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ASSESSMENT OF MOTOR SKILLS DEVELOPMENT IN PRIMARY SCHOOL STUDENTS

Evaluarea nivelului dezvoltării calităţilor motrice la elevii din ciclul primar

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Abstract.

Background. The activity of teaching-learning-assessment in primary school plays a key role in achieving the educational goals and solutions to optimize the contribution of physical education. Assessment is an important component of the didactic approach through which the teacher has the opportunity to objectively determine the effects of the instructive-educational process on the students.

Objectives. The main purpose of this paper is the use of the most efficient tools for assessing the level of motor skills development in primary school students. To this end, we intended to achieve the following objectives: launching a comprehensive action for deep information and documentation, preparation of research, carrying out of the research activity and completion of the research.

Methods. The research was conducted throughout a school year, from November 2015 to March 2016, with a group of 87 students (44 girls and 43 boys of the I-B, III-A and IV-C grades), aged 7 to 10 years, within the „Coresi" Secondary School of Târgovişte. The following methods were used in this research: study of the specialized literature, pedagogical observation, ascertaining pedagogical experiment, method of tests and sports testing events, statistical-mathematical method of results processing and graphical representation of the results. In order to assess the general motor capacity, there were applied 5 test events selected from the National School System of Assessment in Physical Education and Sport subject.

Results. The results of the study highlight the level of general motor skills development in the students aged 7-10 years (girls and boys as well) in terms of dynamics of abdominal, back and arms strength, general coordination and sense of balance during movement. The classes of physical education for these students will focus on the training situations specially created to develop the motor skills, on planning the learning units so that they also influence the development of the motor qualities needed to achieve the motor skills and on the recommendation to the students to practice independently and systematically in order to develop their strength, dexterity and endurance.

Conclusion. The use of the most effective tools for assessing the level of motor skills development in the physical education classes with 7-10 years old students contributed to the achievement of the intended benchmarks as proven by the results obtained in the sports test events.

Keywords: physical education, assessment, primary school, benchmarks, curriculum

Introduction

One of the central directions underlying the current education system as a whole is its structuring per curricular cycles, each one having specific durations and objectives for the biological and psychological assessment of the students that influence the shaping of their personality in accordance with the educational environment (Dragomir & Scarlat, 2004). Thus, the formal structure of the primary education is intersected by two curricular cycles, namely the three-year cycle of core acquisitions (including the students in preparatory grade and the students in first and second grade) and the development cycle, with a duration of four years (including the students of third and fourth grade (Order of the Minister of National Education - O.M.E.N. no. 3418/ 19.03.2013; O.M.E.N. no. 5003/ 02.12.2014).

The assessment of the school results is the totality of the instructional-educative activities that collect, organize and process the data obtained by the students following up the techniques, methods, procedures and measurement tools applied in conformity with the objectives and type of the assessment (Grimalschi & Boian, 2011). There are three types of assessment in the didactic practice (Dragomir & Scarlat, 2004): predictive (initial), formative (continuous) and summative (final) assessment.

Studying the programs of physical education for primary school and the methodological guide for the implementation of Physical Education and Sport Curriculum it can be found out that the framework objectives are identical in all four grades; the difference is made at the level of the reference objectives and the activities of learning (Dragomir & Scarlat, 2004).

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Learning and improving the basic mechanism of the skills specific to the sport branches in school curriculum (gymnastics, athletics, sports games) and also developing the specific motor skills of these sports disciplines lead to the linearly increasing development of students' motor capacity, due to the high degree of mobility of the cortical processes at this age (secondary school) and to the physical availability which also develops from one stage to another (Dumitru, 2011).

In the opinion of the specialists Cârstea Gh., Tudor V., Bota A. Sasu M. (1995), as well as other specialists, the lessons for learning and the lessons for consolidation of the basic motor skills prevail in terms of typology. The mixed/combined lessons are also prevailing; they include themes of different stages of the motor learning (primary learning, consolidation, verification) or themes of the motor traits or of the motor skills and abilities. The specific means of sports branches help to achieve the instructional-educative objectives which ensure the system of actuation for the development of motor skills (Potop & Marinescu, 2014).

Concerning the importance of physical education classes in primary education, it is worth noting the remarks made by Sorin Şerbănoiu (2002): *„at this age, the increased interest of children in movement and physical exercise is based on physiological and mental causes, which is why any diminution or limitation of motor activities has negative repercussions on body functions*".

Based on these ideas, Iulian Săvescu (2007) considers that the principle of accessibility should be taken into consideration while practicing these exercises; the relay races and the applicative circuits have the highest efficiency. Also, when choosing the exercises, it is necessary to take into consideration the motor qualities of the students, the material conditions, the homogeneity of the class, students' gender and health status etc.

Depending on the creative activity of the teacher and on the efficient adaptation to different material conditions and groups of students, there are various ways in which the training situations specific to the physical education lesson can be achieved. Therefore, in the context of these numerous variables, *„the lesson of physical education is the creation of each teacher that must reflect his or her professional knowledge and skills, as well as the particularly important ability to adapt to the concrete conditions of the didactic activity and to the particularities of the students of the class* (Methodological Guide …, 2001).

In terms of morpho-functional, mental and motor particularities of the students in the primary education, on a *morphological level* there is faster and more uniform rhythm of growth and development compared to the previous (pre-school) period (Cârstea, Gh., 1993; Badiu, T., et al, 2000; Sion, G., 2007). On a *functional level*, during this period „the first change of appearance" occurs in human ontogenesis, involving important morphological modifications and functional ones as well (Demeter, 1974; Bota, Prodescu, 1997). On a *psychological level*, the mental development of the child is predominantly influenced by its role of member of a new collectivity and the requirements of this one: systematic accumulation of the fundamentals of some sciences (including speaking, writing and calculation), behavior depending on the specifics of the school program, in the context of correct group relationships etc. (Şchiopu & Verza, 1981; Epuran & Horghidan, 1994; Cârstea, 1999). Regarding the *motor skills*, from 6 to 7 years and from 10 to 11 years (special age of the prepubertal pupils) there are availabilities for the development of some motor skills and the correct creation of the system of basic motor and utilitarian-applicative skills and abilities characterizing some sports disciplines (Cârstea, 1993); motricity is overwhelming, the capacity for motor learning is remarkable but the possibilities to assimilate new movements are reduced. Consequently, only systematic repetition integrates and stabilizes the new structure in child's motor repertoire (Dragnea & Bota, 1999).

Purpose. The main purpose of this paper is to present the most efficient tools for assessing the development level of the motor skills of the students in primary cycle.

Hypotheses of the paper: we believe that the use of the most efficient tools for the assessment of motor skills development during the classes of physical education with the students of 7-10 years old will contribute to the achievement of the intended reference objectives, as shown by the results obtained in the test events.

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Material and Method

The research was conducted throughout a school year, from November 2015 to March 2016), with a group of 87 students (44 girls and 43 boys of grades I-B, III-A and IV-C), aged 7 to 10 years, within ,,Coresi" Secondary School of Târgovişte.

The research used these methods: study of the specialized literature, pedagogical observation, ascertaining pedagogical experiment, method of tests and control events, statistical-mathematical method of results processing and graphical representation of the results.

For assessing the general motor capacity of the students under study, 6 test events selected from the National School System of Assessment in Physical Education and Sport subject (1999) were given differentially to each grade, namely: 4 tests (1, 2, 3 and 5) were given to the 1st grade, 5 tests(1, 2, 3, 5 and 6) were given to the 3rd grade and 5 tests (1, 2, 3, 4 and 5) were given to the 4th grade, as follows:

Test 1 – from supine position, torso raises with arms up in 30 sec, assessment of correct executions number;

Test 2 – from sitting down position leaning against arms backwards – raise of basin in supine position (backward) horizontally in 30 sec., assessment of correct executions number;

Test 3 – Pull-ups from hanging position on a frame (or a gym bench put on two gymnastics boxes), number of reps;

Test 4 – General coordination – Matorin test, jump with 360° turn to the right and to the left, assessed in degrees;

Test 5 - Hopscotch, assessment in seconds, penalties for stepping on the line – 2 sec;

Test 6 – Applicative circuit, assessed in sec (running through cones, roll-over, balanced walk, target throwing etc.).

Results

In table 1 and figure 1 are listed the results of the motor training in the students of "B" 1st grade, both girls and boys, regarding the assessment of abdominal strength, back strength, arms strength and coordination.

Table no.1. Results of motor training of the "B" 1st grade students

Statistical indicators	Test 1 - Tr. raises, (reps no)		Test 2 - Tr. Ext., (reps no)		Test 3 Arms strength - reps no		Test 5-hopscotch, (sec)	
	girls	boys	girls	boys	girls	boys	girls	boys
Mean	11.21	12.25	13.64	14.00	11.57	13.75	6.76	6.95
SEM	0.91	0.68	0.78	0.5	0.42	0.43	0.16	0.46
SD	3.42	2.72	2.92	2.00	1.55	1.73	0.58	1.83
Cv%	30.53	22.21	21.44	14.28	13.44	12.59	8.66	26.34
N	14	16	14	16	14	16	14	16
t, P	0.923; >0.05		0.395; >0.05		3.603; <0.01		0.386; >0.05	
F, P	1.584; >0.05		2.138; <0.15		1.241; >0.05		9.799; <0.001	

Note: t-Test (Assuming Equal Variances), Unpaired Comparison for Means, F-Test for Equal Variances; Significant – P<0.15;

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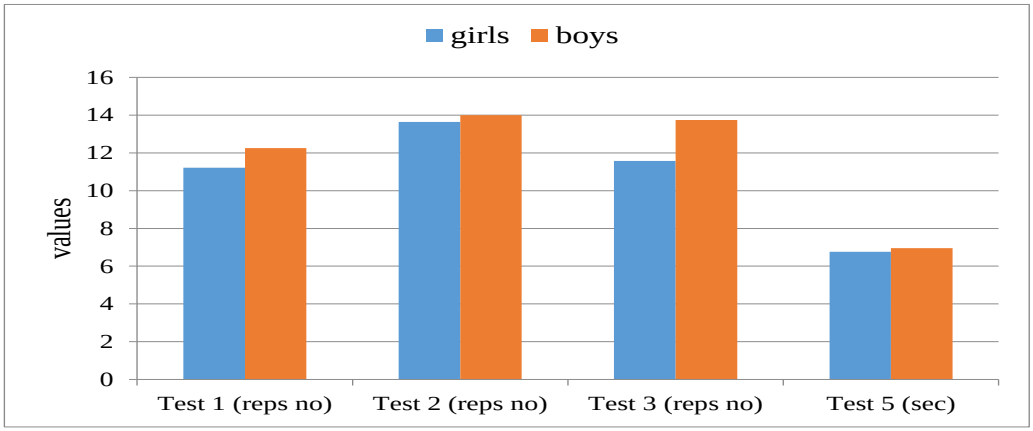

Fig. 1. *Results of motor training of the „B" 1st grade students*

Table 2 and figure 2 show the results of the motor training of the students of the "A" 3rd grade, in girls and boys as well, in terms of assessment of the abdominal strength, back strength, arms strength, movement balance and endurance.

Table no. 2. Results of motor training of the "A" 3rd grade students

Statistical indicators	Test 1- Tr. raises, (reps no)		Test 2 - Tr. Ext., (reps no)		Test 3 - Arms strength, (reps no)		Test 5 – hopscotch, (sec)		Test 6 – Appl. circuits, (sec)	
	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys
Mean	14.78	13.06	18.43	15.68	14.79	15.5	5.92	5.94	68.78	57.81
SEM	0.82	0.77	0.62	1.01	0.57	1.08	0.18	0.06	2.41	2.62
SD	3.07	3.08	2.31	4.06	2.12	4.32	0.67	0.25	9.03	10.46
Cv%	20.75	23.63	12.54	25.89	14.33	27.87	11.25	4.29	13.14	18.09
N	14	16	14	16	14	16	14	16	14	16
t, P	1.529; >0.05		2.226; <0.05		0.561; >0.05		0.136; >0.05		3.051; <0.01	
F, P	1.012; >0.05		3.088; <0.05		4.158; <0.01		6.803; <0.001		1.339; >0.05	

Note: t-Test (Assuming Equal Variances), Unpaired Comparison for Means, F-Test for Equal Variances

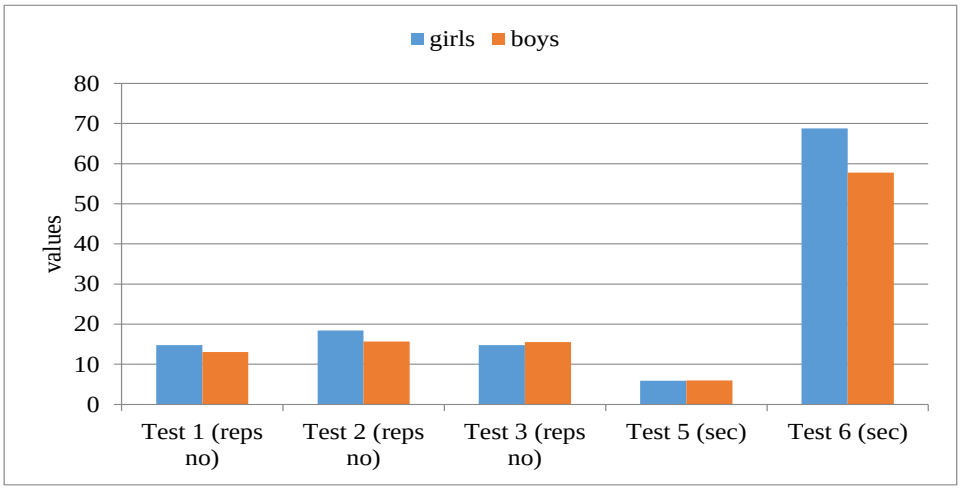

Fig. 2. *Results of motor training of the„A" 3rd grade students*

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Table 3 and figures 3 and 4 show the results of the motor training of "C" 4th grade students, girls and boys as well, regarding the assessment of abdominal strength, back strength, arms strength, coordination and movement balance.

Table no. 3. Results of motor training of the „C" 4th grade students

Statistical indicators	Test 1 – Tr. raises, (reps no)		Test 2 - Tr. Ext., (reps no)		Test 3 – Arms strength, (reps no)		Test 4 - Matorin, (degrees) right		left		Test 5 – hopscotch, (sec)	
	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys	girls	boys
Mean	16.75	18.82	17.94	19.54	17.75	19.45	259.4	328	250.6	301.4	5.61	5.84
SEM	0.76	0.76	0.45	0.93	0.48	1.06	11.53	7.78	14.99	10.05	0.14	0.05
SD	3.04	2.52	1.81	3.08	1.91	3.53	46.11	25.79	59.99	33.32	0.57	0.17
Cv%	18.17	13.40	10.07	15.75	10.78	18.15	17.78	7.85	23.94	11.06	10.32	2.94
N	16	11	16	11	16	11	16	11	16	11	16	11
t, P	1.855; >0.05		1.713; >0.05		1.623; >0.05		4.503; <0.001		2.538; <0.05		1.277; >0.05	
F, P	1.456; >0.05		2.903; <0.05		3.402; <0.05		3.1952; <0.05		3.2415; <0.05		11.347; <0.001	

Note: t-Test (Assuming Equal Variances), Unpaired Comparison for Means, F-Test for Equal Variances

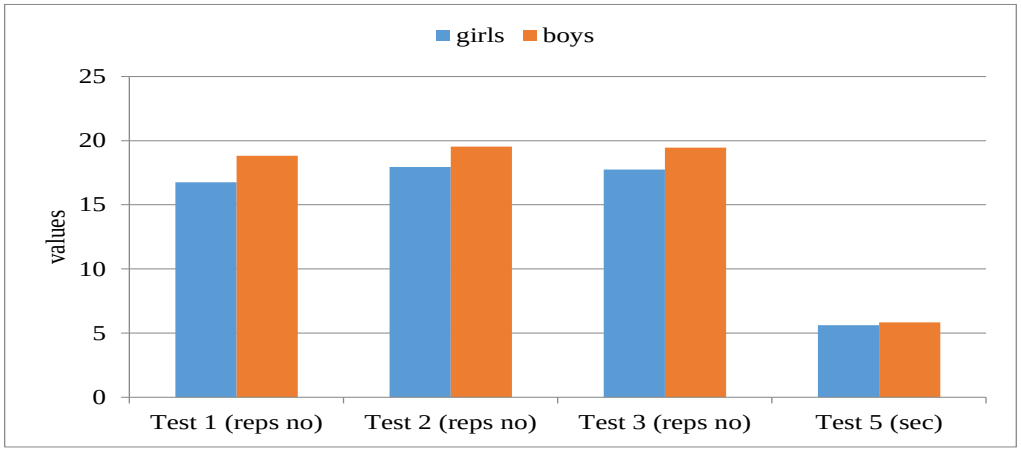

Fig. 3. *Results of the motor training of "C" 4th grade students*

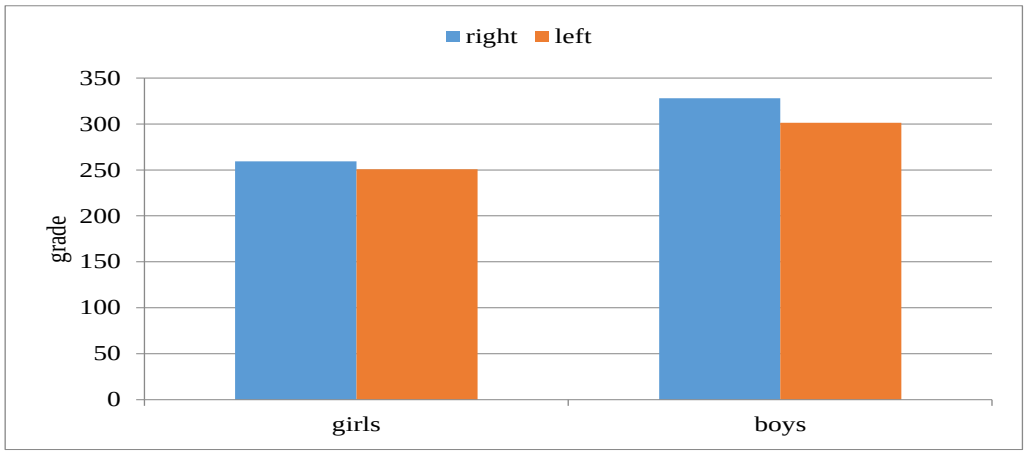

Fig. 4. *Test 4 - Matorin*

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Discussions

School physical education and sport have experienced a comprehensive and sustained upgrading program over the last decade. More and more theoretical ideas, strongly anchored in school and educational issues, have been reported in numerous studies and papers; many of them have been integrated into teaching practice (Miller, 2006; Haynes & Miller, 2015; Chan, Ha & Ng, 2016; Chen, Mason, Hypnar & Bennett, 2016).

The activity of teaching – learning – assessment in the primary school grades plays an important role through its benefic influence on the development and strengthening of the body and as a teaching tool meant to favor the knowledge of children, their faster adaptation to the new requirements of the didactical approach, the assimilation of knowledge fundamentals, the creation of an active environment of work, good understanding and mutual help (Hands, & McIntyre, 2015; Potop & Jurat , 2017; Potop, Uricanu & Jurat, 2018).

The analysis of the results of motor training of the „B" 1st grade students presented in table 1 and fig. 1 highlights the following matters (mean; ±SD, girls, n=12 and boys, n=16): in test 1, regarding the abdominal strength assessed by torso raises, there is a mean of 11.21; ±3.42 no of reps in girls and 12.25; ±2.72 no of reps in boys, with poor homogeneity in both genders and insignificant differences between groups at $p>0.05$; in test 2, regarding the back strength assessed by torso extensions, there is a mean of 13.64; 1.55 no of reps in girls and 14.00; ±2.00 no of reps in boys, with moderate homogeneity and insignificant differences at $p>0.05$ and a significant tendency F at <0.15; in test 3, concerning arms strength assessed by hanging pull-ups, there is a mean of 11.57; ±1.55 no of reps in girls and 13.75; ±1.73 no of reps in boys, with moderate homogeneity and significant differences between groups at $p<0.01$; in test 5, regarding the hopscotch, assessed by covering a route by jumps, there is a mean of 6.76; ±0.58 sec in girls and 6.95; ±1.83 sec in boys, moderate homogeneity in girls and poor one in boys, with significant differences at F test $p<0.001$.

The review of the results of motor training in „A" 3rd grade students, as shown in table 2 and fig. 2, reveals the elements as follows (mean; ±SD, girls, n=12 and boys, n=16): in test 1, a mean of 14.78; ±3.07 no of reps in girls and 13.06; ±3.08 nr. no of reps in boys, with poor homogeneity in both genders and insignificant differences between groups at $p>0.05$; in test 2, the values are 18.43; ±2.31 no of reps in girls and 15.68; ±4.06 no of reps in boys, with moderate homogeneity and significant differences between groups at $p<0.05$; in test 3, the values are of 14.79; ±4.32 no of reps in girls and 15.5; ±4.32 no of reps in boys, with moderate homogeneity and significant differences between groups at $p<0.01$; in test 5, the values are of 5.92; ±0.67 sec in girls and 5.94; ±0.25 sec in boys, with high homogeneity and significant differences at F test $p<0.001$; in test 6, regarding the covering of an applicative circuit, there are values of 68.78; ±9.03 sec in girls and 57.81; ±10.46 sec in boys, with moderate homogeneity and significant differences between groups at $p<0.01$.

The review of the results of motor training of „C" 4th grade students, listed in table 3 and fig. 3 and 4, highlights the following elements (mean; ±SD, girls, n=16 and boys, n=11): in test 1, there is a mean of 16.75; ±3.04 no of reps in girls and 18.82; ±2.52 no of reps in boys, with moderate homogeneity and insignificant differences between groups at $p>0.05$; in test 2, there is a mean of 17.94; 1.81 no of reps in girls and 19.54; ±3.08 no of reps in boys, with moderate homogeneity and significant differences between groups at F test at $p<0.05$; in test 3, there is a mean of 17.75; ±1.91 no of reps in girls and 19.45; ±3.533 no of reps in boys, with moderate homogeneity and significant differences between groups at F test at $p<0.05$; in test 4, regarding Matorin test assessed by jumps with 360 degrees turn to the right there are values of 259.4; ±46.11 degrees in girls and 328.0; ±25.79 degrees in boys while at the turn to the left there are values of 250.6; ±59.99 degrees in girls and 301.4; ±33.32 degrees in boys, poor homogeneity in girls and moderate one in boys and significant differences between groups at $p<0.05$; in test 5, the values are of 5.61; ±0.57 sec in girls and 5.84; ±0.17 sec in boys, high homogeneity and significant differences at F test $p<0.001$.

The lessons of physical education with the students of 7 to 10 years old aimed at designing special training situations to be included in the lesson structure, meant to develop the motor skills. These lessons focused on planning the learning units so that they also influence the development of the motor qualities needed

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to achieve the skill; the students were advised to exercise systematically and independently in order to develop the strength, dexterity and endurance.

Conclusions

The results of the study reveal the development of general motor capacity in the students of 7-10 years old, girls and boys as well, regarding the dynamics of abdominal, back and arms strength, general coordination and sense of balance during movement.

The use of the most efficient tools for assessing the level of motor skills development within the physical education lessons with 7-10 years old students contributed to the achievement of the proposed reference objectives, as shown by the results recorded in the test events.

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