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DEVELOPING AGILITY IN PRIMARY SCHOOL STUDENTS THROUGH JUMP ROPE EXERCISES

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Abstract

Physical education is an essential subject in the school curriculum and plays a vital role in the physical and mental development of students. A key component of physical education is cardio exercise, which can be effectively enhanced through jump rope activities.

Jump rope exercises are an excellent activity for improving coordination and aerobic capacity. They can be performed in a safe and controlled environment, such as a gymnasium or the schoolyard. Jump rope training requires minimal equipment and can be practiced by individuals of all ages and fitness levels.

Through this topic, positive aspects related to the actual development of individuals are highlighted, achieved through the systematic practice of specific means within the field of Physical Education and Sport. These means stand out due to the uniqueness and creativity shaped by each individual's agility, as well as by their inherent level of spectacle and dynamism.

In this study, we applied a series of tests to students of different genders, aiming to evaluate their initial and final levels of agility and to monitor their progress following the implementation of a training program based on specific jump rope exercises.

The results obtained were analyzed and interpreted in order to highlight the impact of this approach on the development of students' motor skills. The research methods used in this study included: the literature review method, the pedagogical observation method, the pedagogical experiment method, and the investigation method.

Introduction

Physical education plays a vital role in the development of children. It involves physical and sports-related activities that provide numerous benefits for children's health and overall development. There are several key aspects of physical

education in primary school that contribute to: physical and cognitive development, improved health and general well-being, development of social skills, enhanced concentration and academic performance, promotion of a healthy lifestyle, stress and energy management, as well as learning values and fair play.

Physical education at the primary level is crucial for children's growth and well-being. Through physical and sports activities, children develop their motor, physical, and mental abilities.

Agility is an essential motor quality that refers to a person's ability to perform precise, coordinated, and controlled movements. It involves good coordination, agility, and finesse in movement execution. Agility is essential in physical education and sports lessons, as well as in daily tasks that require dexterity and precision. It includes motor coordination, manual dexterity, agility, and balance.

There are several conditioning factors that influence the development of the motor skill of agility: Biological factors (age, genetics, neuromuscular development, overall health); Psychological factors (motivation, perseverance, focus and attention, self-confidence); Social factors (family environment, peer influence, access to facilities, culture and traditions); Pedagogical factors (quality of instruction, activity planning, feedback, training individualization); Environmental factors (climatic conditions, availability and quality of training spaces); Practical experience (engagement in various sports, specific training programs). [(6)]

By understanding and addressing these factors, physical education and sports programs can be optimized to enhance students' agility, thereby contributing to improved athletic performance and promoting an active and healthy lifestyle.

Agility, as a motor skill, presents specific characteristics when developed at the primary school level within physical education and sports. At this age, children are in a crucial phase of physical and psychomotor development, which requires a tailored approach in physical education to effectively stimulate agility. Some key characteristics include [(7)]:

1. Development of Coordination and Movement Control
   - Intersegmental coordination: Primary school children develop the ability to coordinate different parts of the body. Activities that involve synchronized movements of the arms and legs—such as jumping and running—are essential at this stage of development.
   - Eye-hand and eye-foot coordination: Games that involve catching, throwing, and striking objects help develop eye-limb coordination. Sports such as basketball, volleyball, and small-ball games are especially effective.
2. Precision and Fineness of Movement
   - Motor accuracy: Exercises that require precise movements, such as aiming with a ball or handling small objects, contribute to the development of fine motor control.

- Dexterity: Activities involving the use of hands to manipulate objects (e.g., building structures with small blocks or solving puzzles) are beneficial for enhancing manual dexterity.

3. Movement Adaptability
   - Adaptation to varied situations: Children need to be able to adjust their movements to different contexts and demands. Games that require quick changes of direction or responses to external stimuli, such as tag games, are excellent for this age group.
   - Flexibility in execution: Activities that allow variability and creativity in movement (e.g., role-playing games and improvisation) encourage motor flexibility and adaptability.
4. Energy Efficiency
   - Economy of movement: Learning efficient and economical movement patterns is important. Repetitive and correctly executed activities help optimize movements and reduce unnecessary effort.
   - Force control: Exercises that involve applying appropriate force, such as throwing a ball to a specific distance, are useful for teaching children how to regulate their strength.
5. Reaction Speed and Response Time
   - Quick reactions: Games and activities requiring rapid responses to stimuli (e.g., catching an unexpectedly thrown ball) help develop reaction speed.
   - Rapid decision-making: Team games and small competitions where children must make quick decisions (e.g., tag games) improve their capacity to make decisions while moving.
6. Concentration and Attention
   - Task focus: Activities that demand attention to detail and concentration, such as balance games or gymnastics exercises, are important for developing this skill.
   - Error reduction: Through repeated and correct practice of movements, children learn to minimize errors and improve overall performance.
7. Creativity in Movement
   - Innovation and variability: Agility in children can be stimulated through activities that encourage creativity and movement variability, such as building games and motor art activities.
   - Improvisation: The ability to improvise and adapt movements in real time, based on activity requirements, can be developed through games and activities that demand creative and quick solutions.
8. Motivation and Enjoyment of Play
   - Playful activities: Fun and engaging games are essential to maintain children's interest and motivation. Physical education should be perceived as an enjoyable and attractive activity.

- Rewards and encouragement: Providing positive feedback and rewards for progress stimulates motivation and builds children's self-confidence.

By addressing these characteristics, physical education programs at the primary school level can be optimized to develop children's agility, thereby improving coordination, adaptability, and movement efficiency. This not only enhances physical performance but also contributes to the healthy and balanced development of children.

Jump rope exercises are a physical activity and an excellent exercise for children, characterized as simple, accessible, and highly effective for developing agility. This gymnastic activity requires very good coordination between the feet, hands, and eyes, making it very beneficial for harmonious physical development.

"Gymnastic activities focus on physical self-education tendencies for harmonious formation and maintenance of fitness, with functions including physical and motor development, body construction, harmony and expressiveness, and vitality." (3)

The benefits of jump rope exercises in primary school include: physical development (improving cardiovascular endurance, increasing muscle strength, developing agility and balance), mental and emotional health (endorphin release, mood enhancement, reducing stress and anxiety levels), and cognitive skill improvement (stimulating concentration and attention, developing fine motor skills). (5)

Practicing jump rope gymnastics brings numerous benefits to an individual's physical and psychological health. "Health, viewed as both an ideal and a fundamental requirement of life, is a concern for every individual as well as society as a whole, with a multitude of factors contributing to its achievement: technical, economic, social, cultural, ecological, spiritual, etc." (1)

Materials and Methods

The physical education lesson represents the primary form of organization of the instructional-educational process and constitutes the unified pedagogical framework through which students acquire knowledge, skills, and habits that lead to the formation of specific capacities, competencies, and attitudes related to physical education and sport as a school subject. These differ significantly from lessons in other disciplines because both the student and the teacher engage in parallel physical and intellectual effort.

This research has the following objectives, which align with some of the knowledge, skills, and attitudes expected at the end of primary school for students participating in physical education classes:

- Learning rope jumping;

- Maintaining and improving health status according to the students' age and gender characteristics;
- Shaping personality traits that support social integration.

The following research methods were used [(2)]:

1. Bibliographic study method, which is absolutely necessary in any scientific investigation as it provides the foundation for the research. This foundation consists of reviewing specialized literature and perspectives of other experts in the fields of physical education and sport, pedagogy, and anatomy.
2. Pedagogical observation method, which is inevitable in educational activity and serves to identify student characteristics, information that is useful when selecting the means used during physical education lessons.
3. Pedagogical experiment method, borrowed from other sciences applied in the school environment, this method is used in designing works related to instructional methodology.
4. Investigation method, a form of inquiry that helps ascertain student performance, systematically organize data, and present it in tables to facilitate analysis and research.
5. Statistical-mathematical method, applied during the paper's development as a technique for calculating and interpreting data through the use of arithmetic mean, standard deviation, and coefficient of variation.
6. Graphical method, applied to visually represent the students' results during the experiment. For this, distinct colors were used in the charts to differentiate between initial and final testing data.

Four tests were applied in this research, extracted from the National Evaluation System for the gymnasium cycle, with scoring criteria differing based on the students' age and gender.

The literature review was conducted from October to November 2023 and was continuously maintained throughout the experiment and research process. The experiment administered to primary school students consisted of tests that are part of the national evaluation system specific to the primary cycle, including: two-foot rope jumps performed in place, endurance running, rope jumps with forward movement, and standing long jump.

The subjects of the research were primary school students from Dolheștii Mici Gymnasium School, which includes five primary classes. The control group was mixed, composed of both boys and girls, all fourth-grade students.

Nr . crt.	Denumirea testului	Unitatea de măsură
TESTUL 1	Sărituri la coardă pe două picioare, pe loc, timp de 30 secunde	Număr de repetări
TESTUL 2	Sărituri la coarda, cu deplasare	Metri
TESTUL 3	Alergare de durată 4'	Minute
TESTUL 4	Săritura în lungime de pe loc	Centimetri

Table 1: Tests applied

Results

Each exercise influences different aspects of the physical education lesson to a greater or lesser extent, and in a particular direction. Therefore, the effectiveness of each exercise depends on the extent to which it targets the factors that determine improved performance in the respective test. Consequently, in physical education lessons as well as in athletic training, the objective is not merely performing exercises, but to *"achieve the structural and functional adaptations specific to the respective competitive effort."* (10)

To successfully implement the experiment, a series of rope-based exercises were designed and carried out over the course of one month. These exercises were intended to bring all students to a similar baseline level, ensuring uniformity at the start of the evaluation process.

Nr crt.	Nume şi prenume	Clasa de proveniență	TESTUL 1 Sărituri la coardă pe două picioare, pe loc (30 secunde)	TESTUL 2 Sărituri la coardă, cu deplasare (metri)	TESTUL 3 Alergrare de durată (minute)	TESTUL 4 Săritura în lungime de pe loc (metri)
1.	A. I. D.	a IV- a	18	14	3,13	137
2.	A. M.	a IV- a	38	2,6	3,09	188
3.	B. D.	a IV- a	27	1,1	3,15	112
4.	B. B. N.	a IV- a	38	9	3,10	140
5.	P. V.	a IV- a	22	1,4	3,06	118
6.	M. I.	a IV- a	12	7	3,45	143
7.	P. N.	a IV- a	25	3	3,40	112
8.	U. I.	a IV- a	30	10	4,32	107
9.	H. R.	a IV- a	53	15	4,20	160
10.	B. A.	a IV- a	23	9	3,39	150
11.	D. D. C.	a IV- a	45	5	4,24	150
12.	Z. L.	a IV- a	20	5	3,31	130

Table 2: Initial testing

PARAMETRII	TESTUL 1 Sărituri la coardă pe două picioare, pe loc (secunde)	TESTUL 2 Sărituri la coardă, cu deplasare (metri)	TESTUL 3 Alergare de durată (minute)	TESTUL 4 Săritura în lungime de pe loc (metri)
X	29,25	6,84	3,48	137,25
Abaterea standard	12,02	4,66	0,48	23,49
C.V. (%)	41%	68%	13%	17%

Table 3: Parameters

Nr crt.	Nume şi prenume	Clasa de proveniență	TESTUL 1 Sărituri la coardă pe două picioare, pe loc (30 secunde)	TESTUL 2 Sărituri la coardă, cu deplasare (metri)	TESTUL 3 Alergare de durată (minute)	TESTUL 4 Săritura în lungime de pe loc (metri)
1.	A. I. D.	a IV- a	21	15	3, 14	138
2.	A. M.	a IV- a	39	4,1	3, 12	189
3.	B. D.	a IV- a	30	1,9	3, 37	123
4.	B. B. N.	a IV- a	39	10,7	3, 35	144
5.	P. V.	a IV- a	24	2,4	3, 40	120
6.	M. I.	a IV- a	15	8,4	3, 48	146
7.	P. N.	a IV- a	29	5	3, 49	118
8.	U. I.	a IV- a	33	10,5	4, 33	112
9.	H. R.	a IV- a	54	17	4, 40	163
10.	B. A.	a IV- a	25	9,4	3, 49	155
11.	D. D. C.	a IV- a	46	5,5	4, 25	152
12.	Z. L.	a IV- a	23	7	3, 35	134

Table 4: Final testing

PARAMETRII	TESTUL 1 Sărituri la coardă pe două picioare, pe loc (30 secunde)	TESTUL 2 Sărituri la coardă, cu deplasare (metri)	TESTUL 3 Alergare de durată (minute)	TESTUL 4 Săritura în lungime de pe loc (metri)
X	31,5	8,07	3,24	141,16
Abaterea standard	11,25	4,72	0,47	22,01
C.V. (%)	35%	58%	13%	15%

Table 5: Parameters

Probe	Testul 1	Testul 2	Testul 3	Testul 4
Testare inițială	29,25	6,84	3,48	137,25
Testare finală	31,5	8,07	3,24	141,16

Table 6: Comparison between initial testing and final testing

According to Table no. 6, the students in the experimental group showed a visible improvement in the final assessment compared to the initial one. Specifically:

- Test 1, which evaluated **stationary rope jumps on two feet**, indicated that the subjects performed a higher number of repetitions, with an average increase of 2.25 jumps in the final test;
- Test 2, involving **rope jumping with forward movement**, showed that students managed to achieve an average displacement 1.23 meters greater than in the initial evaluation;
- Test 3, which assessed endurance through a **long-distance running test**, recorded the smallest improvement, with an average gain of only 0.24 seconds in the final test;
- Test 4, evaluating **standing long jump**, revealed a significant improvement compared to the initial test, with students achieving an average increase of 3.91 meters.

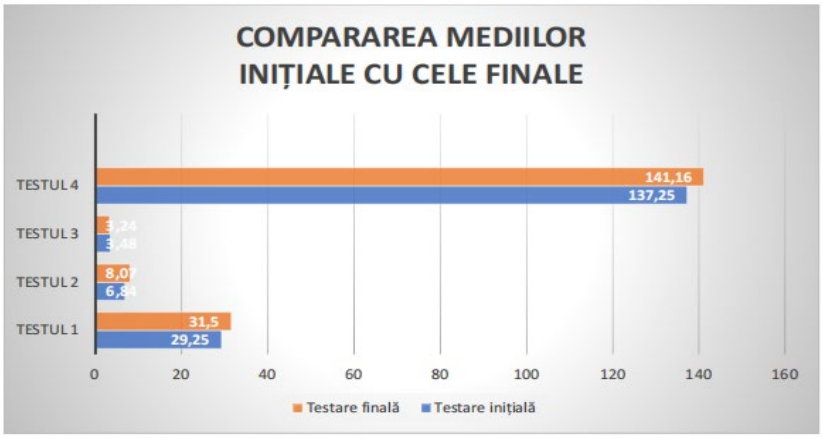

Figure 1. Comparison of initial and final averages

Proba	Testul 1	Testul 2	Testul 3	Testul 4
Testare intială	41%	68%	13%	17%
Testare finală	35%	58%	13%	15%

Table 7: Comparison of the initial and final variability coefficient

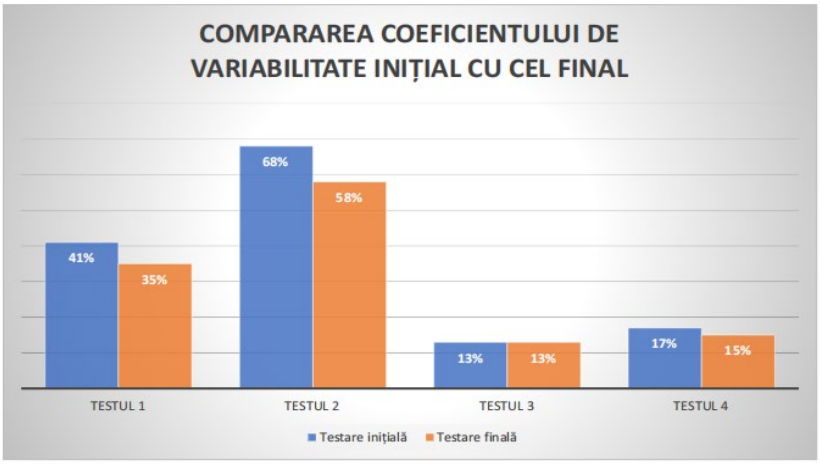

Figure 2. Comparison of the initial and final variability coefficient

Conclusions

Jump rope activities enjoy widespread popularity among students from a very young age, which has contributed to the continuous advancement of physical education theory, the evolution of teaching methodology, and the improvement of performance levels.

Rope jumping, as a form of rhythmic gymnastics, offers a wide range of applications and represents a highly engaging and enjoyable way to train and improve overall health. "Jumping rope has a beneficial influence on the cardiovascular system, contributes to the development of strength, motor rhythm, coordination, and control over the entire moving body. Recognized as a method with complex influence on the body, it is widely used both in school physical education and in athletic training." (8)

This study highlights that the lessons specifically aimed at developing coordinative capacities such as rhythm, orientation, and balance have been successful. Students achieved very good results in the final tests, with noticeable progress compared to the initial assessments. These positive results are attributed to

the consistent effort put in by the experimental group during the training period, as the students were highly motivated to complete the tasks and improve their performance.

Consequently, the aims and objectives of the study were achieved, confirming the hypothesis that accelerated progress can be attained through both individual and group training, as well as through physical education classes that use age-appropriate methods tailored to the students' level of preparedness and developmental characteristics.

The objectives concerning the teaching of rope jumping in primary school were met and resulted in the correct acquisition of execution techniques. The methods and tools chosen for the experiment proved effective, as evidenced by the progress observed in the final test results and graphically represented outcomes.

In conclusion, this study makes an important contribution to understanding how physical activities—especially rope jumping—can be utilized in the school environment to achieve students' motor development goals. The results obtained support continued research in this area and a deeper exploration of the long-term benefits of an integrated approach to physical education.

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