

## **Development of speed motor quality using complex motor actions in secondary school students**

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### **Abstract**

One of the priority objectives of school physical education, specified in school programs for all education cycles, is the development of motor skills. The topic addressed by us in this paper was born from the need to have the greatest possible efficiency in the teaching of physical education in grades V-VIII, where the instructional-educational process must pursue concrete goals regarding the system of knowledge, skills and motor skills in order to concretize the model of each class in gymnasium physical education and sports.

The study of this topic aims to establish the most effective exercise structures regarding the development of speed motor quality in secondary school students.

Using the means proposed by us, after a well-established program in the physical education lesson for secondary school students, in order to develop the speed motor quality, I believe that it will develop obviously, during the whole school year.

The data resulting from the scientific investigation regarding the development of speed motor quality through the use of movement games at the secondary school level were implemented in school units in the municipality of Arad. They can be used in the instructional-educational process by the specialists in the field and as methodical material by the students of the faculties of physical education and sport in the disciplines "Theory of physical education and sport" and "Practice and methodology of motor activities by age groups" . The research was conducted during the 2022-2023 school year.

Following the application of the experiment, it was found that major differences in student performance were obtained, they had a significant increase between the initial testing and the final testing, which allows us to state that the methodology used in the lessons was adequate. The exercises and games used had a positive influence in obtaining the results of the experiment. Of course, the experiment should be continued and possibly extended to a larger sample of children in order to further improve motor quality, speed in particular, as well as harmonious physical development in general.

*Keywords:* motor qualities, methods, means, physical training, program.

### **Introduction**

The specialized literature of the field presents numerous points of view in relation to the name of this component of the instructive-educational process (Mihai Epuran, 2002). Thus, we will encounter terms of motor qualities, physical qualities, or motor skills (A. Dragnea, A. Bota, 1999), (Colibaba Evulet Dumitru, 2010).

Motor qualities were also defined as "movement qualities" and were addressed in the context of the analysis of human motor capacity, as one of its basic components (Colibaba, DE., Bota, 2009), (Emilia Florina Grosu, 2009).

The level of motor capacity among children and adolescents was also linked to other important factors, such as health status, activity level, participation in organized physical activities (A. Dragnea, A. Bota).

The motor component has an impact on the physical and social development of children (Adrian Gagea, 2010). In the scientific literature, the motor component is generally a global term used to reflect motor performance, fundamental movement, motor skills, motor capacity and motor coordination to be directed towards the goal (Gh. Cârstea, 2000).

Achieving the objectives of school physical education is only possible if it is followed systematically - hour by hour, lesson by lesson - quarterly, annually and during an entire schooling cycle of the students, the implementation of some purposes of prime importance for motor training and its education as would be (Tudor, Bompa, 2002):

- the development of motor skills characterized in school programs;
- capitalizing on the influence of physical exercise in support of achieving the general objectives of education;
- integration personality the student;
- preparation multilateral A the student.

The objectification of the motor skills development process requires the teacher (Tudor V, 1999):

- to know the level of preparation of the students and from which stages it starts;
- to establish tests and norms specific to each motor quality and to apply them periodically in the practical activity;
- to periodically assess through tests and norms the value of the actuation systems used for the development of motor qualities according to the developed model;
- to keep a practical record of all the data obtained and to use it properly for the critical assessment of the activity carried out, keeping in mind the necessary lessons;
- to develop the final model, by structuring the exercises used to achieve it.

The concept of speed can be presented in two different ways:

- the first way would be quality MOVEMENT or A aCTS drives to be performed quickly;
- the second way refers to the ability of the human body to perform acts and motor actions, in compliance with certain requirements, imposed under certain conditions.

Speed is characterized as the spatio-temporal unit of movements, which is determined by two main factors: tempo and rhythm. Tempo is the density of movement per unit of time (Tudor V., 2013). Speed effort is categorized according to duration, maximal and submaximal intensity, with a very important role in physical education and sports training (A. Dragnea, S. Mate-Teodorescu, 2002).

### **The hypothesis.**

Starting from necessity optimization of the action system in the education lesson physical, in order to increase EFFICIENCY the activity and A effectiveness MEANS used (exercises, games, relays) I formulated following hypothesis:

- using the means proposed by me in this work, after a well-established program in the physical education lesson for secondary school students, in order to develop the motor quality of speed, I believe that it will develop obviously, during the entire school year.

### **Work methodology.**

The actual research was carried out in the town of Arad, at the "Vasile Goldiș" National College. The experiment was applied to 8th grade high school students, in the 2022-2023 school year. The research was carried out between September 15, 2022 and May 15, 2023, staged as follows:

- 1) 19.09.2022 – initial testing of the 12.5m sprint tests; 25m; 100m.
- 2) 17.01.2023 - intermediate testing of the 12.5m sprint tests; 25m; 100m.
- 3) 15.05.2023 - final testing of the 12.5m sprint tests; 25m; 100m.

During the experiment I used the following means to develop the speed of travel:

- a) The running step, launched at a moderate tempo. The students performed the repetitions over a distance of 100m (three repetitions). This exercise was used in even weeks.
- b) The standing start and the launch from the start, over a distance of 25m each will perform 4-6 repetitions. This exercise was used in odd weeks.
- c) The running step launched by speed, each will perform 4-6 repetitions, over a distance of 12.5m. This exercise was used in even weeks.

### **Research methods use in the development Job**

In the elaboration of the paper, I used the following methods:

- a) the bibliographic study method;
- b) the experimental method;
- c) the statistical-mathematical method of data processing (Stefan Tudos, 2000). The

indicators that

I used them in this research were: arithmetic mean, amplitude, standard deviation, coefficient of variability;

- d) the graphic method.

## Results

The results obtained from the experiment are presented in the tables below

**Table 1**

*Performance dynamics experienced in the 12.5m sprint test.*

<b>Subjects</b>	<b>Initial testing</b>	<b>Intermediate testing</b>	<b>Final testing</b>
<b>1</b>	3.5	3.45	3.34
<b>2</b>	3.75	3.52	3.46
<b>3</b>	3.5	3.46	3.39
<b>4</b>	3.68	3.5	3.41
<b>5</b>	3.6	3.56	3,4
<b>6</b>	3.8	3.71	3.65
<b>7</b>	4	3.45	3,4
<b>8</b>	3.98	3.78	3.62
<b>9</b>	3.78	3.65	3.49
<b>10</b>	4.43	4.35	4.29
<b>Arithmetic mean</b>	3.80	3.64	3.55
<b>Amplitude</b>	0.93	0.9	0.95
<b>Standard deviation</b>	0.27	0.26	0.27
<b>The coefficient of variability</b>	8.08	7.12	7.51

In the 12.5m speed test, (table no. 1), during the 3 tests (initial, intermediate, final), the results evolved as follows:

- mean had an evolution from 3.802 at the initial testing, to 3.643 at the intermediate testing, and at the final testing 3.545. It resulted in an increase of 0.159 (initial-intermediate), and 0.098 (intermediate-final).
- Amplitude evolved from an average of 0.93 at initial testing, to 0.9 at mid-test, and 0.95 at final testing. It resulted in an increase of 0.3 (initial-intermediate), and a decrease of 0.5 (intermediate-final).
- The standard deviation went from a mean of 0.26 at baseline, to 0.25 at mid-test, and 0.26 at final testing, resulting in a decrease of 0.1 (initial-interim) and an increase of 0, 1 (intermediate-final).
- The coefficient of variability evolved from an average of 8.08 at initial testing, to 7.12 at intermediate testing and 7.5 at final testing, resulting in an increase of 0.96 (initial-intermediate) and a decrease of 0, 38 (intermediate-final).

At the end of the school year (final testing) it is found that the students have achieved higher results compared to the beginning of the school year.

**Table 2**

*Performance dynamics experienced in the 25m sprint.*

<b>Subjects</b>	<b>Initial testing</b>	<b>Intermediate testing</b>	<b>Final testing</b>
<b>1</b>	7.2	6.9	6.5
<b>2</b>	7.9	7	6.8
<b>3</b>	7,8	7.6	7.29
<b>4</b>	7.65	7.28	6.92
<b>5</b>	8	7.32	6.99
<b>6</b>	7.5	7.21	7.05
<b>7</b>	8.7	8.43	8.09
<b>8</b>	6.6	6.54	6.21
<b>9</b>	8.5	8,11	7.56
<b>10</b>	6.4	6.29	6.18
<b>Arithmetic mean</b>	7.62	7,268	6.96

<b>Amplitude</b>	2,3	2.14	1.91
<b>Standard deviation</b>	0.70	0.62	0.56
<b>The coefficient of variability</b>	9.20	8.56	8.08

In the 25m speed test, (table no. 2), during the 3 tests (initial, intermediate, final), the results evolved as follows:

- The arithmetic mean evolved from an average of 7.62 at the initial test, to 7.268 at the intermediate test, and 6.96 at the final test, resulting in an increase of 0.352 (initial-intermediate), and 0.308 (intermediate-final) .
- The amplitude evolved from 2.3 at the initial testing, to 2.14 at the intermediate testing and 1.91 at the final testing, resulting in an increase of 0.16 (initial-intermediate), and 0.23 (intermediate-final).
- The standard deviation went from 0.70 at pretest, to 0.62 at midtest, and 0.56 at posttest, resulting in a decrease of 0.08 (pretest-intermediate) and 0.06 (intermediate-final) .
- The coefficient of variability evolved from 9.2 at initial testing, to 8.55 at intermediate testing and 8.08 at final testing, resulting in an increase of 0.65 (initial-intermediate) and 0.47 (intermediate-final) .

At the end of the school year (final testing) it is found that the students have achieved higher results compared to the beginning of the school year.

**Table 3**

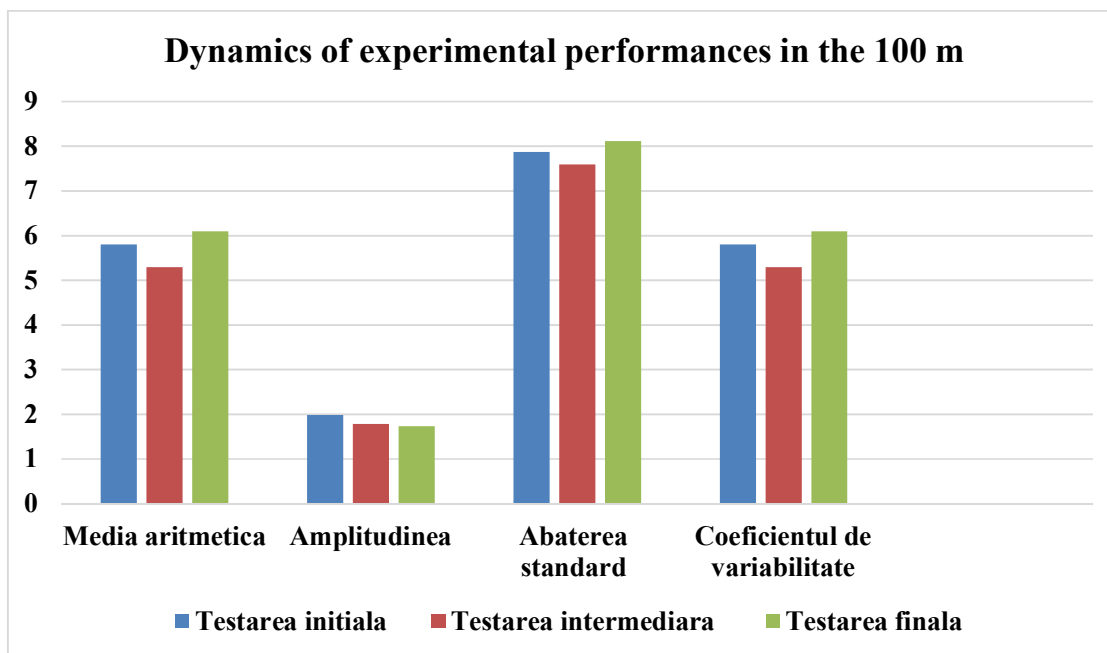
*Performance dynamics experienced in the 100m sprint.*

<b>Subjects</b>	<b>Initial testing</b>	<b>Intermediate testing</b>	<b>Final testing</b>
<b>1</b>	24.6	22.8	20.6
<b>2</b>	28.2	25.9	23.2
<b>3</b>	23.8	22.5	20.8
<b>4</b>	25	23.6	21

<b>5</b>	24.5	22.4	20.5
<b>6</b>	27.6	26.3	25.6
<b>7</b>	28.3	25.9	22.3
<b>8</b>	24.1	22	20.1
<b>9</b>	23.3	22.4	20.3
<b>10</b>	22.5	21	19.5
<b>Arithmetic mean</b>	25.2	23.5	21.4
<b>Amplitude</b>	5.8	5.3	6.1
<b>Standard deviation</b>	1.98	1.78	1.74
<b>The coefficient of variability</b>	7.87	7.59	8,12

**Figure 1**

*The evolution of statistical indicators in the 100m sprint*





In the 100m speed test, (table no. 3 and graph no. 1), during the 3 tests (initial, intermediate, final), the results evolved as follows:

- the arithmetic mean evolved from 5.8 at the initial test, to 5.3 at the intermediate test, and at the final test 5.1 resulting in an increase of 0.5 (initial-intermediate) and 0.2 (intermediate-final) .
- the amplitude evolved from 1.98 at initial testing, to 1.78 at intermediate testing and 1.73 at final testing, resulting in an increase of 0.2 (initial-intermediate), and a decrease of 0.05 (intermediate- the final).
- the standard deviation evolved from 7.87 at initial testing, to 7.59 at mid-test, and 8.12 at final testing, resulting in a decrease of 0.28 (initial-intermediate) and an increase of 1.47 (intermediate- the final).
- the coefficient of variability evolved from 5.8 at initial testing, to 5.3 at intermediate testing and 6.1 at final testing, resulting in an increase of 0.3 (initial-intermediate) and a decrease of 0.8 (intermediate-final).

At the end of the school year (final testing), it is found that students have achieved higher results compared to the beginning of the school year.

### **Conclusions**

After processing the measurement data, the following conclusions can be drawn:

- the means, both those aimed at motor qualities and those aimed at motor skills, must be selected with great competence in order to satisfy the proposed themes and finally achieve the integration of students through physical education in the general set of requirements and implicitly in school performance.
- within the lesson, the ratio between motor qualities and motor skills must be in favor of the qualities, because the higher the qualities are, the faster the motor skills can be acquired.
- the main way for the development of motor skills is the activity within the lessons using the most appropriate exercises, movement games and specific relays adapted to the age.
- Movement games and relay races involve competition and are watched and accepted with particular interest by children who belong to the secondary education cycle.
- following the experiment carried out, the major differences in the results obtained by the students, had a significant increase between the initial testing and the final testing, which allows us to affirm that the methodology used in the lessons was adequate.

With regard to the progress made on all motor capacity tests (speed motor quality), the following situations are noted:

- a) in all three speed tests, significant results are obtained, in progress.
- b) the sample in which a less significant increase was obtained from the initial to the final testing is the 12.5m;
- c) the higher growth rate in the development of speed can be observed between the initial testing and the final testing in the 25m and 100m test respectively;

Through the results obtained in all the tests, the efficiency of most of the drive structures used was validated, but also the possibility that they could be further improved. We can conclude, therefore, that the exercises used had a positive influence in obtaining the results, the tests of 12.5m, 25m, 100m, within the conducted experiment. Of course, the experiment should be continued and possibly extended to a larger sample of children in order to further achieve a harmonious physical development.

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