ORIGINAL ARTICLE

Professional-applied physical training of future specialists in the oil and gas industry with the predominant use of the game method

Roman Boichuk[ABCDE], Oleh Vintonyak[ABCDE], Volodymyr Kryzhanivskyi [ABCDE],
Roman Mikhailenko [ABDE], Andriy Shankovskyi [ABDE], Ihor Belyavskyi[ABE], Andriy Hrabchuk[ADE]

Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas, Ukraine

Authors' Contribution: A – Study design; B – Data collection; C – Statistical analysis; D – Manuscript Preparation; E – Funds Collection.

Abstract

Background and Study Aim: Physical training plays a crucial role in preparing future specialists for the demands of the oil and gas industry, where physical endurance and coordination are essential for professional activities. Implementing effective training methods can enhance students' physical preparedness and overall performance. To identify the pedagogical conditions for using the game method in the process of professional and applied physical training of oil and gas students.

Material and Methods: The study involved students of the specialty "Oil and gas engineering" aged 17–18 (n=60). The students were divided into a control (n=30) and an experimental group (n=30). Physical fitness was assessed using motor tests that evaluated key motor qualities, including strength, endurance, speed, flexibility, and coordination abilities.

Results: Widespread use of the game method contributed to a higher growth rate of the development level of most indicators of physical fitness among students of the experimental group. Significant improvement in physical fitness indicators ($p < 0.05$) was found in almost all indicators in both groups. However, in the experimental group, an improvement ($p < 0.001$) was found in 9 out of 11 indicators. In the control group, a significant improvement in the results ($p < 0.001$) occurred only in 5 out of 11 cases. The use of the game method contributed to a higher growth rate of the development level of coordination abilities in students of the experimental group. Significant improvement ($p < 0.001$) in the experimental group was found in 2 out of 3 indicators of coordination preparedness. Along with this, a significant increase in such professionally significant motor quality as general endurance at the level ($p < 0.001$) was found in students of the experimental group (test "3000 m running").

Conclusions: During the planning of physical education classes, the content, means and methods should be focused on the game form of learning, because game activity is distinguished by its intensity, dynamism, variety and unpredictability of the results of game actions. The use of competitive and game methods in the process of developing students' physical qualities allows students to fully reveal their functional capabilities and fully realize their motor potential. Theoretical and methodological training of students in physical education classes is a kind of basis for improving the development of motor qualities, strengthening and maintaining health, forming students' readiness for independent use of physical education tools for personal self-improvement.

Keywords: professional, applied, physical, training, petroleum, engineers, game, method.

Introduction

The oil and gas industry remains one of the key sectors of the global economy, meeting a significant portion of the world's energy needs. This explains the significant number of higher educational institutions that are currently training specialists of various profiles and levels for oil and gas production, as well as the strong interest among young people worldwide in obtaining a higher education in the oil and gas field. However, professionals in this field operate in challenging climatic and industrial conditions, requiring not only high technical qualifications but also a well-developed level of physical fitness. Extended shifts, work in extreme environments, and physically demanding tasks make physical preparedness a critical factor in professional suitability [1, 2, 3].

As emphasized above, working in the oil and gas industry places high demands on the health, physical and mental qualities of employees. Factors that have a negative impact on the health of specialists include: a high production accident hazard, the use of regional and interregional shift work methods, a combination of shift work methods and variable work regimes, the presence of harmful production factors, the isolated location of gas fields and compressor stations, intensive work that is replaced by a long period of rest, a change in the social environment and psychological microclimate

doi:10.15561/20755279.2025.0105

of shift teams. Among the specialties of the oil and gas profile, the professions of search, extraction, transport and processing of petroleum products are among the most harmful and dangerous. Most specialists are required to manually lift and transport heavy loads. At the same time, the work is carried out in conditions of sharp changes in temperature and humidity, as well as noise and vibration generated by oil equipment. Many specialists deal with substances harmful to health. The work is physically demanding and tiring and is performed at any time of the day or season, regardless of the weather and without adequate shelter from adverse environmental factors. All this puts forward increased requirements for the physical and mental readiness of specialists for professional activity [4, 5, 6].

According to [7, 8] the process of physical education for professional orientation in higher education institutions should be carried out for students of all specialties throughout the entire period of educational activity. After all, the similarity of the type of sport or its elements with the basic requirements of the profession for the human body ensures a high professional-applied effect of sports training, which is felt even after the cessation of sports. Researchers [9, 10] analyzing various types of motor activity argue that some sports have a training effect on functions without a high level of development of which the full profession assimilation is impossible. While other types of motor activity favorably affect the body's systems, which provide adaptation to professional conditions.

Game activity in general and various technical and tactical actions of sports games in particular have unique properties for the formation of vital skills and abilities of students, contribute to the comprehensive development of their physical and mental qualities. The process of improving technical and tactical actions in sports games is an effective means of strengthening health and recreation and can be used by a person throughout his life [11, 12].

For the effective professional activity of future specialists in the oil and gas industry, such motor abilities as strength, endurance (general and static), coordination abilities, and speed will be of great importance. Among the psychophysiological functions, priority is given to vestibular stability, attention functions (switching, distribution), operational thinking, and reaction speed. Important personality qualities are courage, determination, communicability, resistance to adverse conditions [13, 14].

In this context, the importance of certain psychophysical and personal qualities for successful gaming activities is evident. The authors [15, 16] highlight skills such as the ability to navigate in short time frames of the game, speed of decision making, teamwork and quick joint decision making to achieve set goals. Equally important is the sense of mutual help and assistance, the ability to spread and concentrate attention on one or more objects, differentiation of muscle efforts, interaction with partners in a limited space, the ability to overcome stressful situations. Among the motor qualities, coordination abilities, strength, speed, endurance, flexibility should be highlighted. Moreover, sports games are characterized by a significant variety of movements of varying intensity, saturated with elements of running and jumping. Great mobility, the need to quickly respond to a constantly changing game situation, place high and versatile demands on the body. All this leads to an increase in the strength and mobility of nervous processes, improvement of coordination abilities, improvement of functions of the visual analyzer, strengthening of blood circulation and respiration, development of mental functions such as attention, memory, and thinking. As evident, training methods that incorporate elements of sports games align with the objectives of applied physical training of future oil and gas industry professionals [17, 18].

As noted by the authors [19, 20] the advantage of sports games as a factor of adaptation to educational and professional activities is not only that they can be used to model different situations faced by students and professionals in the oil and gas industry, but mainly because they are the most adequate means of raising essential qualities and skills. Thus, a contradiction was revealed between the need for widespread use of the game method in the process of professional and applied physical training of future oil and gas specialists on the one hand and the insufficient development of this problem on the other. This indicates the relevance and expediency of conducting this study.

Hypothesis. It is assumed that the extensive use of outdoor and sports games in the process of professional- applied physical training of oil and gas students will contribute to improving the level of development of professionally significant psychophysical qualities.

Study purpose to identify the pedagogical conditions for using the game method in the process of professional and applied physical training of oil and gas students.

Material and Methods

Participants

The experiment involved students studying in the specialty "Oil and Gas Engineering and Technologies" (n=60). Students aged 17–18 years were divided into control (n=30) and experimental groups (n=30). The created groups were identical in terms of physical fitness level. The study protocol was approved by the Commission on Ethics, Integrity

and Gender Equality of the Ivano-Frankivsk National Technical University of Oil and Gas (Ukraine) (No.1 dated 20.12.2024).

Research Design

The pedagogical experiment lasted 9 months. Assessment of physical fitness was carried out with the help of motor tests, which determine the manifestation of the main motor qualities: strength, endurance, speed, flexibility and coordination abilities. Testing was conducted at the beginning and end of the experiment.

Test 1: 100 m running (s).

Test 2: Pull-ups (number of times).

Test 3: Bant-Arm Hang Test (s) [21].

Test 4: 3000 m running (min).

Test 5: Standing long jump (cm).

Test 6: Vertical Jump Test (cm).

Test 7: Handgrip Strength Test (kg) [22].

Test 8: Numbered medicine ball run test (s) [23].

Test 9: Balsom Agility Test with basketball dribbling (s) [24].

Test 10: Sprint at the Given Rhythm Test with basketball dribbling (s) [24].

Test 11: Stand and Reach Flexibility Test (cm) [21].

The control and experimental groups trained 2 times a week for 2 hours. In addition, students of both groups were provided with 2-3 hours of independent activities with physical exercises to improve the level of development of professionally relevant physical qualities and skills. The content of the classes and training loads were similar in both groups. The only exception was the specifics of using the game method. In the control group, classes were conducted in accordance with the recommendations [25, 26] for conducting physical education classes with students at a higher education institution. In the experimental group, a special program of professional-applied physical training was applied with the predominant use of the game method. Preference was given to the game method because it eliminates monotony, involves rapid changes in game situations, and introduces unpredictability. For this reason, the game method was applied when studying almost all sections of the curriculum, including athletics and swimming. Moreover, training process in experimental group was divided into fixed practice and random practice. Fixed practice was used when new motor actions were learned. That is, a lot of repetitions over and over without many distractions and almost at the same position, whereas, during the random practice students did lots of repetitions without any repetition which was similar like one before. This method was used in order to provide high level of transfer from the training process to the real game situations. Since, sports games like volleyball or basketball do not have the same actions, there are similar ones but not the same. Small-side games 1v1, 2v2 or 3v3 or 4v4 were often used in experimental group. During these games students had an opportunity to touch the ball many times and learn how to work as a team. Moreover, experiencing friendly competition, this version of sports games lays a solid foundation for the development of professionally significant psychophysical qualities of the future petroleum engineers.

The meaningful orientation of using the game method for the development of motor qualities was as follows. If the purpose of the lesson was the development of strength, then it included mobile games with a short-term speed-power load and various forms of overcoming the opponent's muscle resistance in direct contact with him. The main content components of such games include pulling, collisions, holding, pushing, elements of wrestling, weightlifting, armwrestling. To develop speed, games were used that required instant responses to visual, auditory and tactile signals. To improve this motor quality, motor tasks with periodic acceleration, sudden stops, rapid jerks, short-distance running, and other motor acts aimed at consciously and purposefully outpacing the opponent were also used. To develop agility, games were used that involved precise coordination of movements and quick coordination of actions between teammates. To develop endurance, games were used that require a significant expenditure of strength and energy with frequent repetition of complex motor operations or prolonged continuous motor activity.

Along with this, the experimental group paid great attention to the assimilation of theoretical knowledge by students. Since, in our opinion, this was only one way to teach students the psychophysiological features of the work of specialists in this field. It was also shown how the use of physical culture and sports contributes to increasing and restoring the efficiency of specialists in the oil and gas industry. Great attention was paid to the methodology of selection of physical exercises and sports in order to combat industrial fatigue and prevent occupational diseases.

Statistical analysis

Statistical data processing was carried out using Microsoft Excel and SPSS programs. The following parameters were determined for each indicator: arithmetic mean ($\bar{X}$), standard deviation (δ), error of arithmetic mean (m), estimating the validity of differences by Student's t-test with the corresponding significance level (p). Differences were considered significant at a significance level of $p < 0.05$.

Results

Prior to the pedagogical experiment, no

statistically significant differences were found between the experimental and control groups. It was found that the widespread use of the game method contributed to a higher growth rate of the development level of most indicators of physical fitness among students of the experimental group. Significant improvement in physical fitness indicators ($p < 0.05$) was found in almost all indicators in both groups. However, in the experimental group, an improvement ($p < 0.001$) was found in 9 out of 11 indicators (Table 1). In the control group, a significant improvement in the results ($p < 0.001$) occurred only in 5 out of 11 cases.

Classes of physical education conducted during 9 months, taking into account the characteristics of the future profession (in the amount of 6-7 hours per week) led to a significant improvement in both groups: the indicator of speed qualities (the test "run 100 m"); indicator of the manifestation of power qualities (Pull-ups test); power endurance indicator (Bant-Arm Hang Test); ($p<0.001$). It was found that the use of the game method contributed to a higher growth rate of the development level of coordination abilities in students of the experimental group. At the end of the experiment, a significant improvement ($p < 0.001$) in the experimental group was found in 2 out of 3 indicators of coordination preparedness. While in the control group no improvement at this level was found in any of the indicators (Table 2). Along with this, a substantial growth in such professionally significant motor quality as general endurance at the level ($p < 0.001$) was found in students of the experimental group (test "3000 m running").

Table 1. Change in physical fitness of students in the experimental group (n=30)

№	Indicator	Before experiment			After experiment			t	p
		$\bar{x}$	δ	m	$\bar{x}$	δ	m		
1	100 m running (s).	13.6	0.59	0.12	13.47	0.53	0.11	6.32	0.001
2	Pull-ups (number of times).	13.1	2.9	0.58	14.1	2.3	0.45	5.8	0.001
3	Bant-Arm Hang Test (s).	39.5	9.4	1.87	42.4	8.3	1.67	5.4	0.001
4	3000 m running (min).	14.0	0.61	0.11	13.6	0.55	0.12	9.3	0.001
5	Standing long jump (cm).	232.3	12.8	2.6	236.0	11.2	2.3	7.8	0.001
6	Vertical Jump Test (cm).	43.7	4.9	0.9	45.2	4.3	0.9	6.2	0.001
7	Handgrip Strength Test (kg).	44.1	6.1	1.3	45.7	5.7	1.2	6.6	0.001
8	Numbered medicine ball run test (s).	13.0	0.96	0.2	12.8	0.79	0.16	3.2	0.004
9	Balsom Agility Test with basketball dribbling (s).	13.6	0.55	0.1	13.4	0.49	0.1	4.0	0.001
10	Sprint at the Given Rhythm Test with basketball dribbling (s).	6.9	0.54	0.11	6.6	0.41	0.09	6.8	0.001
11	Stand and Reach Flexibility Test (cm).	11.6	2.5	0.5	11.8	2.1	0.4	2.3	0.029

Table 2. Change in physical fitness of students in the control group (n=30)

№	Indicator	Before experiment			After experiment			t	p
		$\bar{x}$	δ	m	$\bar{x}$	δ	m		
1	100 m running (s).	13.7	0.37	0.07	13.6	0.35	0.06	5.01	0.001
2	Pull-ups (number of times).	13.1	2.7	0.5	13.6	2.4	0.4	3.5	0.002
3	Bant-Arm Hang Test (s).	41.4	12.3	2.24	42.4	11.8	2.25	4.01	0.001
4	3000 m running (min).	13.8	0.46	0.08	13.7	0.51	0.09	2.9	0.007
5	Standing long jump (cm).	228.4	11.7	2.1	230.0	11.8	2.2	4.02	0.001
6	Vertical Jump Test (cm).	43.4	6.2	1.14	44.1	5.8	1.07	4.6	0.001
7	Handgrip Strength Test (kg).	43.5	5.2	1.0	43.9	5.0	0.9	3.9	0.001
8	Numbered medicine ball run test (s).	13.2	0.8	0.14	13.1	0.8	0.14	1.8	0.09
9	Balsom Agility Test with basketball dribbling (s).	13.8	0.6	0.1	13.7	0.5	0.1	2.7	0.01
10	Sprint at the Given Rhythm Test with basketball dribbling (s).	6.8	0.47	0.09	6.7	0.45	0.08	3.1	0.004
11	Stand and Reach Flexibility Test (cm).	11.7	2.95	0.55	12.0	2.81	0.52	2.6	0.016

Discussion

It is known that in recent years, scientific research has been repeatedly conducted on the problem of improving the professional orientation of physical education in educational institutions of various profiles [10, 27]. It is emphasized that scientific and technological progress significantly changes the conditions of human life and activity. In this regard, the social order in the field of physical education is changing. Researchers talk about the psychophysical preparation of future specialists [28]. However, the current system of physical education does not fully ensure the psychophysical readiness of graduates of higher educational institutions for life and professional work and requires further improvement [29, 30, 31].

Our theoretical analysis showed that at this time the issue of intensification of production was acute. As a result, requirements for the quality of preparation of specialists in higher education institutions for specific types of professional activity are increasing. In this regard, there is a need to profile physical education taking into account the requirements of the chosen profession. However, as noted by [32], existing programs for physical education of students are limited to general recommendations without specific models of regimes for the development of general and special professional qualities. In this regard, more than half of graduates of higher educational institutions are not able to work qualitatively with the efficiency that modern production requires. A new approach to solving this problem is to assert the applied importance of physical education, and to form the motivation among students by demonstrating the real necessity and usefulness of the proposed physical differentiated exercises taking into account the state of health and further career expectations [33, 34].

The hypothesis formulated in this study regarding the positive impact of the predominant use of the game method in the process of professional and applied physical training of future petroleum engineers supported by the works of other researchers [26, 35] who have studied the optimization of the process of physical education for students. According to their beliefs, the basis of the influence of sports games on the success of professional activity is based on the mechanism of transferring developed motor skills in the process of gaming activity to the result of mastering skills and abilities in labor activity. The main goal of such classes is to increase the range of functional capabilities of the human body, expand the arsenal of its motor coordination, and ensure effective adaptation of the body to various factors that occur in production.

The results of the pedagogical experiment showed a significant increase in the indicators that characterized the endurance and speed of the students of the experimental group. These students were able to widely use sports and outdoor games as a means of complex development of their motor qualities. A similar conclusion was reached by other researchers [36, 37], who are convinced that physical qualities are most effectively developed by an integrated method. Along with this, a high level of endurance is of key practical importance for future petroleum engineers. It is established that work in the oil and gas industry involves various types of labor that can be performed indoors, outdoors, at height, in confined spaces, and under conditions of extreme temperatures, varying lighting, noise, vibration, and gas pollution. Often, specialists have to work in special clothes, a respirator, go down and climb to a great height, work in two or three shifts, stay for a long time in a tense position (sitting, standing) [13].

The next important factor that should be noted in the study is a significant increase in indicators that characterized the power qualities of students of both groups. However, in the experimental group they were more significant. This is explained by the constant use of a competitive, game-based method in this group and the search for ways to compete with group partners in each motor task used in the lesson. Power qualities are an essential factor in the structure of professionally significant psychophysical qualities of future specialists in the oil and gas industry and characterize the ability of a person to counteract or overcome external resistance due to muscle efforts . Moreover, professional activity in this field involves a selection system taking into account health status, functional, mental characteristics, and professional qualities. It is known that health reserves increase non-specific adaptation, the level of functional capabilities of the body, the growth of resistance to adverse effects achieved by using physical culture factors. As a result, each student must prepare in advance and actively for their chosen profession, purposefully strengthening their health, improving professionally significant motor and mental qualities. These qualities serve as an important competitive advantage in employment in the oil and gas industry and will largely determine their success in future professional activities [3, 29].

The widespread use of sports and outdoor games in the experimental group led to a significant improvement in the indicators of coordination abilities. These data are consistent with the results obtained by other authors [38, 39, 40]. At the same time, according to Lyakh [41], coordination abilities are psychomotor properties (features) of an individual, determining his readiness for optimal control and regulation of motor actions. Experts, in particular, recommend distinguishing between the concepts of “coordination of movements” and “coordination abilities”. The first is the organization

of controllability of movements, and the second is the properties necessary for the optimal course of this process. Coordination abilities play a special role in the professional and applied physical training of petroleum engineers due to the fact that their work is rarely stereotyped in terms of the composition of motor actions. A specialist must constantly operate in changing conditions and use a variety of devices. This requires them to be able to perform fast, accurate and economical movements, as well as to develop dexterity and coordination of hand and finger movements. It follows from this that in the process of professional physical education of future specialists in the oil and gas industry, high-quality coordination training is also necessary. In accordance with this [42], coordination training should be understood as a purposeful pedagogical process for the development of coordination abilities that provide rational construction of movements and expedient reconstruction of motor activity. The main tasks of coordination training of students of technical specialties are: systematic mastery of new motor actions, development of abilities for differentiation of spatial, temporal and power parameters of movements, ability to rebuild movement programmes, ability to bind movement activities, orientation, reaction speed, rhythm, balance, arbitrary relaxation of muscles. An important task of this process is also the development of psychophysiological functions (sensory, perceptual, intellectual) [43, 44].

The competitive nature of sports games, the independence of actions, the continuous change of situations, successful action or failure cause students to manifest various feelings and experiences that affect their activities. This creates favorable conditions for future petroleum engineers to develop the ability to manage emotions without losing control over their actions. Carrying out game actions in changing conditions requires the manifestation of high independence of students. At the same time, the work of an engineer of oil and gas production can be classified as intense types of labor with a significant nervous and emotional component due to the large amount of incoming information and a high degree of probability of accidents. Sometimes an engineer needs to quickly make a decision and perform a motor action in a minimum period of time [17, 45].

Therefore, the data we obtained confirmed that sports and outdoor games are excellent means of motor activity that help achieve the goal of forming the foundations of the physical and spiritual culture of the student's personality. Frequent use of the game method in the process of physical education of students contributes to increasing health resources, as a value system that is actively and long-term implemented in a healthy lifestyle. Along with this, further research is needed to find ways to improve the motivation of students to self-exercise. As the volume of physical education classes in higher education institutions is reduced, and the requirements for the psychophysical qualities of oil engineers are increasing. It seems that more time needs to be devoted to providing students with the necessary amount of theoretical knowledge to form skills in the correct use of physical education and sports facilities in the work and rest regime, improving health, leading a healthy lifestyle, and maintaining high work capacity.

Conclusions

1. At this time, physical education classes in higher education institutions, should promote the development of high moral values, strong willpower, and physical qualities in students, as well as support health improvement, and the comprehensive development of the body. In addition to this, at each lesson it is necessary to form motor skills and abilities from the chosen profession, to develop motor qualities inherent in future production activity and professionally important abilities.
2. During the planning of physical education classes, the content, means and methods should be focused on the game form of learning, because game activity is distinguished by its intensity, dynamism, variety and unpredictability of the results of game actions. This contributes to the improvement of students' motor readiness, the development of coordination abilities, muscle strength, endurance, and speed.
3. It is important to use competitive and game methods in the process of developing students' physical qualities. These methods allow students to fully reveal their functional capabilities and fully realize their motor potential. In the process of games and competitions, a student can reach the level of limit functional manifestations and perform work that is impossible during training sessions.
4. Theoretical and methodological training of students in physical education classes is a kind of basis for improving the development of motor qualities, strengthening and maintaining health, forming students' readiness for independent use of physical exercises for personal self-improvement. The acquired theoretical and methodological knowledge allows the student to correctly assess the social significance of physical culture and sports, to understand the objective laws of physical education as a pedagogical phenomenon.

Conflict of interests

The authors declare that there is no conflict of interests.

References

1. Ram J. *Gas to Power & Implications for Economic Diversification in Guyana* [Internet]. Guyana Business Journal (GBJ) & Caribbean Policy Consortium (CPC) March, 2022 [updated 2024 Jun; cited 2024 Sep 28]. Available from: https://guyanabusinessjournal.com/wp-content/uploads/2022/03/Guyana-Gas-to-Power_Justin_Ram_GBJ_CPC_03_30_2022.pdf
2. Fauriol GA. Oil and Security. In: *Oil and Climate Change in the Guyana-Suriname Basin*, 1st ed. London: Routledge; 2024. P. 48–62. https://doi.org/10.4324/9781003457718-5
3. Anikeienko L, Bilokon V. The formation of professionally important mobile qualities in the professional and applied training of students national technical university of Ukraine "Igor Sikorsky Kyiv Polytechnic Institute". *Scientific Journal of National Pedagogical Dragomanov University Series 15 Scientific and pedagogical problems of physical culture (physical culture and sports)*, 2024;(10(183)): 256–259. https://doi.org/10.31392/UDU-nc.series15.2024.10(183).47
4. Yefremova A, Shesterova L, Organizational aspects of an experimental program for physical education with a strengthened course in professional and applied physical training of future electrical engineers in the railway sector. *Slobozhanskyi Herald of Science and Sport*, 2017;59(3): 34–39. https://doi.org/10.15391/snsv.2017-3.006
5. Suruciuc B. Professional application guidelines of technological high school physical education: problems and perspectives. *The Science of Physical Culture*, 2022;(38/2): 165–170. https://doi.org/10.52449/1857-4114.2021.38-2.10
6. Görner K, Reineke A. The influence of endurance and strength training on body composition and physical fitness in female students. *Journal of Physical Education and Sport*, 2020; *20(*Supplement issue 3*)*, 2013–2020. https://doi.org/10.7752/jpes.2020.s3272
7. Klymovych V, Oderov A, Romanchuk S, Korchagin M, Chernozub A, Olkhovyi O, et al. The Influence of Professionally Oriented Physical Training Means on the Operator's Physical Ability Level. *Sport Mont*, 2020;18(1). https://doi.org/10.26773/smj.200204
8. Grinko V, Luchko O, Dovzhenko S. Vocational and applied physical training in the system of physical education of the railway profile. *International Journal of Sports, Health and Physical Education*, 2023;5(1): 25–31. https://doi.org/10.33545/26647559.2023.v5.i1a.50
9. Griban G, Dzenzeliuk D, Dikhtiarenko Z, Yeromenko E, Lytvynenko A, Otravenko O, et al Influence of Sambo Wrestling Training on Students' Physical Fitness. *Sport Mont*, 2021;19(1): 89–95. https://doi.org/10.26773/smj.210219
10. Dereka T, Sheiko V. Model of the professional and applied physical training of nurses. *University Review*. 2021;15(3):12–20.
11. Sgrò F, Pignato S, Lipoma M. Assessing the impact of gender and sport practice on students' performance required in team games. *Journal of Physical Education and Sport*. 2018;18:497–502.
12. Boone EM, Leadbeater BJ. Game On: Diminishing Risks for Depressive Symptoms in Early Adolescence Through Positive Involvement in Team Sports. *Journal of Research on Adolescence*, 2006;16(1): 79–90. https://doi.org/10.1111/j.1532-7795.2006.00122.x
13. Maury V. Specific and compared difficulties in works at great depth in mining civil engineering and oil industry from a rock mechanics perspective. In: *Prediction and Performance in Rock Mechanics and Rock Engineering*, 1st ed. London: Routledge; 2022. P. 1553–1568. https://doi.org/10.1201/9780203742334-19
14. Witter RZ, Tenney L, Clark S, Newman LS. Occupational exposures in the oil and gas extraction industry: State of the science and research recommendations. *American Journal of Industrial Medicine*, 2014;57(7): 847–856. https://doi.org/10.1002/ajim.22316
15. Xin Z, Lim SP, Zhao H. The Impact of Sports Games on the Psychological Health of Middle School Students. *Journal of Contemporary Educational Research*, 2024;8(3): 95–100. https://doi.org/10.26689/jcer.v8i3.6400
16. Vavassori R, Moreno MP, Ureña Espa A. The Perception of Volleyball Student-Athletes: Evaluation of Well-Being, Sport Workload, Players' Response, and Academic Demands. *Healthcare*, 2023;11(11): 1538. https://doi.org/10.3390/healthcare11111538
17. Hao X. The influence of volleyball training on the psychological health development of college students. *Revista de Psicología del Deporte (Journal of Sport Psychology)*. 2024;33(1):258–69.
18. Li Y. Structural modelling of student volleyball athletes' intimacy, social adjustment, perceived stress, and learning-related anxiety: mediating role of psychological safety. *BMC Psychology*, 2025;13(1): 15. https://doi.org/10.1186/s40359-024-02299-z
19. Torres-Guerrero J, Caracuel-Cáliz RF, Collado-Fernández D, Torres-Campos B, Párraga-Montilla J, Cepero-González M. Habits of healthy living in adults former athletes of federated competition in the modality of volleyball in the province of Jaen. *Journal of Human Sport and Exercise*, 2024;19(3): 827–845. https://doi.org/10.55860/a36hg406
20. Usra M, Setiawan E, Octara K, Lesmana IB, Ciocan VC. Team game tournaments to improve the enjoyment and basic technical of handball student-athletes: A randomized-controlled trial. *Edu Sportivo: Indonesian Journal of Physical Education*, 2023;4(2): 148–158. https://doi.org/10.25299/es:ijope.2023.vol4(2).12967
21. Tomkinson GR, Carver KD, Atkinson F, Daniell ND, Lewis LK, Fitzgerald JS, et al. European normative values for physical fitness in children and adolescents aged 9–17 years: results from 2 779 165 Eurofit performances representing 30 countries. *British Journal of Sports Medicine*, 2018;52(22): 1445–1456. https://doi.org/10.1136/bjsports-2017-098253
22. Roberts HC, Denison HJ, Martin HJ, Patel

HP, Syddall H, Cooper C, et al. A review of the measurement of grip strength in clinical and epidemiological studies: towards a standardised approach. *Age and Ageing*, 2011;40(4): 423–429. https://doi.org/10.1093/ageing/afr051
23. Peker AT, Vural M. Comparison of Some Coordinative Abilities in Terms of Team and Individual Sports. *Journal of Education and Training Studies*, 2019;7(8): 67. https://doi.org/10.11114/jets.v7i8.4333
24. Boichuk R, Nosko M, Nosko Y, Grashchenkova Z, Petrenko I, Vaskan I, et al. Ways to improve methods of monitoring the coordination abilities of young basketball players aged 13-14. *Pedagogy of Physical Culture and Sports*, 2024;28(6): 489–500. https://doi.org/10.15561/26649837.2024.0603
25. Griban GP, Lyakhova NA, Tymoshenko OV, Domina ZG, Dovgan NYu, Kruk MZ, et al. Current state of students' health and its improvement in the process of physical education. *Wiadomości Lekarskie*, 2020;73(7): 1438–1447. https://doi.org/10.36740/WLek202007124
26. Babalich V, Sobko N, Maleniuk T, Sobko S, Kovalova Y. Modern trends of physical education and sports in the education system of Ukraine. *Revista Amazonia Investiga*, 2023;12(71): 199–213. https://doi.org/10.34069/AI/2023.71.11.17
27. Prontenko K, Griban G, Dovgan N, Loiko O, Andreychuk V, Tkachenko P, et al. Students' Health and its Interrelation with Physical Fitness Level. *Sport Mont*, 2019;17(3). https://doi.org/10.26773/smj.191018
28. Prots R, Yakovliv V, Medynskyi S, Kharchenko R, Hryb T, Klymenchenko T, et al. Psychophysical Training of Young People for Homeland Defence Using means of Physical Culture and Sports. *Brain. Broad Research in Artificial Intelligence and Neuroscience*, 2021;12(3): 149–171. https://doi.org/10.18662/brain/12.3/225
29. Ovcharuk V, Maksymchuk B, Izmail State University of Humanities, Ovcharuk V, et al. Forming Competency in Health Promotion in Technical Specialists Using Physical Education. *Revista Romaneasca pentru Educatie Multidimensionala*, 2021;13(3): 01–19. https://doi.org/10.18662/rrem/13.3/437
30. Lopatiuk O. Innovative technologies in professional training of future specialists in physical education classes. *Education in the 21st Century*, 2023;9(1): 129–136. https://doi.org/10.46991/ai.2023.1.129
31. Shevchenko O, Ruda I, Yazlovetska O, Bielkova T, Davydova N. Professional training of future specialists in physical culture and sports in the information society. *Eduweb*, 2023;17(4): 126–140. https://doi.org/10.46502/issn.1856-7576/2023.17.04.13
32. Sereda I, Lavrin H, Kucher T, Grygus I, Muszkieta R, Napierała M, et al. The Impact of Yoga Practice on the Development of Flexibility among the Female Student's Pedagogical Specialties in the Process of Physical Training of Higher Educational Institutions. *International Journal of Applied Exercise Physiology*.2020;9(1):85–95.
33. Semeniv B, Bilenkiy P, Golubeva O, Vasyliv O, Prystavskyi T. The Development of Motivation towards Physical Training and Sports in Students of Professional Schools. *Physical Education, Sport and Health Culture in Modern Society*, 2017;(1(37)): 83–90. https://doi.org/10.29038/2220-7481-2017-01-83-90
34. Loluță A-G. Intensification of the professional-applicative physical training process of military firefighters. Știința *Culturii Fizice*. 2021;1(37):51–8.
35. Oslin J, Mitchell S. Game-Centered Approaches to Teaching Physical Education. In: *Handbook of Physical Education*, 1 Oliver's Yard, 55 City Road, London EC1Y 1SP United Kingdom: SAGE Publications Ltd; 2006. P. 627–651. https://doi.org/10.4135/9781848608009.n35
36. Mota T, Afonso J, Sá M, Clemente FM. An Agility Training Continuum for Team Sports: From Cones and Ladders to Small-Sided Games. *Strength & Conditioning Journal*, 2022;44(1): 46–56. https://doi.org/10.1519/SSC.0000000000000653
37. McNeil DG, Spittle M, Mesagno C. Imagery training for reactive agility: Performance improvements for decision time but not overall reactive agility. *International Journal of Sport and Exercise Psychology*, 2021;19(3): 429–445. https://doi.org/10.1080/1612197X.2019.1696866
38. Batez M, Petrušič T, Bogataj Š, Trajković N. Effects of Teaching Program Based on Teaching Games for Understanding Model on Volleyball Skills and Enjoyment in Secondary School Students. *Sustainability*, 2021;13(2): 606. https://doi.org/10.3390/su13020606
39. Bashtovenko O, Yarchuk G, Zvekova V, Hancheva K, Silaiev V, Stanieva S. Influence of Sports Games on Coordination Abilities of Adolescents as a Component of Physical Development: Neuropsychological Features. *BRAIN. Broad Research in Artificial Intelligence and Neuroscience*, 2021;12(4): 238–249. https://doi.org/10.18662/brain/12.4/247
40. Petrariu I, Leuciuc FV. Selection Process for Romanian Children in Handball Based on Coordinative Abilities: A Questionnaire Survey. *International Journal of Environmental Research and Public Health*, 2022;19(6): 3672. https://doi.org/10.3390/ijerph19063672
41. Lyakh V. Differences in the level of development and proficiency in coordination motor abilities among female and male athletes of selected combat sports. *Journal of Kinesiology and Exercise Sciences*, 2021;31(96): 11–23. https://doi.org/10.5604/01.3001.0015.7373
42. Jerzy S, Paweł W, Janusz Z, Tomasz N, Mariusz B. Structure of Coordination Motor Abilities in Male Basketball Players at Different Levels of Competition. *Polish Journal of Sport and Tourism*, 2015;21(4): 234–239. https://doi.org/10.1515/pjst-2015-0004
43. Platonov V, Nikitenko A. Agility and Coordination

Testing in Hand-to-Hand Combat Sports. *Polish Journal of Sport and Tourism*, 2019;26(2): 7–13. https://doi.org/10.2478/pjst-2019-0008

44. Hirtz P, Starosta W. Sensitive and critical periods of motor co-ordination development and its relation to motor learning. *Journal of Human Kinetics*. 2002;7:19–28.

45. Hidalgo YQ, Sánchez JIR, Callejas TW, Sabates HRR. Psychological actions for tactical thinking development on solving tasks in school volleyball. *International research journal of management, IT and social sciences*, 2019;6(6): 128–134. https://doi.org/10.21744/irjmis.v6n6.784

Information about the authors:

Roman Boichuk; (Corresponding author); https://orcid.org/0000-0001-7377-6211; roman-boychuk@ukr.net; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Oleh Vintoniak; https://orcid.org/0000-0003-4940-1238; sport@nung.edu.ua; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Volodymyr Kryzhanivskyi; https://orcid.org/0000-0003-3845-5134; volodymyr.kryzhanivskyi@nung.edu.ua; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Roman Mikhailenko; https://orcid.org/0000-0003-2998-3605; mixaulenko@ukr.net**;** Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Andriy Shankovskyi; https://orcid.org/0000-0003-2904-662X; andrii.shankovskyi@nung.edu.ua; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Ihor Belyavskyi; https://orcid.org/0000-0003-0628-9418; i.leoniduch@gmail.com; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Andriy Hrabchuk; https://orcid.org/0000-0003-1519-8825; Andrii_Hrabchuk@ukr.net; Department of Physical Education and Sports, Ivano-Frankivsk National Technical University of Oil and Gas; Ivano-Frankivsk, Ukraine.

Cite this article as:
Boichuk R, Vintonyak O, Kryzhanivskyi V, Mikhailenko R, Shankovskyi A, Belyavskyi I, Hrabchuk A. Professional-applied physical training of future specialists in the oil and gas industry with the predominant use of the game method. *Physical Education of Students,* 2025;29(1):49–57. https://doi.org/10.15561/20755279.2025.0105

Received: 05.01.2025

Accepted: 23.02.2025; Published: 28.02.2025