Using chatbot application «Telegram» to improve functional fitness, physical fitness and academic performance of students

Alexander S. Sheplyakov[1,1], *Victor L.* Kondakov [2,3], *Sergey I.* Kramskoy[1], *Evgeniya N.* Kopeikina[2], *Ludmila N.* Voloshina[2]

[1] Belgorod State Technological University named after V.G. Shukhov, Belgorod, Russia
[2] Belgorod National Research University, Belgorod, Russia
[3] Belgorod Law Institute of Ministry of the Interior of the Russian Federation named after I.D. Putilin, Belgorod, Russia

Abstract. The aim of the study is to evaluate the possibility of using the chatbot application «Telegram» to improve the indicators of physical fitness, functional fitness and academic performance of students. The study uses the following methods: pedagogical experiment, pedagogical observation, pedagogical testing, methods of mathematical statistics. The authors propose to influence the physical condition of students using modern, fashionable information technology in the form of chat-bot application «Telegram», which can have a positive impact on students. The article describes the mechanism of the chat-bot application «Telegram», the organization of the study and the interaction of the teacher with the participants of the experiment. Testing on the selected criteria at the beginning and end of the experiment was carried out. The obtained indicators were processed using the program SPSS Statistic, nonparametric method by Mann-Whitney U-criterion ($P \leq 0.05$). Reliable differences of the studied criteria of physical fitness and functional capabilities of the organism between the control and experimental groups were obtained. The improvement of academic performance of the experimental participants was proved.

Keywords. students, functional fitness, physical fitness, academic performance

1 Introduction

In modern living conditions, to process and assimilate a large amount of daily information a person needs to maintain a balance of physical and intellectual activity. As practice shows, this balance is not observed by the majority of the Russian population, neglecting motor activity, which in turn contributes to the deterioration of physical fitness and functional fitness of the body. To date, the problem of hypokinesia is relevant for people of all ages. It is important for us to study such a layer of the population as student youth, since their professional activity and

[1]Corresponding author: alex.sheplyakov031@yandex.ru

the development of our country will depend on the effectiveness of their educational activity [1].

Entering and studying at a higher education institution is stressful and requires a large amount of energy expenditure. During the period of study students experience mental stress, and also on its background increases the level of emotional and mental stress. At the same time, modern youth lives in conditions of time shortage, irrationally organizes its day, leads a sedentary lifestyle, does not observe the regime of work and rest, which also affects the functional capabilities of the organism of students and the effectiveness of the educational process.

We have searched for scientific data on methods of improving academic performance and physical conditioning of students. Many works using point-rating systems, computer programs, physical training programs were identified [2-5]. A small body of work was devoted to mobile applications, gadgets and social networks [6]. According to the authors, fashionable information technologies, which include applications, gadgets and social networks, have a huge impact on today's youth, so their use can be effective in solving educational tasks.

The purpose of the study is to evaluate the possibility of using the chatbot application «Telegram» to improve physical fitness, functional fitness and academic performance of students.

2 Materials and Methods

The experiment involved 400 people, students of the main medical group (experimental group of young men EGB - n=100, and girls EGG - n=100, control group of young men CGB - n=100, and girls CGG - n=100). Throughout the school year, the participants of the experiment used a chatbot in the application «Telegram». A teacher was assigned to each study group to monitor the fulfillment of the experiment conditions and to provide advice on the use of chatbot and other issues.

Research methods: pedagogical experiment, pedagogical observation, pedagogical testing, methods of mathematical statistics.

3 Results

To improve the level of physical fitness and functional training of students, it was decided to use the developed chatbot in the application «Telegram», which generates variants of the user's motor activity, taking into account his/her individual characteristics, personal interests and daily employment. The chat-bot acts as an assistant in the daily planning of motor activity and its tracking. The chat-bot in the application «Telegram» is designed as a flowchart algorithm, in which you can select variants of planned or already performed activity. All students are set a norm of 10 thousand steps, but their activity options and their intensity are defined.

The user is offered the following variants of motor activity of different duration and intensity: running, swimming, cycling, walking, sports games, gym, independent exercise at home, stretching, dancing. The algorithm also recommends the user a means of recovery based on the planned or already performed activity for the day, and in case of illness - it is necessary to refrain from motor activity and consult a doctor. The motor activity options have a numerical value measured in steps and obtained as an average of the number of steps from Android and iOS platforms.

The user's occupation is taken into account by completing a daily morning questionnaire. As a result, the chatbot application «Telegram» gives appropriate recommendations on means of recovery or on replenishing the missing motor activity.

Testing of the level of physical fitness and functional capabilities of the organism took place at the beginning and at the end of the experiment. The following tests were used to determine the level of development of physical qualities: running 100 m, long jump from a place, flexion-extension of arms in a supine position, incline from a standing position on a gymnastic bench, torso lifting from a supine position, Cooper's test. To determine the functional capabilities of the organism we used: vital capacity of the lungs, Stange's test, Hench's test, Ruffier's test, Skibinskaya index [7].

Testing of physical fitness and functional capabilities of the organism of the participants of EGB, CGB, EGG, CGG at the beginning of the pedagogical experiment showed that there were no reliable differences according to the Mann-Whitney U-criterion ($P \leq 0.05$) for all studied indicators, so the samples are considered homogeneous.

Indicators of physical fitness of experimental and control groups of boys and girls at the beginning and end of the pedagogical experiment are presented in Table 1.

Significant differences according to the Mann-Whitney U-criterion ($P \leq 0.05$) were recorded for many indicators of physical fitness of students, both within the control and experimental groups and between them. In the EGB reliable changes in all tests, except for incline from standing position on the gymnastic bench, were observed. In the CGB, reliable changes were obtained only in the strength test flexion-extension of the arms in the supine position. Significant differences according to Mann-Whitney U-criterion ($P \leq 0.05$) between the control and experimental groups of young men were revealed for all tested indicators, except for the test incline from standing position on the gymnastic bench. In connection with the above, we can conclude that young men have no aspiration in the development of flexibility.

Table 1. Indicators of physical fitness of students at the beginning and end of the experiment (boys and girls)

Control tests	Group	Before M ± m	After M ± m	P (by Mann-Whitney U-test)	
				Within the groups	Between the groups
Running 100 m (s)	EGB_1	13,81±0,12	13,04±0,13	(0,032) *	(0,020) *
	CGB_1	13,93±0,96	13,72±0,63	- 0,067	
	EGG_1	16,47±0,15	15,35±0,17	(0,038) *	(0,017) *
	CGG_1	16,77±0,16	16,02±0,11	- (0,081)	
Long jump from a standing position (cm)	EGB_1	226,17±1,64	241,91±1,93	(0,027) *	(0,025) *
	CGB_1	227,81±1,72	230,55±1,25	- (0,082)	
	EGG_1	187,07±1,04	198,66±1,03	(0,041) *	(0,029) *
	CGG_1	186,35±1,33	193,22±1,02	- (0,077)	
Bending-extending arms in a supine position (number of times)	EGB_1	26,37±0,85	38,54±1,21	(0,028) *	(0,010) *
	CGB_1	26,85±0,88	31,06±0,98	(0,030) *	
	EGG_1	8,18±0,34	12,94±0,46	(0,009) *	(0,018) *
	CGG_1	8,36±0,38	9,14±0,46	- (0,084)	
Bending from a standing position	EGB_1	11,94±0,45	12,91±0,38	- (0,101)	- (0,090)
	CGB_1	11,75±0,42	12,63±0,41	- (0,089)	

on a gymnastics bench (cm)	EGG_1	15,45±0,32	22,50±0,33	(0,030) *	(0,029) *
	CGG_1	17,60±0,35	19,51±0,44	(0,027) *	
Lifting the trunk from the supine position (number of times per min)	EGB_1	47,41±0,86	61,22±0,67	(0,002) *	(0,009) *
	CGB_1	46,73±0,82	49,01±0,79	- (0,077)	
	EGG_1	42,71±0,48	57,43±0,97	(0,020) *	(0,015) *
	CGG_1	41,46±0,56	46,54±0,35	(0,040) *	
Cooper's test (m)	EGB_1	2438,22±25,23	2809,03±20,47	(0,019) *	(0,021) *
	CGB_1	2424,12±25,09	2504,08±30,36	- (0,091)	
	EGG_1	2103,48±15,35	2292,55±26,69	(0,011) *	(0,006) *
	CGG_1	2067,28±15,31	2095,11±17,46	- (0,099)	

* - reliability of differences by Mann-Whitney U-test ($P \leq 0,05$)

Also reliable differences of physical fitness indicators by Mann-Whitney U-criterion ($P \leq 0.05$) were recorded in the control and experimental groups among girls. EGG participants showed reliable changes in the Mann-Whitney U-criterion indicators ($P \leq 0.05$) for all tests performed. In the CGG group, reliable changes in performance occurred only in the strength and flexibility tests (incline from standing position on a gymnastic bench and torso raising from lying on the back). Between the EGG and CGG groups, reliable differences were recorded by Mann-Whitney U-criterion ($P \leq 0.05$) for all studied indicators.

Table 2. Indicators of functional capabilities of the organism of students at the beginning and the end of the experiment (boys and girls)

Functional tests	Group	Before M ± m	After M ± m	P (by Mann-Whitney U-test)	
				Within the groups	Between the groups
vital capacity of the lungs (l)	EGB_1	3,51±0,14	4,10±0,12	(0,009) *	(0,004) *
	CGB_1	3,46±0,16	3,52±0,11	- (0,103)	
	EGG_1	2,48±0,12	3,06±0,11	(0,012) *	(0,011) *
	CGG_1	2,50±0,12	2,62±0,12	- (0,097)	
Stange's test (sec)	EGB_1	58,3±2,10	88,8±2,03	(0,022) *	(0,013) *
	CGB_1	58,9±1,87	71,4±1,84	(0,015) *	
	EGG_1	40,02±1,96	72,23±1,87	(0,026) *	(0,018) *
	CGG_1	40,91±2,01	49,10±1,75	- (0,063)	
The Hench test (sec).	EGB_1	34,10±1,50	45,68±1,11	(0,007) *	(0,002) *
	CGB_1	33,85±1,68	36,06±0,98	- (0,103)	
	EGG_1	21,18±0,35	32,74±0,39	(0,019) *	(0,010) *
	CGG_1	21,36±0,37	24,14±0,42	- (0,073)	

Ruffier test	EGB_1	6,31±0,96	3,42±0,76	(0,023) *	(0,021) *
	CGB_1	6,33±0,94	6,01±1,03	- (0,084)	
	EGG_1	6,85±1,12	3,04,±0,47	(0,018) *	(0,022) *
	CGG_1	6,77±1,19	6,48±1,10	- (0,078)	
Skibinskaya Index	EGB_1	31,87±2,86	55,32±3,65	(0,011) *	(0,033) *
	CGB_1	32,41±3,99	31,44±4,01	- (0,072)	
	EGG_1	33,14±2,65	55,26±3,89	(0,013) *	(0,036) *
	CGG_1	33,72±3,12	34,87±3,34	- (0,067)	

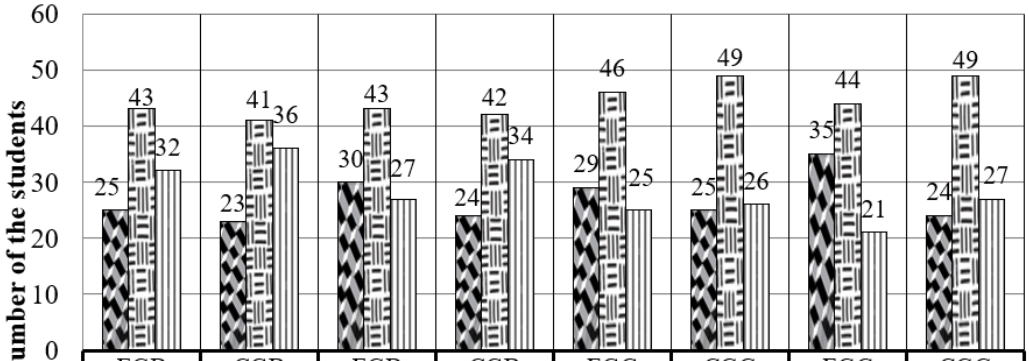
* - reliability of differences by Mann-Whitney U-criterion ($P \leq 0.05$)

Table 2 presents the dynamics of indicators of functional capabilities of the body of the experimental participants. According to the presented results, in EGB and EGG there are reliable differences according to Mann-Whitney U-criterion ($P \leq 0.05$) for all studied functional tests. In contrast to the experimental groups of boys and girls, an increase in the results of the functional capabilities of the organism was revealed in CGB and CGG, but reliable differences in CGG by Mann-Whitney U-criterion ($P \leq 0.05$) were not revealed at all, and in CGB - only in the Stang test.

Significant differences by the Mann-Whitney U-criterion ($P \leq 0.05$) were noted for all tested indicators between the experimental and control groups of both boys and girls.

As a result of using the chatbot application «Telegram», the participants of the experimental groups showed reliable improvements in physical fitness and functional capabilities of the body according to the Mann-Whitney U-criterion ($P \leq 0.05$). In the control groups no reliable differences were recorded according to the Mann-Whitney U-criterion ($P \leq 0.05$).

In order to determine the possibility of using the chatbot application «Telegram» to improve the academic performance of students, we analyzed the exam sheets for two semesters of the academic year (Fig.1).



	EGB (autumn semester)	CGB (autumn semester)	EGB (spring semester)	CGB (spring semester)	EGG (autumn semester)	CGG (autumn semester)	EGG (spring semester)	CGG (spring semester)
"5"	25	23	30	24	29	25	35	24
"4"	43	41	43	42	46	49	44	49
"3"	32	36	27	34	25	26	21	27

Fig. 1. Distribution of students (boys and girls) by academic performance at the end of two semesters of the academic year. *Source:* Sheplyakov A.S. (2023).

It should be noted that according to the results of the previous academic year in the experimental and control groups the number of excellent and good students was equal. The average grade point average at the end of the previous academic year was 3.64 for boys and 3.89 for girls.

In the fall semester, according to Figure 1, in the experimental groups there is a slight advantage in the number of excellent and good students compared to the control groups. The difference in the number of «good» and «excellent» students between EGB and CGB is 4 people. The number of excellent and good students in EGG is more than in CGG by 1 person. However, during the fall semester there were qualitative changes in EGG - the number of excellent students increased. The average grade point average for the fall semester was 3.93 in EGB, 3.87 in CGB, 4.04 in EGG, and 3.99 in CGG.

In the spring semester, when comparing the results, it can be seen that the academic performance of the boys and girls of the experimental group improved significantly. Among EGB there is an increase in the number of excellent students by 5 people, those studying on «good» and «excellent» also by 5 people. In EGG there were 6 more excellent students, good and excellent students increased by 4 people. The average grade point average for the spring semester was 4.03 in EGB and 4.14 in EGG.

There were insignificant changes in the control groups in the spring semester. In CGB there were 2 more people studying on «good» and «excellent», and in CGG there were 1 excellent and 1 good student less. The average grade point average at the end of the spring semester was 3.9 in CGB and 3.97 in CGG.

The analysis of indicators of the control and experimental groups for the second semester shows a significant increase in the performance of students of the experimental group. There are 7 more people in CGB than in EGB, studying for «satisfactory». The number of excellent and good students in EGB is more by 7 people in comparison with CGB. The experimental group of girls also significantly improved their performance in relation to the control group. In the EGG there is a difference of 11 excellent students, and there are 6 more «satisfactory» students in the CGG than in the EGG.

Comparing the average grades of the control and experimental groups, the following results were obtained: in EGB the average grade is 0.13 more than in CGB, and in EGG it is 0.17 more than in CGG.

In connection with all of the above, we can conclude that the use of chatbot application «Telegram» has a positive impact on the indicators of physical fitness, functional fitness and academic performance of students.

4 Discussion

A number of researchers conducted experiments to improve the level of physical fitness and functional capabilities of the body by including in the educational process of additional classes in sports sections. The researchers recommended attending the sections at least three times a week or more, claiming that this is enough to achieve the necessary health-improving and training effect. The results of the experiments showed that the introduction of additional training sessions for two months has a positive effect on the level of health, adaptation of the body to stress, leads to increased efficiency, stress resistance and improved academic performance [8-16].

In our opinion, this method of improving physical fitness, functional capabilities of the organism and improving academic performance is effective. However, visiting sports sections has one disadvantage - it is available to a small number of students, it is impossible to cover the

entire contingent of students, due to the material and technical capabilities of educational institutions. In most universities, students who have sports discharges are admitted to sports sections, so beginners have practically no opportunity to get into the section of the university.

In his study, D.V. Kozlov proved that by introducing various types of motor activity into the daily life of students, such as participation in university fields days, sports festivals, visiting sports sections, various fitness clubs and conducting independent home training, the indicators of physical fitness, efficiency and academic performance increase [3].The author recommended to include morning hygienic gymnastics, walks in the fresh air and physical exercises in the evening as a daily practice. In the course of the experiment it was proved that the participants increased their health, motor activity, became more efficient in coping with learning tasks, and improved their sleep performance.

According to the study of M.L. Listkova, to improve physical fitness, increase efficiency and academic performance, students should include daily, in addition to physical training exercises, elements of health-improving techniques: hardening, breathing exercises, exercises from autotraining for self-regulation of mental state [2].The study proved that improving the level of physical fitness using additional exercises of health-improving nature has a positive effect on the academic performance of students.

5 Conclusion

As a result of the experiment, the reliability of differences in the studied indicators of physical fitness and functional capabilities of the organism between the control and experimental groups, as well as within the groups was recorded.

As a result of testing of physical fitness of students there were recorded reliable differences by Mann-Whitney U-criterion ($P \leq 0.05$) for all indicators between EGG and CGG and between EGB and CGB, with the exception of incline from standing position on the gymnastic bench between EGB and CGB.

The obtained results of testing the functional capabilities of the students' organism allow us to state reliable differences according to the Mann-Whitney U-criterion ($P \leq 0.05$) for all the studied indicators between EGB and CGB, as well as between EGG and CGG.

The analysis of the exam sheets of two semesters of the academic year showed that by the results of the winter session the performance in the experimental group was better by 2.9% than in the control group, and by the results of the summer session the performance was better by 8.1%.

The introduction of the chatbot application «Telegram» in the educational process allowed to improve physical fitness and functional capabilities of the students' organism, to increase the indicators of academic performance.

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