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IMPROVING SPEED IN PRIMARY SCHOOL PUPILS USING INTEGRATED DYNAMIC GAMES

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Abstract: *Current primary education aims at the multilateral development of students using means that interconnect the subjects studied so that they outline a wide range of key competences at the end of the cycle. The present research seeks to find didactic solutions, experimentally confirmed, transposed by the application of dynamic games, with the goal of improving the speed motor quality cumulative with the consolidation of the competences formed within other disciplines, thus, capitalizing on the multifunctional solution of new learning situations. The study was applied to 54 students from 3rd and 4th grades in rural areas, divided in 2: control group and experimental group. In the school year 2021-2022, the experimental group went through the program containing integrated dynamic games for the development of speed motor quality, solving în the same time certain requirements with interdisciplinary approaches. The obtained results confirm the validity of the hypothesis by improving more obvious the speed motor quality of the students from the experiment group as a result of the implementation of integrated dynamic game program. The study also heileights that a reorganization of activities must be made so that the student can demonstrate interconnections in order to respond promptly to the tasks imposed by the future society.*

Key words: *speed motor quality, integrated dynamic games, primary school.*

1. Introduction

Considered to be one of the most important stages of child development, the period of 6-10 years represents the transition through primary education.

The current curriculum for primary education aims at forming the profile of the primary-cycle graduate by assimilating key competences according to the general and specific competences of the school disciplines that are provided in the framework plan. Thus, an integrated approach to content is a primary factor for achieving positive results in shaping a strong profile of the graduate at the end of the primary cycle.

The integrated curriculum concept represents the interdisciplinary approach of the contents, linking the objects of

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study, linking learning outcomes, borrowing developed skills in one area as support for another and offering transfer possibilities with the goal of solving new learning tasks faster and in an innovative way [6].

Physical education realize it's role according to the complexity and diversity of competences that cover a wide range of plans such as biomotric, psychomotric, sociomotric and affective-motivational, which highlights the versatility of this discipline [1], [2], [8], [9].

The competences established at the level of the school programs for physical education have lifelong applicability: Promoting a healthy and active lifestyle, developing motor, social, ethical and well-being capacities, with guidance on the permanent practice of physical activities from a qualitative and quantitative point of view [7].

The current society of knowledge defines the role of the teacher from a new optic, radically changed, orienting education towards transformation and formation at the expense of transmitting information and experiences, respectively, less towards the past and more towards the future.

The main task of the teacher is to ensure an educational climate conducive to the overall development of the student, creating optimal conditions for the activities, taking into account aspects related to the didactic design such as preparing the right means, organizing the place, conducting, modifying and adapting it, stimulating the participation of parents and the community in school and extracurricular activities, fostering the formation and development of key competences [4], [5]. Thus, the student makes the transition from a simple receiver of information to the main subject of knowledge and action through the required learning strategies. Motor qualities are of primary interest to physical education teachers, and physical activities should be designed to stimulate students to develop their motor capacity with pleasure and a desire for learning, especially knowing the plasticity of children's learning adaptation [3], [10]. Dynamic games are one of the favorite activities of primary school students. By participating in the game, the students are permanently cheerful, interested and manage to form a superior motor capacity, to strengthen social integration, to develop their courage, to tone up and balance their psyche.

2. Hypothese and Objectives

2.1. Hypothese of the study

The present research seeks to find didactic solutions, experimentally confirmed, transposed by the application of dynamic games, with the goal of improving the speed quality at the same with the consolidation of the competences formed within other disciplines, thus, capitalizing on the pupil's capacity in adaptation to the new learning situations.

2.2. Objectives

a. Developing speed indices and ensuring harmonious physical development;

b. Modernization of physical education lessons for primary school;

c. A wider visualization and awareness of the importance of study disciplines and especially of the connection between them for optimal personal development.

3. Subjects, Methods and Means

3.1. Subjects

The research activity was carried out between September 2021 and May 2022, at Secondary School no. 1 Hiliseu-Horia from Botosani county. Two groups were made, respectively the control group and the experiment group as follows:

a. The control group was made up from grades III-IV pupils of Structure no. 2 Hilişeu-Crişan: 12 third graders (3 girls and 9 boys) and 15 fourth-graders (8 boys and 7 girls);

b. The experimental group was made up from grades III-IV pupils of the following structures: Secondary School no. 3 Iezer, Secondary School no. 1 Hiliseu-Horia and Primary School no. 4 Hiliseu-Closca. The number of students is 12 in 3rd grade (7 girls and 5 boys) and 15 students in 4th grade (5 girls and 10 boys. The enumeration of 3 structures in the experimental group was due to the fact that they use simultaneous teaching for the primary cycle versus the control group using separate classes.

3.2. Methods and means

The methods used in compiling the study are: the method of bibliographic study, observation, experiment, stathistic-mathematics and graphic-computerized.

For both groups, the curriculum in force and the same annual staggering of the units were respected and carried out under similar conditions. The analysis of the results shall be presented by comparing the two tests for each group and between the two groups.

The control group went through the planning carried out with the help of the means established by the physical education teacher titular at the respective structure, and the experiment group went through the imposed planning having as the main means of acting the use of dynamic games.

Integrated dynamic games have been carefully selected and adapted to the particularities of the experimental group. Some games were personally build as a result of observing the involvement of students in activities, in order to streamline the achievement of the purpose of the research. The games were included in the physical education lessons specific to the main thematic addressed to the education of speed indices. The use of dynamic games as the main means of developing the speed was aimed at the possibility of performing them outdoors or in the classroom because there is no gym or class arranged according to the physical education lesson. The topics of the games were aimed at carrying out tasks using the competences formed and developed within other disciplines such as mathematics, romanian or english language.

In order to assess the level of development of the motor quality, we have chosen several tests that derive from the Eurofit test battery, tests that are used in most European countries to verify the capacity of students aged 7-18 years:

a. Touch the tiles – tests the execution speed and coordination of the upper limbs, consisting in the alternative touch of two delimited areas on one table and over the other hand that will be placed in the center between the two areas. The round-trip movement will be done with the skillful hand in a way that is as fast and carefully as possible in order to reach the 2 marked areas, for not touching one of them an additional touch is required, and

the student will stop only at the teacher's signal. It will be counted the reaching of the 2 zones 25 times, respectively 50 for each zone and the time obtained in tenths of a second will be noted, so a time of 14.4 will be denoted 144.

b. Shuttle run 5X10m - assesses the movement and execution speed and coordination. Two lines marked with 2 milestones at the ends will be drawn, with the distance between them of 10 m. The running is carried out on the distance 5x10m, with departure from the top start from the line, to the sound signal and running at maximum speed with the passage of the other line with both feet, return and repeat the cycle 5 times. It is carried out only once, recording the time in tenths of a second, for a time of 14.34 obtaining 144.

4. Results

The tests were applied initially between September - October 2021 and finally in May 2022. The initial testing was applied to observe the level of motor development of the students, and the final test to observe if there is a progress in the level of motor development, especially for the experimental group. The testing was based on the fact that both groups show physical development as well as similar socio-economic, family and pedagogical conditions.

For each test that was made, the following statistical indices were calculated: arithmetic mean-X, standard deviation-STDEV, coefficient of variability - CV, minimum - MIN and maximum - MAX.

4.1. Touch the tiles test

Table 1 shows the statistical indices interpreted after obtaining the results of the initial and final tests for Touch the tiles by both boys group of third and fourth grade.

Statistical indicators of the Touch the tiles test for boy groups Table 1

CLASS		4th grade boys				3rd grade boys			
GROUP		Control		Experimental		Control		Experimental	
TESTING		Initial	Final	Initial	Final	Initial	Final	Initial	Final
Statistical indicators [tenths of a second]	X	132.5	129.25	134.2	129.1	145.2	143.1	141.4	133.6
	STDEV	3.96	4.68	6.67	5.89	4.94	5.39	4.50	3.78
	CV	2.99	3.62	4.97	4.56	3.40	3.77	3.18	2.83
	MIN	126	122	125	121	135	132	135	130
	MAX	137	136	146	140	151	148	146	139

In this test, the 4th grade control group boys obtained a mean of 132.5 for the initial test and a mean of 129.25 for the final test, managing to obtain a shorter time with 3.25 tenths than the initial test.

The students in the experimental group obtained a mean of 134.2 at the initial test and a mean of 129.1 on the final test, the mean of the final test being less by 5.1 tenths. In the initial test, the fourth grade control group had a better mean by 1.7 than the experimental group, but after the final test, the experimental group had a shorter time by 0.15 than the control group. The third class control group boys achieved an average of 145.2 for the initial

test and a final test average of 143.1, achieving a better final time by 2.1 tenths. The experimental group boys achieved an initial test average of 141.4 and a final test average of 133.6, achieving, by 7.8 tenths better time in the final test than the initial one. The boys in the experimental group achieved a better time with 3.8 after the initial test and with 9.5 after the final test.

The control group maximum time obtained in the final test is better than those in the experimental group, but the experimental group mean is better due to the minimum time obtained which is less than the control group. STDEV shows that the values are spread over a small area, and CV has low values of all tests demonstrating high homogeneity for both groups.

Table 2 shows the statistical indicators of the sample results touch the tiles obtained by the groups of girls.

Statistical indicators of the test Touch the tiles for girl groups Table 2

CLASS		4th grade girls				3rd grade girls			
GROUP		Control		Experimental		Control		Experimental	
TESTING		Initial	Final	Initial	Final	Initial	Final	Initial	Final
Statistical indicators [tenths of a second]	X	134.2	132.1	127.6	124.2	144	141.6	143.7	135.7
	STDEV	5.05	5.08	10.73	11.56	4.35	3.78	4.38	3.90
	CV	3.76	3.84	8.41	9.30	3.02	2.67	3.05	2.87
	MIN	127	126	113	108	141	139	140	130
	MAX	142	140	138	135	149	146	153	141

The 4th grade control group girls obtained a mean for the initial test of 134.2 and a mean of 132.1 for the final test, achieving a better time 2.1 less than the initial test. The girls in the fourth grade experiment group achieved an initial test mean of 127.6 and a final test mean of 124.2, the final test mean being lower with 3.4 tenths of a second then the initial one. In the initial test, the 4th grade experimental group girls obtained a better mean by 6.6 compared to the girls in the control group, and after the final test, the experimental group recorded a time less by 7.9 than the control one. The girls in the experimental group had better progress than both fourth grade boy group tests, so we can conclude that the female gender has the speed of execution of the upper limbs better developed than that of the boys for this sample. The third class control group girls achieved an initial test average of 144 and a final test average of 141.6, achieving a better final time with 2.4. The girls in the experimental group achieved an average of 143.7 for initial testing and a final test average of 135.7, achieving after final testing a time of 8 tenths better than in initial testing. Also, the girls in the third class control group achieved better times than the boys in the same class. The experimental group of both classes obtained better times than the control group after the initial and final testing, and the experimental third class group girl left with an average approximately equal to that of the control group, but recorded a higher progress, this helps to confirm the proposed research hypothesis.

The minimum time of 108 tenths for a fourth grade girl in the experimental

group at the final test, is the best time of all the subjects participating in the research. The maximum value recorded on this sample is obtained by a third grade girl from the experimental group, respectively 153 tenths on the initial test, being also the highest progress made by a subject on this sample. STDEV shows that the values are spread over a small area, and the CV has low values at all tests demonstrating a large homogeneity of both groups.

4.2. Shuttle run 5X10m test

Table 3 shows the statistical indicators obtained in the shuttle 5X10m trial by the boys of both groups involved in the research.

Statistical indicators of the Shuttle run 5X10m for boy groups Table 3

CLASS		4th grade boys				3r 3rd grade boys			
GROUP		Control		Experimental		Control		Experimental	
TESTING		Initial	Final	Initial	Final	Initial	Final	Initial	Final
Statistical indicators [tenths of a second]	X	183	178.3	178.2	171.9	195.3	192.5	193.6	189.4
	STDEV	4.37	5.39	2.14	3.34	2.39	2.29	2.96	4.39
	CV	2.39	3.02	1.20	1.94	1.22	1.19	1.53	2.31
	MIN	179	171	175	168	191	189	189	182
	MAX	189	185	181	177	198	195	197	193

In the shuttle run test, the fourth grade control group boys achieved a mean of 183 for the initial test and a mean of 178.3 for the final test, resulting a better time with 4.7 tenths than the initial test. The boys in the experimental group obtained an initial test average of 178.2 and a final test average of 171.9, with the final test average being less than 6.3 tenths. At the initial test, the fourth grade control group boys scored a mean with 4.6 times bigger than the experimental group boys, who obtained in the initial test a better time with 0.1 tenths than the final test of the fourth control group boys. The difference between the tests for 3rd control group boys demonstrates a final time mean better in 2.8 than the one initially achieved, and for the same level experimental group a time average by 4.2 better than the one obtained in the initial test. The third grade experimental boy group achieved a better time with 1.7 tenths after the initial test and 3.1 tenths after the final test compared to the control group of the same class.

The maximum and minimum time obtained by the experimental groups in both tests is less than the control groups, which demonstrate that the execution speed of the experimental group was from the beginning more developed and progressed more as a result of the application of the proposed variable. CV has low values at all tests demonstrating the high homogeneity of the groups with a small and significantly representative individual values spread for the arithmetic mean of the tests.

The statistical indicators obtained in the shuttle 5X10m test by both girl groups are presented in Table 4:

Statistical indicators of the Shuttle run 5X10m for girl groups Table 4

CLASS		4th grade girls				3rd grade girls			
GROUP		Control		Experimental		Control		Experimental	
TESTING		Initial	Final	Initial	Final	Initial	Final	Initial	Final
Statistical indicators [tenths of a second]	X	185.7	183.7	178.4	172.8	200.6	197.3	198	196.1
	STDEV	2.42	3.63	3.04	4.43	2.08	1.52	5.80	6.25
	CV	1.30	1.98	1.70	2.56	1.03	0.77	2.93	3.18
	MIN	182	179	174	169	199	196	191	189
	MAX	188	189	182	180	203	199	209	208

For the shuttle run test, the 4th grade control group girls obtained a mean of the initial test of 185.7 and a mean for the final test of 183.7, achieving an arithmetic mean time with 1.6 lower than the initial test. The girls in the fourth grade experiment group obtained an average of initial testing of 178.4 and a final test average of 172.8, the final testing mean being less by 5.6 tenths. The initial testing of the 4th grade experimental group showed a better mean by 7.3 compared to the 4th grade control group, and after the final test the girls experimental group recorded a timeless of 10.9 tenths than the control group. The third grade girls control group achieved a better time by 3.3 than the initial one, while the same level experimental group achieved a better time by 1.9 compared with the initial one. The experimental group of both girls obtained better times after initial and final tests than the control group. The MAX value obtained by 3rd grade control group tests is lower than the experimental one, but the arithmetic mean obtained is higher than the one obteined by the experimental group. STDEV shows that the values are spread over a small area and the CV has low values at all tests demonstrating a scattering of the individual values small and significantly representative of the arithmetic mean on this test.

5. Conclusions

Both school and personal success are given precisely by the ability to get out of the pattern of a discipline and making connections and quickly transfers of knowledge, ensuring the student's ability to adapt and apply the information accumulated in concrete situations imposed by society.

We consider dynamic games a good means for integrated curricular approach, the teacher being able to take advantage of the desire and interest of the students to participate in these activities, and to use them to integrate knowledge from other disciplines in a fun and creative way that will develop the key competences necessary for the graduate profile of the primary cycle.

As a result of the application and interpretation of the presented tests, the assumed hypotheses confirm their validity, thus the use of integrated dynamic games brings a double important contribution for the capitalization of the contents offered by the curriculum for the formation of general and specific competences that bring added value to the development of motor quality speed, as well as on the

formation of those key competences so necessary for the school progress and the transformation of the little school child in an adult endowed with higher educational qualities.

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