Analysis of physical fitness indicators in 1-4th grade students

https://doi.org/10.65149/eajss.2026.v6i5.a006

[1]Mamatkulov Akmal Akhmadaliyevich

[1]Gulistan state university, Gulistan, Uzbekistan

Abstract

This article analyzes the physical fitness indicators of students in grades I-IV and their developmental characteristics according to age and gender. During the study, to assess the speed, agility, and strength of primary school students, the following tests were utilized: a 30-meter run, a 4×10-meter shuttle run, pull-ups on a horizontal bar, and push-ups while leaning on a gymnastics bench. In the course of the pedagogical experiment, active games and coordination exercises were applied to first-grade students, speed and jumping exercises to second-grade students, speed-strength exercises and relay races to third-grade students, and interval running and gymnastics elements to develop endurance in fourth-grade students. The results obtained from the experimental and control groups were comparatively analyzed using mathematical-statistical methods, and significant improvements in the students' physical fitness indicators were identified following the pedagogical experiment. The research findings indicate that a differentiated selection of physical exercises, taking into account the age-specific characteristics of primary school students, is of great importance for developing physical qualities and enhancing the effectiveness of physical education classes.

Keywords: primary school students, physical fitness, physical qualities, speed, agility, strength, endurance, track and field, physical education, pedagogical experience, motor skills.

Introduction

President Shavkat Mirziyoyev emphasized that, “There is one truth in the world that requires no proof: the development of any country depends on a healthy and educated generation. Therefore, on the path to building a new Uzbekistan, we must create all the necessary conditions to raise a healthy, educated, deeply-thinking, and patriotic youth”.

The Law of the Republic of Uzbekistan “On Physical Culture and Sports” stipulates that compulsory physical education classes, extracurricular activities, and tests must be conducted in all educational institutions in accordance with the physiological capabilities of the students.

According to data from scientific research in the fields of anatomy and physiology, the successful development of fundamental physical qualities is ensured by forming skills and abilities in the motor activities of students in grades I-IV.

The ages of 7–10 represent the most active period for the formation of physical qualities in students in grades I–IV, and the assessment of physical fitness indicators is a crucial factor in the educational process. The issue of physical fitness and the potential for its purposeful development has been investigated in the scientific research of numerous scholars, including *V.K. Balsevich, N.B. Bernstein, Yu.V. Verkhoshansky, T.S. Usmonkhadjayev, Sh.X. Xankeldiyev, R.S. Salamov, B.G'. Boyboboyev, A.T. Sodiqov, D.D. Sharipova*, and others.

Strengthening the health of today’s youth, developing their physical qualities, enhancing the body’s functional capabilities, and improving motor skills are the primary objectives outlined in the current laws of the Republic of Uzbekistan on physical culture and sports.

The advancement of modern physical education science, technological progress, and the automation of production do not diminish the need for the younger generation to be physically fit. For this reason, overcoming difficulties in training sessions provides broad opportunities to cultivate volitional and physical qualities such as purposefulness, independence, initiative, determination, courage, perseverance, and self-control.

Purpose of the study. To substantiate the methodology used to determine the physical fitness levels of students in grades I–IV.

Methods

This study was developed through the effective use of methods such as pedagogical observation, pedagogical experimentation, instrumental methods, and mathematical-statistical analysis of the materials obtained from the experiments. The methods employed were appropriate for the purpose, objectives, and subject of the research, and were validated through practical experience.

Results and discussion

There is no statistically significant difference ($p > 0.05$) between the results of the initial data from the first three tests for boys and girls.

Based on the analysis of the initial data obtained during the research process, it became necessary to pay greater attention to the physical preparedness of students in grades I-IV during physical education classes and to adopt a creative approach to developing physical qualities. This indicates that this issue is one of the important tasks within the theory and methodology of physical education.

Studying the challenges in mastering walking, running, jumping, and throwing techniques, and based on this, clarifying objectives, selecting, and justifying the means for their practical application, helped increase the effectiveness of the training process in athletics.

The process of developing athletics techniques was carried out in the following sequence:

1) Preparatory stage

2) Teaching fundamental technique elements

3) Consolidation and refinement

4) Monitoring and evaluation stage

In physical education classes for students in grades I-IV, a wide range of methods was used to teach athletics techniques. Specifically, active games and coordination exercises were used for first graders; speed and jumping exercises for second graders; speed-strength exercises and relays for third graders; and for fourth graders, exercises primarily related to endurance, interval running, and elements of gymnastics were widely utilized. This, in turn, supported the development of physical qualities such as speed, agility, dexterity, endurance, and strength. Thanks to the methodological guidelines applied during the research, a statistically significant improvement in physical fitness results was observed.

The study examined the physical fitness results of children with different levels of preparedness, identified the reasons for difficulties in their mastery of the techniques, and analyzed the differences in determining the required level of efficiency when performing the sequence of movements.

Experts assessed the physical quality indicators of students in grades I–IV and noted a statistically significant improvement in the results. Consequently, the results obtained for physical fitness, as indicated by these metrics, showed a statistical difference (from $P<0.05$ to $P<0.001$) between boys and girls, as well as between grades. There was a statistically significant difference in the expert assessment indicators for the physical fitness of students in grades I–IV before and after the experiment.

The post-experiment physical fitness of students in grades I-IV was reflected as follows. While there was no statistical difference in the results between boys and girls in grades I–II before the experiment, a statistical difference was found between the results shown by students of each grade after the experiment (Table 2).

In the 30-meter run, no statistical difference ($P>0.05$) was observed in the pre-experiment results between the control and experimental groups of students in grades I–IV. However, after the experiment, a statistical difference was noted between boys and girls in grades I–II and among boys in grade IV. Although the results for the control and experimental groups of boys and girls in grades III–IV were high, no statistical difference was detected. This indicates that the methods for the track and field events included in the school curriculum were appropriately selected.

While there was no statistically significant difference in the 4x10 m shuttle run results between the control and experimental groups before the experiment, a difference was observed in boys from grades I–II after the experiment ($t=5.00–3.94$; $p<0.05$). For girls, while a statistically significant difference was observed in Grade I ($p<0.05$), no such difference was recorded in Grade II. However, while the results for boys in grades III–IV showed a statistically significant difference ($p<0.05$), the results for girls did not. This is because the tools and methods used in the track and field exercises did not have a sufficiently significant impact to produce a recordable difference in the 4x10 m shuttle run for girls.

While no statistical difference was observed between the boys in the control and experimental classes in the pull-ups on the high bar test before the experiment, a statistical difference of $p<0.05$ was found between all classes after the experiment.

In the arm push-ups on a long bench test, there was no statistical difference between the results shown by the girls, except for the second -grade class. After the experiment, a difference of $p<0.05$ was observed between the results of

Table 1. Physical fitness indicators of I-IV grade students before the experiment

No.	Tests	Gender	Grade I					Grade II				
			n	Experimental group X±m	Control group X±m	t	P	n	Experimental group X±m	Control group X±m	t	P
1.	30m run (s)	M	67	7.101±0.06	7.021±0.10	0.80	>0.05	72	6.901±0.15	6.803±0.15	0.5	>0.05
		F	68	7.201±0.10	7.103±0.14	0.59	>0.05	73	7.202±0.32	7.010±0.15	0.56	>0.05
2.	4x10 m shuttle run (s)	B	67	14,302±0,20	14,011±0,32	0,78	>0,05	72	14,101±0,18	14,103±0,20	0,04	>0,05
		G	68	14,401±0,22	14,011±0,30	1,05	>0,05	73	14,801±0,15	14,602±0,22	0,77	>0,05
3.	Pull-ups (reps)	B	67	0,9±0,20	1,0±0,25	0,32	>0,05	72	2,1±0,25	2,0±0,31	0	>0,05
	Bench push-ups (reps)	G	68	2,5±0,30	3,1±0,41	1,2	>0,05	73	4,9±0,63	5,1±0,60	0,23	>0,05

No.	Tests	Gender	3rd Grade					4th Grade				
			n	Experimental Group X±m	Control Group X±m	t	P	n	Experimental Group X±m	Control Group X±m	t	P
1.	30 m run (s)	B	77	6,602±0,27	6,401±0,30	0,5	>0,05	73	6,002±0,11	5,803±0,13	1,18	>0,05
		G	78	6,701±0,08	6,502±1,14	0,18	>0,05	74	6,403±0,11	6,301±0,10	0,71	>0,05
2.	4x10 m shuttle run (s)	B	77	13,501±0,20	13,402±0,11	0,14	>0,05	73	12,202±0,08	11,503±0,31	2,05	>0,05
		G	78	14,303±1,14	14,102±0,09	0,18	>0,05	74	13,501±0,16	12,303±0,11	6	<0,05
3.	Pull-ups (reps)	B	77	3,1±0,60	3,5±0,30	0,6	>0,05	73	3,2±0,21	3,5±0,29	0,88	>0,05
	Bench push-ups (reps)	G	78	6,0±0,52	7,5±0,50	2,0	>0,05	24	7,2±0,49	8,3±0,38	1,8	>0,05

Table 2. Post-experiment physical fitness indicators of students in grades I-IV

No.	Tests	Gender	Grade I					Grade II				
			n	Experimental Group X̄±m	Control Group X̄±m	t	p	n	Experimental Group X̄±m	Control Group X̄±m	t	p
1.	30 m run (s)	B	67	7.0±0.08	5.7±0.12	9.2	<0.001	72	6.6±0.24	5.3±0.20	4.9	<0.01
		G	68	7.1±0.32	6.4±0.15	2.0	>0.05	73	6.7±0.35	5.4±0.24	3.10	<0.01
2.	4x10 m shuttle run (s)	B	67	13.9±0.18	12.6±0.20	5.0	<0.01	72	13.5±0.24	12.2±0.23	3.94	<0.01
		G	68	14.2±0.15	13.0±0.22	4.54	<0.01	73	14.3±0.18	13.0±0.20	1.98	>0.05
3.	Pull-ups (reps)	B	67	2.0±0.25	3.5±0.31	4.00	<0.01	72	3.1±0.35	4.8±0.31	3.7	<0.01
	Bent-arm push-ups on a long bench (reps)	G	68	3.1±0.63	5.2±0.60	2.41	<0.05	73	6.1±0.73	7.7±0.60	1.7	>0.05

No.	Tests	Gender	Grade III					Grade IV				
			n	Experimental Group X̄±m	Control Group X̄±m	t	p	n	Experimental Group X̄±m	Control Group X̄±m	t	p
1.	30 m run (s)	B	77	6.7±0.06	6.2±0.00	0	>0.05	73	6.5±0.15	5.8±0.15	3.5	<0.01
		G	78	6.6±0.32	6.3±0.15	0.88	>0.05	74	6.4±0.15	6.2±1.32	0.15	>0.05
2.	4x10 m shuttle run (s)	M	77	12.1±0.20	11.2±0.32	2.43	<0.05	73	12.0±0.18	11.0±0.20	3.85	<0.01
		F	78	13.5±1.22	12.2±0.30	0.86	>0.05	74	13.2±1.15	12.1±0.22	0.94	>0.05
3.	Pull-ups on the high bar (reps)	M	77	3.2±0.20	3.6±0.25	4.00	<0.01	73	3.1±0.30	4.5±0.21	3.8	<0.01
	Arm push-ups on a long bench (reps)	F	78	7.2±0.30	8.5±0.41	2.60	<0.05	74	7.2±0.33	8.3±0.30	2.61	<0.05

the first, third, and fourth-grade classes.

In the pedagogical experiment, the methodology for teaching track and field techniques to students in grades I-IV was improved, and its tasks and tools were identified. At the same time, great importance was given in the experimental groups to forming skills related to the active interaction of leg movements, torso, arm, and support.

Conclusion

The physical fitness of students in grades 1–4 developed progressively in accordance with their age and had a strong impact on the quality of physical education classes. Therefore, in physical education lessons for students in grades 1–4, it is recommended to use active games and coordination exercises for first graders, speed and jumping exercises for second graders, speed-strength exercises and relays for third graders, and for fourth graders, to focus more on exercises related to endurance, interval running, and elements of gymnastics.

References

Boyboboyev, B. G‘. (1999). *Jismoniy tarbiya darslarida 11–14 yoshli o‘g‘il bolalar uchun nagruzkani me’yorlash*

[Pedagogika fanlari nomzodi dissertatsiyasi]. Toshkent.

Khosilova Roxilakhon Dilshod qizi. (2026). Optimizing flexibility in 5-6-year-old preschool girls by integrating stretching exercises and a play-based approach using the "Stretching for kids" digital plat form: an experimental study. Eurasian Journal of Sport Science, 6(2), 49–56. https://doi.org/10.65149/eajss.2026.v6i2.a009

Qurbonov, X. (2026). Methodology for developing the sports form of middle-distance runners in the third year of the training stage. Eurasian Journal of Sport Science, 6 (1), 36–40. https://doi.org/10.65149/eajss.2026.v6i1.a008

AUTHOR BIOGRAPHY:



Akmal Akhmadaliyevich MAMATKULOV

Employment
Lecturer at Gulistan state university

Degree
PhD

Research interests
youth sport school, physical education and sport, Theory of physical education, Analyzing of sport competitions

E-mail:
akmal.mamatkulov@gmail.com