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## STUDY ON IMPROVING THE MOTOR QUALITY SPEED WITH SECONDARY SCHOOL STUDENTS BY USING ALGORITHMS

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### Abstract:

Permanent improvement of the teaching process is a constant concern of specialists in pedagogy. Therefore, in this paper we wanted to present how the development of motor quality "speed" can be improved in several forms. For this, we used the method of training algorithm. The study was conducted by students of grade VIII. Results showed that the efficiency of this method is higher than the traditional method.

*Key words: physical education, secondary school, speed, manifestation forms, algorithmization*

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### Introduction:

The main directions of research were the specific objectives of school physical education.

Harmonious physical development and improving the motor skills indices are some of these objectives. Thereby, the speed in all its forms of manifestation is the objective of the teaching process, adapted to the psychomotor peculiarities of age school children.

Algorithmization in physical education can be the basic element of didactic programming and projecting, which ultimately contributes to the frame objectives and reference objectives. This consists in compiling and application of actuator systems (means, exercises) in order to achieve the proposed objectives in a logical and rational sequence, complying with requirements of the principle of accessibility (Iconomescu T.M., 2013:36-37)

Observation and intervention in the educational process are meant to collect data that lead to validation or refutation of working hypothesis.

Observations are going to examine whether the students are receptive to activity performed during mandatory lessons.

We also intended to observe if students have an appropriate conduct and they are interested in the proposals of teachers for improving their performance.

This improvement will be achieved through the implementation of programs with algorithms designed by us in order to improve their manifestation of speed and their response to all sorts of situations for they were requested.

### Method

To check the working hypothesis we conducted a pedagogical experiment which involves a change in the regular work program of physical education lessons.

For this purpose we have made an experimental lot with VIII grade students, divided into two groups, the experimental group and the control group (boys and girls).

The experimental group will execute the means of practice based on algorithms, guided by professor of physical education during lessons from school program.

The control group worked in physical education classes according to the planning documents of the school, conceived by the teacher without explicitly focus on differentiated means to improve speed.

The experiment was conducted during the first semester of school year 2014 - 2015, when 40 lessons were observed in the "Constantin Bratescu" High School, Isaccea, Tulcea County.

During this period, there are foreseen in planning the units of learning that involves improving speed in all its aspects.

In experiment were included eighth grade students from the secondary school, the control class comprising 26 students including 16 girls and 10 boys, while the experimental class consisted of 22 students including 11 girls and 11 boys.

**Procedure**

Measuring and testing of students under standard conditions was performed using control samples specific VIII grade, concerning general preparation level of students in secondary school.

In terms of motor, we used the following tests:

*Running - speed on the distance of 50 m* provided within the national system verification and assessment. Running begins with standing start and is timed from the first movement. Two attempts are given and recorded the best performance obtained. Pause between runs is 10-15 minutes. The result is recorded in seconds and tenths of a second.

*Knee-up jump* runs from the standing position. At the acoustic signal, students jump with knees up, arms flexed along the body.

At the detachment off the ground is banned double beating. It will record the number of correct and consecutive executions.

*Throwing and catching the ball up against the wall* is the test that took place in the standing position, facing the wall at a distance of three meters, by throwing tennis balls to the wall with one hand up above the shoulder and catching with two hands the ball ricocheted off the wall, and replay.

It performs ten consecutive attempts and records the number of successful catches the ball.

To achieve the aim of the research we tried during mandatory physical education classes, the implementation of algorithms that contribute to development motor abilities of speed.

These algorithms were oriented towards all forms of speed manifestation as a whole.

At the end of application period there was a test for speed qualities in order to see if their application was successful. For evaluation, we used the tests above.

As a model, we present below two structures of these algorithms and the way they were applied in physical education classes (Table 1 and Table 2).

Table 1 - Pattern of algorithms for development the speed of movement

Means	Dosage	Methodical indications and working groups
<ul style="list-style-type: none"> <li>• From squat, at the beep, fast standing and running as competition.</li> <li>• Moving in game ankle, at the beep fast running in place, knees to chest.</li> <li>• In-line one row, each student having a rubber ball. To the signal, the ball is thrown up and forward, running to catch it before it hit the ground; who does not catch the ball returns to the starting line and continuing executions. The student who is furthest from the starting line wins.</li> </ul>	4 x 10 m	- frontal practice and by groups
	4 x 15 m	- stimulating appreciation
	5 reps	- two lines of 15 students
	Pause 30"	

Table 2 - Pattern of algorithms for development the speed of rehearsal

Means	Dosage	Methodical indications and working groups
<ul style="list-style-type: none"> <li>• Standing in ankle game, in place, at the beep jumping legs to chest.</li> <li>• Standing, slight jumping in place, at the beep balancing calf forward;</li> <li>• Standing, balancing calf back, in place, jumping by turning 180 degrees and squat landing;</li> <li>• Two standing face to face: one running back in the direction of movement, and the other follows him running with knees to chest. At the beep, the one running back turning on 180 degrees, running and avoid being caught by partner.</li> </ul>	2 x 20"	- two lines of 15 students
	2 x 20"	- frontal practice and by pairs
	2 x 20"	- demonstration
		- corrections
	3 x 15 m	- systematic observation
	Pause 30"	

### Result and discussion

To observe the evolution of physical training of secondary school students, following application of training programs as algorithms, we performed a set of tests commonly found in practice of specialized teachers.

First test aimed the evolution of the indices on speed of movement. This test was applied to both girls and boys. The test consisted of running on 50 meters, which is one of the most common tests for assessing the qualities of speed in physical education in school.

Initial and final test results for girls, both for the control group and the experimental group are presented in Table 3.

Table 3 - Results of girls groups of movement speed testing

GROUPS	GIRLS			
	Control group (n=13)		Experimental group (n=14)	
	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Running - speed on the distance of 50 m (sec.)	9,31±0,10	9,08±0,09	9,29±0,08	8,75±0,06

As it can be noticed from the centralized results, the initial test result at control group was 9.31 seconds, while the experimental group had a value of 9.29 seconds.

In other words, previous level of training it is very similar, with a value almost equal in both groups. This is justified by the fact that in principle the students' classes go through the same training program planned by the teacher.

Table 4 - Results of boys groups of movement speed testing

GROUPS	BOYS			
	Control group (n=17)		Experimental group (n=15)	
	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Running - speed on the distance of 50 m (sec.)	8,28±0,11	8,03±0,06	8,27±0,10	7,73±0,07

Following the tabulation of results obtained by the groups of boys can be seen, as in the case of girls, that initial testing results are very similar. Thus, the control group has achieved an average of 8.28 seconds for this test and the experimental group an average of 8.27 seconds.

We appreciate that the result of control group at final testing was 8.03 seconds, better performance than the initial testing by 0.25 seconds.

Compared with the control group, the experimental group achieved a time of 7.73 seconds, improving their initial performance with 0.54 seconds.

It is therefore obvious that the progress of experimental group is almost double compared to the progress of the control group.

Following the analysis of results of the experimental group, both girls and boys, can be appreciated that increasing the index of speed movement was due to the application of algorithms specific for improving this motor quality.

Another test to which high school students were subjected, wanted to observe the evolution of the speed index, in terms of speed repetition.

For this, the students were subjected to a test that consists in performing a number of jumping with knees up, in a limited time.

In natural manner, at the initial testing both groups showed relatively equal results that fall within the general trend specific to this age. Centralized data for this test are summarized in Table 5 for groups of girls and Table 6 for groups of boys.

Table 5 - Results of girls groups of repetition speed testing

GROUPS	GIRLS			
	Control group (n=13)		Experimental group (n=14)	
	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Jumping with knees up (reps)	10,20±0,38	10,67±0,29	10,71±0,49	12,18±0,49

Significant differences emerged in the case of the final tests on groups of girls, as shown in analysis of data table.

Thus, at the final testing of the control group, the average has improved by 4.6% compared to initial test. For the same test of the experimental group, the performances in the final testing were improved by 13.72% compared to the initial test.

The same trend was recorded in the case of groups of boys.

Table 6 - Results of boys groups of repetition speed testing

TEST	GROUPS		BOYS			
			Control group (n=17)		Experimental group (n=15)	
			I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Jumping with knees up (reps)			11,5±0,51	13,00±0,33	10,53±0,39	14,07±0,33

Therefore, for the final analysis we will refer only to the results recorded in the final testing.

Thus, in the case of control group for jumping with knees up, at the final test, the average was improved by 13.04% compared to the initial test.

Concurrently with this, in the same test, the experimental group has improved its performance significantly by 33.61% to final testing compared to initial testing.

To observe the evolution of motor quality - speed, the students were subjected to the third test to analyze the indexes on speed of execution.

Therefore, a new test was selected, test which is found in the National Verification and Assessment System, namely "*Throwing ball at the wall*".

Differences in the initial tests are relatively small. As with the other tests, this is attributed to the fact that both classes tested have completed the curriculum in a unitary manner and therefore their performances may be significantly different.

Tabulation of results for the groups of girls, both for initial testing and final testing are summarized in Table 7.

Table 7 - Results of girls groups of execution speed testing

TEST	GROUPS		GIRLS			
			Control group (n=13)		Experimental group (n=14)	
			I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Throwing / catching ball at the wall (reps)			7,93±0,27	9,13±0,24	8,12±0,22	10,12±0,31

Significant changes, confirming the hypothesis of utility of practicing with algorithms in teaching process, were recorded for final testing.

Thus, for this test, at the control group to the final testing, it was found that the average improved by 15.13% compared to initial testing,

In the case of the experimental group, the performance was improved by 24.63% in the final testing compared to the initial test, which is a significant increase almost double that of the control group.

For groups of boys performances obtained are similar. The results of these tests are presented in Table 16 and confirm trend of equality for initial testing and trend of superiority of the control group in the final test.

Table 8 - Results of boys groups of execution speed testing

TEST	GROUPS		BOYS			
			Control group (n=17)		Experimental group (n=15)	
			I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$	I.T. $\bar{x} \pm m$	F.T. $\bar{x} \pm m$
Throwing / catching ball at the wall (reps)			8,14±0,38	9,29±0,30	8,00±0,39	10,13±0,39

For this test, it can be noticed that control group at the final test, the average improved by 14.12% compared to initial testing, while experimental group has significantly improved its performance with 26.62% in the final testing versus initial testing.

Following the interpretation of all results obtained from testing the two groups involved in experiment, we can appreciate that the use of algorithms in preparing students to physical education is useful and this is evidenced by superior results recorded by the experimental group compared to the control group.

The differences between students were recorded only in final testing, because in terms of motor quality - speed, the two classes have made a different practice.

For groups of girls in the final test, differences arose between the performances achieved by the two groups studied.

At running - speed, the control group has improved its performance, achieving slightly above note six, while the experimental group was able to get over note nine.

At the jumping with knees up, the control group has recorded an average lower with 11.08% compared to the scale of note ten.

For the same test it was found that compared with the scale for note ten, the experimental group recorded an average of the performances in the final testing higher by 1.5%. In other words, the experimental group had a result that is over the scale of assessment.

For test throwing ball at the wall, the control group has recorded an average 8.7% lower compared to the scale for note ten.

From the same perspective and the same test was found that compared with the scale for note ten, the average performance in the final test for the experimental group is higher by 1.2%, which confirms validity of the working hypothesis proposed.

Also in the case of groups of boys, the differences concerning the success in physical education have occurred in final tests.

Thus, at running - speed test, the control group barely managed to approach the note five, while the success of the experimental group is placed, in relation to the performance achieved, at the note nine and even more than this, so close to the scale considered optimal for the age level.

For test jumping with knees up, the experimental group average value is 7.14% lower than the scale for note ten.

For the same test was found that compared with the scale for note ten, the average performance in the final testing obtained by the experimental group was higher by 0.5%, that is over it.

Regarding throwing ball at the wall test, the control group average is lower by 7.1% compared to the scale for note ten.

For this test it was found that compared to scale for note ten, the average performance in the final testing obtained by the experimental group is higher by 1.3%, thus noting its top success.

## Conclusion

Basic teaching experiment highlights the effectiveness of training based on algorithms for teaching and practicing to increase the level of physical preparation of students.

Thus, in the experimental groups, both boys and girls have achieved very good results concerning development of motor qualities - speed in all its manifestations.

This is explained by the positive transfer of motor qualities developed through the practice of physical exercise based on algorithmization method.

Participation in physical education classes has become more attractive since the topics proposed by the teachers were more easily learned by students due to the increased level of physical preparation.

Lesson content was directly improved in the case of those who have followed the motor quality - speed. There have also been improved indirectly other motor qualities or skills which involve a high intake of motor quality - speed.

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