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GYMNASTICS MEANS INFLUENCE ON IMPROVING STUDENTS' CAPACITIES AND SKILLS IN PRIMARY SCHOOL

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Abstract

The purpose of this paper is to improve the capacities and skills of students according to the primary school curriculum, through a diversified application of the content of gymnastics means. This scientific approach involved the organization of an experimental study at the Elementary and Middle School no. 2 of Urziceni, Ialomita County, conducted during the first semester of 2016-2017 school year with a group of 59 students selected from grades 1-4. The following research methods were used in this study: literature review, pedagogical observation, ascertaining pedagogical experiment, programmed learning, testing, statistical-mathematical method and graphical representation method for data processing and interpretation. The biannual evaluation included 3 test events selected from the National School Assessment System for Physical Education and Sport in primary school, as follows: 25-m speed run, lower target throw horizontally with both hands and standing long jump. The other capacities and skills listed in the curriculum will be assessed in the 2nd semester. The diversified use of the gymnastics content in the instructive-educational process for achieving the learning units in primary school has led to the improvement of movement speed, muscle strength of lower limbs and more effective learning of the acrobatic elements included in the curriculum for this education level.

Keywords: Primary school, physical education class, gymnastics, learning units, evaluation.

1. Introduction

The education system in Romania undergoes an extensive restructuring program, in line with the requirements of the educational and professional training system of the European Community. In this context, physical education too must reconsider its role, content, didactic methodology and student assessment system (Dragomir & Scarlat, 2004).

The National School Assessment System for Physical Education and Sport subject is a component part of the reform, which has the main objective to determine the effects of the new curricula implementation. The National System aims at evaluating the most important skills and abilities required by the Physical Education and Sport curriculum. Depending on the timetable adopted, the system is supplemented with the assessment of other skills and abilities provided in the curricula (MEN, 1999).

The curriculum of Physical Education and Sport is an official document that mainly provides the training process content in the different sub-systems of Physical Education and Sport. It must fulfill certain conditions which are also its main characteristics: it is compulsory, dynamic, linear and concentric; it has a unitary, multilateral and continuously ascending basis; it offers priority to formative training, a differentiated approach etc. (Cârstea, 2000, p. 74).

Evaluation is a component of the didactic approach enabling the teacher to objectively determine the effects of the initiated didactic process on the students throughout each learning unit and at the end of the learning unit. In teaching practice, there are three types of evaluation: predictive (initial) evaluation, formative (continuous) evaluation and summative (final) evaluation (Dragomir & Scarlat, 2004; Grimalschi & Boian, 2011; Potop & Marinescu, 2014).

The objective of the evaluation is represented by the student's skills acquired during school physical education or, more correctly said, the student's skills from the bio-psychosocial point of view. Thus, evaluation in school physical education should not be developed and performed only by measuring and evaluating the results of the students, but it must also take into consideration the morphological (anatomical), physiological and psychological aspects that lead to the achievement of those results, and their social implication as well (Urichianu Toma, Timnea, & Cheran, 2010, p. 11).

2. Problem Statement

The Physical Education curriculum is designed according to a new curricular model centred on competencies, so as to contribute to developing the education profile of the primary school student. From the perspective of the school subject, the didactic approach orientation starts from competencies, their purpose and action for developing the student's personality. The school curriculum structure includes the following elements: introductory note, general competencies, specific competencies and examples of learning activities, content and methodological suggestions (MEN, 2013).

The goals set out in the physical education curricula derive from the specific purposes of primary education and the objectives of the two curricular cycles intersecting it, namely the cycle of fundamental acquisitions during preparatory grades (the first and second ones) and the development cycle (the third and fourth grades). The didactic design reflects how the elementary schoolmaster, the teacher or the physical education teacher understands the accomplishment of the reference objectives for each grade. Depending on the education cycle, some categories of content listed in the curriculum can be learning

units, such as the "organizational capacity", "physical development" and some basic motor or utilitarian-applicative skills (Dragomir & Scarlat, 2004; Potop & Marinescu, 2014).

In order to turn into good account the key competencies and ensure transferability within the educational activity, the didactic strategies used for teaching Physical Education will focus on coherence and integrated approaches. According to the provisions of OMECTS no. 3462/2012, it is possible to organize sports teams and formations in the primary school, in addition to the physical education classes provided in the framework plan (MECTS, 2012).

In the activity system, the lesson is the basic organizational form of the instructive-educational process. In school, gymnastics can also be practiced in other forms, beside the lesson: gymnastics during organized breaks, one minute of gymnastics during the class, individual gymnastics performed at home, gymnastics training sessions within sports circles (Rusu et al., 1999).

The physical education class (with gymnastics elements) must take into consideration the students' age, gender and level of physical training. The following requirements will be fulfilled when applying the gymnastics methods during a lesson: selection of exercises, alternation of muscle groups, repetition and variation of exercises, location and gradation of effort, multilateral training and correct execution of movements (Pehkonen, 2010; Potop & Marinescu, 2014).

The analysis of literature on school acrobatic gymnastics reveals that the optimum and effective assimilation of the main technical elements included in the curriculum requires the knowledge and development of the psychomotor skills necessary for learning the dynamic and static acrobatic elements (Paşcan, 2003; Culjak et al., 2014; Webster, 2014).

3. Research Questions

This scientific approach intends to solve the following research questions:

Does the comparative analysis of the test events included in the primary school curriculum – first semester, for both boys and girls – highlight the development of speed, segmental coordination of upper limbs and strength of lower limbs?

Will the achievement of learning units, by diversifying the content of gymnastics means during the instructive-educational process, contribute to the improvement of capacities and skills necessary for the primary school students?

4. Purpose of the Study

The aim of this paper is to improve the capacities and skills of primary school students through the diversified application of the content of gymnastics means.

5. Research Methods

This scientific approach entailed the organization of an experimental study at the Elementary and Middle School no. 2 of Urziceni, Ialomita County, conducted during the first semester of 2016-2017 school year with a group of 59 students (28 boys and 31 girls) selected from grades 1-4 of this school.

The following research methods were used in this study: literature review, pedagogical observation, ascertaining pedagogical experiment, programmed learning (Boloban, 2013, pp. 108-110), testing, statistical-mathematical method and graphical representation method for data processing and interpretation.

The biannual evaluation included 3 test events selected from the National School Assessment System for Physical Education and Sport in primary school (Potop & Jurat, 2016). These tests were the following: 25-m speed run, lower target throw horizontally with both hands and standing long jump. The other capacities and skills listed in the curriculum will be assessed in the 2nd semester.

The study conducted with the 1st to 4th grade students included contents with gymnastics extension: line-up formation in two rows, two-column movement formation, formation and bringing together the gymnastics column; left face; squat walk; walk with added step; jumps, jumps from tucked to tucked posture; leaps; stepping up and down the gymnastics bench; climbing-descending using natural obstacles and installations, traction (movement of one's own body along a slippery surface by traction with the arms), complex exercises with portable objects for physical development; pushing up into a bridge; forward rollover from tucked to tucked posture; backward rollover from tucked to astride posture.

6. Findings

The assessment results of the test events included in the 1st semester curriculum for the 1st to 4th grade boys, in terms of running speed, lower target throw horizontally with both hands and standing long jump are listed in Table 01 and Figure 01.

Table 01. Assessment results of the test events in the 1st semester for the 1st to 4th grade boys

Statistical ind.	Grade	Test 1 (sec)		Test 2 (no of reps)		Test 3 (m)	
		Initial	Final	Initial	Final	Initial	Final
x; ±SD	1, n=10	6.38; 0.16	6.18; 0.16	1.90; 0.57	2.60; 0.52	1.11; 0.03	1.14; 0.04
x; ±SD	2, n=5	6.20; 0.19	6.06; 0.13	1.80; 0.45	2.00; 0.00	1.192;0.03	1.188; 0.04
x; ±SD	3, n=6	6.27; 0.33	5.88; 0.34	2.17; 0.41	2.50; 0.55	1.22; 0.04	1.25; 0.05
x; ±SD	4, n=7	5.73; 0.13	5.49; 0.25	2.00; 0.82	2.43; 0.53	1.26; 0.02	1.29; 0.02
t; p	n=28	8.446; p<0.001		-4.837; p<0.001		4.798; p<0.001	
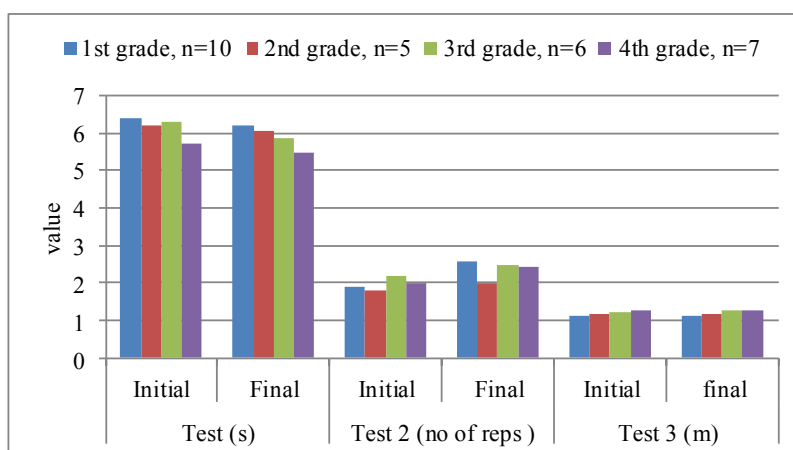
Figure 01. Graphical representation of the assessment results of the test events in the 1st semester for the 1st to 4th grade boys

The results of the comparative analysis highlight the following aspects:

- 1st grade (n=10, x; ±SD): in test 1 for the assessment of 25-m running speed, the average value is equal to 6.38; 0.16 sec in initial testing and an improvement in speed by 0.2 sec in final testing, with an average of 6.18; 0.16 sec; in test 2 for the assessment of lower target throw horizontally with both hands at a 3-m distance, 3 attempts, the average value is equal to 1.90; 0.57 reps and an increase in the number of successful attempts by 0.7 reps in final testing, with an average of 2.60; 0.52 reps; in test 3 for the assessment of standing long jump, the average value is equal to 1.11; 0.03 m in initial testing and an increase in jump length by 0.03 m in final testing, with an average of 1.14; 0.04 m;

- 2nd grade (n=5, x; ±SD): in test 1, the average value is equal to 6.20; 0.19 sec in initial testing and an improvement in speed by 0.14 sec in final testing, with an average of 6.06; 0.13 sec; in test 2, the average value is equal to 1.80; 0.45 reps and an increase in the number of successful attempts by 0.20 reps in final testing; the average is 2.00; 0.00 reps; in test 3, the average value is equal to 1.192; 0.03 m in initial testing and an increase in jump length by 0.004 m in final testing, with an average of 1.188; 0.04 m;

- 3rd grade (n=6, x; ±SD): in test 1, the average value is equal to 6.27; 0.33 sec in initial testing and an improvement in speed by 0.39 sec in final testing, with an average of 5.88; 0.34 sec; in test 2, throw from 5 m, 3 attempts, the average value is equal to 2.17; 0.41 reps and an increase in the number of successful attempts by 0.33 reps in final testing, with an average of 2.50; 0.55 reps; in test 3, the average value is equal to 1.22; 0.04 m in initial testing and an increase in jump length by 0.03 m in final testing, with an average of 1.25; 0.05 m;
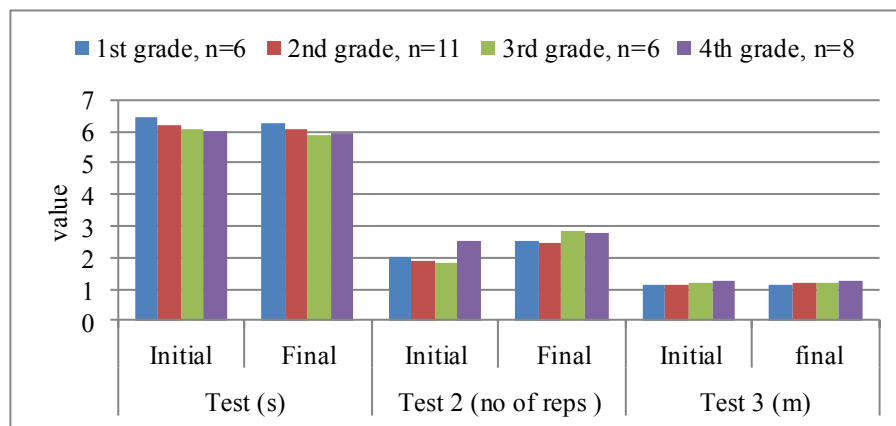
- 4th grade (n=7, x; ±SD): in test 1, the average value is equal to 5.73; 0.13 sec in initial testing and an improvement in speed by 0.24 sec in final testing, with an average of 5.49; 0.25 sec; in test 2, throw from 5 m, 3 attempts, the average value is equal to 2.00; 0.82 reps and an increase in the number of successful attempts by 0.43 reps in final testing, with an average of 2.43; 0.53 reps; in test 3, the average value is equal to 1.26; 0.02 m in initial testing and an increase in jump length by 0.03 m in final testing, with an average of 1.29; 0.02 m.

Regarding the comparison of average values between tests in all events, the statistically calculated t-value is higher at $p < 0.001$, which confirms the influence of the content of gymnastics means on the development of motor skills of 1st to 4th grade boys.

Table 02 and Figure 02 show the assessment results of the test events included in the 1st semester curriculum for the 1st to 4th grade girls, in terms of running speed, lower target throw horizontally with both hands and standing long jump.

Table 02. Assessment results of the test events in the 1st semester for the 1st to 4th grade girls

Statistical ind.	Grade	Test 1 (sec)		Test 2 (no of reps)		Test 3 (m)	
		Initial	Final	Initial	Final	Initial	Final
x; ±SD	1, n=6	6.43; 0.31	6.23; 0.29	2.00; 0.63	2.50; 0.84	1.11; 0.07	1.13; 0.07
x; ±SD	2, n=11	6.19; 0.31	6.10; 0.3	1.91; 0.54	2.45; 0.52	1.15; 0.02	1.17; 0.03
x; ±SD	3, n=6	6.07; 0.46	5.85; 0.22	1.83; 0.75	2.83; 0.41	1.20; 0.07	1.21; 0.06
x; ±SD	4, n=8	6.03; 0.28	5.95; 0.21	2.50; 0.76	2.75; 0.71	1.25; 0.03	1.27; 0.04
t; p	n=31	4.728; p<0.001		-5.376; p<0.001		8.675; p<0.001	

Figure 02. Graphical representation of the assessment results of the test events in the 1st semester for the 1st to 4th grade girls

The results of the comparative analysis reveal the following aspects:

- 1st grade (n=6, x; ±SD): in test 1 for the assessment of 25-m running speed, the average value is equal to 6.43; 0.31 sec in initial testing and an increase in speed by 0.2 sec in final testing, with an average of 6.23; 0.29 sec; in test 2 for the assessment of lower target throw horizontally with both hands from a 3-m distance, 3 attempts, the average value is equal to 2.00; 0.63 reps and an increase in the number of successful attempts by 0.5 reps in final testing, with an average of 2.50; 0.84 reps; in test 3, for the assessment of standing long jump, the average value is equal to 1.11; 0.07 m in initial testing and an increase in jump length by 0.02 m in final testing, with an average of 1.13; 0.07 m;

- 2nd grade (n=11, x; ±SD): in test 1, the average value is equal to 6.19; 0.31 sec in initial testing and an improvement in speed by 0.09 sec in final testing, with an average of 6.10; 0.3 sec; in test 2, the average value is equal to 1.91; 0.54 reps and an increase in the number of successful attempts by 0.54 reps in final testing, with an average of 2.45; 0.52 reps; in test 3, the average value is equal to 1.15; 0.02 m in initial testing and an increase in jump length by 0.02 m in final testing, with an average of 1.17; 0.03 m;

- 3rd grade (n=6, x; ±SD): in test 1, the average value is equal to 6.07; 0.46 sec in initial testing and an improvement in speed by 0.22 sec in final testing, with an average of 5.85; 0.22 sec; in test 2, throw from 5 m, 3 attempts, the average value is equal to 1.83; 0.75 reps and an increase in the number of successful attempts by 1.00 reps in final testing, with an average of 2.83; 0.41 reps; in test 3, the average value is equal to 1.20; 0.07 m in initial testing and an increase in jump length by 0.01 m in final testing, with an average of 1.21; 0.06 m;

- 4th grade (n=8, x; ±SD): in test 1, the average value is equal to 6.03; 0.28 sec in initial testing and an improvement in speed by 0.08 sec in final testing, with an average of 5.95; 0.21 sec; in test 2, throw from 5 m, 3 attempts, the average value is equal to 2.00; 0.82 reps and an increase in the number of successful attempts by 0.43 reps in final testing, with an average of 2.43; 0.53 reps; in test 3, the average value is equal to 1.26; 0.02 m in initial testing and an increase in jump length by 0.03 m in final testing, with an average of 1.29; 0.02 m.

Comparing the average values between tests in all events, we notice that the statistically calculated t-value is higher at $p<0.001$, which confirms the influence of the content of gymnastics means on the development of motor skills of 1st to 4th grade girls.

In terms of didactic technologies of learning by diversifying the content of gymnastics means within the physical education class, other studies have been also carried out in this respect (Boloban, 2011; Potop et al., 2016; Potop & Urichianu, 2016; Kamaev et al., 2017; Potop & Buftea, 2017).

Figure 03 shows an example of algorithmic diagram of the linear programming for learning the back rollover tucked within the diversified use of the content of gymnastics means.
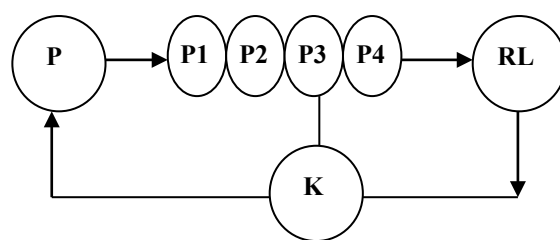
Figure 03. Algorithmic diagram of linear programming for learning back rollover tucked

Note: P – purpose of exercise learning – learning back rollover; learning tasks in terms of creation of the motor representation of the exercise to be learnt by introducing parts of the training material P1- P4: P1 – learning tucked position; P2 – learning backward-forward rollover tucked; P3 – learning back rollover tucked in an inclined plane; P4 – learning back rollover tucked on floor for the floor routines (acrobatic gymnastics). P3 – control exercise (K). RL – result of learning – execution of back rollover tucked, with a mark not less than 9 points.

7. Conclusion

The comparative analysis of the test events specified in the primary school curriculum – 1st semester, for boys and girls as well, points out the improvement of the assessed motor skills, namely an increase in running speed, the development of segmental coordination of upper limbs and strength of lower limbs.

The achievement of the learning units during the instructive-educational process by diversifying the content of gymnastics means leads to the improvement of capacities and skills necessary for the primary school students.

The diversified use of gymnastics contents within the instructive-educational process for achieving the learning units in primary cycle resulted in improved running speed, development of lower- limb muscle strength, segmental coordination of upper limbs and more efficient learning of the acrobatic elements mentioned in the curricular area at this level.

Acknowledgments

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