

# Technology of Increasing Physical Activity of University Students

## Metody zwiększania aktywności fizycznej studentów szkół wyższych

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### SUMMARY

**Aim:** To check the effectiveness of authors' technology of increasing physical activity of university students.

**Materials and Methods:** The research involved 369 students (including 197 males and 172 females). All students were divided into control (CG) and experimental groups (EG). The EG included 188 students (105 males, 83 females), the CG – 181 students (92 males, 89 females) respectively. The effectiveness of authors' technology was assessed by the following indicators: the amount of physical activity; the dynamics of students' physical fitness during four years of studying.

**Results:** The results of the experiment show that authors' technology contributes to increasing the amount of students' physical activity and improving the level of their physical fitness. The students (both males and females) of the EG were recorded to have significantly better indicators than the CG.

**Conclusions:** The experimental work confirmed the effectiveness, functionality and adaptability of the authors' technology of increasing physical activity of university students. A high level of physical activity of students will contribute to strengthening their health and improving the efficiency of their future professional activities.

**Key words:** physical activity, fitness, physical education, students

**Słowa kluczowe:** aktywność fizyczna, sprawność fizyczna, wychowanie fizyczne, studenci

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### INTRODUCTION

Modern society requires the theory and practice of higher education institutions (HEI) to direct the accumulated scientific experience at the basis of the formation of a new structure of competent professionals who can think creatively, navigate in the information space, master worldview paradigms on their own and systematically maintain their health and high mental and physical capacity. As a result, the need for effective preparation of students for independent creative and research activities and the ability to maintain their physical condition has significantly increased [1-3]. It developed in a need to update the educational process in HEI owing to its focus on the model of the future professional activity of graduates under conditions of introducing effective technologies for organizing the educational process, which will promote the formation of personality with creative thinking

and a healthful mind [4, 5]. The system of physical education is a historically determined type of the social practice of physical education, which is based on ideological, normative program, scientific, methodical, and organizational principles that provide the physical education of different segments of the population [6, 7]. One of the main elements of the physical education system functioning is normative programs and regulations, the central element of which are educational programs that determine the amount of knowledge, skills, the level of physical development and physical fitness, health, and others. In modern society, the functions of the physical education of university students are being changed significantly. The functions of physical education are often aimed at providing services, which focus on having appropriate leisure and ensuring a healthy lifestyle, i.e. they acquire a social dimension [8, 9].

The system of physical education in Ukraine does not meet the natural biological needs of students in physical activity, does not provide students with the necessary level of health, physical fitness, theoretical knowledge, motivation, scientifically sound educational and health technologies that can be used later in life. There is a contradiction between the students' needs for worldview, spiritual, cultural, intellectual enrichment and the need for physical improvement [10, 11].

### AIM

The aim is to check the effectiveness of authors' technology of increasing physical activity of university students.

### MATERIALS AND METHODS

The research was conducted at Zhytomyr Ivan Franko State University (Ukraine) in 2017-2022. The pedagogical experiment involved 369 students (including 197 males and 172 females) of the different faculties. All students were divided into control (CG) and experimental groups (EG) by the methods of even distribution of groups. The experimental groups included 188 students (105 males, 83 females), the control groups – 181 students respectively (92 males, 89 females). According to the schedule, physical education classes were held twice a week in the first part of the day in all groups.

The authors' technology was introduced into the educational process of the students of experimental groups. The characteristic features of the newly created technology include: scientifically sound planning of the process of physical education; unity and interrelation of theoretical, methodical and practical training of students; high, but accessible level of difficulties in training sessions, fast and high-quality mastering of technique of exercises performance and mastering of the methodology of their improvement; maximum activity and independence of students during training sessions; combination of individual and collective physical culture and health activities of students; providing the educational process with sufficient quantity and quality of technical equipment and sports facilities; extensive use of innovative technologies of physical education.

The main tasks of authors' technology are: to increase the amount of physical activity in order to promote health, improve well-being, mood of students, enhance their mental and physical working capacity; to increase the level of physical fitness of students in order to ensure the effectiveness of their educational activities and improve the quality of life.

The authors' technology combines a set of components of a holistic pedagogical process – from goals to the end result – and focuses on the personality of the future professionals who has competencies and a high level of skills in health and fitness activities and sports. The authors' technology was based on the theory and methods of physical education, the theory of training of physical culture specialists, as well as the idea of integrating all components of a holistic system.

The authors' technology was introduced into the educational process of university students in four stages. At the first stage (adaptive, the 1st year of study) the solution of the following fundamental pedagogical tasks is provided: adaptation to the educational process (intensive mental activity) at HEI and

activation of the students' mental processes speed by means of physical education; developing students' stable interest, motives, positive attitude and need for motor (physical) activity; an increase in the general level of physical fitness, the development of physical abilities, reserve functional capabilities of the body, health improvement, promotion of comprehensive development; formation of knowledge on a healthy lifestyle and involvement in independent physical exercises, active leisure; mastering the skills and abilities of life safety in the field of physical culture and sports. At the second stage (achievement of comprehensive development, the 2nd year of study) the solution of the following pedagogical tasks is provided: developing students' socially significant qualities; the use of various forms of physical education and mastering health programs; mastering innovative technologies of physical education. At the third stage (forming the need for a healthy lifestyle, the 3rd-4th years of study) the solution of the following pedagogical tasks is provided: harmonious development of an organism and a significant increase in physical performance; developing students' stable need for physical self-improvement, self-cognition, and self-assessment; defining a system of physical exercises or a sport to create a system of personal physical improvement; the acquisition of skills and abilities to conduct independent training and health-improving activities, dosing of physical activity; gaining experience to use physical culture and sports activities to get professional and life skills and qualities; mastering the methodology of organizing and conducting mass sporting events and fitness and health activities in the future professional activity. At this stage, the principle of professional orientation and designing of the educational material content were carried out to use in future professional activities, taking into account the chosen specialty.

The students of the control groups were training according to the "Physical Education" curriculum traditional for HEI of Ukraine.

The effectiveness of the authors' technology was assessed by the following indicators: the amount of students' physical activity; the dynamics of students' physical fitness during four years of studying at HEI. The amount of the students' physical activity while studying at the university was investigated by an interview methods in order to determine the time devoted to physical activity during the week activities (physical education classes, independent classes, sports sections, morning exercises, sports events, other types of physical activity). The level of students' physical fitness was assessed by the following tests: males – the 3000 m and 100 m run, long standing jumps, push-ups, pull-ups, sit-ups in 1 min, 4 x 9 m shuttle run, seated forward bend, and females – the 2000 m and 100 m run, long standing jumps, push-ups, bent arm hang, sit-ups in 1 min, 4 x 9 m shuttle run, seated forward bend.

Research methods included theoretical (the method of conceptual and comparative analyses which compared the existing theoretical approaches to studying the current state of the physical education system of the students of the Ukrainian HEI, analyzed educational, methodical literature and many years of teaching experience); empirical (pedagogical

observations, questionnaires and surveys, physical fitness testing); the pedagogical experiment was conducted to check the effectiveness of authors' technology of increasing physical activity of university students; statistical data processing methods were used to process research results and display them in tabular forms.

## RESULTS

The research showed that only purposeful methodical work on the formation of motivational and value-based attitude to the physical education process and the means of physical culture and sports contributes to the activation of physical activity of university students. Experimental data show that the traditional system of physical education is not able to cause significant changes in the structure of the students' budget of time in favor of physical activity. The comparison of the time spent by the students of control and experimental groups on educational and independent physical exercises, sports training, mass sporting events, fitness and health activities, morning hygienic gymnastics, etc. indicates a huge gap between groups (Table 1). The students of experimental groups miss fewer physical education classes, attend classes in sections and groups of physical training more often, pay more attention to the implementation of morning hygienic gymnastics and sports events held at the university. Accordingly, such differences in the time spent on physical activity encourage students of experimental groups to successful physical culture and sports activities and a positive result in physical education.

The analysis of students' physical fitness indicators obtained in the process of experiment convincingly showed the high efficiency of the authors' technology. In all eight tests on physical fitness, male students of the EG significantly improved their performance (Table 2). The most significant results were shown in the 3000 m run, push-ups, pull-ups,

sit-ups in 1 min, seated forward bend ( $p < 0.001$ ), 100 m run, long standing jumps, 4 x 9 m shuttle run ( $p < 0.05$ ). In the CI, male students improved the results in five tests, namely: sit-ups in 1 min, seated forward bend ( $p < 0.01$ ), 3000 m run, push-ups, and pull-ups ( $p < 0.05$ ), but the average indicators were significantly lower.

Female students from the EG also improved their performance significantly in all tests. The best results were achieved in the 2000 m run, push-ups, bent arm hang, sit-ups in 1 min ( $p < 0.001$ ), seated forward bend ( $p < 0.01$ ), 100 m run, long standing jumps, and 4 x 9 m shuttle run ( $p < 0.05$ ). In the CG, female students showed a significant improvement only in three tests, namely: sit-ups in 1 min ( $p < 0.01$ ), 2000 m run, and bent arm hang ( $p < 0.05$ ). In general, the performance of female students in the CG was significantly lower (Table 3).

## DISCUSSION

An effective system of physical education must meet the following requirements: a) to ensure targeted physical activity of all segments of the population and to promote the improvement of physical fitness, health, and disease prevention on this basis; b) to guarantee the availability and quality of health-improving services; c) to form the necessary human, financial, and material and technical support, their rational use [12, 13].

Therefore, the program requirements for physical education should take into account the corresponding minimum level of compulsory physical education for university students, and the purpose of the "Physical Education" discipline at HEI is to consistently form the physical culture of the individual. In addition, the main criteria for the physical education effectiveness of a HEI graduate, one's mastery of health competencies, the necessary state of health, physical development level, and preparedness for life should be defined. Instead, many authors [14, 15] show in their research the dynamics of growth in the

**Table 1.** Weekly physical activity of university students as a result of the introduction of the authors' technology into the educational process (in h:min, %)

The types of physical activity	Groups	The year of study								Average data	
		1st		2nd		3rd		4th		time	%
		time	%	time	%	time	%	time	%		
Scheduled classes	EG	2:51	1.70	2:54	1.73	2:49	1.68	2:46	1.65	2:50	1.69
	CG	2:45	1.64	2:39	1.58	2:31	1.50	2:14	1.33	2:33	1.52
Independent extracurricular classes	EG	2:16	1.35	2:43	1.62	3:32	2.11	3:36	2.15	2:57	1.76
	CG	2:04	1.23	2:18	1.37	2:06	1.25	3:47	2.26	2:44	1.63
Training in sections, groups	EG	3:21	2.00	4:07	2.45	3:44	2.23	3:41	2.20	3:54	2.33
	CG	2:34	1.53	2:48	1.67	2:30	1.49	1:52	1.12	2:16	1.35
Morning exercises	EG	0:54	0.54	1:51	1.11	1:48	1.08	1:43	1.03	1:26	0.86
	CG	0:43	0.43	0:56	0.56	1:13	0.73	0:52	0.52	0:56	0.56
Sports events	EG	0:21	0.21	0:29	0.29	0:35	0.35	0:31	0.31	0:29	0.29
	CG	0:18	0.18	0:15	0.15	0:18	0.18	0:14	0.14	0:17	0.17
Fast walking	EG	2:26	1.45	2:19	1.38	2:24	1.43	2:37	1.56	2:27	1.46
	CG	2:38	1.57	2:47	1.66	2:53	1.72	3:09	1.88	2:52	1.71
Other physical activity	EG	1:15	0.75	1:38	0.98	1:47	1.07	1:56	1.15	1:39	0.99
	CG	1:27	0.87	1:46	1.06	2:03	1.22	2:18	1.37	1:54	1.33
In total	EG	13:24	7.98	16:01	9.54	16:39	9.91	16:50	10.02	15:46	9.36
	CG	12:29	7.43	13:29	8.03	13:34	8.08	14:26	8.60	13:32	8.06

**Table 2.** The dynamics of the male students' physical fitness indicators before and after the experiment (n=197), Mean±SD

Tests	Groups	Before the experiment	After the experiment	Changes in 4 years	Significance value	
					t	p
3000 m run (min, s)	EG	13.59.1±1.53	12.41.4±1.61	1.17.7	2.78	<0.001
	CG	13.57.3±2.36	13.39.2±2.13	18.1	2.19	<0.05
100 m run (s)	EG	14.41±0.67	13.72±0.92	0.69	1.23	<0.05
	CG	14.37±0.56	14.24±0.69	0.13	1.06	>0.05
Long standing jump (cm)	EG	216.37±19.72	229.53±18.14	13.16	2.35	<0.05
	CG	215.19±18.18	217.21±17.57	2.02	1.19	>0.05
Push-ups (reps)	EG	29.68±7.43	43.93±6.48	14.25	2.14	<0.001
	CG	30.02±6.63	35.76±7.35	5.74	1.96	<0.05
Pull-ups (reps)	EG	7.83±3.19	13.89±4.21	6.06	1.87	<0.001
	CG	7.93±3.41	10.24±3.38	2.31	1.96	<0.05
Sit-ups (reps)	EG	32.46±5.35	52.01±7.59	19.55	2.49	<0.001
	CG	33.09±6.22	44.71±7.76	11.62	2.08	<0.01
4 x 9 m shuttle run (s)	EG	10.13±0.61	9.03±0.79	1.1	0.93	<0.05
	CG	9.93 ± 0.78	9.45 ± 0.82	0.48	1.43	> 0.05
Seated forward bend (cm)	EG	9.53 ± 6.21	17.74 ± 5.37	8.21	2.73	< 0.001
	CG	9.48 ± 6.37	13.43 ± 6.28	3.95	1.94	< 0.01

Note: Mean: arithmetical average; SD: standard deviation; t: t-test value, p: the significance of the difference between the indicators of studied groups before and after the experiment

**Table 3.** The dynamics of the female students' physical fitness indicators before and after the experiment (n=172), Mean±SD

Tests	Groups	Before the experiment	After the experiment	Changes in 4 years	Significance value	
					t	p
2000 m run (min, s)	EG	11.43.1±1.34	10.19.4±1.23	1.23.7	2.72	<0.001
	CG	11.37.1±1.06	11.19.3±1.94	17.8	2.64	<0.05
100 m run (s)	EG	18.34±1.27	17.04±1.48	1.3	2.01	<0.05
	CG	17.87±0.36	17.91±0.63	-0.04	1.24	>0.05
Long standing jump (cm)	EG	165.65±7.80	177.43±7.98	11.78	2.16	<0.05
	CG	166.19±6.08	171.23±7.52	5.04	1.97	>0.05
Push-ups (reps)	EG	9.14±3.75	18.02±4.26	8.08	2.17	<0.001
	CG	9.78±3.43	12.31±3.23	2.53	1.94	>0.05
Bent arm hang (s)	EG	6.94±6.74	15.83±5.16	8.89	1.76	<0.001
	CG	7.21±6.43	9.63±4.78	2.42	1.82	<0.05
Sit-ups (reps)	EG	27.49±4.47	43.62±3.79	16.13	1.98	<0.001
	CG	28.45±5.12	36.84±4.03	8.39	2.14	<0.01
4 x 9 m shuttle run (s)	EG	11.04±0.81	10.42±0.63	0.62	1.79	<0.05
	CG	10.95±0.67	10.81±0.76	0.14	1.83	>0.05
Seated forward bend (cm)	EG	13.62±2.84	18.16±3.64	4.54	2.18	<0.01
	CG	12.86±3.63	14.58±3.98	1.72	2.03	>0.05

Note: Mean: arithmetical average; SD: standard deviation; t: t-test value, p: the significance of the difference between the indicators of studied groups before and after the experiment

number of students who are assigned to a special medical group after a medical examination at a HEI. There are also problems in preparing students of the main educational department to take tests on physical training, insufficient material and technical support of physical exercises and sports.

With the entry of Ukraine into the Bologna process, new problems arose in the system of physical education of students, and the destruction of the traditional process of physical education began. Not understanding the principles of the Bologna process, not deciding on the content of subjects and technology of their structuring, many HEI principles of various ranks required departments of physical education to develop a credit-modular system of the educational process in physical education in accordance with European Credit Transfer Systems (ECTS). Physical education and where its

place will be in the case of Ukraine's entry into the educational and scientific space of Europe has become the subject of discussion. Currently, physical education falls into line with special disciplines, which violate the principles of regularity, consistency, continuity of exercises. It should also be noted that none of the special disciplines is studied at the HEI of Ukraine for four years or more. Undoubtedly, the developed system of studying should be integrated into the European educational space. Such a system, which began to be developed by many departments of physical education at HEI of Ukraine, does not exist in Europe. In Ukraine, attempts to implement ECTS requirements in the discipline of "Physical Education" have been made. The study of the experience of European countries, as well as the analysis of leading European publications in the field of education and upbringing, showed that physical



education is not included in the curricula of universities, but is an independent work of students. Students take care of their own physical development, their own health, and proper level of performance [16, 17, 18].

Currently, Ukraine has a traditional training system for students at HEI, where physical education is an integral part of professional training. Transferring students to independent physical education classes is unjustified and premature today. It is substantiated by a low level of consciousness of students and careless attitude to their own health; the lack of criteria for assessing the health of professionals who are applying for a job; the material and technical base is not able to provide individual desires of students to exercise in their spare time; very low physical fitness of most students and their insufficient physical development; 5.7 to 20.0% of students having disabilities and diseases that require classes in special rehabilitation techniques under the guidance of a teacher or methodologist of physical therapy; retraining of teaching staff needed, change of the curriculum and staff training at physical education universities, institutes, and faculties of physical education.

The prospects for a radical change in the system of physical education of students should be associated with the introduction of healthy lifestyle technologies, ensuring good health, physical, mental, social, emotional, and spiritual well-being of students. Depending on the target setting, organizational forms, means, and types of physical activity in the system of physical education, the following main groups of physical education can be recommended: active games, competitive sports, recreational and health-promoting sports, health-improving motor activity, professionally-oriented motor activity, everyday motor activity.

The results of the experiment show that the, implemented authors' technology in the educational process of university students, contributes to improving the quality of the students' physical education. The authors' technology requires the teacher to adhere to the principle of mutual respect and cooperation by the basic principle of assessing the physical fitness of students. A teacher who does not use encouragement, praise, does not want to understand a student who cannot meet the standard for physical testing, will ruin the student's desire to exercise. Unsatisfactory grades on physical fitness should not degrade the students' dignity. Testing indicators should be used in three aspects in order to 1) determine the level of physical fitness of students and evaluate it; 2) optimize physical activity in physical education classes and adjust the use of the means of physical qualities development; 3) activate students' motivation for physical improvement and independent physical exercises.

## CONCLUSIONS

The checking of the effectiveness of authors' technology of increasing physical activity of university students showed its greater effectiveness in comparison to the traditional program of physical education at HEI. The students (both males and females) of the experimental groups were recorded to have significantly ( $p < 0.001$ ) better indicators than the control

groups, according to the following criteria: the amount of students' physical activity while studying at the university (scheduled classes, independent classes, sports sections, morning exercises, etc.); the level of physical fitness indicators. A high level of physical activity of students will contribute to strengthening their health and improving the efficiency of their future professional activities.

Prospects for further research are aimed at studying the students' motivation for physical improvement and independent physical exercises.

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#### Conflict of interest:

The Authors declare no conflict of interest

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W Polsce mamy nie tylko ustawę uzdrowiskową, w Polsce balneologia i medycyna fizykalna stanowi odrębną dyscyplinę medyczną z własnym programem nauczania. Te okoliczności sprawiają, że czasopismo jest atrakcyjne zarówno dla autorów jak i odbiorców polskich i zagranicznych.

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