

Incorporating specific sambo exercises into distance learning for high school students aged 15-16

Valeriia Zakharevich^{1ABCDE}, Georgiy Korobeynikov^{2,3CDE}, Olena Nesen^{1ABCD}, Abdulaziz Xamidjonov^{2CDE}

¹H.S. Skovoroda Kharkiv National Pedagogical University, Ukraine

²Uzbek State University of Physical Education and Sports, Uzbekistan

³National University of Ukraine on Physical Education and Sport, Ukraine

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Abstract

Background and Study Aim The military situation in Ukraine necessitates a revision of the school class organization system. Proximity to the military contact line forces schools to switch to online learning. Additionally, there is a decrease in physical activity among school students. In these conditions, it is important to explore the effectiveness of using specific sambo exercises to develop physical qualities in high school students during distance learning. The aim of the study is to determine the effectiveness of such application of sambo exercises for the development of physical qualities in high school students in a distance learning format.

Material and Methods The study involved tenth-grade students (n=15), aged 15-16 years. Data collection was conducted through surveys using Google Forms and testing to determine physical quality indicators. The experiment lasted for 8 weeks (with sessions three times a week), during which specific sambo exercises were applied in a remote format during physical education lessons.

Results The study results showed that 80% of the students were interested in implementing a new module - sambo - in physical education lessons. Correlational links were established between the results of the exercises and indicators of strength, flexibility, and coordination. Moreover, there was a significant improvement in the test results for coordination, flexibility, and strength, averaging 20%.

Conclusions The study results indicate significant interest among high school students in implementing specific sambo exercises in a distance learning environment. This is confirmed by the high percentage of students who expressed a desire to practice sambo during physical education lessons.

Keywords: physical qualities, specific sambo exercises, distance learning, pupils, senior pupils, school, lesson.

Introduction

The martial law in Ukraine requires a revision of the school class organization system. The proximity to the military contact line forces schools to switch to online learning. In addition, there is a decrease in physical activity among school students. In these conditions, it is important to explore the effectiveness of using specific sambo exercises for the development of physical qualities in senior students during distance learning. Martial arts are popular around the world and serve as a means of preparing students both physically and psychologically. Among the innovations in the field of physical education in Ukraine is the Modular program "Physical Education. Grades 10-11" [1]. Variable modules contribute to the diversity of approaches to physical activity and allow students to choose the sport that suits them best or interests them the

most. These innovations will lead to an increase in motivation among students in physical education classes and will contribute to the improvement of their psycho-emotional state [2].

Engaging in sports, including martial arts, serves as an important form of daily physical activity for children and teenagers due to the numerous benefits for physical and mental health [3, 4, 5]. Activities such as martial arts can improve children's executive functions, enhance motor skills, and create a suitable environment for teenage engagement [6, 7, 8]. School sports activities are particularly effective for children with psychosocial difficulties and low academic performance [9]. Martial arts classes increase the level of physical fitness in children and teenagers and teach the basics of self-defense [10].

Recently, sambo wrestling has gained particular attention among children. Engaging in this type of martial art teaches children self-control, discipline, and promotes health [11, 12]. The main goal of special physical training in sambo classes is to improve those qualities that students need for successful

performance of educational technical actions [13, 14]. Nonetheless, it is important to ensure the safety and age-appropriateness of martial arts classes. This implies proper qualifications of teachers and adherence to safety standards during training [15]. Such measures to reduce injuries stimulate physical activity among children and adolescents while ensuring their safety [16]. It should also be noted that a sedentary lifestyle, characteristic of distance learning, deteriorates the body's condition, leads to a loss of motivation for physical education, affects the immune system, and leads to a significant decrease in physical development [17].

One of the key issues in this direction is the development of physical abilities. These abilities include a range of aspects such as strength, speed, endurance, agility, and flexibility, which are well-known in the sports sphere [18]. Thus, the introduction of specific martial arts exercises into the educational process can have a significant impact on the physical and psychological development of students, as well as contribute to the formation of an active lifestyle and strengthening their health. The aim of the study is to determine the effectiveness of such application of sambo exercises for the development of physical qualities in senior students in a remote format.

Materials and Methods

Participants

The study involved tenth-grade students (n=15), aged 15-16 years. A survey was conducted involving 82 students. Parents gave their consent for their children's participation in the experiment.

Research Design

For data collection, questionnaires using Google Forms and testing to determine physical quality indicators were used. The experiment lasted for 8 weeks (with sessions held three times a week), during which specific sambo exercises were applied in physical education classes in a remote format (Fig. 1; [19]). The duration of specific exercises in each class varied from 10 to 15 minutes. Also, specific exercises for developing special physical qualities of sambo athletes for independent performance in class were used, lasting 5-8 minutes.

The following tests were used (fig. 2):

- for determining coordination abilities: Bondarevsky's test (fig. 2a);
- for determining strength abilities: push-ups (fig. 2b); 45 degree leg raise hold (fig. 2c);
- for determining flexibility: sitting forward bend (fig. 2d); plow pose (fig. 2e).

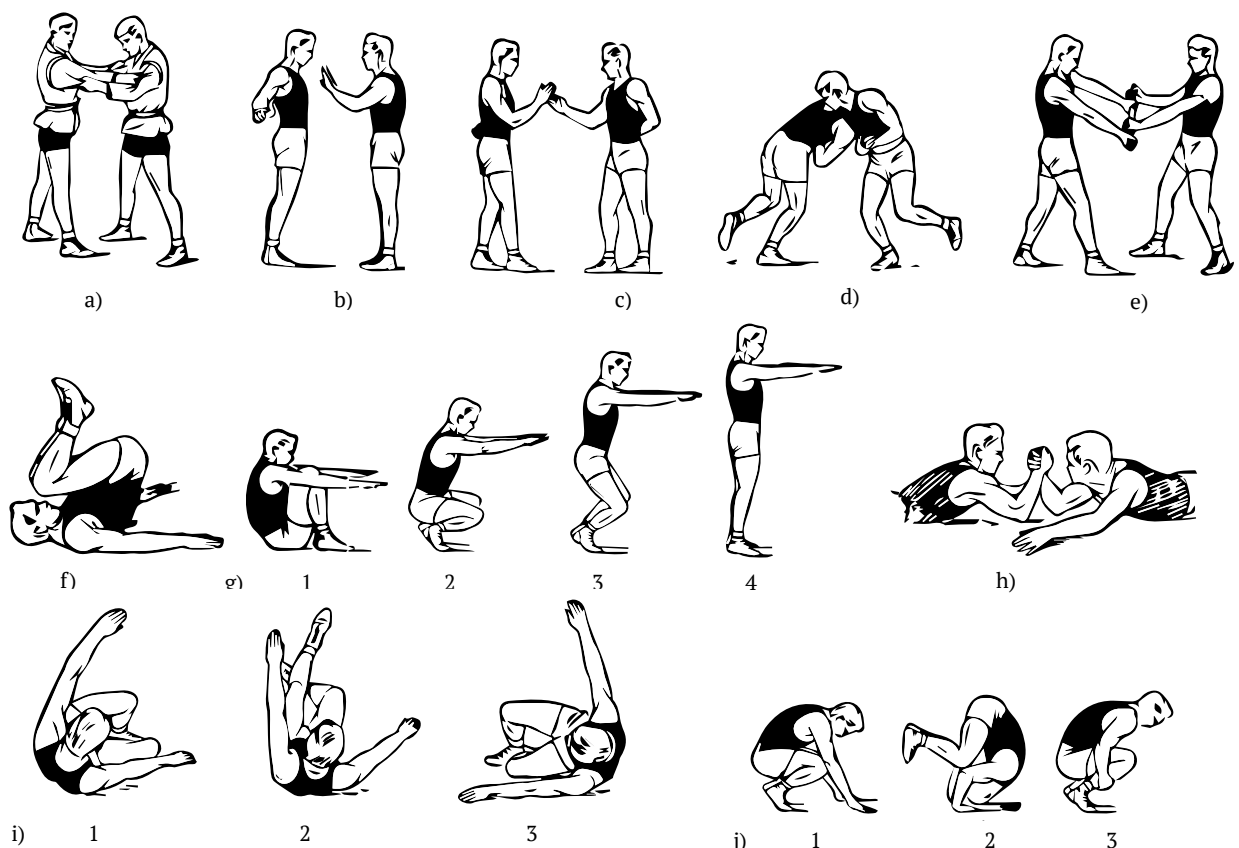


Figure 1. Sambo exercise battery (image: [19]): a) The most common stance of sambo wrestlers (basic stance); b) Disbalancing by pushing palms against palms; c) Disbalancing while standing on one line; d) Disbalancing by shoulder pushes, hopping on one leg; e) Struggle for a stick (whoever manages to take it away); f) Correct position when falling on one's back; g) Starting positions for rolling on the back and side; h) Battle for wrist control; i) Rolling from one side to the other; j) Forward roll (roll over the head).

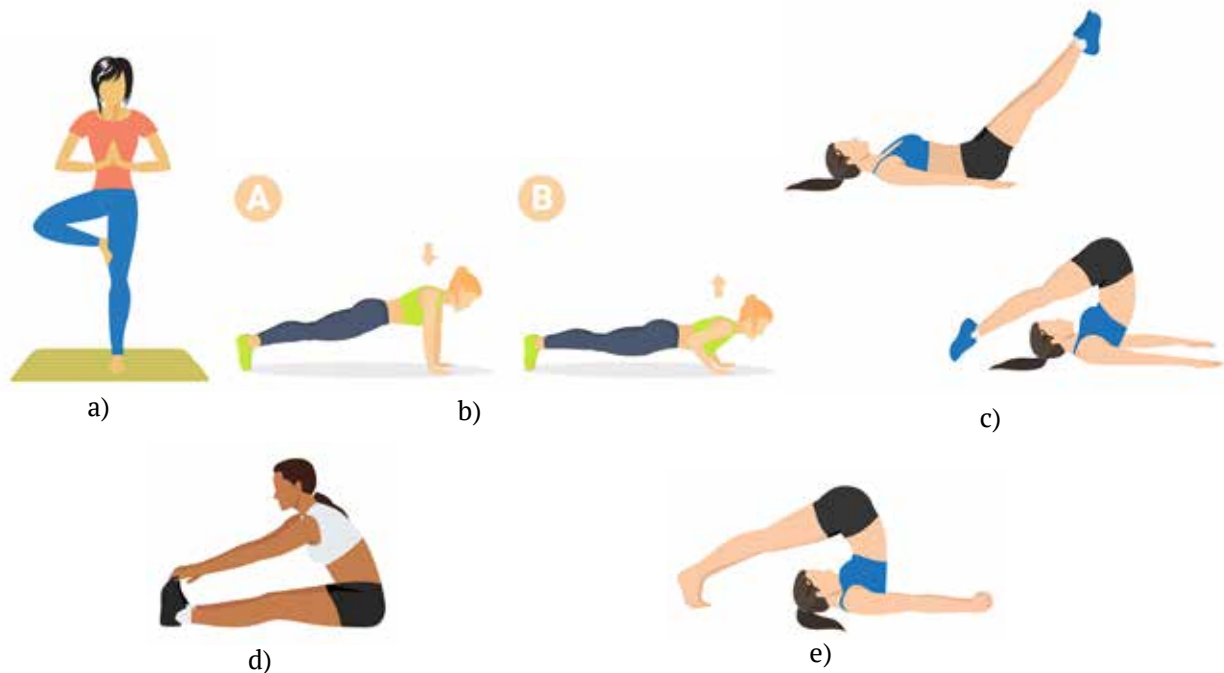


Figure 2. Battery of Tests (image: VectorStock)

Statistical Analysis

For statistical data analysis, the SPSS program (Statistical Package for the Social Sciences) was used. The t-test was utilized for analyzing the differences between initial and final results. Correlational analysis was employed to identify relationships between the results of physical fitness test exercises. The significance level for all statistical tests was set at $\alpha = 0.05$.

Results

The survey among students revealed that 30.5% of students do not understand the content of sambo wrestling and do not even have a general idea of how the actions are performed. When asked about the desire to practice sambo during physical education classes, 39% of respondents (including 35.5% of girls) answered negatively. The remaining 61% of students expressed a desire to engage in this type of activity or at least try it.

To analyze the correlational relationships between the results of physical fitness test exercises among high school students, a correlation matrix was created based on the test results (Fig. 3).

In the heatmap presented (Fig. 3), the correlational relationships between the results of physical fitness test exercises of senior students are visualized with different shades. The darker the color, the stronger the positive correlation between the results of two tests. The lighter or closer to red, the weaker the connection, or there is even a negative correlation present. For example, a very high positive correlation is observed between the results of the «Bondarevsky's test (right leg)» and «Throwing legs over the head» (0.80), indicating that success in one test can be a

good predictor of success in the other. At the same time, there is a negative correlation between the «Bondarevsky's test (left leg)» and «Throwing legs over the head» (-0.16), which is quite unusual and may indicate that these two measures of physical fitness in some cases mutually exclude each other or are not directly related. This data can be used to develop more targeted physical fitness programs, taking into account the relationship between various aspects of physical form.

The test results are presented in Figure 4. This figure demonstrates a significant improvement in the physical indicators of students at the conclusion of the research period, confirmed by the t and p values indicating the statistical significance of the differences. The improvement in each of the tests attests to the effectiveness of the physical training methods applied in the educational process. These data underline the importance of systematic physical training and its positive impact on students' performance. The improvement in indicators reflects the increase in physical fitness and overall health of the students, as well as the effectiveness of the applied training program.

Discussion

The aim of our study was to determine the effectiveness of implementing sambo exercises for the development of physical qualities in senior students in a remote format. We turned to various data sources to assess the impact of martial arts classes on the physical and mental health of adolescents. Our analysis showed that martial arts, including sambo, play an important role in the physical activity of teenagers, having a positive

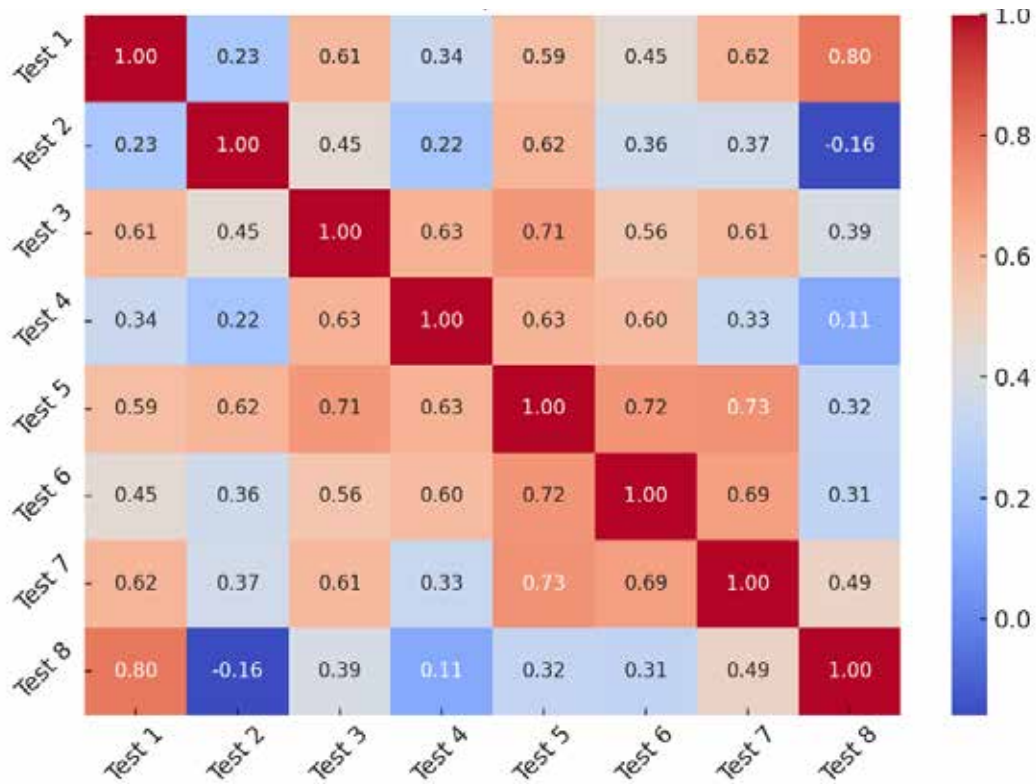


Figure 3. Correlational relationships between the results of physical fitness test exercises of senior male students: Test 1 - Bondarevsky’s test (right leg), sec; Test 2 - Bondarevsky’s test (left leg), sec; Test 3 - One-leg stand (right leg), sec; Test 4 - One-leg stand (left leg), sec; Test 5 - Push-ups (number of repetitions); Test 6 - 45 degree leg raise hold, sec; Test 7 - Sitting forward bend, cm; Test 8 - Plow pose, cm.

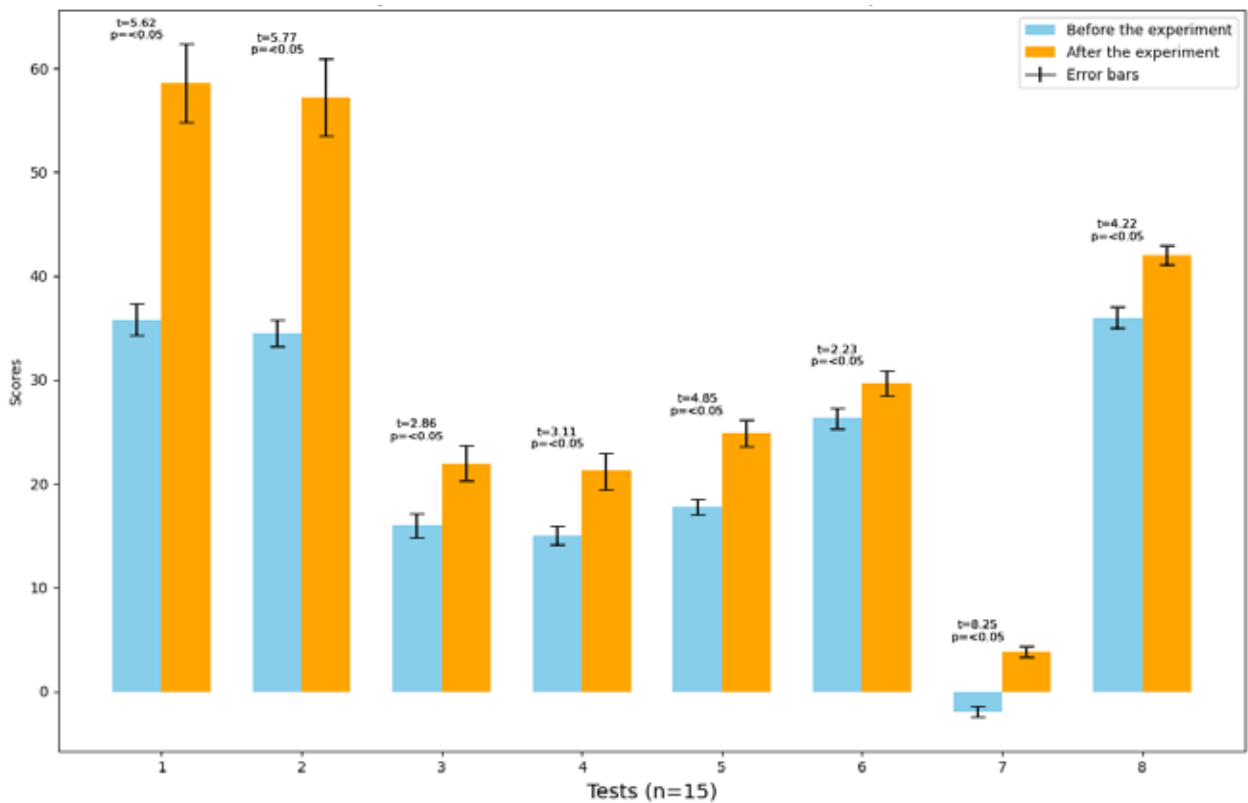


Figure 4. Physical fitness results of students at the beginning and end of the experiment (n=15): Test 1 - Bondarevsky’s test (right leg), sec; Test 2 - Bondarevsky’s test (left leg), sec; Test 3 - One-leg stand (right leg), sec; Test 4 - One-leg stand (left leg), sec; Test 5 - Push-ups (number of repetitions); Test 6 - 45 degree leg raise hold, sec; Test 7 - Sitting forward bend, cm; Test 8 - Plow pose, cm.

effect on their overall physical condition [4, 5, 20]. The study results also confirmed that martial arts classes contribute to the improvement of executive functions in children [6] and the enhancement of movement coordination [8].

It is interesting to note that sambo exercises can be an effective tool both in the everyday physical training of schoolchildren and in specialized physical training during physical education classes [13, 14]. However, it is necessary to ensure the safety of martial arts classes and their appropriateness to the age characteristics of the students [15]. Our findings are consistent with previous studies that confirm the importance of physical activity in the daily lives of children and adolescents [9, 16]. The sedentary lifestyle characteristic of distance learning is a serious issue, and our data underline the need to improve methods of stimulating physical activity among students [17].

In the context of our study, these findings highlight the importance of integrating martial arts into school physical education programs and extracurricular activities [4]. Martial arts as a form of physical activity can have a positive impact on the physical and psychological development of adolescents, which corresponds with our results [5]. Furthermore, studies show that regular taekwondo practice can positively affect the cognitive and

physical performance of children and adolescents [21, 22]. These findings affirm the significance of sambo exercises as a means to improve mental health and behavioral aspects of students [23, 24].

Despite the achieved results, our work has certain limitations. One of them is the limited number of study participants, which may reduce the generalizability of the obtained results. Further research could consider a wider range of age groups and the duration of classes to obtain more substantiated conclusions. Thus, the results of our study confirm the importance of integrating sambo exercises into the educational process and call for further exploration of this issue with the aim of improving the physical health and overall well-being of senior students.

Conclusions

The integration of martial arts classes, such as sambo, into the educational process for senior students in a remote format represents a promising direction for the development of physical activity and the improvement of the psychological state of adolescents. The results of our study emphasize the significance of martial arts for the overall development of children and adolescents, as well as confirm the positive impact of such exercises on the physical and mental health of students.

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Information about the authors:

Valeriia Zakharevich; <https://orcid.org/0009-0000-2476-0619>; valerizaharevich@gmail.com; Faculty of Physical Education and Sport, H.S. Skovoroda Kharkiv National Pedagogical University; Kharkiv, Ukraine.

Georgiy Korobeynikov; <https://orcid.org/0000-0002-1097-4787>; k.george.65.w@gmail.com; Department of Theory and Methodology of International Wrestling, Uzbek State University of Physical Education and Sports (Tashkent region, Chirchik, Uzbekistan); National University of Ukraine on Physical Education and Sport (Kyiv, Ukraine).

Olena Nesen; (Corresponding Author); PhD, Associate Professor; <https://orcid.org/0000-0002-7473-6673>; helena.nesen@gmail.com; Faculty of Physical Education and Sport, H.S. Skovoroda Kharkiv National Pedagogical University; Kharkiv, Ukraine.

Abdulaziz Xamidjonov; <https://orcid.org/0009-0005-2636-3584>; abdulaziz_xam@mail.ru; Scientific Research Institute of Physical Education and Sport, Uzbek State University of Physical Education and Sports; Chirchik, Uzbekistan.

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