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CAPITALISATION OF RHYTHMIC GYMNASTICS MEANS IN PRE-SCHOOL EDUCATION

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Abstract

This paper aims to present, on the basis of the study of a large bibliography, practical ways of organizing and conducting physical education lessons for pre-school children using the means of rhythmic gymnastics. Participants: The experimental group (X±Ds = 4.24±0.74) consists of 21 children, including 15 girls and 6 boys. The control group (X±Ds = 8.25±0.91) consists of 20 children, including 16 girls and 4 boys. Methods: The applied psychomotor tests aimed at laterality and body schema. Specific rhythmic gymnastics tests (n=4) were created in accordance with the possibilities and level of motor and psychomotor development of middle-aged children and aimed at the possibilities of manipulating hand apparatus (ball, hoop, rope, scarves) in close relationship with body elements. Discussion: Following the final tests, it has been observed that the differences between the experimental group and control group are statistically insignificant for all four elements executed with the 4 hand apparatus included in our research. The comparison between the two groups showed a statistical insignificance at $p < 0.005$ in the ball test, and in the other tests, a statistical significance at $p < 0.001$, except for the value obtained in the initial scarf test. Conclusion: Manipulation of apparatus requiring special manual coordination (rope, scarves) leads to an improvement in laterality, but is also a prerequisite for improving fine motor skills that are so necessary for the future of the school.

Keywords: Physical education, kindergarten, psychomotor tests, rhythmic gymnastics. .

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1. Introduction

Pre-school centres have also become important for children's development, due to the large amount of time children spend in them nowadays.

Because physical exercises in kindergartens are often performed according to out-of-date models, we consider that the application of rhythmic gymnastics means will create a pleasant, relaxed atmosphere, while children develop the psychomotricity components that are so necessary at this age. This paper aims to present, on the basis of the study of a large bibliography, practical ways of organizing and conducting physical education lessons in pre-school children using the means of rhythmic gymnastics.

Given that all pre-school education activities involve interventions in the psychomotor field, we consider that the present work is of particular importance, being addressed to physical education teachers.

1.1. The psychomotor development of pre-school children

Using body, space and time, psychomotricity provides techniques that enable the person to know his/her body and environment and act accordingly. Affective, motor and intellectual functions are closely linked in all individuals. Thus, tracking the stages of child development, it will be seen that activity stimulates their cognitive, motor or emotional abilities by enabling their global psychomotor development. (Nicoletti, 1992)

The general psychological characteristics that occur at pre-school age stem from a series of contradictions that are noticed in several aspects of the child's personality (Shingjergji, 2013):

- Contradictions between external demands and adaptation possibilities are starting points for the explosive development of behaviours, the differentiated social behaviour;
- Contradictions between the internal requirements, desires, aspirations and interests of the child and the possibilities to be satisfied;
- Contradictions regarding the means of meeting the needs and requirements involved;
- Contradictions in the knowledge plane.

At pre-school age, the following aspects can be highlighted (Gray, 1998):

- Strength, agility and intelligence develop;
- There are opposing attitudes towards the adult;
- Creative activity develops;
- The learning ability becomes active, being accompanied by knowledge-related interests;
- Infant symbolism is impregnated by a gap between the development of affectivity and that of intellect. (p. 17)

In the motricity plane, middle- and large- pre-school groups improve coordination of gross movements, with the exception of those that engage the small muscles of the hands and fingers (fine motricity), increase muscle tone and resistance to longer and longer stress, the running phase begins to be noticed and they enhance general pace in executing motor acts and actions (Tomporowski, McCulick, & Pesce, 2015).

Any educational approach must start, on the one hand, from knowing the level of normality of motor and psychomotor development in ontogenesis, and on the other hand, from the level of a particular

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individual. Knowing the general issues common to the subjects of a certain age becomes an indispensable condition for the efficiency of the activity. (Radu, 2000)

2. Problem Statement

There are studies that, based on the theoretical-didactic references in the field of the psychomotor education of pre-school children, aim to bring some qualitative training alternatives to the readers' attention, such as the one written by Shingjergji in 2013.

The role and types of meaning in physical education have been a central research focus for scholars arguing the inherent value potential of movement as a site of meaning-making to enrich human existence (Arnold, 1979; Brown, 2008; Hawkins, 2008; Kretchmar, 2000; McCaughtry & Rovegno, 2001; Metheny, 1968; Rintala, 2009). Games are important in the physical education program, because they provide big-muscle activity necessary for developing and maintaining a desirable level of physical fitness (Palmer, 2003, p. 46).

"Young children need specific and systematic opportunities to learn fundamental physical skills that will contribute to a lifetime of physical activity" is a conclusion of the research made by Stork and Sanders in 2008 (p. 197). This article examines the incidence and quality of physical activity instruction during early childhood.

Knowing this, we can say that there is little knowledge about the use of means from rhythmic gymnastics, especially hand apparatus, in the development of psychomotor components in early childhood.

3. Research Questions

We assume in our research that the exercises for rhythmic gymnastics apparatus manipulation applied to pre-schoolers will achieve a better development of laterality and representation of body schema.

4. Purpose of the Study

The motor and especially the psychomotor qualities can be developed/ educated by applying, in the didactic process, bodily technical elements and rhythmic gymnastics apparatus manipulation specific to pre-school age. We aimed in this paper to highlight the effectiveness of manipulative exercises in rhythmic gymnastics in the form of games to improve body schema and laterality in pre-schoolers.

5. Research Methods

The experimental group consists of 21 children, including 15 girls and 6 boys, representing the middle group "A" of the "Colibri" Kindergarten in Constanta. The control group consists of 20 children, including 16 girls and 4 boys, representing the middle group "B" of the same centre.

The research was conducted over a period of 6 months, during which 24 weeks of actual work, with a total of 48 days. Each lesson lasted 40 minutes, so we allocated 32 hours to achieve the goal of our research.

All subjects had the same training conditions and actuation systems, and tests were run at the same time, but on different days of the week. Initial testing took place in November 2016, and final testing took

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place at the end of the experiment, in May 2017. The proposed operational models were dosed in all the training periods, so that they fit within the allocated time.

5.1. Research objectives

- Choosing and organizing drive systems at the level of the experimental group to improve the targeted psychomotor indices;
- Verification of the effectiveness of the applied systems and analysis of the results obtained in the subsequent tests.

After applying the three tests and the statistical calculation, we analysed the efficiency of the applied programs, checking the dynamics of the obtained results.

5.2. Research tasks

- Observing the level of psychomotricity and its dynamics;
- Applying the specific psychomotor test battery from rhythmic gymnastics;
- Applying the training technology as a means of improving body schema and laterality at pre-primary level;
- Statistical processing and interpretation of the data recorded in the initial and final tests.

5.3. The research protocol

Verification methods used psychomotor tests aimed at laterality and body schema:

- Laterality – the test proposed by Piaget (quoted by Massenz & Simonetta, 2002, p. 75)
- Adaptation with mental representation of static posture – the test proposed by Massenz and Simonetta (2002, p. 69)

Specific rhythmic gymnastics tests were created in accordance with the possibilities and level of motor and psychomotor development of middle-aged children and aimed at the possibilities of manipulating hand apparatus in close relation with body elements.

Children were scored or not, depending on the execution level. For each valid execution, one point was granted. The points were awarded by the teacher who worked in the class, trying to avoid as much as possible subjectivism. Each item was executed 3 times.

Tests related to body schema and laterality for hand apparatus with classroom work:

- Ball - placed with legs together lifted to L, with running the ball on both legs
- Hoop - two successive squat jumps through the hoop
- Rope - turning the rope twice above the head and wrapping it around the holding hand
- Scarves - walking on tiptoes with the successive swinging of the scarves above the head

5.4. Rhythmic gymnastics exercises applied to research

For the successful education of the body schema, the entire movement complex – kinesthetic, balance, tactile, visual, proprioceptive and exteroceptive sensations, as well as the internal factors that command the triggering of the movement, have to be taken into account. In this sense, the developed and

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experienced programs have been structured so that the degree of difficulty gradually increases from easy to difficult, from simple to complex.

For each hand apparatus (ball, hoop, rope, scarf), we have designed exercises that follow the basic skills of the basic technique in rhythmic gymnastics and also represent ways to educate the body schema. These exercises were applied during the 40 minutes of each training session as follows: 2 training sessions were held every week of the month. At each training session, 4-5 exercises were performed to acquire body technique and 4-5 exercises to acquire the hand apparatus technique. Every two weeks, the hand apparatus was changed.

6. Findings

6.1. Comparative analysis of the groups in the psychomotor tests

6.1.1. Experimental group

The results of statistical processing for the experimental group from the initial to the final test reveal its progress following the application of the proposed operational systems. Thus, for the right-side laterality, we notice an improvement in group average, its statistical significance from the initial to the final test being significant at $p < 0.005$. In left-turn test, the experimental group recorded average, but statistically insignificant increases. The dispersion of individual values is high compared to the average, which also results from the data obtained by calculating the coefficient of variation that indicates a non-homogeneous group in initial and final testing, for both the right and left execution. (Table 01)

Table 01. Psychomotor test data for the experimental group

Experimental group			**X±Ds**	**Cv%**
Initial testing	Laterality	Right	1.04±0.38	36.67
		Left	0.62±0.67	10.8
	Postural adjustment		6.04±0.74	12.24
Final testing	Laterality	Right	2.52±0.60	23.84
		Left	2.33±0.65	28.21
	Postural adjustment		9±0.70	7.85

In the second psychomotor test (the developmental level of body schema), the experimental group has an upward evolution from initial testing to final testing, which is statistically insignificant. Children only have an average of X±Ds = 5.85±0.67 in initial testing, the test being totally invalid, because they had to respond correctly to at least 6 tasks to validate it. 20% of children failed to respond correctly to at least 6 tasks from those proposed in initial testing, which distorted the group average and implicitly the statistical significance of the *t* test. The increase in group average is thus statistically insignificant for this test, in both initial testing and final testing. (Table 02)

Table 02. Psychomotor tests – *t* test for the experimental group

Experimental group	**Laterality**		**Postural adjustment**
	Right	**Left**	
T	2.90	1	-18.3
P	<0.005	>0.005	>0.005

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6.1.2. Control group

For the control group, we also notice an increase in psychomotor parameters from initial testing to final testing, but the initial threshold was lower than for the experimental group. The average for the control group is X±Ds = 0.8±0.52 for the right turn and X±Ds = 0.75±0.44 for left turn at the initial test. (Table 03)

Table 03. Psychomotor test data for the control group

Control group			**X±Ds**	**Cv%**
Initial testing	Laterality	Right	0.8±0.52	65.4
		Left	0.75±0.44	59.23
	Postural adjustment		5.85±0.67	11.5
Final testing	Laterality	Right	1.65±0.49	29.7
		Left	1.35±0.81	60.2
	Postural adjustment		8.25±0.91	11

In final testing, children are able to achieve a group average of X±Ds = 1.65±0.49 in the initial test for right-back and X±Ds = 1.35±0.81 for return to the left. The group is characterised by non-homogeneous coefficients of variation in both tests. The t-test calculation reveals a non-significant statistical significance of the parameters recorded in the two tests. (Table 04)

Table 04. Psychomotor tests – *t* test for the control group

Control group	**Laterality**		**Postural adjustment**
	Right	**Left**	
T	0.29	1.45	-16
P	>0.005	>0.005	>0.005

6.2. Psychomotor test data – Comparative analysis between initial and final testing

For the right-side laterality test and the test determining the level of body schema, the differences between the two groups are insignificant at the initial tests (Table 05).

Table 05. Psychomotor test data for the two groups

Independent *t* test		**Laterality**		**Postural adjustment**
		Right	**Left**	
Initial testing	t	1.67	4.98	0.87
	p	>0.005	<0.001	>0.005
Final testing	t	1.72	4.13	2.86
	p	<0.05	<0.001	<0.005

For the left-side laterality test, we obtained a significant value in favour of the experimental group. This can be explained by the presence of a large number of children (n=10) with the left side as the dominant side of the body or who present low levels of ambidexterity. In final testing, we notice a statistically significant difference in favour of the experimental group average in both psychomotor tests. (Table 05)

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6.3. Comparative analysis of the groups in the rhythmic-gymnastics specific tests

Experimental group

In the specific tests, where the teacher awarded grades for accuracy in performing elements with the hand apparatus, we noticed good evolution of the average from one test to the other. The lowest average was obtained in the initial ball test (executed with legs together lifted to L, with running the ball on both legs) representing one of the most difficult elements tested (X±Ds = 7.19±0.81). The highest average was recorded for body elements performed with scarves (X±Ds = 7.52+0.68), the movements proposed for execution with this hand apparatus being similar to those in everyday life (the hand balancing close to the body while walking or running). (Table 06)

Table 06. Rhythmic-gymnastics specific test data for the experimental group

Experimental group		**X±Ds**	**Cv%**
Initial testing	Ball	7.19±0.81	11.31
	Rope	7.38±0.80	10.9
	Scarves	7.52±0.68	9.03
	Hoop	7.42±0.81	10.91
Final testing	Ball	8.95±0.59	6.59
	Rope	9±0.70	7.85
	Scarves	9.33±0.57	6.18
	Hoop	9.09±0.62	6.87

In final testing, the situation is the same in terms of the lowest and highest average values, which indicates that our assumptions about the difficulty of the proposed tests have come true. The values for standard deviation denote low and medium dispersion, which is also shown by the coefficients of variation in both testing stages for all the specific tests applied. However, an improvement in group homogeneity is noted in final testing for all applied tests. (Table 07)

Table 07. Specific tests – *t* test for the experimental group

Experimental group	**Ball**	**Rope**	**Scarves**	**Hoop**
T	-14.98	-14.9	-16.2	-15.8
P	>0.005	>0.005	>0.005	>0.005

The mean difference is statistically insignificant for all four elements executed with the 4 hand apparatus included in our research.

6.3.1. Control group

The control group also has a statistically significant increase in the average from initial testing to final testing (Table 08). In the control group, the lowest average is recorded (in both tests) for the element executed with the rope. Wrapping the rope around the hand after turning it twice over the head put the children in trouble, in the sense that they did not hold their hands wide and the rope wrapped around the face. Calculation of the coefficient of variation has shown values that characterise the group as a homogeneous environment. (Table 09)

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Table 08. Rhythmic gymnastics-specific test data for the control group

Control group		**X±Ds**	**Cv %**
Initial testing	Ball	6.45±0.83	12.8
	Rope	6.2±0.95	15.3
	Scarves	7.15±0.67	9.38
	Hoop	6.25±0.78	12.58
Final testing	Ball	8.2±1	12.26
	Rope	8.05±1.05	13
	Scarves	8.25±0.85	10.3
	Hoop	7.95±1.05	13.2

Table 09. Specific tests – *t* test for the control group

Control group	**Ball**	**Rope**	**Scarves**	**Hoop**
t	-14.2	-11	-4.6	-8.23
p	>0.005	>0.005	>0.005	>0.005

6.4. Rhythmic-gymnastics specific test data – Comparative analysis between initial and final testing

Table 10. Rhythmic-gymnastics specific test data for the two groups

Independent *t* test		**Ball**	**Rope**	**Scarves**	**Hoop**
Initial testing	t	2.81	4.17	1.72	4,.60
	p	<0.005	<0.001	<0.05	<0.001
Final testing	t	2.83	3.29	4.63	4.11
	p	<0.005	<0.001	<0.001	<0.001

The comparison between the two groups showed a statistical significance at p <0.005 in the ball test, and in the other tests, a statistical significance at p <0.001, except for the value obtained in the initial scarf test. These values are in favor of the experimental group, which denotes better development of psychomotor qualities, especially those targeted in our research: laterality and representation of body schema. (Table 10)

7. Conclusion

After the discussions based on the values obtained from the statistical calculations for the two groups included in our research, we can say that the hypothesis has been confirmed. Thus, the effectiveness of manipulative exercises in rhythmic gymnastics to improve body schema and laterality in pre-school children has been proven.

The development of psychomotor skills in pre-schoolers must be sustained and systematic, so that they do not get bored with the same exercises (Oltean, 2016). Manipulation of hand apparatus requiring special manual coordination (rope, scarves) leads to an improvement in laterality, but is also a prerequisite for improving fine motor skills, which is so necessary for the future in the school.

The hoop and the ball are hand apparatus that help to improve body schema representation through their shape and peculiarities. The ways of action (judiciously chosen and aimed at improving body schema) also determine the improvement of psychomotor qualities. We consider it appropriate to intervene on pre-

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school children and recommend the application of exercises for the manipulation of hand apparatus in all age groups.

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