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DEVELOPING THE MOTOR QUALITY OF SPEED THROUGH SPECIFIC ATHLETICS MEANS IN MIDDLE SCHOOL STUDENTS

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Abstract. Athletics is an important discipline in physical education, contributing to the development of fundamental motor skills such as speed, endurance, strength, agility, and coordination all of which are important for the harmonious physical development of students.This paper aims to analyze the influence of speed development on the physical performance of middle school students, based on the premise that specific athletics exercises can improve their ability to perform fast and efficient movements. The experiment was conducted at Vereşti Middle School, Suceava County, on two groups of students 14 students each, 4 girls and 10 boys, one experimental and one control. The experimental group followed a special athletics exercise program, while the control group continued with traditional physical education activities. The study was conducted over two modules IV and V, with two weekly lessons held on a 20 x 40 m synthetic field. The results highlight the importance of integrating athletics exercises into the school curriculum, as they play a significant role in improving physical performance and promoting an active and healthy lifestyle.

Introduction: Athletics, considered the basis of many sports, occupies a central place in physical education, especially in middle school, when children go through an important stage of physical and motor development. The development of fundamental motor skills, such as speed, strength, endurance, coordination, and agility, is a basic objective of school motor activities. Athletics-specific exercises, due to their variety and applicability, contribute to the formation of a solid foundation for future sports activities, but also for a healthy lifestyle. The authors of the book [1] define motor skills as individual characteristics that enable the efficient performance of motor activities, and their development must be systematic and planned. The author Epuran [2] emphasizes the role of physical education in shaping attitudes toward effort, discipline, and perseverance, which are important

components in the education of young people. Another author [3], emphasizes the importance of speed as a determining factor in physical performance and adaptation to the demands of everyday life. Therefore, the integration of athletics into physical education lessons in middle school is justified not only by its physical benefits, but also by its educational benefits, contributing to the formation of a balanced and active individual. Speed is one of the most important motor skills and plays an important role in the physical development of middle school students. This stage of childhood is characterized by a marked increase in neuromuscular abilities, which makes speed an extremely responsive quality to specific stimuli in learning. In the literature, speed is defined in various ways, but all refer to the ability to perform movements in the shortest possible time. For example, author [6] considers speed to be "the individual ability to perform motor actions in a minimum amount of time, depending on the given conditions." Author [7] defines it simply as "the ability to perform rapid movements," while author [8] emphasizes the idea of speed combined with safety in execution. Another author [9] states that speed involves "performing movements with speed and high frequency," and author [10] describes it as "the possibility of performing motor actions at maximum speed, under given conditions." Author [11] adds the optimal frequency component, defining speed as "the execution of movements in a minimum time and with an optimal frequency." A modern point of view is offered by the author [12], who defines speed as "the rapid and efficient response of the neuromuscular system to stimuli specific to motor action," emphasizing the integration of the central nervous system in speed performance. In the context of school physical education, the development of speed has multiple implications: it supports the formation of correct motor skills, influences efficiency in other motor qualities (strength, agility, coordination), and contributes to increased confidence in one's own physical abilities. Lessons for developing speed must take into account the age characteristics of students: an adapted lesson structure, alternating between intense exercises and adequate breaks, as well as diversifying the means used. The focus should be on reaction, sprinting, and coordination exercises, all of which have a significant impact on the developing neuromuscular system. [13]. Integrating athletics-specific activities into physical education is an effective solution, as running, jumping, and throwing require speed in various forms and encourage automaticity and movement control. Thus, athletics becomes an excellent basis for developing speed naturally and progressively, without overexertion.

Material-method: The hypothesis of this paper assumes that developing motor speed in school physical education classes, through the use of athletics-specific methods, contributes significantly to improving students' physical performance. This has a positive impact on their ability to perform fast and efficient movements, both in sports and in everyday activities. The aim of the paper is to analyze and highlight the importance of developing motor speed in physical

education in middle school, emphasizing its influence on students' overall physical performance. The objectives of the study are: to study the concept of "speed" as a motor quality from the perspective of different theoretical approaches formulated by specialists in the field; to investigate the role of speed in the development of students' motor skills; to identify and present the most effective athletics exercises for developing speed among middle school students. Research methods: Review of specialized literature; Observation method; Testing method; Mathematical-statistical method; Graphical method. Structure of the experimental program: The program lasted two modules, with two lessons per week, each lesson lasting approximately 50 minutes. The experiment was conducted on two groups, one experimental and one control, consisting of 4 girls and 10 boys from the Vereşti Secondary School in Suceava County. The experimental group followed a specific programme of athletics exercises, while the control group practised a traditional programme. The experiment was conducted over two modules (IV and V), with two lessons per week. The lessons took place on a synthetic sports field measuring 20 x 40 m.

Table 1 Program for Module IV – 7 weeks (2 lessons per week)

Week	Objective	Exercise	Duration
Week 1	Introduction to starting technique and quick reaction	Short starts (10 m): 4x10 m with 1-minute rest between sets	12 min
		Short sprints (20 m): 3x20 m with 2-minute rest	12 min
Week 2	Developing reaction and sprint technique	Speed running from different start positions: 4x20 m (2-minute rest)	12 min
		Lunges over 10 m (quick change of direction): 3 sets	8 min
Week 3	Improving maximum speed over short distances	Speed running over 30 m: 4x30 m with 2–3 minutes rest between sets	12 min
		Progressive accelerations: 3x20 m (from slow to maximum speed)	10 min
Week 4	Developing reaction speed	Starts on auditory signal: 5x20 m, from different start positions	12 min
		Short sprints with direction change: 3x20 m	10 min
Week 5	Consolidating sprint technique and reaction speed	20–30 m sprints with correct technique: 4x30 m	12 min
		Quick changes of direction: 4x10 m with directional changes	8 min
Week 6	Increasing intensity over longer distances	Speed running over 40 m: 4x40 m with 3-minute rest	12 min
		Speed running over 20 m with quick direction changes: 3x20 m	10 min
Week 7	Finalizing and consolidating maximum speed	30–40 m sprints at maximum speed: 4x40 m	15 min
		Active recovery exercises (light running + stretching)	10 min

Table 2 Program for Module V – 7 weeks (2 lessons per week)

Week	**Objective**	**Exercise**	**Duration**
Week 1	Introduction to sprint technique and reaction speed	Short starts (15 m): 4x15 m with 2-minute rest between sets	12 min
		Speed running over 30 m: 3x30 m with 2-minute rest between sets	12 min
Week 2	Developing reaction and movement frequency	Speed running over 30 m: 4x30 m with 2-minute rest	12 min
		Quick direction change exercises: 3x20 m	10 min
Week 3	Improving maximum speed	40 m sprints: 4x40 m with 3-minute rest	12 min

		Accelerated running over 30 m: 3x30 m (slow start, maximum speed)	10 min
Week 4	Developing reaction speed	Starts from different positions: 5x20 m	12 min
		Speed running over 30 m with quick direction change: 3x30 m	10 min
Week 5	Consolidating sprint technique over medium distances	Speed running over 30–40 m with correct technique: 4x30 m	12 min
		Progressive acceleration exercises: 3x20 m	10 min
Week 6	Developing maximum speed over longer distances	Speed running over 50–60 m: 3x50 m with 3-minute rest	12 min
		Speed running with quick direction changes over 40 m: 3x40 m	12 min
Week 7	Active recovery and consolidation	Final sprints over 40 m: 4x40 m (maximum speed)	15 min
		Light running + stretching (active recovery)	10 min

Each week, the exercises are structured to focus on a logical progression of speed, from quick reactions and starting technique to developing maximum speed over short and long distances. The intensity increases gradually, and in the final weeks the focus is on longer distances and consolidating speed running technique. Each lesson also includes an active recovery component to prevent overtraining and support the continued development of speed.

Results: As part of the experimental program on developing speed through athletics, the results obtained were evaluated based on measuring students' progress in terms of speed. The collected data were analyzed using statistical-mathematical and graphical methods, and their interpretation allowed conclusions to be drawn regarding the program's effectiveness and the impact of athletics exercises on students' speed development. The data was collected in two stages: Initial assessment: Before the start of the experimental program, the students' performance was measured through speed tests (20 m and 50 m), as well as by measuring their reaction times to visual and auditory signals. Final assessment: After the program was implemented in the two school modules, the students were reassessed using the same criteria.

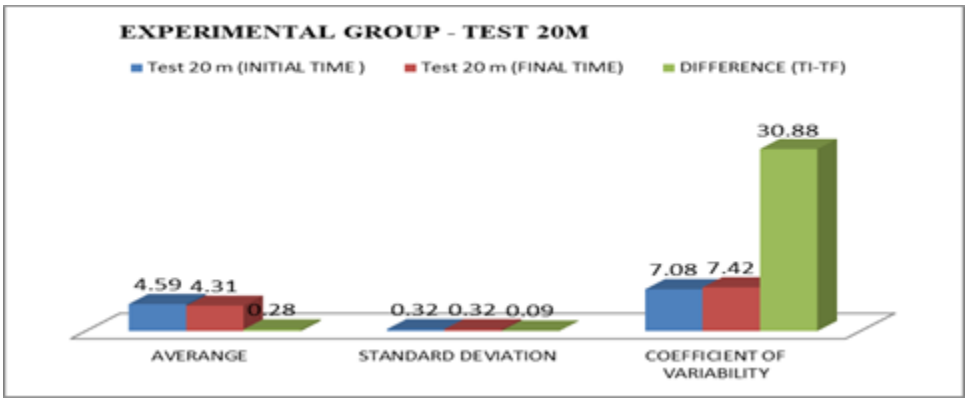

Fig.1

The average initial time in the 20m test is 4.59 seconds, and the average final time is 4.31 seconds. This indicates an average improvement of 0.28 seconds between

the initial and final tests, suggesting that students improved their performance in the 20m sprint. The standard deviation is 0.32 for both the initial and final tests. This suggests that there is quite a lot of variability between students' performances, but this variability does not change significantly between the beginning and end of the experimental program. The coefficient of variability for the initial test is 7.08% and for the final test it is 7.42%. This indicator shows that there is relatively little variability in student performance. However, it is important to note that the coefficient of variability increased slightly in the final test, which may indicate that at the end of the experiment there were more students with very good performance and a few with weaker performance.

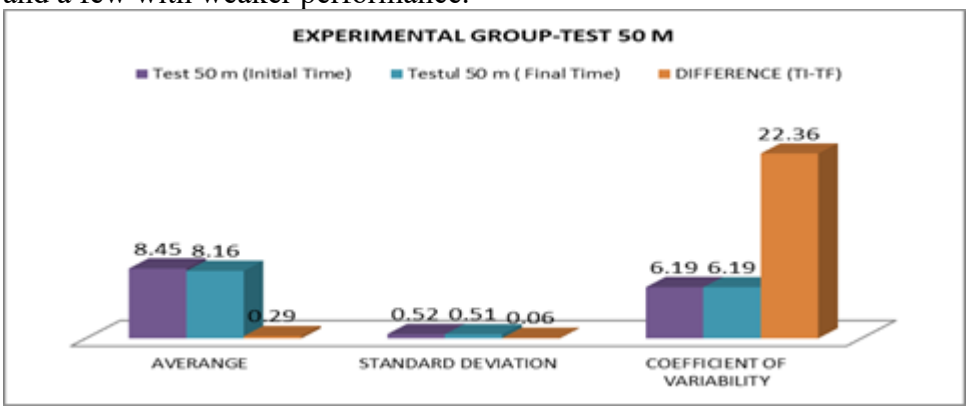

Fig. 2

The average initial time for the 50 m test is 8.45 seconds, and the average final time is 8.16 seconds, which means an average improvement of 0.29 seconds over the 50 m distance. This result also suggests that the students performed better in the 50 m sprint after the training sessions. The standard deviation is 0.52 for the initial test and 0.51 for the final test. This shows a fairly high variability in student performance and a small difference between the variability at the beginning and end of testing. There is a fairly high variance in the results obtained, but again, this does not change significantly during the experiment. The coefficient of variability is higher for the 50 m test (6.19% for both tests). This suggests that performance in the 50 m sprint is more consistent compared to the 20 m test and that the differences between students are smaller than in the 20 m test.

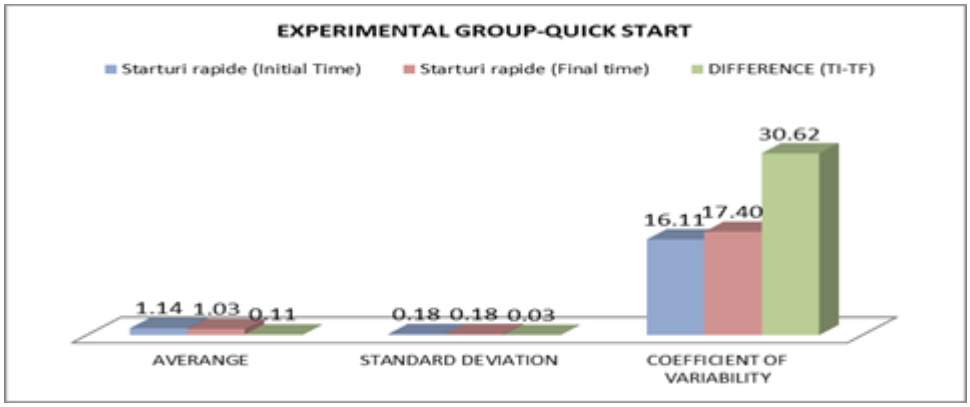

Fig. 3

The average time for quick starts at the beginning of the test is 1.14 seconds, and the average time for quick starts at the end of the test is 1.03 seconds. The difference between the initial and final times is 0.11 seconds, which suggests an improvement in performance, i.e., students were able to react more quickly to the start signal. The standard deviation is 0.18 seconds, indicating moderate variability in the times obtained by students at the beginning of the test, and the standard deviation for the final test is the same at 0.18 seconds, suggesting that the variation between students did not change significantly as a result of the experimental program. However, it can be seen that all students had a faster reaction in the final test. The coefficient of variability in the initial test is 16.11%, indicating a significant variation between students in terms of initial reaction time, and in the final test it increases to 17.40%, suggesting an even greater variation in the final time.

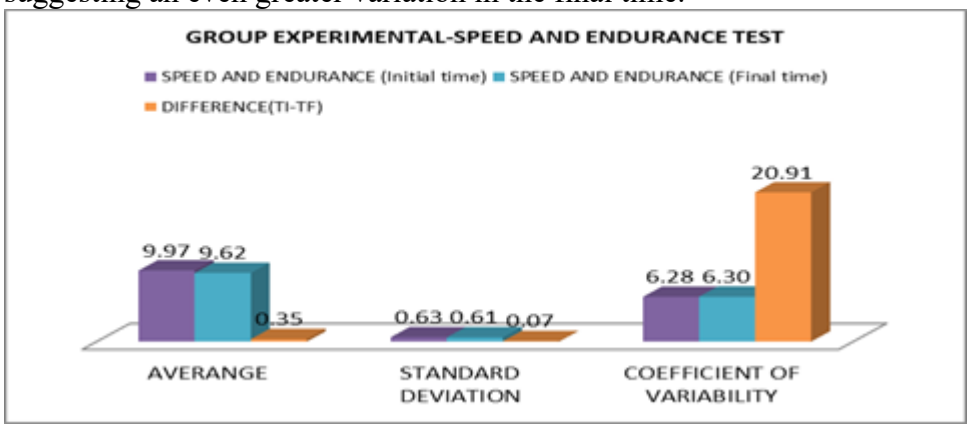

Fig. 4

The initial average time for the speed and endurance test at the beginning of the experiment is 9.97 seconds, and the final average time for the speed and endurance test at the end of the test is 9.62 seconds. The difference between the initial and final times is 0.35 seconds, suggesting a more significant improvement in running speed over the 20 m distance (in the speed and endurance test). The standard

deviation in the initial test is 0.63 seconds, suggesting considerable variability in student performance at the beginning of the test, and in the final test, the standard deviation is 0.61 seconds, indicating a reduction in variation, although this reduction is not significant. The coefficient of variability for the initial test is 6.28%, suggesting moderate variability among students, and for the final test it is 6.30%, almost the same as the initial one, suggesting fairly uniform performance with small differences between students at the end of the experimental program.

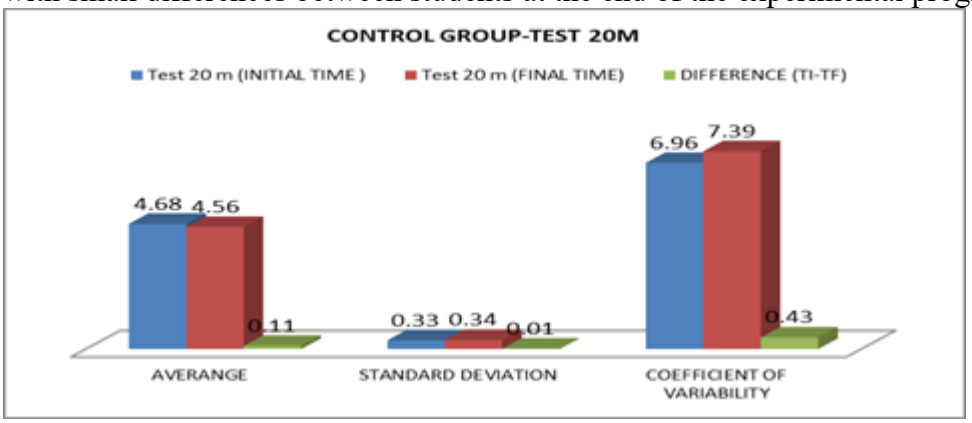

Fig. 5

The average initial time for the 20 m test at the beginning of the test is 4.68 seconds, and the average time for the 20 m test at the end of the test is 4.56 seconds. The difference between the initial and final times is 0.11 seconds, suggesting a slight improvement in student performance over the 20 m distance. The standard deviation of the initial time is 0.33 seconds, which indicates a relatively moderate variability between the times obtained by the students at the beginning of the test, and the standard deviation in the final test increases slightly to 0.34 seconds, which suggests a slight increase in variability between students during the final test. The coefficient of variability for the initial test is 6.96%, suggesting moderate variability among students in terms of performance at the beginning of the experiment, and in the final test it increases to 7.39%, indicating slightly higher variability among students after the experimental program period. Although there is an average improvement in performance, some students made greater progress than others.

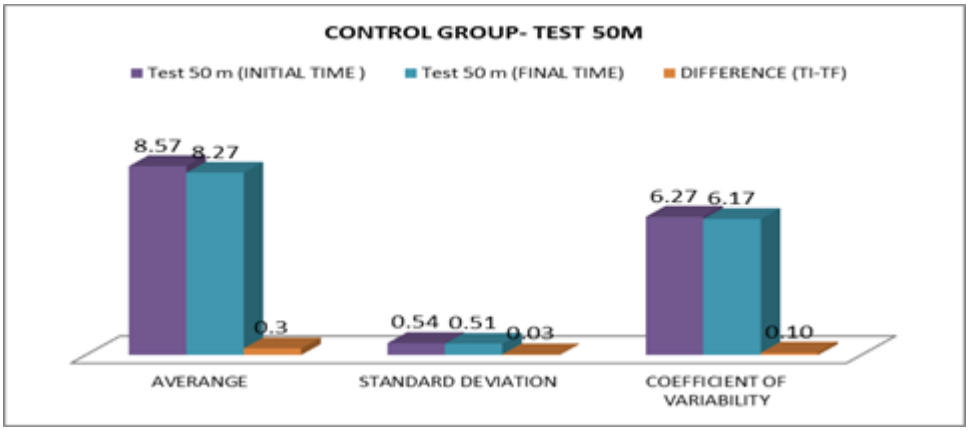

Fig. 6

The average initial time for the 50 m test at the beginning of the test is 8.57 seconds, and the average final time for the 50 m test is 8.27 seconds. The difference between the initial and final times is 0.3 seconds, which indicates a moderate improvement in performance in the 50 m sprint. The standard deviation in the initial test is 0.54 seconds, suggesting considerable variability between the times achieved by students at the beginning of the test, and the standard deviation in the final test decreases to 0.51 seconds, indicating a slight uniformity in performance at the end of the experimental program. The coefficient of variability for the initial test is 6.27%, suggesting moderate variability in student performance at the beginning of the test, and for the final test it decreases slightly to 6.17%, suggesting a small reduction in variability between students after training. This indicates an improvement in overall performance, but the differences between students are not significantly reduced.

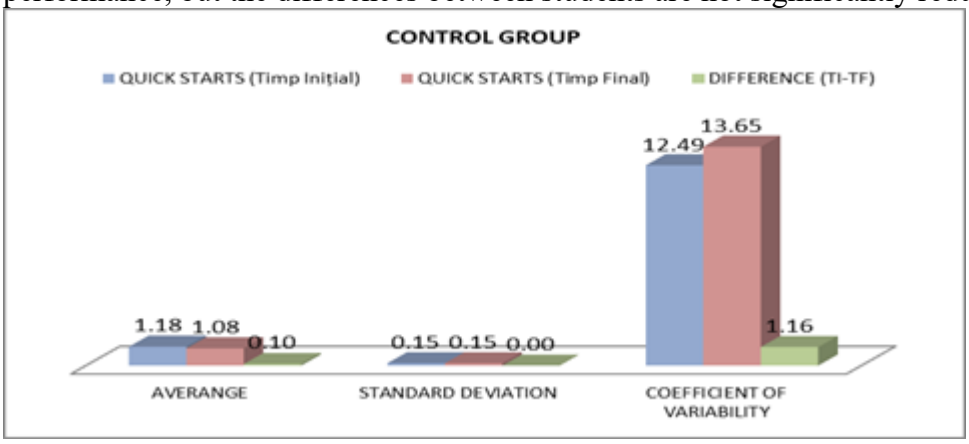

Fig. 7

The average time for the Quick Starts test at the beginning of the test is 1.18 seconds. The average time for the Quick Starts test at the end of the test is 1.08 seconds. The difference between the initial and final times is 0.10 seconds, which suggests an improvement in performance, with students being able to react more quickly to the

start signal. The standard deviation is 0.15 seconds, which suggests relatively little variability between the times achieved by students at the beginning of the test. The standard deviation remains constant at 0.15 seconds in the final test, indicating that although the students improved, they had fairly consistent times in both stages of the test. The coefficient of variability for the initial test is 12.49%, suggesting average variability in performance among students, and in the final test, it increases to 13.65%, indicating an increase in variability among students in terms of rapid reaction time.

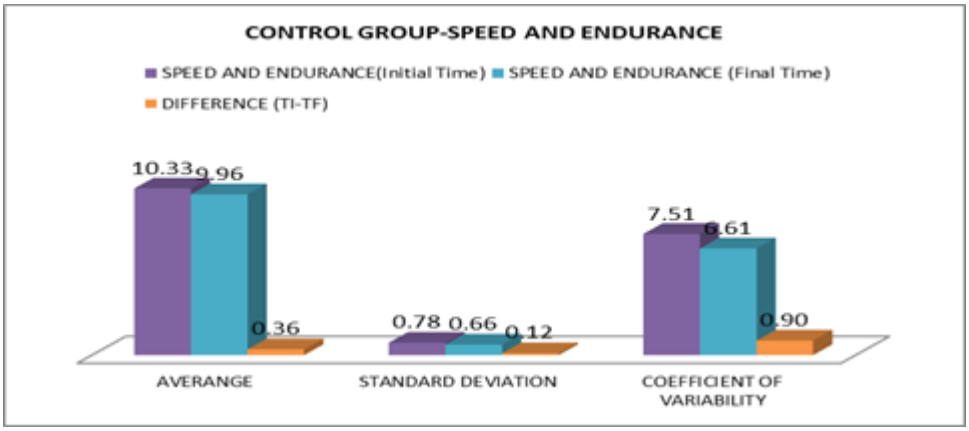

Fig. 8

The average time for the Speed and Endurance test at the beginning of the test is 10.33 seconds. The average time for the Speed and Endurance test at the end of the test is 9.96 seconds, and the difference between the initial and final times is 0.36 seconds, suggesting a considerable improvement in performance during the speed and endurance test. The standard deviation is 0.78 seconds, indicating a significant variation between the times achieved by students at the beginning of the test, and the standard deviation decreases to 0.66 seconds in the final test, suggesting that students became more consistent in their performance at the end of the test. The coefficient of variability for the initial test is 7.51%, suggesting moderate variability in performance, and in the final test it decreases to 6.61%, indicating a reduction in variability among students in terms of performance over the respective distance.

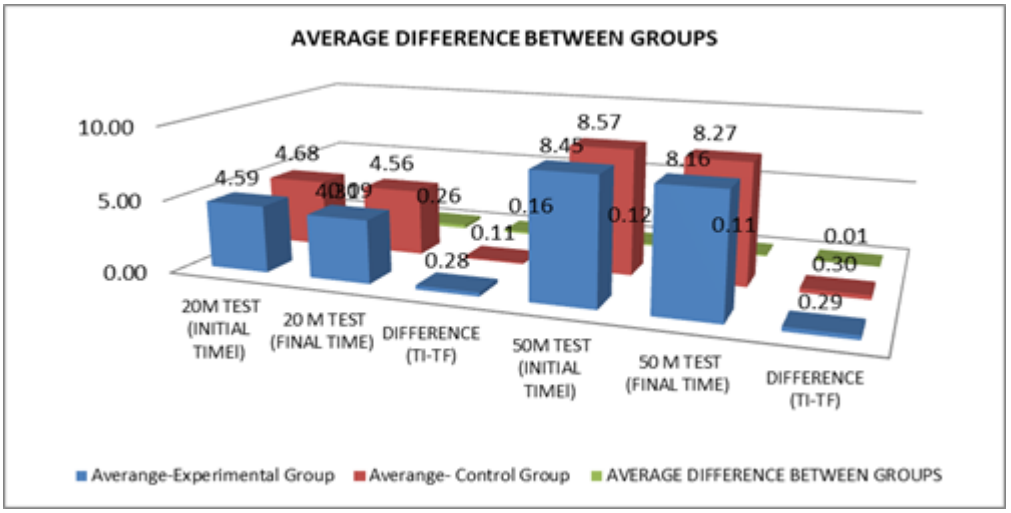

Fig. 9

In the 20 m test, the difference is 0.28 seconds, with a significant improvement in the performance of the experimental group, suggesting that specific exercises had a positive effect on running speed over a distance of 20 m. In the 20 m test, the difference is 0.11 seconds for the control group, the improvement is smaller, suggesting that the lack of specific athletics exercises did not have a significant impact on their performance. The difference is 0.09 seconds between the experimental and control groups, with the experimental group showing greater progress over the 20 m distance. The difference between the groups is 0.29 seconds. The experimental group also showed a significant improvement over the 50 m distance, indicating that specific exercises had a positive impact on performance over longer distances, while in the control group the difference is 0.30 seconds, showing an improvement which is similar to the experimental group, but smaller in terms of the ratio between relative improvements. The difference between the groups is 0.12 seconds, but it appears to favor the control group, suggesting that the improvements recorded by both groups are similar, but the progress of the experimental group over the 50 m distance was slightly smaller.

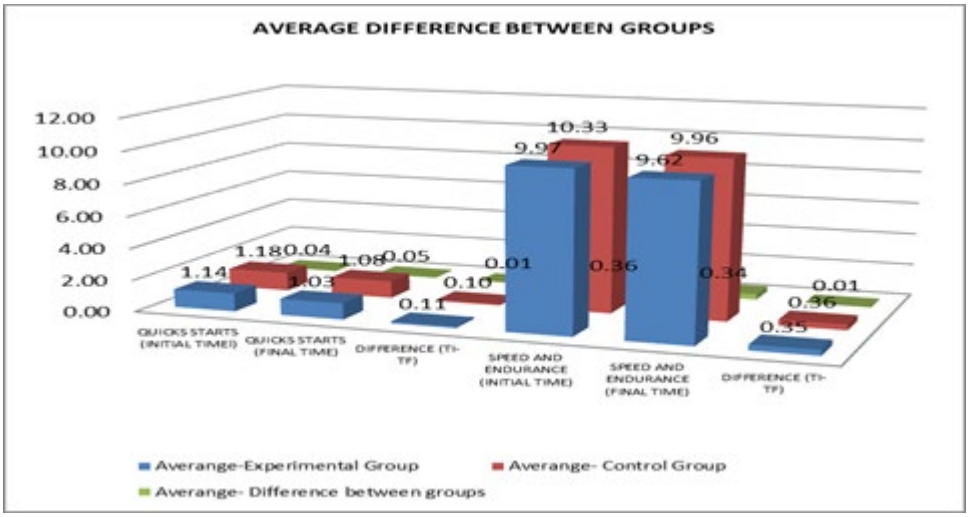

Fig. 10

Difference: 0.11 seconds in the quick start test, the experimental group recorded a significant improvement, reducing the time by 0.11 seconds, which suggests that the specific exercises applied to this group had a positive impact on quick reaction speed. In the control group, the difference of 0.10 seconds showed a similar improvement of 0.10 seconds, but this is smaller than the improvement in the experimental group, suggesting that the experimental program had a positive but smaller effect. The difference between the groups is 0.04 seconds in favor of the experimental group, suggesting that the improvements recorded by the experimental group were greater than those obtained by the control group. In the Speed and Endurance test, the difference was 0.35 seconds, with the experimental group showing a significant improvement, reducing the time by 0.35 seconds, which indicates a notable development in performance in terms of the combination of speed and endurance. Although the control group also recorded an improvement of 0.36 seconds, this progress is almost similar to that of the experimental group. However, the improvement of the control group is slightly greater in absolute terms. The difference between the groups is 0.36 seconds for the control group and 0.34 seconds for the experimental group, which indicates a very small difference between the two groups in terms of improvements in the Speed and Endurance test.

Discussions: The study [14] involved 52 students from two ninth-grade classes, divided into an experimental group (ninth grade B: 12 girls, 17 boys) and a control group (ninth grade C: 12 girls, 11 boys). The experiment was conducted during the 2015–2016 school year, outdoors and in the gym. Running, as a natural and accessible skill, was used to develop speed—a genetic motor quality expressed in various forms (reaction, execution, movement, etc.). The study looks at how effective athletics-specific methods are in improving motor speed when used in the first part of a physical education class, after the students have warmed up.

Conclusions Through a variety of specific activities such as running, jumping, and throwing, athletics supports the development of fundamental skills necessary for both an active lifestyle and possible future athletic performance. Athletics-specific exercises are recommended for developing basic motor skills such as speed, endurance, strength, and agility. In physical education classes, they contribute to improving students' physical performance and learning correct movement techniques. Speed is a motor skill that can be effectively improved through athletic activities, having a positive impact on quick reactions, coordination, and overall performance, both in school and extracurricular contexts. The results obtained in the study demonstrate the effectiveness of athletic exercises on speed development: the experimental group recorded an improvement of 0.28 seconds in the 20 m test, compared to 0.11 seconds in the control group, indicating a clear positive influence of the training program. In the 50 m test, both groups had similar improvements (0.29 seconds in the experimental group and 0.30 seconds in the control group), suggesting overall progress but no significant differences between the methods applied. In the speed and endurance test, the results were comparable (0.35 seconds in the experimental group and 0.36 seconds in the control group), indicating the effectiveness of both types of interventions in developing this quality. In the quick start test, the experimental group showed an improvement of 0.11 seconds, compared to 0.10 seconds in the control group, a small difference, but one that confirms the favorable trend of using athletic exercises on reaction time.

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