Improving the physical abilities of students of the Institute of Social Engineering that are important for their future profession through the use of mini-volleyball

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Abstract

Objective of the study is to identify the influence of the mini-volley game on the development of professionally important physical qualities of students at the Institute of Social Engineering.

Methods and structure of the study. To determine the key professional physical qualities of students, a survey was conducted, in which 19 teachers from the Department of Physical Education and Health, as well as the Institute of Social Engineering of the Siberian State University named after M.F. Reshetnev took part. The study itself involved 30 second-year students of the ISI of the Siberian State Agrarian University named after M.F. Reshetnev. The control group (15 girls) was represented by students of the directions 44.03.01 "Pedagogical Education" and 39.03.02 "Social Work". The experimental group (EG) also consisted of 15 girls studying in the direction 45.03.02 "Linguistics". The students from the control group trained according to programs including volleyball and basketball, while the participants of the EG studied the technique and tactics of playing mini-volleyball for two semesters (36 hours in each).

Results and conclusions. It has been determined that such physical qualities as coordination, reaction speed and general physical endurance are critically important for successful professional development of graduates of the Institute of Contemporary Art (ICA). The study experimentally confirmed the effectiveness of using mini-volleyball in the training process in professional and applied physical education (PAPE) to improve coordination and speed skills, which are key physical attributes for ICA students. The developers propose integrating additional classes, including elements of mini-volleyball, into the curriculum of the PPE discipline for ICA students, with a total duration of 72 hours.

Keywords: *students of the Institute of Social Engineering, mini-volleyball, professionally important physical qualities, coordination, endurance, speed abilities.*

Introduction. The problem of improving the physical fitness of ISI students is poorly studied and is relevant. Analysis of scientific literature [4], a survey of university teachers conducted by the authors showed that professionally important physical qualities for the future professional activity of ISI students include coordination skills (agility), speed abilities (speed of visual-motor reaction) and general endurance. Analysis of physical fitness of students conducted over 10 years shows that the level of strength abilities of ISI girls is, on average, significantly lower (at $p < 0.05$) than students of the Institute of Forest Technology (IFT) and the Institute of Chemical Technology (ICT).

Often, ISI students, due to insufficient physical fitness, are not able to fully demonstrate themselves in team sports such as basketball and volleyball, which leads to a decrease in involvement and motivation for classes, absences from classes, and an increased risk of injury. In our study, we proposed to integrate the game of “mini-volley” into the curriculum of the PPFK of students of the ISI in the amount of 72 hours, which will allow more productively to develop their professionally important physical qualities, increase motivation for classes, and create a favorable emotional background in them.

Krasnoyarsk Krai is one of the regions where the game of mini-volley is developing both at the profes-

sional and student levels. This game is included in the number of types of the University Spartakiad held among the teachers of the Siberian State University named after Reshetnev.

An analysis of scientific papers included in the RSCI database allowed us to establish that mini-volley as a game begins its history on the island of Hokkaido, in 1972 Hidetoshi Kojima launched his project in Japan. In 2011, in St. Petersburg, at the international congress "Man. Sport. Health", Hidetoshi Kojima presented mini-volley to the general public [1, 2]. An analysis of scientific literature has shown that the use of mini-volleyball in physical education classes increases motivation for classes among both senior and higher education students [2, 3]. A survey of students showed that mini-volleyball is the most interesting game in terms of content in physical education classes [1].

Unlike volleyball, the mini-volleyball game, in our opinion, is safer for ISI students; it is played on a smaller playing field with a lighter ball and a low net. The game does not require technical training of students. However, due to the higher speed and unpredictability of the ball's trajectory, the participants in the game must be constantly as focused as possible and quickly respond to the game actions of their opponents. In our opinion, the game motor actions performed during the mini-volley game have a positive effect on the development of professionally important physical qualities of ISI students.

Objective of the study is to identify the influence of the mini-volley game on the development of professionally important physical qualities of ISI students.

Methods and structure of the study. The study involved 30 second-year students of the Institute of Social Sciences of the Siberian State University named after M.F. Reshetnev. The control group included 15 girls studying in the fields of study 44.03.01 "Pedagogical Education" and 39.03.02 "Social Work", the experimental group included 15 girls studying in the field of study 45.03.02 "Linguistics". The experiment was conducted over two semesters of the 24/25 academic year, during PPFC classes. At the initial stage of the experiment, in order to obtain the initial indicators of physical fitness and the functional state of students in both groups, pedagogical testing was conducted. To assess physical fitness, the following tests were used: 2000 and 60 meter runs, 3x10 meter shuttle run, simple visual-motor reaction tests, tennis ball throws for accuracy, and the functional state – the Ruffier test. Students of the KG in the autumn-winter and spring-summer semesters studied volleyball and basketball programs, while students included in the EG for 36 hours in each of the two semesters learned to play mini-volleyball. In the survey, in order to identify professionally important physical qualities of students of the ISI, 19 teachers of the Department of Physical Culture and Sport and the Institute of Social Engineering of the Siberian State University named after M.F. Reshetnev took part.

Results and conclusions. As a result of the analysis of scientific literature and the survey of teachers of the Siberian State University named after M.F. Reshetnev, the authors of the study found that the professionally important physical qualities of students include coordination (agility), speed abilities and general endurance. Comparative results shown in the tests at the initial and final stages of the pedagogical experiment were processed using the Mann-Whitney U-test (see table).

Comparative results of testing ISI girls at the initial and final stages of the pedagogical experiment

Test	To		U-emp.	U-kr.	P	After		U-emp.	U-kr.	P
	CG (n=15)	EG (n=15)				CG (n=15)	EG (n=15)			
	$\bar{X}\pm\sigma$	$\bar{X}\pm\sigma$				$\bar{X}\pm\sigma$	$\bar{X}\pm\sigma$			
60 meter dash, s	13,3±0,71	13,2±0,63	90	64	>0,05	13,1±0,66	12,4±0,58	38	64	<0,05
Shuttle run 3x10 meters, s	12,5±0,69	12,4±0,67	85	64	>0,05	12,5±0,64	11,9±0,55	43	64	<0,05
2000m run, min:s	13:08±12,99	13:04±12,74	81	64	>0,05	12:58±11,35	12:55±11,19	78	64	>0,05
Speed of visual-motor reaction, cm	5,4±0,52	5,3±0,51	79	64	>0,05	5,4±0,51	4,1±0,37	25	64	<0,05
Tennis Ball Throwing Accuracy, Number of Hits out of 10 Throws	4,59±0,81	4,73±0,78	75	64	>0,05	4,78±0,79	5,87±0,64	32	64	<0,05
Ruffier test, Ruffier index	7,4±0,81	7,4±0,77	92	64	>0,05	7,1±0,79	7,0±0,73	87	64	>0,05

Note: ISE – Institute of Social Engineering, $\bar{X}$ – average value of the sample, CG – control group, EG – experimental group, U-emp. – empirical value, U-cr. – critical value, σ – standard deviation, n – number of subjects in the group, P – significance level.

When obtaining the initial indicators of physical fitness and functional state of the subjects through pedagogical testing, at the initial stage of the experiment we failed to identify reliable intergroup differences (at $p > 0.05$) in any of the tests. This indicates the homogeneity of the study groups and approximately the same level of physical fitness and functional state of all subjects. Low standard deviation coefficients in all tests indicate a small spread of indicators within the groups.

After conducting the experiment with the use of mini-volleys in PGFC classes in the EG, we noted reliable differences between the groups at a 5% significance level in the following tests: 3x10 meter shuttle run, 60 meter run, speed of visual-motor reaction and tennis ball throws for accuracy. No differences were found between the groups in the 2000 meter run and the Ruffier test, which indicates the same functional state and general endurance of the subjects of both groups before and after the experiment.

Conclusions. The study found that professionally important physical qualities necessary for the future professional activity of ISI students include coordination and speed abilities.

The study experimentally proved the effectiveness of using the mini-volley game in the PPFC classes of ISI students. The authors proposed to supplement the curriculum of the PPFC discipline for ISI students with classes using the mini-volley game in the amount of 72 hours. This will allow more effectively developing the professionally important physical qualities of ISI students, increasing motivation, and creating a favorable emotional background in PPFC classes.

We did not establish a positive effect of the mini-volley game on the development of general endurance of students, and noted the need for further research on the presented topic.

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