Content of professional and practical physical training indicators for students of higher education institutions

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Abstract

Purpose: to study and analyze the physical fitness indicators of students in higher pedagogical educational institutions.

Methods: The study uses methods of analysis of scientific and methodological literature, questionnaires; pedagogi cal observations; biomedical methods, control tests char acterizing special preparedness, pedagogical experiment, mathematical and statistical data processing.

Results: Lifting the body upwards by 90° with legs together while lying on the back (during 1 min, repetitions) - In this abdominal muscle exercise (repetitions of body lifts in 1 minute), 1st-year students performed an average of 34.02 ± 4.75 repetitions (V% = 13.96); 2nd-year students achieved 34.99 ± 4.80 repetitions (V% = 13.71). A difference of approximately +0.97 repetitions was observed in favor of the second group; however, this difference is not statistically significant ($t = 1.78$; $P > 0.05$). Consequently, the results of 1st and 2nd-year students in abdominal muscle strength and endurance are practically the same. The one-year increase in training did not provide a significant advantage in this exercise, which is likely due to the similarity of the students' physical education program and insufficient time. The dispersion of results in both groups is also almost equal (V% 14%), meaning that although some students' indicators within the group differed from others, this difference did not significantly impact the intergroup averages.

Conlcusion: providing university students with sufficient sports equipment and inventory for physical education and sports activities, thereby increasing their level of professional and practical physical fitness;

- widespread implementation of innovative technologies in physical education and sports training processes, taking into account modern scientifically-based techniques and technologies;
- regular organization of friendly matches and competitions in physical fitness among university students;
- it would be advisable to develop a training program that enhances students' individual characteristics and physical qualities, serving their comprehensive development, as well as to formulate strict recommendations for this.

Keywords: Physical education, sports, physical development, physical fitness, health improvement, physical education minutes, morning exercises, individual physical education classes.

Introduction

In higher pedagogical educational institutions, new pedagogical technologies play an important role not only in teaching specialized subjects but also in developing the physical fitness of student youth within the modern education system. The interconnectedness of labor, education, vocational training, and physical preparation, as well as methods of instilling these in young people, is one of the natural and essential challenges in life and daily existence.

The scientific and practical study and analysis of these processes is a requirement of our time. In this context, when analyzing the results of research conducted by foreign scientists, the data obtained showed that during the period of study in higher educational institutions, only about 7-10% of students engage in extracurricular forms of physical education and sports activities. Based on this, we can conclude that students' interest in sports is very low.

Higher educational institutions have various forms of physical education and sports activities (physical education classes, extracurricular sports and recreational activities, mass sports events, and public amateur physical education sessions). These activities should effectively fulfill the tasks of improving students' health and strengthening their physical fitness from both methodological and organizational perspectives. However, in practice, the current higher education system only provides first-year students (in private and some public higher educational institutions) with 2 hours of physical education and sports activities per week during the first academic semester. This limited provision creates difficulties in improving their level of physical development and professional-applied physical training.

Considering today's challenges, it is necessary to theoretically and practically study the physical development and professional-applied physical training of students in higher educational institutions and find effective solutions.

Regarding this issue, we studied the indicators of professional-applied physical training of higher education students, analyzed the results, and developed necessary recommendations.

Results and discussion

According to the initial analysis results, no significant statistical differences were found at the beginning of the experiment between the physical fitness indicators of 1st and 2nd-year male students from various fields of study in higher education institutions (in all cases $P > 0.05$). Below, the mean results ($\bar{X} \pm \sigma$), coefficient of variation (V%), and t and P values of the intergroup differences were analyzed for each test criterion. For each indicator, the presence or absence of differences between groups, their statistical significance, and potential causes were explained.

100 m run (seconds) - 1st-year students covered the 100-meter distance on average in 14.43 ± 1.34 seconds (V% = 9.25), while for 2nd-year students this indicator was 14.28 ± 1.31 s (V% = 9.15). The difference in the results between both groups was only about 0.15 seconds and was not statistically significant ($t = 1.03$; $P > 0.05$). This means that the level of speed preparedness of first-year and second-year students is practically the same; a one-year difference may not have led to a significant change in this sprint indicator. The coefficients of variation (~9%) are also very low, which indicates that the results of the 100-meter race in both groups are extremely similar.

Pull-ups on the horizontal bar (times) - 1st-year students were able to do pull-ups on the horizontal bar on average 10.94 ± 1.52 times (V% = 13.92); 2nd-year students did 11.27 ± 1.55 pull-ups (V% = 13.75). The difference between the results (0.33 times) is small and is not statistically significant ($t = 1.90$; $P > 0.05$). So, although upper-year students performed slightly more pull-ups, this difference is not statistically reliable. Perhaps, during the year, the strength indicators did not increase significantly, or the 1st-year students were also physically adequately prepared upon arrival. The distribution of results in both groups is practically the same (V% 14%), which also confirms their similarity in terms of pull-up performance.

Throwing a 700g sports implement (meters) - The average distance for throwing a 700-gram sports implement (for example, a small shot put or ball) by 1st-year students was 33.88 ± 4.30 m (V% = 12.70); for 2nd-year students, this indicator was 34.50 ± 4.09 m (V% = 11.85). The average results of both groups are very close to each other (the difference is approximately 0.62 m) and are not statistically significant ($t = 1.28$; $P > 0.05$).

This indicates that although second-year students appear to have a slight advantage in throwing, this advantage is not statistically reliable. It is likely that the students who were one year older did not achieve a significant advantage in strength and throwing technique; that is, both groups demonstrated similar preparedness in this test.

Additionally, the coefficient of variation is slightly lower in the 2nd-year group (11.85% compared to 12.70%), which suggests that the results of the second group are somewhat more consistent (less scattered), but the difference in

Table 1. Comparative analysis of physical fitness indicators of first- and second-year male students at pedagogical higher education institutions, tested at the beginning of the study

No.	Tests	1st year (n=156)		2nd year (n=148)		t	P
		± σ	V %	± σ	V %		
1.	*100m run (s)*	14.43±1.34	9.25	14.28±1.31	9.15	1.03	>0.05
2.	*Pull-ups on horizontal bar (times)*	10.94±1.52	13.92	11.27±1.55	13.75	1.90	>0.05
3.	*Throwing 700g sports equipment (m)*	33.88±4.30	12.70	34.50±4.09	11.85	1.28	>0.05
4.	*Push-ups (times)*	31.04±3.75	12.09	31.86±4.11	12.89	1.81	>0.05
5.	*Lying on back, lifting legs together to 90° (1 min, times)*	34.02±4.75	13.96	34.99±4.80	13.71	1.78	>0.05
6.	*Standing long jump (cm)*	214.03±30.42	14.21	219.23±27.66	12.62	1.56	>0.05

Table 2. Comparative analysis of physical fitness indicators of 3rd and 4th year male students of pedagogical higher education institutions, tested at the beginning of the study

No.	Tests	3rd year (n=146)		4th year (n=144)		t	p
		± σ	V %	± σ	V %		
1.	*100m sprint (s)*	14.08±1.31	9.27	13.83±1.25	9.07	1.64	>0.05
2.	*Pull-ups on horizontal bar (times)*	11.68±1.64	14.06	12.28±1.72	14.04	3.00	<0.01
3.	*Throwing 700g sports equipment (m)*	35.26±4.18	11.86	36.21±4.43	12.24	1.87	>0.05
4.	*Push-ups (times)*	32.90±4.21	12.80	34.34±4.79	13.95	2.71	<0.05
5.	*Lying on back, raise legs together to 90° (times per 1 min)*	36.17±4.77	13.18	37.58±4.71	12.54	2.52	<0.05
6.	*Standing long jump (cm)*	225.24±31.22	13.86	232.21±27.38	11.79	2.02	<0.05

the means remains insignificant.

In the push-up exercise (referred to as "otjimanie"), which involves bending and extending the arms while leaning on the ground, 1st-year students performed an average of 31.04 ± 3.75 repetitions (V% = 12.09), while 2nd-year students performed 31.86 ± 4.11 repetitions (V% = 12.89). The difference is very small (0.82 repetitions) and statistically insignificant (t = 1.81; P > 0.05). This result indicates that the level of strength endurance in arm muscles is nearly identical for students in both years. It appears that the one-year difference was not sufficient to significantly increase this indicator - although 2nd-year students tend to perform slightly more repetitions, this difference is not consistently observed. For both groups, the V% was approximately 12%, indicating moderate variability in results, with similar values recorded within each group.

In the standing long jump (cm) exercise, 1st-year students showed an average result of 214.03 ± 30.42 cm (V% = 14.21), while 2nd-year students jumped 219.23 ± 27.66 cm (V% = 12.62). The second-year result is slightly higher (+5.20 cm), but this difference is not statistically significant (t = 1.56; P > 0.05). Thus, almost identical results are observed in jump distance for both groups. Although 2nd-year students have a slight advantage, this advantage is not reliable and is considered within the range of natural individual differences. Perhaps the explosive power and technique demonstrated in jumping did not increase significantly over a year, or there are enough first-year students with high physical fitness. The coefficient of variation is relatively lower in the 2nd year (12.62% vs 14.21%), which indicates that the results of the second group are somewhat more consistent, but not enough to make the intergroup difference significant. (See Table 1)

A comparative analysis of the physical training results of third and fourth-year male student groups was conducted. For six test criteria across these stages, the average values of the indicators for 3rd and 4th-year students (M ± σ), the coefficient of variation (V%) expressing the degree of variability, and the statistical significance of the differences (t and P) were assessed. Overall, while the indicators of 4th-year males were slightly better than those of 3rd -year students, the differences were relatively small and in some cases statistically insignificant.

Detailed results for each test are provided below. Result of the first test: Fourth-year students had a slightly higher average result than third-year students on this test. Specifically, the 4th-year group's average score turned out to be marginally better, with the standard deviation (σ) also potentially being slightly lower. However, the identified difference is not statistically

significant: the calculated t-value is small, with $P > 0.05$. Therefore, there is no significant difference between the results of 3rd and 4th-year males in the first test. This suggests that by the transition to the fourth year, this indicator did not change significantly.

A possible reason for this is that by the end of the third year, this ability had already reached a high level, and no substantial increase was observed in the following year. For the second indicator, 4th-year males showed a significantly better result. Compared to 3rd-year students, their average value was much higher, and the level of variation was lower, meaning the results in the fourth year were more consistent.

This difference was confirmed by statistical analysis ($P < 0.01$). Thus, 4th-year students have a statistically confirmed advantage in this test criterion. Perhaps this physical quality (such as strength or speed) was further developed in the fourth year, likely due to more intensive training and increased experience over the course of a year. Analyzing the results of the third test, we can see practically no difference between the 3rd and 4th-year groups.

The average indicators of both groups are very close, and the coefficients of variation are in approximately the same range. Statistically, no significant difference was found for this indicator ($P > 0.05$). Thus, during the transition from the third to the fourth year, this physical indicator either did not change or changes were negligible. This may be due to a lack of specific training targeting this test or because the development limit of this ability had already been reached. In the fourth test criterion, a clear difference was observed: 4th-year students had higher results compared to 3rd-year students.

Their average indicator increased significantly, and the dispersion of individual results decreased relatively (reflected in a lower V% value). The difference between the results was statistically significant ($P < 0.05$). Thus, fourth-year males achieved a significant advantage in this test. This can be attributed to students' physical training being enhanced by another year of practice and experience, particularly through more exercises related to this criterion. An interesting situation is observed regarding the fifth test indicator: the average result of 4th-year students was slightly lower than that of 3rd -year students. This indicator appears to have decreased slightly in the fourth year ($\bar{X}4 < \bar{X}3$), although the difference is not substantial. The coefficients of variation were similar in both groups. Statistically, this difference is not significant ($P > 0.05$), meaning the small difference falls within the range of random variation.

Therefore, in practice, 4th-year males did not perform worse in this test compared to 3rd-year students; the results are almost equal. The slightly lower performance in the 4th year might be due to decreased attention to physical exercises or increased academic workload at this stage. The results of the sixth criterion again indicate a slight advantage for the 4th-year group.

Fourth-year students had a better average result in this final test, surpassing the 3rd-year students. Although the difference is not large, the statistical analysis yielded a value of $p \approx 0.05$ or less, suggesting the difference can be considered somewhat significant. This indicates that by the fourth year, this indicator also improved somewhat.

This result was likely due to the increase in overall physical fitness and continued form improvement even in the final year. In conclusion, the differences in physical fitness levels between 3rd and 4th-year male students are relatively small. In some tests, fourth-year students showed a significant advantage (statistically confirmed), while in others, results were almost equal.

Even for one criterion, a slight decrease was observed in the fourth year, but it was not statistically significant. Generally, the transition from the third to the fourth year saw students' physical fitness tending to stabilize; while some indicators slightly improved in the 4th year, no dramatic improvements were observed. This suggests that by this time, most students' physical abilities had largely developed, and the effects of training had somewhat plateaued. (See Table 2)

Conclusion

Based on the results of studying students' physical fitness levels, it can be said that their professional-practical physical fitness indicators and practical motor activity are at a satisfactory level. To strengthen physical development, increase professional-practical physical fitness levels, gain theoretical knowledge about them, improve health, and achieve physical perfection, students should:

- actively participate in physical education classes and independently join sports clubs;
- regularly perform morning gymnastics exercises, individual physical education exercises at home, and general developmental exer-

cises in their free time;

- On weekends and during holidays, they should actively participate in health-improving activities such as walking and tourist trips.

Increasing the level of physical development and professional-applied physical training of students in higher educational institutions is of current importance;

In our opinion, to improve students' level of physical development and professional-applied physical training, the higher educational institution should:

- Include the subject "Physical Culture and Sports Activity" not as an elective, but as a compulsory subject in the curriculum of all specialties;

- Conduct classes aimed at improving physical fitness throughout the academic year, ensuring the use of brief physical education activities (physical education minutes, micropauses) during theoretical classes;

- To popularize physical culture and sports among students and ensure physical abilities and activity, based on the Law of the Republic of Uzbekistan "On Education," organize sports and fitness groups during extracurricular time at the university, properly implement mass sports, further improve public and amateur forms, organize various sports sections, and ensure the continuity of existing activities.

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