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CURRICULAR ANALYSIS AND STUDENT ENGAGEMENT AS AN INDICATOR OF THE EFFICIENCY OF THE PHYSICAL EDUCATION SYSTEM IN UNIVERSITY

Олена Кошелева, Ірина Скрипченко, Рам Мохан Сінгх, Андрій Порохнявий, Віктор Счастливець, Владислав Ластовкін. АНАЛІЗ НАВЧАЛЬНОЇ ПРОГРАМИ ТА ЗАЛУЧЕННЯ СТУДЕНТІВ ЯК ПОКАЗНИК ЕФЕКТИВНОСТІ СИСТЕМИ ФІЗИЧНОГО ВИХОВАННЯ В УНІВЕРСИТЕТІ. Досліджено динаміку показників фізичного стану студентів в залежності від особливостей побудови системи фізичного виховання у закладі вищої освіти. Метою дослідження було визначення особливостей впливу організаційно-методичних умов побудови системи фізичного виховання у закладі вищої освіти на показники фізичного стану студентів.

Дослідження проводилися на базі закладів вищої освіти міста Дніпра – Дніпровського національного університету імені Олеся Гончара (ДНУ ім. Олеся Гончара), Дніпропетровського державного університету внутрішніх справ (ДДУВС). У дослідженні взяли участь 120 студентів

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основного навчального відділення. Визначення фізичного стану студентів здійснювалася в динаміці навчання з першого по четвертий курси за показниками фізичного розвитку, фізичної підготовленості та соматичного здоров'я. Досліджувались показники довжини і маси тіла, життєвої ємності легенів (ЖЄЛ), динамометрії кисті, ЧСС і АТ; відповідність маси довжині тіла визначалась за допомогою індексу маси тіла (ІМТ). Для визначення фізичної підготовленості використовувались тести: біг 100, біг 3000 м (юнаки), 2000 м (дівчата), підтягування на перекладині (юнаки), згинання та розгинання рук в упорі лежачи (дівчата), човниковий біг 4×9 м, нахил вперед із положення сидячи. Соматичне здоров'я студентів досліджувалось за методикою Г. Апанасенка. Статистичний аналіз охоплював визначення середнього, середньоквадратичного відхилення, коефіцієнту варіації, помилки вибіркової середньої (помилки репрезентативності), достовірності відмінностей середніх значень (t-критерій Стьюдента). Отримані результати свідчать, що організаційно-методичні умови побудови системи фізичного виховання студентів в ЗВО відрізняються за тривалістю вивчення дисципліни «Фізичне виховання» по курсам, кількості навчальних годин, відведених на її вивчення, видів спорту та фізкультурно-оздоровчих систем, представлених в програмах, організації фізкультурно-оздоровчої та спортивної роботи зі студентами в позанавчальний час. Дослідження фізичного стану студенів свідчать, що на першому курсі не спостерігалось достовірної різниці в показниках фізичного стану студентів. З першого по четвертий курси у студентів ДНУ ім. Олеся Гончара відбулося достовірне покращення показників фізичного розвитку, фізичної підготовленості та соматичного здоров'я. Показники фізичного стану студентів ДДУВС не зазнали достовірних змін протягом навчання. В підсумку спостерігається залежність показників фізичного стану студентів від особливостей побудови системи фізичного виховання в закладах вищої освіти, що дозволяє визначити умови її удосконалення.

Ключові слова*: організаційно-методичні умови, система фізичного виховання, фізичний стан.*

Relevance of the study. Students in their youth are a special social group. Their lives are characterized by a high mental and emotional load caused by intellectual work. Such a high load could cause a burden of time, nervous tension, and stress [1–3]. An analysis of the scientific literature on the subject shows that during the years of study at higher education institutions, young students generally do not improve their health, but largely lose the reserve capacity of their bodies. This could negatively affect their capacity and sharply reduce their creativity [4–8]. To address this challenge, higher education institutions need to make full use of physical education programs. Meanwhile, in the conditions of reforming higher education and granting autonomy to the Free Economic Zones, the entire responsibility for the organization of physical education in higher education institutions rests with its administration. Unfortunately, according to leading experts in the field of physical culture [9–12], there is currently an underestimation by representatives of higher education administrations on the importance and potential of physical education to preserve and promote the health of student youth. This gap unfortunately has led to a decrease in sustaining the workload, lack of quality, and control of physical condition among the students. Currently, there is a reduction in the number of academic hours for studying and engaging in the discipline of «Physical Education» in many free educational institutions. This situation has led to a decrease in physical activity and, as a consequence deteriorated the physical health condition of many students.

Recent publications review. The results of numerous studies in recent years show that the rate of decline in the average physical development, physical fitness, and health of student youth are becoming critical [13–15]. Researchers note that most students have developed abnormalities in health, low levels of physical fitness during assessments at the time of admission to educational institutions [16–18]. Over many years of study in the University, there has been a deterioration in their physical condition. One of the reasons for this situation, experts believe, is the low efficiency of the current system of physical education in higher education institutions. Scientists note that the system of physical education and curricula requires radical changes in methodology and logistical support [19–20]. In recent years, a large number of research works have been conducted in this direction. Scientists have proposed different approaches to improve the practical, theoretical, methodological training of students [21–23], the system of control measures [24]. Technologies have been developed to increase the effectiveness of independent physical exercises [25–26]; methods of using innovative technologies based on modern needs of motor activity [27–29], interactive teaching methods [30–31], personality-oriented approach [32], sports-oriented physical education [33–34], and computer-based technologies [35–36], etc., were substantiated. However, in the context of reforming higher education, the study of the physical condition of students in the dynamics of education and curricula in the University as the most informative indicator of the effectiveness of the physical education system has become especially relevant.

The research paper's objective is to analyze the impact of organizational and methodological conditions prevailing in two-valued higher education institutions in Ukraine and their effect on the physical condition of their students.

The study involved 120 students from the main educational department of Oles Honchar Dnipro National University (OHDNU) and Dnipropetrovsk State University of Internal Affairs (DDUVS). Thirty boys and thirty girls from each higher education institution voluntarily agreed to participate in this study. Informed consent was obtained from them and was free to leave the study any time they chose without giving any reason. However, all the participants completed the parameters of the study without any hitch.

The testing parameters included anthropometric measurements such as body weight, collected using a weighing scale adjusted to 0.1 kg (SECA 665, Seca, Germany), and height which was measured using a Stadiometer adjusted to 0.01 mm (Holtain Ltd., Croswell, UK), to calculate the BMI. The grip strength of the dominant hand was measured using a Dynamometer. Testing of students was carried out according to Tests and Standards of the annual assessment of physical preparedness of the population of Ukraine applicable for the age group of people in the age group of 17 to 22 years.

The research was conducted on the students from the two higher education institutions in the city of Dnipro – Oles Honchar Dnipro National University (OHDNU), Dnipropetrovsk State University of Internal Affairs (DDUVS).

In the course of the research, the working content of the educational curricula from the Departments of Physical Education from the two higher education institutions namely OHDNU and DDUVS were analyzed. The study of the physical condition of the students was carried out in the dynamics of learning from the first to the fourth year of the course. The responses during the above-mentioned years served as the indicators of physical development, physical fitness, and physical health of the students during this study.

Data analysis was performed using SPSS Statistics software version 22. Descriptive data are shown as means and standard deviations. In the hypothesis testing for continuous variables between groups, the Student's t-test was used to assess the variables that followed a normal distribution. For all purposes, the condition was considered to be reliable at $P<0.5$.

Discussion. Analysis of the working educational curriculum of the Departments of Physical Education of OHDNU and DDUVS showed that the organizational and methodological conditions for building a system of physical education of students had significant differences during the period of the course. Physical education, sports and fitness programs, organization of fitness, and sports work for students were performed or encouraged as extracurricular activities.

The OHDNU study of the discipline «Physical Education» was carried out during the entire period of study, except for the final semester. In the final semester, four classroom hours per week were allocated to physical education. In each semester four modules on the following sports were planned: athletics, gymnastics, sports & games, swimming. Students were not allowed to choose a sport during their studies. During extracurricular activities, students had the opportunity to attend classes in seasonal sports, recreational sports, and health programs in groups that operated based on the available infrastructure in the university.

In DDUVS compulsory classes were held for four semesters. In the first and second years, four hours a week were allotted. Each semester contained two modules. The first module included athletics (short and long-distance running, relay running, jumping, throwing, etc.) and general development through physical exercises, the second module included sports and games such as basketball, volleyball, football, table tennis. During extracurricular activities based on the available sports infrastructure, DDUVS organized sessions on various sports (there are sessions on athletics, basketball, volleyball, football, table tennis, athletic gymnastics, judo, sambo, boxing, weightlifting, and hand-to-hand combat). Classes were free for students and it was conducted once a week.

One of the crucial tasks faced by the specialists in the field of physical education currently was to improve the system of theoretical and methodological training of students. Theoretical material involved the worldview system of scientific and practical knowledge and the attitude of students towards physical culture. Methodical skills provided an opportunity to creatively use the acquired knowledge for professional development, personal development, self-improvement, and habituating a healthy lifestyle. Engaging in regular physical activity directly and indirectly affected the physical condition of the students. Therefore, we paid close attention to the peculiarities of the organization in theoretical and methodological training of

students in the system of physical education.

In OHDNU, theoretical training was imparted in the form of short reports of the teacher (10–15 minutes) on practical classes and individual consultations. Lectures on physical education were not provided by the program. In each semester four topics from the section of theoretical and methodical preparation were imparted, for which tasks on independent preparation, control questions, and the list of the recommended literature were developed. The assessment of students' knowledge was carried out based on the quality of oral answers and the performance of self-preparation tasks. Further, the students were observed and their participation and presentation during scientific conferences in physical education, debates, and round tables outside of school hours were noted. The students were awarded additional points for their contribution to the above programs during the final certification.

In DDUVS, the study of theoretical and methodological sections of the program was in form of basic and elective components. It provided two hours of classes each semester and four hours of independent training. The department had developed the topics of theoretical training and lecture material for the entire period of study. They provided a list of topics for independent training of the students and a list of recommended reading. The main form of final grades in both the institutions in the free economic zones was «the test», which was given at the end of each semester (table 1).

Table 1

Organizational and methodological features of the system of Physical Education in the two selected free educational institutions

Indicators	OHDNU	DDUVS
Duration of study in the discipline «Physical Education» by semesters	Seven semesters at the standard of higher education «Bachelor»	Four semesters at the standard of higher education «Bachelor»
Duration of the program	4 years	4 years
Sports and fitness systems in the basic component of the program	Athletics, Gymnastics, Sports (Basketball, Volleyball, Football, Badminton), Swimming	Athletics, Sports & Games (Basketball, Volleyball, Football, Table Tennis)
Conditions for the implementation of the elective component of the program	During extracurricular time	During training sessions
Features of the implementation of theoretical and methodological training	During every classroom and practical class	Eight hours of lecture and ten hours of independent training in each module
Form of final Assessment	Test	Test
Conditions for physical education classes in extracurricular activities	Twelve subscription sessions, preferential terms of payment for classes, two times a week	Eleven sessions for students, classes are free, two times a week

To determine the attitude of students towards physical culture and sports and to assess the effectiveness of the existing system of physical education in higher education institutions in the autumn-winter semester during the fourth year of the course, a survey was conducted. The survey showed that, among the factors that caused dissatisfaction with the content of physical education classes, the vast majority of students (53.3 % of students of OHDNU and 40 % of students of DDUVS) indicated that they lacked opportunities to engage in their chosen sport. 43.3 % of students of OHDNU and 56.6 % of DDUVS students were forced to play a sport they did not prefer.

According to the results of the survey, 43.3 % of students of OHDNU and 33.3 % of DDUVS students found physical education & sports as attractive activities. At the same time, most students of OHDNU and DDUVS preferred independent physical exercises (50.0 % and 43.3 %, respectively), and only a small proportion of students from both Universities preferred to exercise in the classroom during extracurricular activities classes. These results indicated the need to improve the system of physical culture, sports and mass workouts outside of school hours on one hand and the other, pay more attention to the student-centric planning of independent exercises during extracurricular activities classes, learning self-control techniques, and customized curriculum in theoretical and methodological training students.

Among the reasons that motivate students to exercise, the most important response from the students of both the free economic zones was the knowledge of the benefits of exercise. However,

the number of students of OHDNU, who pointed to this reason, significantly exceeded the number of DDUVS students (63.3 % compared to 43.3 % respectively). This fact indicates that the formation of knowledge about the benefits of exercise among the students of OHDNU was better than DDUVS as the former gave more attention to it.

The need to take a test in physical education was also more stimulating for the students of OHDNU than DDUVS students (66.6 % and 38.3 % respectively), which indicated higher need and competency of the students. We determined the physical condition of students in the dynamics of learning from the first to fourth years on the indicators namely physical development, physical fitness, and physical health. To determine the physical development of students, height, bodyweight for calculating BMI, vital capacity (VC), hand dynamometry, heart rate, and blood pressure were used as indicators. The data collected on the above parameters are shown in table 2.

Table 2

Indicators of physical development of students from the 1st to 4th years of the courses in both the institutions

Universities	**OHDNU**				**DDUVS**			
Indicators	1st year	2nd year	3rd year	4th year	1st year	2nd year	3rd year	4th year
Men (n = 60)								
	n=30				n=30			
Height, cm	178,8±7,36	179,2±7,14	179,3±7,27	179,3±7,15	177,5±6,92	177,8±6,58	177,8±6,73	177,4±6,82
Weight, kg	68,8±8,14	71,4 ±8,96	70,9 ±8,53	71,6±8,54	68,9±8,36	70,2±7,47	70,4±7,16	71,2±6,94
BMI, kg• m^{-2}	21,77 ±2,44	22,31±2,57	22,15±2,54	22,37±2,56	22,01±1,98	22,42±2,21	22,49±2,13	22,74±1,92
Vital capacity, ml	3545,0±601,0	3660,0±690,0	3790,0±720,0	3870,0**±602,0	3565,0±620,0	3780,0±730,0	3650,0±780,0	3590,0±730,0
Heart rate, beats • min^{-1}	76,3±6,62	72,1*±7,38	69,1±7,06	67,55**±7,25	78,8±8,14	75,6±7,85	76,3±5,57	77,9±7,83
SBP, mmHg	121,3±4,37	120,9±4,10	122,1±5,32	121,8±4,94	120,8±3,97	122,0±4,28	120,3±4,84	122,5±4,63
DBP, mmHg	79,0±3,11	80,0±3,45	81,0±4,13	81,0±3,85	79,0±3,97	79,4±4,72	80,3±4,66	81,1±4,91
Dynamometry, kg	44,1±9,22	48,0±8,95	52,3±9,64	54,2**±8,77	43,8±9,19	45,9±8,85	45,6±8,33	46,1±7,86±
Women (n = 60)								
	n=30				n=30			
Height, cm	166,4±3,63	166,4±3,84	166,4±3,84	166,4±3,84	165,9±3,16	166,0±3,54	166,0±3,54	166,0±3,54
Weight, kg	57,3±8,01	57,9±7,64	58,5±6,95	58,8±7,57	56,9±8,25	58,9±8,28	60,8±7,98	61,1 ±7,8
BMI, kg• m^{-2}	20,83±5,43	21,05±5,24	21,27±6,16	21,38±6,57	20,91±4,18	21,41±5,39	22,10±6,20	22,21±5,88
Vital capacity, ml	2500,0±620,0	2610,0±602,0	2610,0±687,0	2845,0**±590,0	2590,0±650,0	2725,0±695,0	2650,0±650,0	2600,0±705,0
Heart rate, beats • min^{-1}	78,9±7,91	77,3±6,82	74,3±7,26	69,8**±6,52	78,5±6,15	77,9±8,72	78,7 ±7,96	80,9±10,23
SBP, mmHg	118,3±4,33	120,1±3,98	119±4,15	121±3,99	119,7±4,87	119,2±4,66	122,0±3,21	120,0±3,76
DBP, mmHg	79,3±4,26	81,1±4,41	77,6±3,41	72,12±4,41	78,8±4,9	78,6±4,19	77,9 ±4,87	78,9±3,79
Dynamometry, kg	19,8 ±6,34	22,3±7,19±	25,6±7,16±	27,8**±6,87	20,7±7,27	21,4±6,98	22,8 ±7,35	21,6 ±7,35

Notes: * – a significant difference between the indicators in the first and second courses at$P<0.05$;
** – a significant difference between the indicators in the first and fourth years at $P<0.05$.

Analysis of indicators of physical development of students showed that in the first year there were no statistically significant differences between representatives of the two selected higher education institutions on any of the parameters measured during the study ($p>0.05$). The average values of all indicators correspond to the age norms. In the dynamics of learning from the first to the fourth year, none of the institutions of higher education showed any statistically significant changes in height, body weight, body mass index, blood pressure ($p>0.05$) among their students.

The students of OHDNU however, reported a marked decrease in resting heart rate from the first to the second year by 4.2 beats • $min.^{-1}$ ($p<0.05$), and from the first to the fourth – by 8.75 beats • $min.^{-1}$ ($p<0.05$). Women reported a similar trend, but a marked decrease was observed from the first to the fourth year by 9.1 beats • min^{-1} ($p<0.05$). There was a significant increase in vital capacity of the students from the first to the fourth year: in men – by 325 ml ($p<0.05$), and in women – by 345 ml ($p<0.05$). Also, the participants of the two selected higher education institutions significantly increased their dynamometry score of the dominant

hand from the first to the fourth year: men – by 10.1 kg ($p<0.05$), and women – by 8 kg ($p<0.05$). The participants of DSUAI did not show any statistically significant differences from the first to the fourth year on any of the parameters of physical development ($p> 0.05$), in fact, in some indicators, there was a tendency of gradual deterioration.

The level of development of basic physical qualities was determined using tests provided for students «Tests and standards for annual assessment of physical fitness of the population of Ukraine»: 100 meters run, 3000 meters run for men and 2000 meters run for women, pull-ups on the crossbar for men, flexion and extension of the arms in the supine position for women, shuttle run 4 × 9 meters, sit-ups, standing broad jump, and sit and reach test. The scores of the students in the physical fitness assessments from both the selected higher education institutions are shown in table 3.

Table 3

Indicators of physical fitness among Male students of OHDNU and DDUVS

Universities	OHDNU (n = 30)				DDUVS (n = 30)			
	M	**±S**	**V,%**	**±m**	**M**	**±S**	**V,%**	**±m**
Running 100 meters, sec								
1-st	14,4	1,41	9,79	0,13	14,9	1,27	8,52	0,15
2-nd	14,2	1,35	9,50	0,14	14,8	1,32	8,91	0,17
3-rd	13,9	1,29	9,28	0,12	15,0	1,29	8,60	0,14
4-th	14,0	1,17	8,35	0,15	15,2	1,31	8,61	0,16
Running 3000 meters, min, sec								
1-st	14,14	0,59	4,17	0,21	14,15	1,03	7,27	0,27
2-nd	14,01	1,08	7,70	0,24	14,06	1,07	7,15	0,29
3-rd	13,46	1,05	7,80	0,31	14,11	1,12	7,93	0,21
4-th	13,38*	0,57	4,26	0,28	14,15	1,09	7,70	0,23
Shuttle run 4 × 9 meters, sec								
1-st	9,35	0,51	5,45	0,11	9,75	0,42	4,30	0,12
2-nd	9,20	0,48	5,21	0,09	9,66	0,58	6,00	0,14
3-rd	9,26	0,52	5,61	0,15	9,95	0,54	5,32	0,11
4-th	9,18	0,56	6,10	0,13	9,96	0,56	5,48	0,13
Standing Broad Jump, cms								
1-st	218,51	19,84	9,07	2,17	220,54	19,21	8,71	2,15
2-nd	223,75	18,93	8,46	2,09	224,93	18,76	8,34	2,19
3-rd	228,15	19,16	8,39	1,98	223,5	18,39	8,22	2,08
4-th	231,28*	18,91	8,17	1,79	219,87	19,91	9,05	1,96
Pull-ups, Numbers per min								
1-st	11,8	3,41	28,89	0,96	11,5	2,81	24,43	0,59
2-nd	12,5	3,48	27,84	1,07	12,7	4,43	34,88	0,83
3-rd	12,8	4,01	31,32	1,13	12,5	3,91	31,28	0,75
4-th	13,6	3,85	28,30	1,32	11,9	4,14	34,78	0,67
Sit-ups, Numbers per min								
1-st	43,21	5,78	13,37	1,47	43,74	6,72	15,36	1,89
2-nd	45,57	6,37	13,97	1,48	46,01	6,29	13,67	2,01
3-rd	47,81	7,09	14,82	1,82	45,29	5,83	12,87	1,73
4-th	49,67	6,96	14,01	1,67	44,15	6,08	13,77	1,86
Sit and Reach test, cms								
1-st	13,3	5,21	39,17	0,91	12,4	4,84	39,03	0,98
2-nd	14,2	5,67	39,92	1,30	12,6	4,91	38,96	1,32
3-rd	15,5	6,03	38,90	1,22	12,3	5,07	41,21	1,43
4-th	16,2*	5,85	36,11	1,19	11,9	4,95	41,59	1,51

Notes: * – significant difference between indicators at p <0, 05.

The analysis of indicators shows that in the first year there were no statistically significant differences in the scores of development of physical qualities ($p>0.05$). At the beginning of the study, the development of strength, agility, and flexibility among students in both Universities was at the average level, and endurance and speed were below average. During the period of study, no statistically significant changes in the indicators of speed development («100 meters run») and agility («shuttle run 4 × 9 meters») ($p>0.05$) were

observed among the students of both Universities.

It was also observed that the students of OHDNU significantly improved the results in endurance test (3000 meters run), speed and strength abilities tests (Standing broad jump, sit-ups), and flexibility test ($p<0.05$) from their first to fourth-year term.

In comparison in DDUVS, there were no statistically significant changes in the results of physical fitness testing due to training ($p>0.05$), and, from the third year, there was a tendency to deterioration in the results of the tests that were applied during the experiment.

Similar trends were observed in the indicators of physical fitness of female students of DDUVS (Table 4). As in the case of young men, groups of students in the first year did not have statistically significant differences in the indicators of physical fitness ($p>0.05$). According to the data shown in table 3, the indicators of speed and agility in girls also did not show statistically significant changes from the first to the fourth year ($p>0.05$).

The women students of OHDNU achieved a gradual increase in performance in the tests such as 2000 meters run, Pull-ups, Sit-ups for one minute, and sit and reach test, which in the fourth year was significantly higher than in the first ($p<0,05$).

However, in DDUVS, there were no statistically significant differences in the indicators of physical fitness ($p>0.05$) during the entire period of study from the first to the fourth year, however, there was a tendency of deterioration in all tests applied in our study.

Table 4

Indicators of physical fitness of students during training (women)

Course	OHDNU (n = 30)				DDUVS (n = 30)			
	M	**±S**	**V,%**	**±m**	**M**	**±S**	**V,%**	**±m**
100 meters run, sec								
1-st	17,33	1,17	6,75	0,25	17,47	1,16	6,87	0,19
2-nd	17,03	1,21	7,18	0,31	17,01	1,13	6,64	0,21
3-rd	16,91	1,19	7,34	0,24	17,13	1,18	6,88	0,23
4-th	16,88	1,22	7,38	0,22	17,21	1,14	6,62	0,18
2000 meters run, min, sec								
1-st	11,55	0,59	5,10	0,35	11,57	1,01	8,72	0,26
2-nd	11,46	0,57	4,96	0,29	11,49	0,58	5,04	0,24
3-rd	11,32	0,54	4,77	0,27	11,55	1,04	9,00	0,27
4-th	11,24*	0,56	4,98	0,28	11,59	1,02	8,80	0,31
Shuttle run 4 × 9 meters, seconds								
1-st	11,13	0,53	4,76	0,13	11,02	0,48	4,35	0,11
2-nd	11,10	0,48	4,32	0,12	10,70	0,53	4,95	0,14
3-rd	11,06	0,46	4,15	0,16	11,13	0,58	5,21	0,15
4-th	10,88	0,51	4,68	0,14	11,21	0,61	5,44	0,13
Standing Broad jump, cms								
1-st	165,54	13,89	8,49	1,87	165,82	13,48	8,12	1,79
2-nd	169,81	14,01	8,25	1,93	170,73	13,76	8,05	1,86
3-rd	171,95	14,17	8,24	1,91	168,28	13,84	8,22	1,91
4-th	172,17	14,28	8,15	1,89	166,11	13,65	8,21	1,94
Pull-ups, Numbers per minute								
1-st	14,82	3,41	23,00	0,69	14,56	2,82	19,36	0,56
2-nd	15,58	5,54	35,55	1,01	15,31	4,39	28,67	0,81
3-rd	17,59	4,49	25,52	1,02	15,08	4,56	30,23	0,90
4-th	18,03*	5,38	29,83	1,10	14,17	4,18	29,49	0,89
Sit-ups Numbers per minute								
1-st	35,66	6,59	18,48	1,76	37,81	6,97	18,43	1,69
2-nd	39,09	6,73	17,17	1,82	40,95	7,02	16,73	1,76
3-rd	44,67	6,91	15,46	1,78	40,34	6,89	17,07	1,74
4-th	48,80*	7,11	14,56	1,91	38,82	7,12	18,34	1,77
Sit and Reach test, cms								
1-st	14,33	5,13	35,79	0,93	14,18	4,67	30,76	0,81
2-nd	15,81	5,19	32,82	0,96	14,96	6,02	37,71	1,12
3-rd	17,28	6,11	35,35	0,91	14,95	5,97	39,51	1,08
4-th	18,89*	5,76	30,49	0,89	14,56	5,89	40,45	1,11

Notes: * – significant difference between indicators at p <0, 05.

Analysis of the results on somatic health of the students according to the method of H. Apanasenko, testified that in the first year, most students in both higher education institutions had low and below-average levels of physical health. Thus, 40 % and 36.7 % of male students from OHDNU and DDUVS respectively reported Low somatic health during their first years. The level of somatic health was below the average in 36.7 % of students of OHDNU and 46.6 % of DDUVS first-year male students. The average level of somatic health was 23.3 % of students of OHDNU and 16.6% of DDUVS first-year male students.

Table 5

Levels of somatic health of students of different Universities in Percentage

Universities / Level	OHDNU				DDUVS			
	1st course	2nd course	3rd course	4th course	1st course	2nd course	3rd course	4th course
	Men (n=60)							
	n=30				n=30			
Low	40,0	36,7	33,3	30,0	36,7	33,3	40,0	43,3
Below average	36,7	40,0	36,7	36,7	46,6	50,0	43,3	43,3
Average	23,3	23,3	26,7	30,0	16,7	16,7	16,7	13,4
Above average	-	-	3,3	3,3	-	-	-	-
High	-	-	-	-	-	-	-	-
Women (n=60)								
	n=30				n=30			
Low	33,4	30,0	26,7	13,3	40,0	43,3	43,3	40,0
Below average	53,3	53,3	56,7	53,3	50,0	40,0	40,0	50,0
Average	13,3	16,7	13,3	16,7	10,0	16,7	16,7	10,0
Above average	-	-	3,3	13,3	-	-	-	-
High	-	-	-	3,4	-	-	-	-

Among women, 33.4 % of students of OHDNU and 40 % of students of DDUVS had a low level of somatic health; a below-average score was reported in 53.3 % of women students of OHDNU and 50 % women students of DDUVS. 13.3 % of students OHDNU recorded an average level of somatic health along with 10 % of women students from DDUVS. During the second year, indicators of somatic health of students of OHDNU and DDUVS had not changed significantly. Even in the third and fourth years, the indicators of somatic health of DDUVS women students did not differ significantly from those registered in the second year, while among the women students of OHDNU, there was a gradual increase in the number of students with average and above-average levels of somatic health.

Analysis of the physical fitness students showed that at the beginning of the study, the development of strength, agility and flexibility of students in both Universities corresponded to the average level, and endurance and speed – low. Such results were consistent with the data presented in the works of Griban et al. [13], Kozhokar et al. [15], Kosheleva O. [16], Ilchenko S. [24].

The study of somatic health led to the conclusion that the majority of first-year students had low and below average levels, which confirms the research data of Dorofieieva et al. [5], Moskalenko, N. & Kovtun A. [5], Sazanov et al. [8].

A comparison of indicators of physical condition of students of different high educational institutions in the dynamics of education shows that in the first year they did not have statistically significant differences in terms of physical development, physical fitness and physical health ($p>0.05$). The students of DNU. O. Gonchar in the period from the first to the fourth year there is a gradual decrease in heart rate at rest and an increase of lung capacity ($p<0,05$); improving endurance, strength and flexibility, increasing the number of students with average, above average and high levels of physical health.

No significant changes in physical performance were observed in DDUVS' students during the study ($p> 0.05$).

Data on the content and organization of physical education in various free educational institutions have been expanded and supplemented (Iermakov et al. [11]; Kadyrov S. [12]; Kosheleva E. [16] on the peculiarities of the influence of organizational and methodological conditions of the system of physical education on the indicators of physical condition (Griban

et al. [14]; Mozolev et al. [21] motivation of students to physical education Korzh N.L. [25], Sidorchuk et al. [26].

Conclusions. Thus, a comparison of indicators of the physical condition of students in the dynamics of learning shows that in the first year, students of both the selected Universities did not have statistically significant differences in terms of physical development, physical fitness, and physical health. The students of OHDNU in the period from the first to the fourth year reported a gradual decrease in their resting heart rate and an increase in vital capacity, which differed significantly when compared to the indicators determined in the first and fourth years ($p<0,05$) students of DDUVS.

Analysis of indicators of physical fitness of students in the dynamics of learning showed that the participants from OHDNU recorded gradual growth rates in strength, endurance, and flexibility, which significantly increased during their fourth year ($p<0.05$) when compared to their first-year counterparts. However, there are no such significant changes in the level of development of physical qualities in DDUVS students.

A similar trend was observed in the indicators of students' somatic health. The students of OHDNU, who scored average, above average and high levels of somatic health were gradually increasing from year to year. These changes in the fourth year were significantly different from those identified in the first year. However, there were no significant changes in the level of students' physical health in the dynamics of learning.

In our opinion, such results are explained by the fact that in OHDNU compulsory physical education classes were held at a frequency of four hours per week throughout the study period. According to the responses obtained from the questionnaire, stricter requirements were imposed on students while taking the test, more attention was paid to their theoretical training, which promoted a conscious attitude towards physical education and exercises. This opinion, in particular, was confirmed by the fact that OHDNU attracted more students than DDUVS (43.3 % compared to 33.3 % respectively) for the extracurricular classes and regular exercises. In DDUVS compulsory physical education classes were held only during the first two years of the program in University and physical culture and health and mass sports work in extracurricular time covered only a few students.

Hence, it is concluded that the curriculum followed by Oles Honchar Dnipro National University, Ukraine is much better than the curriculum followed by Dnipropetrovsk State University of Internal Affairs, Ukraine in engaging the students in Physical Education not only for their academic benefit but for better fitness, health, and awareness. The research of the authors substantiated that physical education classes must be carried out throughout the entire period of study at the university.

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ABSTRACT

This article examines the dynamics of physical condition indicators among students depending on the peculiarities of building a system of physical education in higher education. The aim of the study was to determine the characteristics of the impact of organizational and methodological conditions for building a system of physical education in higher education on the physical condition of students.

The research was conducted on the higher education institutions in the city of Dnipro – Oles Honchar Dnipro National University (OHDNU), Dnipropetrovsk State University of Internal Affairs (DDUVS). The study involved 120 students of the main department. The physical condition of the students was determined by analyzing the dynamics of learning from the first to the fourth years. The indicators included physical development, physical fitness and physical health. The results showed that the organizational and methodological conditions for building a system of physical education among students in free economic education differ in the duration of the discipline «Physical Education», the number of hours devoted to its study, sports and physical culture and health systems presented in the programs, organization of physical culture and health and sports work with students in extracurricular activities. Studying the physical condition of the students' show that in the first year there was no significant difference in the physical condition of the students. From the first to the fourth year, the students of OHDNU significantly improved their indicators of physical development, physical fitness and physical health. Indicators of physical condition of DDUVS students did not exhibit significant changes during their studies.

There was a dependence of indicators of physical condition of students on the peculiarities of the construction of the system of physical education in higher education institutions, which allowed to determine the conditions of its improvement.

Keywords: *organizational and methodological conditions, system of physical education, physical condition.*

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ЗАСТОСУВАННЯ ЗАХОДІВ ПРИМУСУ ПЕРСОНАЛОМ УСТАНОВ ВИКОНАННЯ ПОКАРАНЬ: НЕОБХІДНА СКЛАДОВА ПРОФЕСІЙНОЇ ДІЯЛЬНОСТІ ЧИ ЗАСТАРІЛИЙ РУДИМЕНТ

Здійснено аналіз проблемних питань застосування персоналом установ виконання покарань вогнепальної зброї, спеціальних засобів, заходів фізичного впливу та службових собак.

Визначено, що серед заходів примусу, які найчастіше застосовувалися персоналом відносно засуджених, є кайданки та фізична сила. Здебільшого вказані заходи застосовувались у випадках припинення фізичного опору персоналу установ та перешкоджання виконання заходів процедурної безпеки, а також спроб самопошкодження засуджених.

Найбільше рішень Європейського суду з прав людини постановлено щодо порушення вимог статті 3 Конвенції про захист прав людини і основоположних свобод при застосуванні персоналом установ виконання покарань вказаних заходів примусу, що містили ознаки катування та нелюдського поводження.

Розглянуто питання невідповідності превентивній меті виконання покарання типу вогнепальної зброї, що використовується при виконанні завдань з охорони установ, переміщення

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