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The improvement of speed in mentally deficient pupils through the use of differentiated instruction in the physical education lesson

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Abstract

For the mentally disabled children, choosing the specific methods in organizing and teaching the physical education lessons is of great importance for its quality and comprehensiveness.

Therefore, we must agree that using differentiated instruction as a method for emphasizing each child's abilities leads to the achievement of the specific objectives of the physical education classes.

This experimental study compares the results of the initial and final assessments of the experiment group, as well as the results of the final assessment between the experiment group and the control one for the motor ability speed.

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1. Introduction

Physical education as a formative process reunites a variety of organization forms, directions, methodology tendencies, principles, objectives, methods, means, permanently improved and adapted by the area specialists to the system's social requests. Physical education and sports methodology aims at improving the children's motor abilities. They have always been connected to the every day life's demands and to the individual's own characteristics. (Moanță et. al., 2006)

Physical education and sports are motor activities that are suitable for healthy individuals as well as for deficient ones. The distinctive specificity of their content is given by the capacity of intellectual, emotional, motor and social development of the human being. Creativity is an essential characteristic of physical education classes and is used to a greater extent nowadays.

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To improve the quality of life of the mentally deficient children, we used differentiated instruction as a method and principle.

Jean Jacques Rousseau introduced differentiated instruction in psychology (apud. Marolicaru, 1896). The less stimulating effects of the standardized instruction determined it. At the beginning of the 20th century, in the physical education system in Romania, professors Gheorghe Zapan and Petre Lazăr make the first attempts of introducing differentiated instruction in the physical education lessons (Cârstea, 1993).

Applying differentiated instruction in physical education improves the teaching process by generating an adequate content related to each subject's performance (Șerbănoiu and Tudor, 2007).

The research paper aims at improving the instruction process in elementary schools by designing some practical differentiated programs according to each child's own biometric, morphologic and functional characteristics.

2. Methods and materials

2.1. Hypothesis

The use of differentiated instruction during the physical education determines an improvement of mentally disabled students performances at motor abilities speed.

2.2. Debates

The experimental study was conducted during 2010-2011 school year. We used the psychopedagogic experiment.

The subjects recruited for the experiment were 6th grade pupils. The physical education classes took place twice a week and had a duration of 50 min each. The specimens were divided into 2 groups:

- VIth A grade – experiment group;
- VIth B grade – control group.

The two groups were independent one from the other.

The research had a pre-established structure. We organized an initial assessment for both groups, consisting in specific physical tasks for the determination of speed - 25 meters Shuttle Run Test (Tudor, 2005). The experiment group was divided by gender into boys and girls.

Using The National School Assessment System in Physical Education and Sport for each control test we divided the class into value groups, according to their motor performance:

Table 1. Range of value

Value group	Girls	Boys
I	Below 12" – 14"99	Below 10"31 – 12"30
II	15" – above 17"	12"31 – above 14"

Following the initial assessment, the results were:

- Girls: 2 girls in value group I and 3 girls in value group II;
- Boys: 2 boys in value group I and 2 boys in value group II;

For each value group we applied operational modules according to their gender and motor potential. For value group I, the modules consisted in increasing the repetitions, increasing the exercise complexity, its intensity and hardening certain tasks. For value group II the demand were lighter. We lessened the execution by dividing the tasks and helping them.

The use of the operational modules lead to:

- Girls: 4 girls in value group I and one girl in value group II (table 3);
- Boys: 4 boys in value group I and neither in value group II (table 3).

Table 2. Research subjects – comparative results

Assessment	Girls		Boys	
	Value group I	Value group II	Value group I	Value group II
Initial (%)	40	80	50	100
Final (%)	60	20	50	0

The control group was not submitted to the division into value groups but had the same initial and final assessments as the experiment one.

To interpret the results, we used the following research methods: arithmetic average, standard deviation, coefficient of variation, test “t” significance, Spearman correlation (Niculescu, 2002).

2.3. The analysis and interpretation of results

2.3.1. The analysis and interpretation of results achieved by the experimental group in the initial and final assessment – girls (table 2)

Comparing the initial and final assessments we concluded the following:

- The average performance decreased with 0.66 points from 13"72 at the initial assessment to 13"16 at the final assessment.
- The rather small progress of students regarding their speed, from the initial assessment to the final one is due to the specificity of this motor quality. The results are not spectacular due to the increased heritability coefficient.
- The Spearman correlation coefficient has a value equal to 0,90 (very good), while the significance test “t” is: $T=3.61$.
- The table value read at n-2 in Fischer’s Table is 3.18 for the significance landmark $p < 0.05$, while for $p < 0.01$ is 5.84. The “t” value calculated for speed is 3.61. Therefore we may notice that “t” value is higher than $p < 0.05$, thus the correlation coefficient is significant for the motor quality speed. The hypothesis is validated.

2.3.2. The analysis and interpretation of results achieved by the experimental group for the initial and final assessment – boys (table 3)

The values achieved at the final assessment are better than the ones achieved at the initial assessment. This led to an increase in the number of students in value group I. In the end, no student remained in the value group II. The average performance at the initial assessment is 12"41, whereas at the final assessment it improved with 1.38 points to 11"03. Group homogeneity is very small/inexistent at the initial assessment (35%), whereas at the final

assessment it is high (11%). The value of Spearman correlation coefficient is 0.95 (excellent), while the significance test “t” equals 4.31.

“T” value is calculated pursuant to the previously presented formula, whereas for statistic significance it is required that the calculated value to be higher than the table value read at n-2 in the Fischer table.

The table value read at n-2 is 4.30 for the significance landmark $p < 0.05$, while for $p < 0.01$ is 9.92. The calculated value of “t” is 4.31 for motor quality speed. “T” value calculated for speed is 4.31, being higher than that of $p < 0.05$. Therefore the correlation coefficient is significant and the hypothesis was validated.

Table 3. Experiment group - girls` and boys` results

Pupils	Spearman correlation	Test “t” significance	Assessment	Arithmetic average	Standard deviation	Coefficient of variation
Girls	0.90	3.61	Initial	13"72	2.19	15%
			Final	13"16	1.51	11%
Boys	0.95	4.31	Initial	12"41	4.27	35%
			Final	11"03	1.10	11%

2.3.3. The analysis and interpretation of results achieved by the experimental and control group at the final assessment – girls (table 4)

As a result of the comparative analysis of the final values of the two classes (the experimental and the control one) we note that there is a difference of 0.51 points in favor of the experimental group (the 6th A grade). The average mark of the two groups proved that using the differentiated instruction, the experimental group achieved 13"16 while the control group achieved 13"77.

Experimental group’s homogeneity of 11% is high, whereas for the control group it is moderate (17%).

2.3.4. The analysis and interpretation of results achieved by the experimental and control group at the final assessment – boys (table 3)

Comparing the results at the final assessment between the experiment and control groups, we determined that there is a difference of 0.91 points in favor of the experiment group (the 6th A grade). We calculated the average mark of the two classes and noted that the experiment group achieved an average equal to 11"03 at the final assessment, while the control group achieved 11"94.

The homogeneity is high for the experimental group (11%) and moderate for the control group (19 %).

Table 4. Experiment and control group – final assessment

Classes	Tests	Girls	Boys
Experiment group	Arithmetic average	13"16	11"03
	Homogeneity	11%	11%
Control group	Arithmetic average	13"77	11"94
	Homogeneity	17%	19%

3. Conclusions

As a result of the research study regarding the efficiency in using the differentiated instruction for the 6th grade pupils during the physical education classes in special education schools for the motor quality speed, the working hypothesis has been confirmed, resulting the improvement of the students' performance at a biometric level. Through the use of differentiated instruction, subjects were involved in a dynamic relational system with other colleagues, teachers and family members as well as with students in other classes. The improvement of speed as a motor ability through the use of differentiated instruction determines an increase in the child's capacities used both at school as well as in his activities of daily living.

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