhC&S specialists, including specialized software in the field of digital health, in particular, social networks and channels with video content and fitness bracelets, pedometers, etc.

The terminological analysis of the concept of "digital health" proved the lack of unanimity in the opinions of scientists and practitioners regarding its interpretation. According to the analysis of the regulatory documents of the World Health Organization, digital health should be defined as a result of using digital, mobile, and wireless technologies to achieve healthcare goals. The regulatory documents of the Ministry of Health and Ministry of Digital Transformation of Ukraine show no domestic analog of the term in question.

Content analysis of Internet sources allows us to interpret digital health as a result of the integration of digital technologies with the healthcare industry. On the Web, the term "digital health" is used to cover a wide range of technologies used in healthcare, medical informatics, medical education, health promotion, and public health purposes. It includes other concepts such as "eHealth", "mHealth", and "Wireless Health" [9; 10; 11].

Note that these concepts include, among other things, the use of social services as platforms for cooperation and

interaction between specialists and clients/patients: blogs (simple websites with short messages that reflect different points of view and contain information that is presented in a narrative form; thematic blogs are used for health care, for example, nikko.ua/blog); wikis (web pages for joint editing of information; special wiki pages highlight health issues, for example, sport-wiki); social networks (web pages that connect users and organize communication between them; for example, FB or other social networks pages for communication between fitness trainers); podcasts (audio recordings in the form of lectures, for example, on health topics, for example, podcasts.apple.com/us/podcast/ted-health/id470623173); chat rooms (environments for rapid exchange of text messages in real-time, for example, mixsport.pro/chat-rooms); video sharing (a web page that allows private or professional users to upload video files).

Based on the results of the content analysis, the directions of using social networks in the context of digital health support by PhC&S specialists were characterized as 1) the creation of special health-related pages (e.g., on Facebook) to receive answers to questions of interest; 2) sharing knowledge and receiving feedback (e.g., creating pages on Twitter, where daily information about healthy eating habits is provided); 3) using the information in a new practical context (e.g., sharing healthy food recipes and eating healthy food).

It should also be noted that PhC&S specialists actively use the YouTube service:

- cardio training (<https://www.youtube.com/channel/UCQkaczRlyBj3UKBH59W3XQ>, USA);
- cardio training, yoga, fitness (<https://www.youtube.com/channel/UCHJBoCDxaCTRrwCHXEBA-BA>, Germany);
- tabata (<https://www.youtube.com/channel/UCrom-lPe2Ekby1kWLOAnL1A>, USA);
- tabata (<https://www.youtube.com/channel/UCq7bR6RxqqOx8cptc1-0AVQ>, Korea);
- fitness (<https://www.youtube.com/channel/UCfTC21JEugC009tNSPQrbqQ>, USA);
- running (https://www.youtube.com/channel/UCNFi_fSAzGT7ZK_xsfLboig, Estonia);
- swimming (<https://www.youtube.com/channel/UCU1eyHLIMZXu0TjmI887FyA>, Ukraine);
- Thai boxing (<https://www.youtube.com/channel/UCF6qYExQuDsBBJrKyT15Yig>, Ukraine)
- mountainboard, skiing (<https://www.youtube.com/user/skiandschool/>, Ukraine).

Digital health technologies are directly related to the use of mobile communication technologies and allow monitoring of clients and providing them with qualified recommendations from PhC&S specialists [12].

Digital health tools include hardware (wireless devices, e.g., pulse oximeter, fitness bracelets, Smart Band tracker, microcontrollers, etc.) and software (e.g.,

MyFitnessPal, Waterbalance), social networks, and health information technologies.

Also, an important trend today is the emergence of research on the use of augmented and virtual reality [13]

Today, operating the listed technologies and tools is important in the professional activities of PhC&S specialists. Stakeholders noted the importance of forming appropriate training results within educational programs: the ability of PhC&S specialists to use digital technologies in their professional activities, not at a household level, but at a professional level.

The purpose of the study is to describe the methodology for training PhC&S specialists for the use of digital technologies in professional activities.

II. PECULIARITIES OF PhC&S SPECIALISTS TRAINING FOR THE USE OF DIGITAL TECHNOLOGIES IN PROFESSIONAL ACTIVITIES

The process of training future PhC&S specialists for the use of digital technologies in professional activities takes place under the influence of digital technologies and tools and should be carried out not spontaneously, but purposefully according to the developed method of forming skills to use digital technologies in professional activities. The methodology integrates five components (purpose, content, forms, techniques, and means of teaching) and is implemented considering several methodological approaches (technological, BYOD approach, visual-digital).

The technological approach is involved due to the need to integrate various technologies (educational, informational, digital) into the professional training of PhC&S specialists. This will make it possible to develop skills in using various digital services to create one's own professional content and distribute it through electronic communication channels. The BYOD approach is used to ensure the intensification of training and access to electronic resources for educational and professional purposes, direct mastering of digital health tools on one's own portable devices, which are often more powerful than the material and technical support of higher education institutions. We use a visual and digital approach to visualize dynamically the external, internal, and associative connections of the main concepts and processes (including the processes that occur inside the human body) that combine PhC&S and digital health fields through the use of digital technologies of the specialized direction.

The content of the model is the disciplines "Information and communication technologies in the field of PhC&S" (the goal is to form ideas about digital technologies in the field of PhC&S in general) and "Digital health technologies in the field of PhC&S" (the goal is to develop: knowledge about health and healthy lifestyle, digital technologies for maintaining and controlling one's health and the health of others; ability to use digital health tools in professional activities; reflection skills about the use of digital means health).

The discipline "Information and communication technologies in the field of PhC&S" involves the formation of knowledge about digital resources for educational and sports purposes, knowledge about specialized software and cloud services for the creation of various types and formats of sports materials (photos, audio, and video); skills to search for the special digital resources in all the kinds of sports, skills to use DT and cloud services to create/process author's content (photos, videos) in their own sports specialization. The discipline is studied in the first year, has a minimum volume (3 ECTS credits), and does not allow a fully demonstrate of the potential of digital technologies and means for specialists in the field of PhC&S. The course program involves mastering a number of topics.

The discipline "Digital health technologies in the field of PhC&S" is studied in the 3rd year of training (3 credits). Her program involves mastering such topics (Figure 1).

- Topic 1.**
- Digital resources in the field of PhC&S. Search and processing of information in a professional direction. Digital tools of the PhC&S specialist. Mobile applications as coaching tools. A trainer's personal digital network.
- Topic 2.**
- Digital health. Modern approaches to the interpretation of digital health technologies. Digital health tools in the activity of a PhC&S specialist.
- Topic 3.**
- Peculiarities of using digital health tools in the training process. General principles and conditions for using digital health tools. Designing the training process using digital health tools.

Figure 1. The program topics of discipline "Digital health technologies in the field of PhC&S"

Note that the introduction of the topic "Digital resources in the field of PhC&S. Search and processing of information in a professional direction" is due to a cursory consideration of the methods of searching for information on the Internet in the general course "Information and communication technologies in the field of PhC&S", since it is believed that the school course of Computer Science provided relevant knowledge and skills. However, as our experience shows, the level of general preparation of students majoring in "017 Physical Education and Sports" in the field of digital technologies is mostly low and average, and therefore we consider it important to develop knowledge and ability to use information search and processing methods, including those of professional direction. For this, search systems and queries, peculiarities of searching for various types of information, etc. are considered and the following types of tasks are offered: search for information about interesting (non-standard) facts from the history of Olympic sports and summarize them in the form of essays, presentations (e.g., on doping scandals), a compilation of tables (e.g., on characteristics of specialized software).

Among the methods of learning in the conditions of traditional forms of the educational process (practical classes) organization, we single out a problem-based method as one of the leading methods.

Among the tools, we consider practice-oriented exercises and exercises for the development of critical thinking of the youth to be effective. Exercises for filling in tables with blanks are classified as exercises of the first type. For the second type of exercise for the formation of skills using Internet resources, specialized social networks, or YouTube channels, "Find the mistake" exercises were offered: e.g., a video of performing a forward roll was provided, after which it was necessary to characterize possible consequences of incorrect performance of the exercise, to give approximate physical loads indicators, describe digital health indicators if a certain type of hardware was used. With reference to Internet resources, students had to justify the error and the reason for its appearance, propose possible ways to eliminate it, provide recommendations for its prevention, and describe the digital characteristics of digital health tools. The exercise ended with a multimedia presentation of the results and their discussion.

Future PhC&S specialists conducted a content analysis of the specialized resources, analyzed the possibilities of placing the author's materials and published their own video on social networks. Further discussion of video materials in social networks and interaction in web communities with classmates and teachers performed the function of reflection and contributed to the development of critical thinking. The practice has shown that such tasks contribute to the formation of students' abilities to argue their own views, search, select and analyze information, and develop communication skills.

An important element of training was mastery of various digital health tools aimed at recording individual physical characteristics of health and various software in the field of health. Among them: are pedometers; electronic bracelets, where it is possible to measure the amount of physical exertion (number of kilometers traveled, number of floors climbed, etc.), physical parameters of the body (pulse, pressure, weight, sleep characteristics, etc.); calorie counters (MyFitnessPal, FatSecret, Diet&Diary); fitness apps (Endomondo, Nike Training Club, InShapeFree, RunKeeper, SamsungGearFit). The purpose of mastering such tools was the formation of reflection skills regarding the restoration and improvement of one's own health by monitoring the dependence between a person's health and physical exertion.

When selecting the exercises, we took into account that they should be multifunctional, and meet such requirements as comprehensibility; professional orientation; availability of instructions for a certain type of action with specialized material; novelty.

III. CHECKING THE EFFECTIVENESS OF THE AUTHOR'S METHODOLOGY

To test the effectiveness of the described methodology, a pedagogical experiment was conducted, which was based on a comparison of the average in two samples (control (102 people) and experimental (81 people) groups). Students of the specialty " PhC&S " were acquainted with the features of the experiment, its

goals, and methods of data collection. The data was collected during 2019-2022.

We proceeded from the fact that groups can have different levels of their ability to use DT in professional activities. Therefore, at the beginning of the pedagogical experiment, the similarity of samples regarding the ability to use digital technologies in professional activities was confirmed. We used the rating points of students in the discipline "Information and communication technologies in the field of PhC&S". For the statistical hypotheses "H₀: the averages of both groups are statistically the same" and "H_a: the averages of both groups are different statistically" the criterion of chi-square Pearson was applied. At the significance level of 0.05, the null hypothesis was confirmed by the statistical similarity of the averages [5; 14].

Then the students of the experimental group studied the special course "Technology of digital health", after which the students of both groups were asked to complete individual tasks: to develop a program of health activities for a given age group with a certain sports specialization, in which to foresee the monitoring of possible physical parameters using digital health tools and information support of the program in social networks.

The task was aimed at testing the skills to use DH in the professional activities of future PhC&S specialists. The evaluation criteria for the final task were: taking into account age (1 point); consideration of sports specialization (1 point); use of digital health technologies (1 point), number of physical health indicators monitored (up to 2 points), information support of the program (up to 2 points). The maximum possible result is 7 points.

For statistical analysis, the Pearson chi-square criterion with the same hypotheses was again used ("H₀: the averages of both groups are statistically the same" and "H_a: the averages of both groups are statistically different"). The critical value of the criterion for a significance level of 0.05 and three degrees of freedom is 7.815. The calculated value of the criterion is 8.94. Therefore, the alternative hypothesis H_a is accepted: the averages of the two groups are different, and in the experimental group, the average score is higher (72 in control group vs. 76 in experimental group). Statistical analysis proves that in the experimental group, the differences in the results are not random, they are higher in relation to the results of the control group. The analysis confirmed the effectiveness of the developed methodology, focused on the formation of the skills of future specialists of PhC&S to use digital technologies in professional activities.

IV. CONCLUSION

Active development of digital technologies and tools determines their use in the professional activities of PhC&S specialists. Among the variety of digital technologies and tools in the field of PhC&S, digital health should be noted as the integration of digital technologies with the field of health care.

Digital technologies in the professional activities of PhC&S specialists are connected with the use of mobile

communication technologies and access to Internet resources. Digital health tools include hardware (wireless devices, e.g., pulse oximeter, fitness bracelets, Smart Band tracker, microcontrollers, etc.) and software (e.g., MyFitnessPal, Waterbalance), social networks, and health information technologies.

Mastering the listed technologies and tools is an important result of the training of future specialists of PhC&S, which integrates traditional forms of training (practical classes) with problem-based methods and tools (practically oriented exercises and exercises for the development of critical thinking) and provides for the modernization of the content of professional training.

The conducted study actualizes the problem of training future physical education specialists to use digital technologies in the conditions of non-formal/informal education. The study of the problems that stand in the way of successful training of future PhC&S specialists to use digital health tools and the development of recommendations for their avoidance also remain relevant.

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