

## Application of fitness technologies to increase motor activity and physical fitness of adolescents

NATALIIA NESTERCHUK<sup>1</sup>, SERHII RABCHENIUK<sup>2</sup>, ALINA KURIATA<sup>3</sup>, HALYNA BOREIKO<sup>4</sup>,  
DARIUSZ SKALSKI<sup>5</sup>

<sup>1</sup>Department of Physical Therapy, Educational and Scientific Institute of Health, National University of Water and Environmental Engineering, Rivne, UKRAINE

<sup>2</sup>Department of Theory and Methodology of Physical Education, National University of Water and Environmental Engineering, Rivne, UKRAINE

<sup>4</sup>Department of theatrical direction, Rivne State Humanitarian University, Rivne, UKRAINE

<sup>5</sup>Department of the physical culture, Academy of Physical Education and Sport of Jędrzej Śniadecki in Gdansk, POLAND

Published online: October 30, 2021

(Accepted for publication October 15, 2021)

DOI:10.7752/jpes.2021.s5389

### Abstract

*Purpose:* to prove the positive effect of fitness technologies on the physical fitness of adolescents. *Design:* a randomized controlled trial. *Participants:* the study involved the students of the 7 grade (12-13 years old), who were then divided into the main group and control group each containing 62 members. *Interventions:* the members of the control group were trained using the traditional methodology, while the students of the main group were exposed to the developed fitness technologies. *Main Outcome Measures:* we were looking into the students': Flexibility (trunk bending from a sitting position (cm)); muscle strength (lifting the torso to a sitting position from the starting position lying on your back (number of times) for 30 s); strength (chest press (number of times) boys from the floor, girls from the bench). To evaluate the functional condition of the body, we measured: heart rate; arterial pressure, Ruffier-Dickson test; **BFOF**- blood flow optimization factor. *Results:* The lessons involving the developed fitness technologies started with an active dancing warm-up, were mostly based on a variety of general strengthening exercises that develop the correct posture and strengthen all muscle groups, and finished with exercises for flexibility and stretching each particular muscle group. Various methods were used in order to regulate the physical load on the students, including the "periodical" and "continuous training". During the lessons, we changed the pace and intensity of the exercises depending on the music playing in the background. The final part of the lesson included exercises for flexibility in the lying and sitting positions, as well as yoga asanas, which were performed statically to calm music (10-15 s). Incorporating yoga elements allowed students to rediscover their bodies and facilitated the harmonization of all internal body processes. The introduction of fitness technologies into the studying process began with teaching the teenagers of the main group and assessing the awareness of the students of the importance of doing aerobic exercises, as well as their effectiveness for improving one's health. As a result of the pedagogical experiment, we discovered the positive effect of fitness technologies on the development of students' motor skills ( $p < 0,05$ ). We witnessed the optimization of the functional condition of the adolescents in the main group (decreased heart rate (at the beginning  $85 \pm 0,64$ , at the end  $83 \pm 0,41$ ); decreased BFOF (at the beginning  $2580 \pm 26$ , at the end  $2450 \pm 0,12$  ( $p < 0,05$ )); improved results of the Ruffier-Dickson test (at the beginning  $7,8 \pm 0,43$ , at the end  $4,2 \pm 0,18$  ( $p < 0,05$ )). *Conclusions:* The implementation of fitness technologies allowed us to update the contents of the curriculum of physical education for adolescents by introducing various types of motor activities that match their interests. The results of the pedagogical experiment proved that that lessons that included fitness technologies enriched the motor experience of the students, which is supported by the increased physical factors measures in the main group. Additionally, students showed more interest in attending PE lessons. Various fitness programs have contributed to the development of the creative abilities of adolescents.

**Key words:** fitness technologies, adolescents, physical education, motor activity, physical fitness.

### Introduction

The world of today requires that significant improvement be made to the way we perform recreational, motor, and sports activities in school (Soloveva et al., 2017). The necessity of motor physical activities for one's health is undoubted (Dutchak et al., 2019; Marinovich et al., 2019). Apart from that, the question of compensating for people's sedentary lifestyles and choosing the right physical activities is still open to discussion (Grygus et al., 2020). There are different ways of achieving visible results while working with one's fitness and body (Campos et al., 2019).

Purpose: to prove the positive effect of fitness technologies on the physical fitness of adolescents.

The use of innovative types of physical activity in the process of physical education allows the child to quickly and efficiently master new skills (Vetoshko, 2018; Grudina, 2012; Chayka, 2012) and abilities that help increase the level of physical fitness and physical performance of students (Diachenko-Bohun et al., 2020). The suggested program that includes fitness technologies was aimed at increasing students' interest in PE lessons as well as providing them with systematic physical exercise, which contributes to the optimization of the educational process and increases the level of adolescents' physical fitness. Another goal of implementing physical technologies is to optimize the functional condition of the teenagers' cardiovascular system and their bodies as a whole (Nesterchuk et al., 2018).

Physical activity is also a powerful positive remedy of getting rid of any bad habits. Scientists confirm the influence of regular physical activity on the social and spiritual development of young people. The results of the study of scientists prove the fact that after starting regular physical activity, teenagers begin following other components of a healthy lifestyle. These results are due to the fact that after starting physical activity, the teenager realizes that it can affect their health. The effect of physical activity associated with other elements of a healthy lifestyle can be used to stimulate other positive changes in adolescent behavior (Vetoshko, 2018; Marinovich et al., 2019; Diachenko-Bohun et al., 2020).

### Material and Methods

*Design.* A randomized controlled trial.

*Participants.* Before beginning to introduce fitness technologies into the system of physical education, we chose the participants: the students of the 7 grade (12-13 years old), who were then divided into the main group and control group each containing 62 members. To measure the effectiveness of our interventions, at the beginning and at the end of the experiment we carried out the testing of the physical characteristics and major indicators of the adolescents' functional condition.

*Interventions:* The members of the control group followed the traditional methodology. The members of the main group used specially designed fitness technologies.

*Outcome Measures:* In order to measure the physical abilities of students we assessed the following factors: Flexibility, measured based on the outcomes of trunk bending from a sitting position (cm); abdominal muscle strength – lifting the torso to a sitting position from the starting position lying on your back (number of times) for 30 s; strength – chest press (number of times) boys from the floor, girls from the bench. To evaluate the functional condition of the body, we measured: the following physiological indicators: Heart rate was calculated by palpation of arterial wall oscillations during 1 min; blood pressure; Ruffier-Dickson test; **BFOF**– blood flow optimization factor.

*Statistical analysis.* Experimental data was processed using the conventional methods of mathematical statistics to determine the arithmetic mean, standard deviations, and the standard error of the arithmetic mean. The Student's t-test (at  $p = 0.05$ ) was used by comparing the obtained data with the values in the table.

### Results

The effectiveness of fitness technologies in the process of physical education is that they equally impact the musculoskeletal, cardiovascular, respiratory, and nervous systems of the child, the development of motor skills, and prevention of various diseases (Saykina, 2012).

The emotional nature of the classes is not only explained by the musical background, which contributes to students' positive mood, but also by the desire of teenagers to coordinate their movements with those of their partners in the group, the ability to demonstrate well-practiced movements, and general satisfaction with classes, which, in turn, emotionally inspires and increases children's interest in them (Nesterchuk et al., 2019, Khlopetskyi, 2020). The introduction of fitness technologies was mainly aimed at the development of the cardio-respiratory system of adolescents (Chapkovich, 2016).

It is widely recognized that aerobic exercises increase the functionality of the cardiovascular system, strengthen the cardiac muscle and enhance its ability to absorb oxygen (Mykhailova et al., 2012). Apart from the positive health effects associated with improved circulatory and respiratory function, aerobic exercises are beneficial for carbohydrate metabolism, liver function, and gastrointestinal tract.

Aerobic physical activities help to reduce heart rate, blood pressure, and the risk of heart failure, as well as improve lung function and help to overcome the stress students endure in the process of studying (Nesterchuk et al., 2018). Reasonable and purposeful introduction of fitness technologies into the lessons of physical education for the development and education of adolescents is currently one of the main and most urgent tasks of updating school curricula (Skalski et al., 2020; Kulik, 2017).

Fig. 1. demonstrates some of the positive and innovative aspects of fitness technologies.

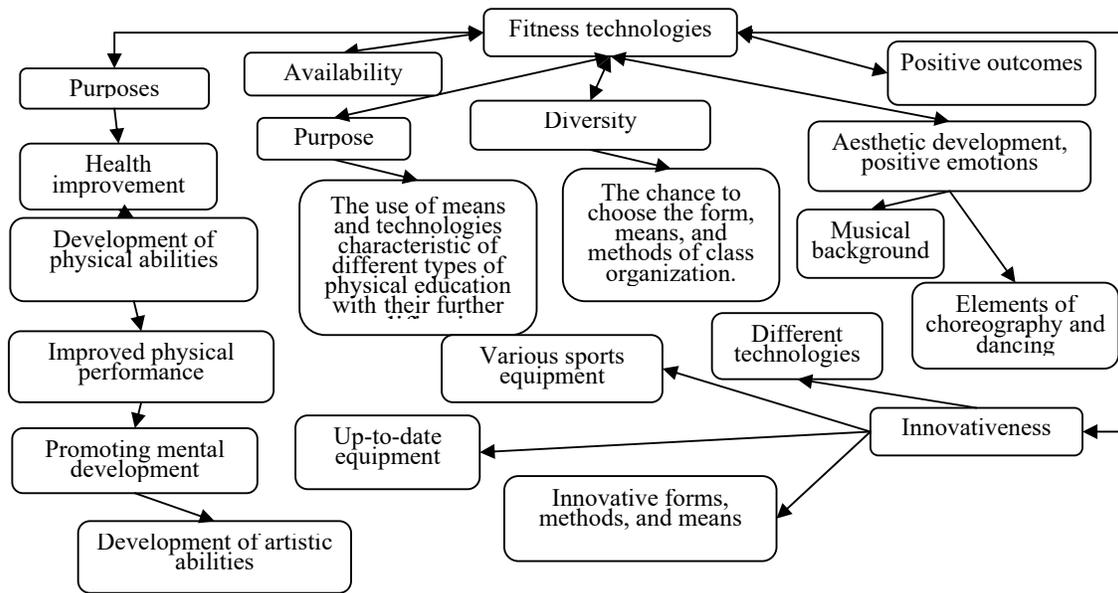


Fig. 1. Block-diagram of fitness technologies

In the course of implementing fitness technologies into the studying process we were trying to cover all the aspects of the curriculum for the children of 5-9 classes of general schools:

- ✓ shaping of a general notion of physical culture, its importance for people, as well as improving one's health and fitness;
- ✓ enriching students' motor activities, development of vital motor skills along with implementing them into the everyday game activities;
- ✓ improving children's physical functionality through the consistent development of major physical characteristics and innate abilities;
- ✓ formation of stable values regarding the use of physical activities as one of the main factors of a healthy lifestyle;
- ✓ formation of practical skills for independent sports activities and active recreation.

Therefore, one can claim that by using fitness technologies, it is possible to fully cover all aspects of the studying process. Alongside this, the mentioned technologies also have the following innovative characteristics: They serve as a way of raising interest and artistic potential of students, developing positive thinking, optimizing the conditions in which PE lessons are held, and enhancing their overall activity and appeal.

Based on the analyzed scientific and methodological literature as well as our own experience, we distinguished some specific characteristics of doing children's fitness, which makes it especially attractive and popular among adolescents (fig. 2).

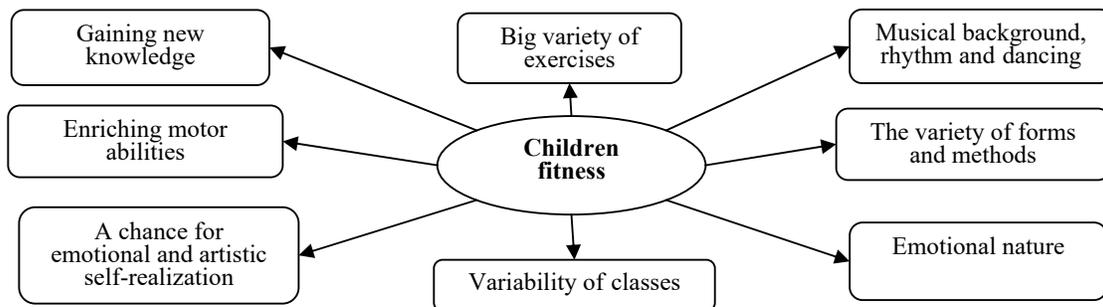


Fig. 2. The specifics of children fitness classes

Taking into consideration children's physical characteristics and 2 scheduled PE lessons a week, the principles of training have to be consistent and take into account the following aspects:

✓ At the beginning of the lesson there must be a 10-minute warm-up. At the end of the lesson, there should be some stretching exercises aimed at improving children’s flexibility and blood circulation in the muscles. Apart from that, it is necessary to warm up particular muscles before carrying out exercises on them.

- ✓ It is also advisable to do ABS exercises closer to the end of the lesson.
- ✓ All the activities, especially the basic ones, should be performed using the appropriate techniques.

While compiling the curriculum, it is necessary to consider the following aspects:

✓ The child’s age. This is an important factor that can limit the array of the suggested exercises.  
 ✓ Health condition. This aspect is equally important, considering the main goal of any physical education lessons - to improve one’s health.

- ✓ Daily schedule. There needs to be a personalized training plan for independent training.

During the introduction of fitness technologies for the adolescents of the main group, their lesson was divided into three parts, with each one serving a particular purpose.

During the preparation stage of the lesson, we used exercises that ensure:

- ✓ the steady increase of the heart rate;
- ✓ muscles warm-up;
- ✓ preparing of the musculoskeletal system to further activities and increasing blood flow to muscles;
- ✓ enhancing joints mobility.

In the main part of the lesson, we tried to achieve:

- ✓ increased heart rate to the desired level (depending on the purpose of the lesson);
- ✓ increased functionality of various body systems;
- ✓ increased calorie expenditure during the special exercises;

During the concluding part of the lesson, we used exercises that allow:

- ✓ to steadily decrease metabolic body processes;
- ✓ to decrease heart rate to the normal level.

The lessons started with an active dancing warm-up, which was mostly based on a variety of general strengthening exercises that develop the correct posture and strengthen all muscle groups, and finished with exercises for flexibility and stretching each particular muscle group. We utilized different kinds of equipment during the lessons, including sticks, dumbbells, and balls.

Various methods were used in order to regulate the physical load on the students, including the “periodical” and “continuous training”. We also took into consideration the physical characteristics of the cardiovascular system functionality. During the lessons, we changed the pace and intensity of the exercises depending on the music playing in the background. We found that lessons turn out to be much more effective and useful when exercises are accompanied by positive upbeat music.

The final part of the lesson included exercises for flexibility in the lying and sitting positions, as well as yoga asanas, which were performed statically to calm music (10-15 s). Such exercises were used for individual students, as well as in pairs and groups; the tactile nature of yoga exercises helped overcome adolescents’ self-awareness and tension. Incorporating yoga elements allowed students to rediscover their bodies and facilitated the harmonization of all internal body processes. We also utilized health training, breathing, and relaxation exercises. The introduction of fitness technologies into the studying process began with teaching the teenagers of the main group and assessing the awareness of the students of the importance of doing aerobic exercises, as well as their effectiveness for improving one’s health.

As we can see, at the beginning of the experiment, the test results for both groups are quite similar (table 1, table 2).

Table 1

Results of physical characteristics test

Control exercises	Group	Sex	The stage of the experiment	
			At the beginning	At the end
Chest press	Control group	Boys (n=30)	12±0,37	14±0,46
		Girls (n=32)	8±0,26	10±0,73
	General group	Boys (n=30)	11±0,43	21±0,44* **
		Girls (n=32)	8±0,35	16±0,27* **
Sit-ups (in 30 seconds)	Control group	Boys (n=30)	17±0,51	20±0,52
		Girls (n=32)	15±0,43	19±0,63
	General group	Boys (n=30)	16±0,38	30±0,74* **
		Girls (n=32)	14±0,34	26±0,26* **
Forward bending (cm)	Control group	Boys (n=30)	3±0,18	4±0,16
		Girls (n=32)	8±0,43	9±0,23
	General group	Boys (n=30)	3±0,27	7±0,14* **
		Girls (n=32)	9±0,45	14±0,35* **

Notes: \* – the probability of discrepancies index  $p < 0.05$  between the indicators at the beginning and end of the experiment within the group;

\*\* – probability of discrepancies index  $p < 0.05$  between the main group and the control group.

**Indicators of the adolescents' functional condition at the end of the study**

Control exercises	Group	The stage of the experiment	
		At the beginning	At the end
Heart rate (beats per minute)	Control group (n=62)	84±0,53	82±0,45
	Main group (n=62)	85±0,64	83±0,41
BFOF	Control group (n=62)	2520±32	2460±0,35
	Main group (n=62)	2580±26	2450±0,12*
Ruffier-Dickson test	Control group (n=62)	7,8±0,5	7,5±0,5
	Main group (n=62)	7,8±0,43	4,2±0,18* **

Notes: \* – the probability of discrepancies index  $p < 0.05$  between the indicators at the beginning and end of the experiment within the group;

\*\* – probability of discrepancies index  $p < 0.05$  between the main group and the control group.

As a result of the pedagogical experiment, we discovered the positive effect of fitness technologies on the development of students' motor skills. We can see the optimization of the functional conditions of the adolescents in the main group (decreased heart rate, decreased BFOF. Improved results of the Ruffier-Dickson test).

The study also proved that lessons that were using fitness technologies increase students' interest to studying PE. Additionally, incorporating music into lessons improved the general mood of the students. They also acquired basic vital motor skills for independent sports activities, which is evident from the survey among the students of the main group. Changes also happened regarding the negative attitude of students to PE lessons, since the attendance rate went up.

### Discussion

The research results proved that a variety of means and methods used during lessons helps to increase the motor activity of students and develop their muscular strength and endurance; it also contributes to fixing teenagers' posture, motor abilities, improving the functionality of the cardiovascular, respiratory, and other body systems. Physical culture and sports are important components of full development and upbringing, as they promote the process of physical and moral development, act as a guarantee of health, a means of increasing social and work activity, promote meaningful leisure and satisfy aesthetic and creative needs. However, not everyone is aware of the importance of sports and exercise. Moreover, due to passivity during leisure and sedentary lifestyle at home, there is a general decrease in physical activity of adolescents (Khlopetskyi V.M., 2020). Given the peculiarity of the curriculum, the required daily rate of physical activity of adolescents cannot be performed in physical education classes. Accordingly, adolescents need to engage in their physical development in extracurricular activities (Vetoshko, 2018; Diachenko-Bohun et al., 2020). Various scholars claim that during a lesson, a teenager should feel like an artist, mastering exercises, pondering them, memorizing, analyzing, and realizing their significance (Nesterchuk et al., 2020; Yegorova et al., 2011). Considering the psychological specifics of the teenagers, it is necessary to take into account their interests and help them realize their creative potential. All the activities should be aimed at achieving satisfaction and self-confidence (Voronkov et al., 2018). The research we carried out proved that it is essential to establish a beneficial psychological climate during the lessons as well as inspire teenagers emotionally, build emotional contact with them and implement a personalized individual approach. The teacher has to establish contact and mutual understanding with the student, create an atmosphere of friendliness (Yegorova, 2012), stimulate successes and achievements, promote a positive mood, and help students to define their personal purposes and real chances of their achievement (Diachenko-Bohun et al., 2019; Boiko et al., 2012). Another important aspect is shaping the need for systematic physical activities and raising awareness of the necessity of healthcare (Lakeykina et al., 2018).

### Conclusions

The implementation of fitness technologies allowed us to update the contents of the curriculum of physical education for adolescents by introducing various types of motor activities that match their interests. Fitness technologies entail the use of mild and intense physical exercises that encompass more than half of all body muscles. Such a training regime increases the amount of oxygen consumed by the body through the respiratory and cardiovascular systems. The study allowed us to establish that a big variety of innovative means, methods and forms of training create unlimited opportunities for improving adolescents' fitness. The work we carried out proves that teenagers of the main group showed significant positive physical changes at the end of the research. The results of the pedagogical experiment proved that lessons that included fitness technologies enriched the motor experience of the students, which is supported by the increased physical factors measures in the main group. Additionally, students showed more interest in attending PE lessons. They demonstrated improved aerobic skills and optimized functionality of the cardiovascular system. The study also proved that

lessons that were using fitness technologies increase students' interest in studying PE. Additionally, incorporating music into lessons improved the general mood of the students. They also acquired basic vital motor skills for independent sports activities. Various fitness programs have contributed to the development of the creative abilities of adolescents. The results of the study indicate the possibility of practical implementation of the developed innovative lessons and sets of exercises into the process of teaching physical culture.

### Compliance with Ethical Standards

**Conflict of Interest.** The authors declare that there is no conflict of interest that could be perceived as interfering with publication of the article.

**Competing Interests.** The authors declare that they have no competing interests.

**Ethical Approval.** All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards.

**Informed Consent.** Informed consent was obtained from all individual participants included in the study. All subjects of the institutional survey gave consent for anonymized data to be used for publication purposes. Funding sources. This study has not received any financial support from any government, community or commercial organization.

### References

- Boiko A.S., Dubynska O.Ya. (2012). Health fitness in the system of physical education of junior schoolchildren. *Suchasni problemy fizychnoho vykhovannia i sportu shkolariv ta studentiv Ukrainy: materialy KhII Vseukr. nauk.-prakt. konf. molodykh uchenykh z mizhnar. uchastiu*. Sumy. 1. 26–30. [In Ukrainian]
- Campos F., Lourenço Martins F.M., Villora S.G. (2019). Benefits of 8-week fitness programs in health and fitness parameters. *Nuevas Tendencias en Educación Física, Deporte y Recreación*. 35. 224-228.
- Chapkovich Zh.A. (2016). History of fitness development as a type of physical activity of the population. *Vestnik TGPU (TSPU Bulletin)*. 8 (173). 112–116. [In Ukrainian]
- Chayka D. (2012). Children's fitness as an innovation in the field of preschool education. *Sportivnyi visnik Pridniprov'ya*. 2. 127–130 [in Ukrainian].
- Diachenko-Bohun, M., Hrytsai, N., Grynova, M., Grygus, I., Skaliy, A., Hagner-Derengowska, M., Napierała, M., Muszkieta, R., & Zukow, W. (2020). Historical Retrospective of the Development of Scientific Approaches to Health-Saving Activity in Society. *International Journal of Applied Exercise Physiology*, 9(1), 31-38. [In Polish]
- Diachenko-Bohun, M., Rybalko, L., Grygus, I. Zukow, W. (2019). Health Preserving Educational Environment in the Condition for Information Technologies. *Journal of History Culture and Art Research*, 8(2), 93-101. [In Polish]
- Dutchak M., Zhdanova O., Chekhov L., Chekhov M. (2019). Health fitness as a subsystem of health and recreational motor activity. *Physical culture, sport and health: status, problems and prospects*. 134-136. [In Ukrainian]
- Grudina S.V. (2012). The relevance of the introduction of fitness technology in the educational process of schoolchildren. *Teoriya i praktika obrazovaniya v sovremennom mire: materialy II Mezhdunar. nauch. konf. Sankt-Peterburg. Renome*, 70-72. [In Russian]
- Grygus I., Nesterchuk N., Hrytseniuk R., Rabcheniuk S., Zukow W. (2020). Correction of posture disorders with sport and ballroom dancing. *Medicni perspektivi*. 25 (1). 174-184. [In Ukrainian]
- Khlopetskyi V.M. (2020). Correction of negative mental states of students by means of health fitness. Avtoref. dys. ... kand. nauk z fiz. vykhovannia i sportu : 24.00.02. Kyiv, 23. [In Ukrainian]
- Kulik N.A. (2017). Fitness in the system of health and physical culture of students of the Higher Education Institution. *Actual problems of the physical culture of the local population*. III All-Ukrainian Science and Practice Conference, Kharkiv. 105-110. [In Ukrainian]
- Lakeykina I.A., Begmetova M.Kh. (2018). Fitness technologies as a means of health improvement of female students of a technical university. *Physical culture. Sport. Tourism. Motor recreation*. 4. 90-93. [In Russian]
- Marinovich M.A., Trofimova O.S., Fomenko V.V., Yakubets I.P. (2019). The content of fitness classes with elements of single combats with girls of 8 years old in organizations of additional education. *Scientific notes of the University them. P.F. Lesgaft*. 5 (171). 198-202. [In Russian]
- Mykhailova N.Ye., Grygus I.M. (2012). Correction of excess weight with the help of health and rehabilitation technologies. *Sportyvnyi visnyk Prydniprovia*. 3. 105-107. [In Ukrainian]
- Nesterchuk N, Grygus I, Ievtukh M, Kudriavtsev A., Sokolowski D. (2020). Impact of the wellness programme on the students' quality of life. *Journal of Physical Education and Sport*, 20 (Supplement issue 2). 929-938. [In Polish]

- Nesterchuk N., Matsyshyna K., Grygus I., Skalski D. (2018). The main aspects of physical rehabilitation of children with scoliosis. *Medycyna i zdrowie. Wybrane aspekty ratownictwa. Redakcja naukowa*. 3. Gdynia – Gdańsk – Starogard Gdański. 65-74. [In Polish]
- Nesterchuk N.Ie., Hrytseniuk R.A., Rabcheniuk S.V. (2019). Psychological aspects of personality formation of dancers. *Naukovyi chasopys Natsionalnoho pedahohichnoho universytetu imeni M.P. Drahomanova*. Serii 15. Kyiv: Vyd-vo NPU imeni M.P. Drahomanova. 2(108). 115-122. [In Ukrainian]
- Nesterchuk N.Ie., Skalski D., Yevtukh M.I., Rabcheniuk S.V. (2018). The concept of physical education taking into account the peculiarities of adolescence. *Naukovyi chasopys Natsionalnoho pedahohichnoho universytetu imeni M. P. Drahomanova*. Serii 15. Kyiv: Vyd-vo NPU imeni M.P. Drahomanova. 11(105). 95-100. [In Ukrainian]
- Saykina Ye.G. (2012). The strategic role of fitness in the modernization of physical education of schoolchildren. Monografiya. Sankt-Peterburg: Izd-vo RGPU im. A.I. Gertsena. 297. [In Russian]
- Skalski D., Kovalski D., Skalska E., Grygus I., Nesterchuk N. (2020). Physical culture in the context of early childhood education. *Kultura fizyczna, pedagogika, zdrowie i fizjoterapia*. Monografia. Starogard Gdański. 15-25. [In Polish]
- Soloveva, D.V., Komleva S.V. (2017). Children's fitness as one of the innovative health-saving technologies of physical education. *Problemy kachestva fizkulturno-ozdorovitelnoy i zdorovesberegayushchey deyatelnosti obrazovatelnykh organizatsiy: sbornik statey 7-y Mezhdunarodnoy nauchno-prakticheskoy konferentsii*, Yekaterinburg: RGPPU. 203-208. [In Russian]
- Vetoshko G.V. (2018). Methodical aspects of assessing the competitiveness of fitness clubs based on a study of the factors of its formation. *Azimet nauchnykh issledovaniy: ekonomika i upravlenie*. 2(23). 89-93. [In Ukrainian]
- Voronkov A.V., Zavgorodniy E.Yu., Morozov I.I. (2018). Use of martial arts means in the fitness industry. Current state and trends in the development of physical culture and sports: a collection of scientific articles based on the results of the V All-Russian scientific-practical conference with international participation. 22-25. [In Russian]
- Yegorova N.V. (2012). Fitness for junior schoolgirls in the system of additional education: dissertatsiya ... kandidata pedagogicheskikh nauk: 13.00.04. Yegorova Nadezhda Vyacheslavovna. Velikie Luki, 2012. 186. [In Russian]
- Yegorova N.V., Andriyanova Ye.Yu. (2011). The influence of children's fitness classes on the psychophysical condition of girls 7-9 years. *Fizicheskaya kultura: vospitanie, obrazovanie, trenirovka*. 5. 40-42. [In Russian]