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# MECHANISM FOR DEVELOPING SPEED AND AGILITY IN PRIMARY SCHOOL STUDENTS THROUGH INNOVATIVE TECHNOLOGIES

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## ABOUT ARTICLE

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**Abstract:** Today, the global scientific community is conducting multifaceted innovative research across various fields of science and practice, including physical education and sport. In the physical education system of primary school students, particular importance is attached to improving fundamental motor skills, expanding motor potential, developing basic physical qualities such as strength, speed, agility, endurance, and flexibility, as well as activating and optimizing psychophysiological processes, including attention, perception, and motor reactions. In this regard, the use of innovative digital technologies aimed at developing speed and agility in primary school students is becoming increasingly important.

**Introduction.** Along with the modernization of education worldwide, scientific research is being conducted on innovative digital technologies in the field of physical education and sports. In general education schools of our Republic, particular attention is paid to improving students' physical fitness, with the aim of increasing their physical activity and ensuring their healthy and harmonious physical development. The school education system sets such objectives as ensuring the spiritual and moral education of students, promoting the healthy and physically strong development of children, popularizing the principles of healthy nutrition

among general education school students, and organizing sports clubs in general education institutions [4].

An analysis of the scientific and methodological literature related to the topic shows that the research findings of a number of scholars from our Republic, including T.S. Usmankhodjaev, F.G. Khodjaev, M.S. Akhmatov, I.A. Koshbakhtiev, O.V. Gancharova, A.Sh. Abdullaev, Sh.Kh. Khankeldiev, R.S. Salamov, L.Z. Kholmurodov, I.I. Saidov, and M.M. Azizov, devoted to the issues of health promotion and physical education, deserve particular attention. Research on the use of hypothermic breaks during practical physical education classes in general education schools has also been conducted by K.M. Makhkamjonov, Sh.O. Atamurodov, Sh.D. Abdullaev, Z.Sh. Yusupova, and others.

The analysis of scientific and methodological literature developed by domestic and foreign research institutions on the physical fitness of general education school students has revealed the need for a more in-depth, scientifically grounded, and purpose-oriented pedagogical investigation of the problem of improving physical education. This, in turn, serves to substantiate the relevance of the research direction selected for our dissertation.

The purpose of the research is to develop proposals and recommendations for improving the speed and agility of primary school students through innovative technologies in extracurricular physical education activities.

Research objectives:

to optimize the mechanism for applying exercises aimed at developing speed and agility in primary school students through innovative digital technologies;

to develop a training program aimed at improving speed and agility in primary school students;

to improve the system for applying innovative technologies aimed at strengthening the physical fitness and enhancing the functional capabilities of primary school students;

to develop a mobile application aimed at improving speed and agility in primary school students, taking into account their anthropometric, morphofunctional, and physical fitness indicators.

The object of the research is the process of extracurricular physical education activities aimed at developing speed and agility in primary school students.

The subject of the research comprises the means, methods, and criteria for developing speed and agility in primary school students during extracurricular physical education activities.

Research methods. The study employed the analysis and generalization of scientific and methodological literature, pedagogical testing, pedagogical observation, comprehensive analysis of motor abilities, instrumental methods, the “LD TEST” methodology, pedagogical experimentation, and mathematical-statistical methods.

The scientific novelty of the research is as follows:

the mechanism for developing the physical fitness of primary school students has been optimized through the application of innovative technologies and a set of special exercises aimed at developing speed and agility;

the possibility of targeted management of training loads has been enhanced by dividing the training program aimed at developing speed and agility in primary school students into four methodological blocks (formative, developmental, modifying, and improving) according to their effects on physical qualities;

the possibilities for developing speed and agility have been enhanced through the development and application of the innovative “LD TEST” technology aimed at strengthening physical fitness and improving the functional capabilities of primary school students during extracurricular activities;

the possibility of independently performing extracurricular physical activities has been expanded through the development of the “Life Dynamic” mobile application aimed at improving speed and agility, taking into account the anthropometric, morphofunctional, and physical fitness indicators of primary school students.

**Metods.** The long-term practice of addressing this pedagogical problem indicates that most research studies devoted to this issue lack a sufficiently sound methodological foundation and are fragmented in nature, containing a number of contradictions and debatable issues. Research findings and everyday pedagogical practice demonstrate that the educational process in physical education is not logically integrated into the process of students’ physical self-improvement.

Purpose of the mechanism. The purpose is to improve the physical fitness and physical activity of primary school students and to develop their speed and agility through the use of innovative technologies. Based on the above information and in order to implement the developed instrumental methodology, a mechanism for developing speed and agility was developed by us. To develop speed and agility in primary school students, a methodology for applying modern technologies developed for extracurricular physical education activities was designed on the basis of a new pedagogical approach. Within this framework, a novel

mechanism for conducting training sessions using the “LD TEST” device was introduced into practice.

A four-stage mechanism has been developed by us as an effective program for implementation in extracurricular physical education activities. This four-stage mechanism represents a set of means aimed at developing speed and agility. The methods applied during the training process are presented in a clear, understandable, and practical manner to ensure their effective use by specialists.

In order to develop speed and agility in primary school students during extracurricular physical education activities, a special set of exercises was developed. Accordingly, exercises aimed at developing reaction abilities were divided into three groups: simple exercises, complex exercises, and exercises performed with objects and equipment.

The developed set of special exercises is of significant importance for improving speed and agility in primary school students. The proper application of this methodology makes it possible to enhance the development of speed and agility while taking into account the individual capabilities of each student.

In order to develop speed and agility in primary school students while taking into account their individual capabilities, a special methodology was developed by us. This methodology consists of three sets of exercises: individual exercises, game-based exercises, and relay competition exercises.

Individual exercises are performed taking into account the individual capabilities of primary school students. The performance of these exercises not only contributes to the development of speed and agility but also has a positive effect on enhancing students’ individual physical capabilities.

Game-based exercises were developed with consideration of the age characteristics of the participants. This is because primary school students are naturally inclined toward play and show considerable interest in various competitive games. Taking these interests into account, a special program of game-based exercises was developed.

Relay competition exercises were developed by taking into account students’ interest in competitive activities. Primary school students tend to use their full potential and abilities in order to achieve high results in competitions. This provides a favorable condition for achieving the intended goal, since one of the most important factors in developing speed and agility is enabling participants to make maximum use of their physical capabilities.

The application and effective use of information and communication technologies (ICT) in the field of physical education and sports are increasingly reflected in scientific research

conducted by specialists in the field. Mobile technologies have become firmly established in various sectors of developed countries, including manufacturing, medicine, industry, and education. In particular, mobile technologies are now widely used as convenient means of information exchange and have become an integral part of everyday life [1].

Scope of application. This mobile application is designed to develop speed and agility and improve the physical fitness levels of primary school students during extracurricular physical education activities through the use of modern technologies.

The standards established for fourth-grade students are considerably higher than those for the previous primary grades. In order to achieve high results in the fourth grade, the educational and training process should be implemented in a purposeful and systematic manner, since the standards for fourth-grade students are 21% higher than those established for first-grade students.

This mobile application has been specifically developed for primary school students and includes the following goals and objectives.

Goals and objectives of the “Mobile Application for Monitoring the Physical Fitness of Primary School Students”:

To ensure the effective use of primary school students’ free time outside of classes and increase their interest in physical education and sports;

To identify problems related to the development of primary school students’ physical fitness through this application and provide recommendations for addressing them;

To enable primary school students to engage in independent physical activities through the mobile application and to improve and develop their level of physical fitness;

To develop the physical qualities of primary school students, including speed, strength, agility, endurance, and flexibility;

To continuously improve the health and physical fitness levels of primary school students.

It has been proven in numerous scientific studies that engaging students of this age group in physical activities through the use of mobile communication technologies can produce highly effective results.

The use of mobile applications not only enables students to make productive use of their free time but also helps them remain continuously informed about and familiar with modern information and communication technologies.

Today, the development of a new mechanism for assessing students’ physical fitness levels makes it possible to systematically regulate training loads. The use of computer

technologies in developing the proposed system for assessing the physical fitness levels of primary school students provides a number of opportunities and practical advantages. In order to determine the effectiveness of the methodology developed by us, primary school students from General Education Schools No. 2 and No. 15 in Chirchiq, Tashkent Region, participated in the study. The participants were fourth-grade students aged 10 years. A total of 72 students, including 36 boys and 36 girls, were involved [3]. All participants in the study (n = 144) were divided into two groups: the experimental group (TG) and the control group (NG). Each group consisted of an equal number of students (n = 72). The students in the control group continued their extracurricular activities in the traditional manner without any changes, whereas the experimental group participated in activities based on the methodology developed and proposed by us. At the beginning of the pedagogical experiment, a comparative statistical analysis of the indicators of physical development and physical fitness of primary school students was conducted (see Table 1). Note: The original text contains a numerical inconsistency: it first states that 72 students participated, but later indicates a total sample of n = 144, with 72 students in each group. If the total sample was actually 144, the first sentence should also be corrected accordingly.

**Table 1**

**Statistical analysis of physical fitness indicators of primary school students at the beginning of the pedagogical experiment (n=144)**

| Types of Tests | Gender | Control Group n=72 | | Experimental Group n=72 | | t | P |
|---|---|---|---|---|---|---|---|
| | | ( $\bar{X}$ ±σ) | V % | ( $\bar{X}$ ±σ) | V % | | |
| 30 m Sprint (s) | M | 6,01±0,54 | 8,98 | 6,11±0,58 | 9,50 | 1,35 | >0,05 |
| | F | 6,42±0,65 | 10,12 | 6,30±0,69 | 10,95 | 1,26 | >0,05 |
| Rope Jumping (1 min) | M | 58,13±6,62 | 11,38 | 58,54±6,52 | 11,14 | 0,71 | >0,05 |
| | F | 78,41±8,19 | 10,44 | 77,62±8,01 | 10,31 | 0,83 | >0,05 |
| 3×10 m Shuttle Run (s) | M | 11,12±1,37 | 12,32 | 11,21±1,46 | 13.02 | 0,60 | >0,05 |
| | F | 11,54±1,38 | 11,54 | 11,70±0,97 | 8,29 | 1,42 | >0,05 |
| Standing Long Jump (cm) | M | 112,32±9,81 | 8,73 | 114,20±10,81 | 9,46 | 1,87 | >0,05 |
| | F | 109,34±11,32 | 10,35 | 106,94±10,71 | 10,01 | 1,85 | >0,05 |
| Push-ups (repetitions) | M | 15,08±1,68 | 11,14 | 15,37±1,61 | 10,47 | 0,94 | >0,05 |
| | F | 10,22±1,50 | 14,67 | 10,32±1,44 | 13,95 | 0,57 | >0,05 |

As can be seen from the data presented in the table, no statistically significant differences were identified between the groups in terms of the five physical fitness indicators. Therefore, there are sufficient grounds to conclude that children with similar levels of physical fitness were selected for the experimental and control groups, which makes it possible to conduct the pedagogical experiment in a purposeful manner. At the beginning of the pedagogical experiment, a comparative statistical analysis of the physical development and

functional fitness indicators of the primary school students under study was conducted (see Table 2).

At the end of the pedagogical experiment, a comparative statistical analysis of the physical development and physical fitness indicators of the primary school students under study was conducted. The table shows improvements in three out of five indicators in the group of primary school boys and in two indicators in the group of girls. For example, at the end of the experiment, the 30-meter sprint result among boys was 5.86±0.41 s in the control group and 5.56±0.52 s in the experimental group. The difference between the experimental group (TG) and the control group (NG) was 0.30 s.

**Table 2**

**Statistical analysis of morphofunctional fitness indicators of primary school students at the beginning of the pedagogical experiment (n=144)**

| Indicators | | Gender | Control Group **n=72** | | Experimental Group **n=72** | | **t** | **P** |
|---|---|---|---|---|---|---|---|---|
| | | | **( $\bar{X}$ ±σ)** | **V %** | **( $\bar{X}$ ±σ)** | **V %** | | |
| Body Height (cm) | | M | 138,42±12,91 | 9,32 | 136,24±12,27 | 9,10 | 1,44 | >0,05 |
| | | F | 135,21±13,10 | 9,68 | 133,81±13,43 | 10,03 | 1,09 | >0,05 |
| Body Weight (kg) | | M | 36,40±4,42 | 12,14 | 37,13±4,75 | 12,79 | 1,67 | >0,05 |
| | | F | 34,82±4,47 | 12,83 | 33,90±3,94 | 11,62 | 1,83 | >0,05 |
| Chest Circumference (cm) | At Rest | M | 57,21±6,20 | 10,83 | 58,74±6,40 | 10,89 | 1,68 | >0,05 |
| | | F | 55,42±6,81 | 12,28 | 54,10±5,82 | 10,75 | 1,74 | >0,05 |
| | During Inhalation | M | 61,72±7,13 | 11,55 | 63,13±7,15 | 11,32 | 1,68 | >0,05 |
| | | F | 59,67±7,43 | 12,45 | 58,4±7,70 | 13,18 | 1,34 | >0,05 |
| | During Exhalation | M | 54,32±8,21 | 15,11 | 56,10±8,46 | 15,12 | 1,84 | >0,05 |
| | | F | 52,56±8,58 | 15,32 | 54,34±8,22 | 15,10 | 1,83 | >0,05 |
| Vital Capacity of the Lungs (L) | | M | 1,64±0.10 | 6,09 | 1,61±0,11 | 6,87 | 1,71 | >0,05 |
| | | F | 1,53±0.12 | 7,84 | 1,51±0,12 | 6,75 | 1,42 | >0,05 |
| Ruffier Test (s) | | M | 16,45±2,13 | 12,94 | 16,85±2,20 | 13,05 | 1,57 | >0,05 |
| | | F | 15,42±2,21 | 14,33 | 14,23±2,06 | 14,47 | 1,58 | >0,05 |
| Stange Test (s) | | M | 25,20±3,25 | 12,89 | 24,61±3,14 | 12,76 | 1,61 | >0,05 |
| | | F | 22,65±3,01 | 13,28 | 23,34±3,21 | 13,75 | 1,91 | >0,05 |
| Genchi Test (s) | | M | 20,32±2,73 | 13,43 | 19,82±2,80 | 14,12 | 1,19 | >0,05 |
| | | F | 19,54±2,12 | 10,84 | 18,84±2,05 | 10,88 | 1,65 | >0,05 |

The differences were statistically significant (t=3.87; P<0.001). Among girls, the 30-meter sprint result at the end of the pedagogical experiment was 6.17±0.80 s in the control group and 5.73±0.72 s in the experimental group. The difference between the TG and NG was

0.44 s. The differences between the groups were statistically significant (t=3.45; P<0.001) (see Table 3).

According to the "Rope Jumping" test, the boys in the control group performed 61.21±7.54 repetitions, whereas the experimental group achieved 64.73±7.20 repetitions. The difference between the groups was 3.52 repetitions, and the statistical difference was significant (t=2.82; P<0.01). Among girls, the control group performed 82.63±8.84 repetitions, while the experimental group achieved 87.15±9.27 repetitions. The difference between the groups was 4.52 repetitions, and the statistical difference was significant (t=2.96; P<0.01). For the next indicator, the 3×10 m shuttle run test, no statistically significant differences were observed among boys, although minor changes were recorded.

**Table 3**

**Comparative statistical analysis of physical fitness indicators of primary school students at the end of the pedagogical experiment (n=144)**

| Types of Tests | Gender | Control Group **n=72** | | Experimental Group **n=72** | | **t** | **p** |
|---|---|---|---|---|---|---|---|
| | | **( $\bar{X}$ ±σ)** | **V %** | **( $\bar{X}$ ±σ)** | **V %** | | |
| 30 m Sprint (s) | M | 5,86±0,41 | 7,99 | 5,56±0,52 | 9,35 | 3,87 | <0,001 |
| | F | 6,17±0,80 | 13,29 | 5,73±0,72 | 12,56 | 3,45 | <0,001 |
| Rope Jumping (1 min) | M | 61,21±7,54 | 12,31 | 64,73±7,20 | 11,12 | 2,82 | <0,01 |
| | F | 82,63±8,84 | 10,69 | 87,15±9,27 | 10,63 | 2,96 | <0,01 |
| 3×10 m Shuttle Run (s) | M | 10,72±1,19 | 11,10 | 10,31±1,30 | 12,60 | 1,90 | >0,05 |
| | F | 11,25±1,45 | 12,88 | 10,83±1,45 | 13,38 | 1,78 | >0,05 |
| Standing Long Jump (cm) | M | 115,34±10,64 | 9,22 | 121,27±11,46 | 9,44 | 3,18 | <0,01 |
| | F | 111,65±12,62 | 11,30 | 116,46±12,35 | 10,60 | 2,29 | <0,05 |
| Push-ups (repetitions) | M | 15,77±1,89 | 11,98 | 16,52±1,80 | 10,89 | 2,42 | <0,05 |
| | F | 10,72±1,71 | 15,95 | 11,05±1,33 | 12,03 | 1,28 | >0,05 |

The experimental group showed a result of 10.72±1.19 s, while the control group recorded 10.31±1.30 s (t=1.90; P>0.05). Similarly, no statistically significant differences were observed among girls: the experimental group recorded 11.25±1.45 s, while the control group achieved 10.83±1.45 s. Statistical analysis confirmed that the differences were not significant (t=1.78; P>0.05). In the "Standing Long Jump" test, boys in the control group achieved 115.34±10.64 cm, whereas those in the experimental group achieved 121.27±11.46 cm. The difference between the NG and TG was 5.93 cm (t=3.18; P<0.01). Among girls, the control group achieved 111.65±12.62 cm, while the experimental group recorded 116.46±12.35 cm. The

difference between the NG and TG was 4.81 cm, and the difference was statistically significant (t=2.29; P<0.05). At the end of the experiment, in the "Push-ups from a Floor-Supported Position" test, boys in the control group performed 15.77±1.89 repetitions, while those in the experimental group performed 16.52±1.80 repetitions (t=2.42; P<0.05). Among girls, the control group performed 10.72±1.71 repetitions, while the experimental group performed 11.05±1.33 repetitions. The difference between the groups was 0.33 repetitions (t=1.28; P>0.05), indicating that the difference was not statistically significant. According to the results obtained at the end of the pedagogical experiment, positive changes in physical development were observed. These findings were also confirmed by indicators reflecting the students' physical development and functional fitness levels. By the end of the experiment, improvements in the functional fitness indicators of primary school students could be observed (see Table 4). According to the analysis of the table, statistically significant differences were observed in five anthropometric indicators among primary school boys and in six indicators among primary school girls [8].

**Table 4**

**Pedagogik tadqiqot oxirida boshlang'ich sinf o'quvchilarining morfofunksional holati bo'yicha ko'rsatkichlarining statistik tahlili (n=144)**

| Indicators | | Gende | Control Group **n=72** | | Experimental Group **n=72** | | **t** | **P** |
|---|---|---|---|---|---|---|---|---|
| | | | **( $\bar{X}$ ±σ)** | **V %** | **( $\bar{X}$ ±σ)** | **V %** | | |
| Body Height (cm) | | O' | 141,63±13,15 | 9,28 | 143,11±13,20 | 9,22 | 1,68 | >0,05 |
| | | Q | 139,45±13,42 | 9,62 | 141,56±14,32 | 10,11 | 1,94 | >0,05 |
| Body Weight (kg) | | O' | 38,57±4,50 | 11.66 | 40,84±4,27 | 10,45 | 2,92 | <0,01 |
| | | Q | 36,33±4,75 | 13,07 | 37,12±4,26 | 11,47 | 1,06 | >0,05 |
| Chest Circumference (cm) | At Rest | O' | 59,20±6,81 | 11,50 | 62,31±6,53 | 10,48 | 3,07 | <0,01 |
| | | Q | 56,62±6,54 | 11,55 | 59,94±6,41 | 10,69 | 2,94 | <0,01 |
| | During Inhalation | O' | 64,16±7,53 | 11,73 | 67,81±7,60 | 11,20 | 2,85 | <0,01 |
| | | Q | 62,14±7,81 | 12,56 | 64,68±6,94 | 10,72 | 2,16 | <0,05 |
| | During Exhalation | O' | 56,53 ±7,35 | 13,02 | 60,61±8,25 | 13,61 | 3,13 | <0,01 |
| | | Q | 55,43±7,35 | 13,25 | 59,30±7,61 | 12,83 | 3,10 | <0,01 |
| O'pkaning tiriklik sig'imi (l) | | O' | 1,69±0,14 | 8,28 | 1,75±0,15 | 8,57 | 2,65 | <0,01 |
| | | Q | 1,57±0,13 | 8,29 | 1,62±0,14 | 8,64 | 2,21 | <0,05 |
| Ruffier Test (s) | | O' | 15,92±2,41 | 15,13 | 15,43±2,51 | 15,26 | 1,21 | >0,05 |
| | | Q | 14,80±2,13 | 14,39 | 13,72±1,85 | 13,48 | 3,27 | <0,01 |
| Stange Test (s) | | O' | 26,32±3,54 | 13,44 | 27,24±2,83 | 10,38 | 1,46 | >0,05 |
| | | Q | 23,85±2,97 | 12,45 | 25,33±3,50 | 13,81 | 2,80 | <0,01 |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| Genchi Test (s) | O‘ | 21,32±2,95 | 13,83 | 21,94±3,13 | 14,26 | 1,25 | >0,05 |
| | Q | 20,50±2,91 | 14,19 | 21,22±3,36 | 14,83 | 1,30 | >0,05 |

According to the results, the standing body height of boys was 141.63±13.15 cm in the control group and 143.11±13.20 cm in the experimental group. The difference between the groups was 1.48 cm and was not statistically significant (t=1.68; P>0.05). Among girls, this indicator was 139.45±13.42 cm in the control group and 141.56±14.32 cm in the experimental group. The difference between the groups was 2.11 cm and was not statistically significant (t=1.94; P>0.05). In terms of body weight, boys in the control group had an average value of 38.57±4.50 kg, whereas those in the experimental group had an average value of 40.84±4.27 kg. The difference between the NG and TG was 2.27 kg (t=2.9; P<0.01). Among girls, body weight was 36.33±4.75 kg in the control group and 37.12±4.26 kg in the experimental group. The difference between the groups was 0.79 kg and was not statistically significant (t=1.06; P>0.05). Regarding chest circumference, at the end of the experiment, boys in the control group demonstrated values of 59.20±6.81 cm at rest, 64.16±7.53 cm during inhalation, and 56.53±7.35 cm during exhalation. In the experimental group, the corresponding values were 62.31±6.53 cm, 67.81±7.60 cm, and 60.61±8.25 cm, respectively. The differences between the groups were 3.11 cm, 3.65 cm, and 4.08 cm, respectively, and were statistically significant (P<0.01). Among girls, at the end of the experiment, chest circumference in the control group was 56.62±6.54 cm at rest, 62.14±7.81 cm during inhalation, and 55.43±7.35 cm during exhalation. In the experimental group, the corresponding values were 59.94±6.41 cm, 64.68±6.94 cm, and 59.30±7.61 cm, respectively. The differences between the groups were 3.32 cm, 2.54 cm, and 3.87 cm, respectively, and were found to be statistically significant (P<0.01).

The vital capacity of the lungs (VC) was 1.69±0.14 L in the control group, whereas in the experimental group (TG), which regularly trained using innovative technologies based on the methodology developed by us, it reached 1.75±0.15 L. The difference between the groups was 0.06 L (t=2.65; P<0.01). Among girls, this indicator was 1.57±0.13 L in the control group and 1.62±0.15 L in the experimental group. The difference between the groups was 0.05 L (t=2.21; P<0.05).

According to the Ruffier test, at the end of the experiment, the result among boys was 15.92±2.41 s in the control group and 15.43±2.51 s in the experimental group. The difference between the groups was 0.49 s (t=1.21; P>0.05). Among girls, the corresponding results were 14.80±2.13 s in the control group and 13.72±1.85 s in the experimental group. The difference between the groups was 1.07 s and was statistically significant (t=3.27; P<0.01).

In the Stange test, boys in the control group demonstrated a result of 26.32±3.54 s, while the experimental group achieved 27.24±2.83 s. The difference was not statistically significant (t=1.46; P>0.05). Among girls, the result was 23.85±2.97 s in the control group and 25.33±3.50 s in the experimental group, with a statistically significant difference (t=2.80; P<0.01).

According to the Genchi test, boys in the control group achieved 21.32±2.95 s, whereas those in the experimental group achieved 21.94±3.13 s. The difference between the groups was 0.62 s and was not statistically significant (t=1.25; P>0.05). Among girls, at the end of the experiment, the control group recorded 20.50±2.91 s, while the experimental group recorded 21.22±3.36 s. The difference between the groups was 0.72 s and was not statistically significant (t=1.30; P>0.05).

In the experimental group, the best results were recorded in seven out of nine indicators among boys and in six indicators among girls. These findings indicate that the methodology developed by us produced positive outcomes for both boys and girls. At the beginning of the pedagogical experiment, no statistically significant differences were identified between the experimental and control groups. However, following the implementation of the developed methodology, the indicators of the students in the experimental group showed substantial improvements.

**Conclusion.** During the organization and implementation of the pedagogical experiment related to the physical education of primary school students, it was found that information technologies have been actively introduced into general education schools in recent years. However, the absence of a unified electronic system in our country for identifying, collecting, and recording data on students' physical and functional development and physical fitness reduces the effectiveness of training and complicates the monitoring process. The application of the four-stage methodology proposed by us, aimed at assessing children's physical qualities and creating a functional database for developing speed and agility during extracurricular physical education activities, made it possible to increase physical development indicators by 12.3% and the level of physical fitness by 11.9%.

The mobile application developed on the basis of physical and functional indicators was introduced into the extracurricular training process. Mathematical and statistical processing of the obtained results and verification of their statistical significance demonstrated the high effectiveness of the methodology developed by us. At the end of the study, the results of the children in the experimental group differed significantly from those of the control group (P<0.01), confirming the effectiveness of the experimental methodology.

A mechanism for developing the physical fitness of primary school students through a set of special exercises aimed at improving speed and agility using innovative digital technologies was developed. The implementation of this mechanism enabled primary school students to make effective use of their free time, improve their health and morphofunctional status, increase physical fitness indicators by 10.9%, and improve morphofunctional indicators by 9.2%. As a result of the pedagogical experiment, improvements were observed in the physical and functional fitness indicators of the experimental group. The most significant changes were identified in the following indicators. In the 30 m sprint, boys in the control group recorded 5.86±0.41 s, whereas boys in the experimental group recorded 5.56±0.52 s ($t=3.87$; $P<0.001$). Among girls, the corresponding results were 6.17±0.80 s in the control group and 5.73±0.72 s in the experimental group ($t=3.45$; $P<0.001$). In the rope jumping test, boys in the control group performed 61.21±7.54 repetitions, whereas those in the experimental group performed 64.73±7.20 repetitions ($t=2.82$; $P<0.01$). Among girls, the control group performed 82.63±8.84 repetitions, while the experimental group performed 87.15±9.27 repetitions ($t=2.96$; $P<0.01$). The results of the study showed that the experimental program was more effective than the generally accepted traditional program. The training program designed to develop speed and agility in primary school students during extracurricular physical education activities was divided into four methodological blocks—formative, developmental, modifying, and improving—according to their effects on physical qualities. This approach made it possible to apply training loads in a differentiated manner, thereby contributing to the development of students' general endurance, comprehensive physical development, and improvement of their overall physical fitness. Furthermore, by developing and integrating into the mobile application a methodology that enables the selection of appropriate means and methods for organizing the training process, opportunities were created for students to independently acquire both theoretical knowledge and practical skills.

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