# Basic Motor Skills in Learning Mini-Athletics in Children 4-6 Years of Age from Zone 1 of Ecuador

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## Abstract

The objective of the research project is to determine the incidence of the variables of "Basic motor skills in the learning of mini-athletics in children 4-6 years old, the research is methodologically based under a non-experimental design, by correlational and cutting scope cross-sectional, taken a sample of 300 children distributed in male and female genders of the zonal coordination 1 (Carchi, Esmeraldas, Imbabura and Sucumbíos) The instrument to evaluate the first study variable was the "retest" test validated and considered In order to evaluate the basic motor skills, as well as for the second variable, an observation sheet was used to evaluate the ability of mini-athletics through the A-B-C- of the basics of the race. The systematic process in the application of the technical fundamentals of mini-athletics, allowed obtaining the results that show the highest percentage of the study sample in relation to the basic motor skill levels were at a normal level and in the same way in the execution. of the ability of the basic movements of mini-athletics as a base and training sport to use it in sports initiation, reaching the conclusion of being able to determine that there is a positive correlation between the study variables, accepting the research hypothesis that affirms that motor skills Basic skills affect the learning of the ability to execute movements in mini-athletics in zone 1 of Ecuador.

**Keywords:** Basic motor skills, mini-athletics, locomotion, training.

## 1. Introduction

The processes of sports training, carried out in different parts of the world, are characterized by the selection of potential talents and the consequent methodology applied to choose a possible athlete with the best conditions for successful practice of this type of activity. In this process, the

basic motor skills, which according to (Fernández García, 2007) are essential before delving into learning specific skills like running, play a crucial role. These basic skills, along with their main characteristic of locomotion, and the development of neuromuscular coordination are vital for the proper development of a student's motor skills, with a focus on movement. (p. 15)

This quote demonstrates that strategically applying motor skills in a natural and progressive manner has an impact as a foundation for sports training and initiation.

The characteristics of basic motor processes should be directed towards the multilateral development of multidisciplinary and multifaceted displacements, as emphasized by (Bascon, 2010) in the research on basic motor skills:

They are a set of various fundamental movements and certain motor actions that originate from human evolution where specific motor patterns emerge. They support the improvement of perceptual-motor capacities, evolving over time and playing a crucial role in the development of a student's motor skills. (p. 2)

Considering basic running skills as fundamental motor skills of humans, there are movement patterns in motor development which are important for technique strengthening, especially in the A-B-C movements of running, also known as the foundation of athletics' basic movements.

In a research article by Jiménez García (2016) titled "Methodology for the development of basic motor skills that promotes the comprehensive educational attention process for autistic students in the context of equine therapy," the author states:

Basic motor skills are a series of actions that emerge in the evolution of the human being, such as running, jumping, walking, rolling, throwing, and climbing, among others. They start developing from early childhood and progress to perfection. They combine to perform various academic tasks and household activities. This is a product of a motor learning process common to all individuals, allowing survival, communication, health preservation, work, and serving as a fundamental means in the development of sports motor skills.

The importance of basic motor skills in children is evident in the article "Motor learning in basic motor skills: coordination and balance," which emphasizes that human behavior is modified and adapted through experiences during training. Basic motor skills play a fundamental role because they are motor acts that develop naturally and constitute the basic sensorimotor structure, a foundation for other motor actions enabling locomotion, manipulation, stability, or balance (Cidoncha Falcón & Díaz Rivero, 2010).

In conclusion, basic motor skills are the acquisition of motor patterns that start from the natural motor skills of the human being and are later used in different quantitative and qualitative conditions. This allows the development of new motor learning, providing the child with more possibilities to explore responses to motor skills.

In line with the sports training process, basic coordinative skills, according to Gilb (1975) in his book titled "Games for Schoolchildren," mentions that classroom games are rarely as active as those played in the playgrounds, but they can be fun and provide creativity during breaks. Team games are considered fundamental for young children, as they require minimal organization,

limited skills, and adaptability to all children from first to fourth grades. The purpose of these games is to develop their skills, encourage them to work together toward a common goal, and achieve success collectively. Selecting relay games involving intense muscular activity and quick movements which ensure everybody's interest until their turn comes. In conclusion, games for schoolchildren should be interactive and interesting, not only motivating learning but also enjoying the entire activity, fostering integral development in the future.

In the same vein as the principles of sports training, Grisales (2018) in his research "Art therapy and play: a ludic-pedagogical project for the development of motor and social skills in early childhood" stated:

Currently, students who are more active in activities like art and cooperative play tend to develop their basic motor and social skills more easily. They can express and identify feelings and emotions, making movement a central axis in their learning. On the other hand, many schoolchildren spend their free time playing video games or staying indoors due to insecurity, which can adversely affect fine and gross motor skills and cooperation in recreational activities. Therefore, parents and students need to engage in daily outdoor activities with other children or adults involving painting, interaction, and fine-gross motor skills exercises to keep them active and healthy, breaking away from sedentary habits and excessive use of technology.

Considering the impact of teaching and learning in sports initiation, Quiroz Varela, Borja Peña, Hernández Lopera, & Cuervo Zapata (2023) in their research article titled "Effect of a didactic unit based on traditional games on basic locomotion motor skills" state:

Games or playful activities selected by educators should have characteristics that favor both motor and cognitive aspects. It is essential to consider the internal logic and interrelation of parts to engage students actively. The teacher should be prepared to present a variety of creative resources, considering the students' initial diagnosis, equipment suitable for their needs and interests, facilitating stimuli for continuous adaptation. Children should exercise both motor and cognitive abilities synchronously to understand the world around them.

The aforementioned background allows us to observe various perspectives that strengthen the study topic and discover important guidelines for the development of this work. Depending on the publications, a significance within the learning process through playful methods is demonstrated, along with the child's skill development within the educational environment. This will be effective with the support of appropriate pedagogy used by the Physical Education teacher.

Motor skills consider movement as a means of interacting with others, enabling effective communication and expression. It is a fundamental pillar in the harmonious development of a child's personality, integrating thoughts, emotions, and motor skills through socialization (Alonso Álvarez & Pazos Couto, 2020).

Therefore, when talking about motor skills, we refer to the complete expression of the human being in its sensible existence. It extends beyond leisure activities to sports, games, or activities that enhance our health. Considering that humans can manifest their corporeality and motor skills

intentionally or consciously, it allows them to express their feelings and communicate thoughts in any given environment (Pazos Couto & Trigo, 2014).

Similarly, we understand that motor skills play a crucial role in learning, as the child constructs their identity in sports training processes, fostering emotional and psychological maturity. This allows the establishment of affective relationships, personal autonomy, and eventual integration into their context through various forms of communication. It is essential to note that motor skills are indispensable in carrying out actions, such as working methods in the school cycle, content in each area, and the method of imparting classes. The interaction of the student makes them a dominant and active being in all aspects of education. For motor education, it serves as a complete means that unites action with consciousness, allowing the child to explore his environment and acquire information about the origin of preservation, meaning, and how the brain organizes information (Viciana Garófano & Cano Guirado, 2017).

Analyzing from the perspective of sports training, motor skills not only allow the motor development of children but also, through them, children express and communicate their emotions with movement and thoughts. It provides the necessary knowledge according to the school cycle, depending on the region. Movement is an essential pillar in the teaching process; it is also a motivating agent capable of propelling children into action. Combined with play, it holds an important place in the daily lives of children. It can be added that an education that does not consider a child's motor skills as a fundamental tool will not meet the realistic condition of the child.

Regarding the aforementioned topic, there are two types of motor skills, which are detailed below:

Fine Motor Skills. These are voluntary movements that occur precisely, involving small muscle groups in the face, hands, and feet. It requires great coordination between what our eyes see and what our hands touch. This is essential for the full expression of intelligence, as it is crucial for experimenting with learning about the surrounding environment which allows skills to unfold progressively in an orderly manner (Vázquez, Palchisaca, Mediavilla, & Jarrín, 2020).

Gross Motor Skills. It is the capacity that stimulates body movements, allowing children to change their body position and control their strength. Additionally, gross motor skills are considered an ability that children gradually acquire to move all the muscles of the body harmoniously. It gradually helps maintain the balance of the head, trunk, and limbs, enabling activities like sitting, crawling, standing, moving, walking, and running in a defined space (Morán, 2017).

Considering that games are a didactic tool and motor skills are the means through which a child develops comprehensively, we can emphasize that they are always intertwined from infancy. Their priority is to entertain, have fun, and learn from each action they perform or experience in their lives. In the same way, it not only allows the development of their skills but also teaches them to move their muscles in a coordinated, balanced, agile, strong, and fast manner. Through learning with the Physical Education teacher, they gradually refine their previous knowledge with new information.

Athletics is considered a high-performance sport, composed of various disciplines with the goal of enhancing individuals' sports abilities. To achieve this, teachers should provide attractive, accessible, and instructive athletics (Martínez and Medina, 2022). Within athletics, there are disciplines such as:

- Throws
- Combined events
- Racewalking

Brazo (2019) states that athletics is a sport where participants engage in actions such as running, jumping, or throwing. These sports activities test and enhance participants' speed. Athletics can be developed both individually and in groups.

Mini Athletics. Considered a sport exclusively for children, it aims to keep children more active, capable of performing different basic and varied movements. The fundamental principle of mini athletics is versatility, ensuring that all children can participate in different events (Martínez and Medina, 2022).

According to Gallardo (2018), games in mini athletics allow:

Improvement of children's learning, encourage them to be more active, and experiment with different movements, both basic and varied. Here, children can be more agile and fast in developing various activities. This program, known as mini athletics, aims to increase children's adventurous spirit and develop coordinative capacities (p.21).

Mini athletics can be developed in three age groups or categories:

- The first group consists of children aged 7 to 8 years.
- The second group includes children aged 9 and 10 years.
- Finally, the third group consists of children aged 11 and 12 years (Calapiña, 2023).

Objectives

According to Martínez and Medina (2022), mini athletics has two key objectives:

- Develop individual athletics practiced by everyone from an early age.
- Provide equal opportunities to all children to prepare for their future.

Requirements for Mini Athletics

To develop mini athletics properly and achieve the best results from its application, it must meet the following requirements:

- Attractive: Develop activities in attractive places that demonstrate creativity and motivation for their development.

- Accessible: Focus on the active participation of all children and make it easy for them to perform these activities.
- Instructive: Focus on fulfilling each of the requirements of the activities, following established norms and regulations (Martínez and Medina, 2022)

## 2. Materials and Methods

Research Design:

The present research corresponds to a quantitative approach with a basic purpose and a non-experimental design. It has an explanatory scope, and adopts a cross-sectional design where a synthetic method was applied for its theoretical foundation. The hypothetic-deductive method was also used for obtaining results, and a comparative method for achieving the objectives.

The quantitative approach is described as "a quantitative technique" that is based on a physical measurement scale that allows quantifying a particular characteristic of an evaluated entity in an absolute manner" (Domingo, 1990, p. 60).

Cross-Sectional Design:

The best design depends fundamentally on the research question, the stated objectives, and the hypothesis to be tested. Key aspects related to the type of questions answered, biases, sample size, and analysis plan that should be considered a priori in the selection of the cross-sectional design are presented (Milena Rodríguez, 2018).

Synthetic Method:

The objective of the research was to verify to what extent the use of methodological strategies for reading and writing contributed to the improvement of the teaching-learning process, employing documentary or bibliographic methodology. Additionally, a method aimed at examining the reality of the problem was used as well. Regarding the acquisition of bibliographic information, evidence was obtained that the use of methodological tools favors the development of basic motor skills which allow the development and personal interactions in all areas where the student is involved (Quiroz-Albán, 2021).

Hypothetic-Deductive Method:

The possibility of using the hypothetic-deductive method as a tool to contribute basic motor skills in a learning process about running ability is proposed until development and evolution can be evidenced (Pérez Talia, 2018).

Comparative Method:

The origin of the research for the analysis of basic motor skills gives rise to the exhaustive development of the methodological approach that is carried out. Some results of the constructed work is also be presented, and finally, some reflections on the use of this method for the analysis of running ability are developed (García, 2019).

Materials:

- Balls
- Hurdles
- Weighing machine
- Whistle
- Cones
- Stopwatch
- Courts of the Hispano America High School
- Collective score sheets

Bibliographic Resources:

Books, scientific articles based on the research topic, and reliable sources such as REDALYC, GOOGLE SCHOLAR, SCIELO, and LATINDEX.

Human Resources:

- Researchers
- District Director of Education
- Authorities of educational units in Carchi
- Teachers from educational units in León Rúales and Sucre
- President of the Sports Federation of Carchi
- Children from zone N 1

Table 1. Technological Resources

| Technological Resources |
|---|
| Computer |
| Cell phone |
| SPSS software |

## 3. Results and Discussion

Analysis and Discussion of Results:

In this chapter, the obtained results are presented based on the research objectives outlined and the application of written research instruments analyzed within the research methodology chapter.

Characterization of the Study Sample:

The characterization of the study sample was carried out based on the variables of gender, weight, age, and height of the study sample.

Table 2: Characterization of the Study Sample

| Variable | Male (n=200 – 60%) | | Female (n=100 – 40%) | | P | Total (n=300 - 100%) | |
|---|---|---|---|---|---|---|---|
| | M | ±DS | M | ±DS | | M | ±DS |
| Age (years) | 5 | 0,26 | 5 | 0,22 | 0,836* | 8,94 | 0,24 |
| Weigh (kg) | 28 | 6,77 | 29 | 6,73 | 0,198* | 32,03 | 6,80 |
| Height (m) | 1,15 | 0,07 | 1,18 | 0,05 | 0,855* | 1,32 | 0,06 |

Note. SPSS Statistical Analysis: Mean values (M) with their standard deviations (±SD); Significant differences at a P level>0.05(*)

The analysis of the characterization of the study sample determined that the majority of it was within the male group, being higher by 10% compared to the female group. Regarding the age variable, the female group had a higher mean value than the male group, being greater by 0.02 years. Concerning the weight variable, it showed a higher mean value of 2.85. For the height variable, it presented a value of 0.01. In all the variables studied, no statistically significant differences were evident with significance values at a level of P≥ 0.05, demonstrating statistical equality between the two groups.

Result of Diagnosis of the Level of Basic Motor Skills in Children Aged 4-6:

The diagnosis of the level of basic motor skills of the study sample was carried out by applying the "retest" test, which assesses locomotion skills and manipulation skills based on different tests.

Table 3. Locomotion Skill

| Basic motor skills | N | Minimum | Máximum | Mean | Stándar deviation |
|---|---|---|---|---|---|
| Locomotion | 300 | 120,00 | 180,00 | 160,89 | ±2,32 |
| Handling | | 170,00 | 130,00 | 160,00 | ±4,12 |
| Basic motor skills | | 190,00 | 210,00 | 320,89 | ±4,95 |

Table 4 Results in locomotion ability

| Locomotion skills | N | Mínimum | Máximum | Mean | Standar deviation |
|---|---|---|---|---|---|
| March | 300 | 1 | 5 | 3,00 | ±0,77 |
| Running | | 2 | 5 | 3,40 | ±0,81 |
| Horizontal jump with feet together | | 1 | 5 | 3,31 | ±0,99 |
| Jump on right foot | | 1 | 5 | 3,83 | ±1,01 |
| Jump on left foot | | 2 | 5 | 3,34 | ±0,91 |

The analysis of the scores obtained in locomotion skills determined that the test of jumping on the right foot and running obtained the highest average scores, and the test of marching and jumping with feet together were the ones that obtained the lowest points.

Manipulation skill

The handling skills were determined that the throwing test with the right hand had the highest average score and the throwing test with two hands had the lowest score. In relation to the kicking tests, the kicking test with the right foot was the one that obtained the lowest score and in the reception tests, the kicking test with the left foot also obtained the lowest score.

The scores for individual tests of the different basic skills assessed allowed us to obtain global results by skill and in general as the development of basic motor skills:

The calculation of the general score of basic motor skills according to the instrument applied allowed the study sample to be categorized into levels of development of the skills in question:

Table 5 General results by type of basic motor skill

| Handling skills | N | Minimum | Maximum | Mean | Standar Deviation |
|---|---|---|---|---|---|
| Throwing with two hands | | 0 | 5 | 2,71 | ±1,25 |
| Right Hand Throw | | 2 | 5 | 3,09 | ±0,85 |
| Throwing with the left hand | | 1 | 5 | 2,83 | ±1,04 |
| Catch with both hands | 300 | 1 | 5 | 2,54 | ±0,98 |
| Kick with right foot | | 1 | 5 | 2,60 | ±1,01 |
| Kick with left foot | | 1 | 5 | 2,94 | ±0,94 |
| Reception with the right foot | | 1 | 4 | 2,43 | ±0,88 |
| Reception with the left foot | | 0 | 4 | 1,86 | ±1,21 |

The categorization and levels of tests of basic motor skills determined that half of the study sample was at a good level and half of the sample was at a regular level.

The calculation of the general score of basic motor skills according to the instrument applied allowed the study sample to be categorized into levels of development of the skills in question:

Levels of development of basic motor skills

Table 6 Levels of development of basic motor skills

| Level | Frequency | Percentage |
|---|---|---|
| Regular | 150 | 50% |
| Good | 150 | 50% |
| Total | 300 | 100% |

The categorization and levels of tests of basic motor skills determined that half of the study sample was at a good level and half of the sample was at a regular level.

Evaluation results of the learning level of mini athletics skill

The learning evaluation of the mini athletics skill was carried out by applying the observation sheet in which the compliance or not of different technical parameters could be observed:

The calculation of the general score of basic motor skills according to the instrument applied allowed the study sample to be categorized into levels of development of the skills in question.

The learning evaluation of the mini athletics skill was carried out by applying the observation sheet in which the compliance or not of different technical parameters could be observed:

The values with the highest average score were evaluated: when pushing off, the leg is completely stretched, representing and those with the lowest average score were evaluated: when placing the foot, the knee is somewhat flexed but then it is completely stretched, the strides are wide.

Based on the scores obtained by evaluated technical parameters, the overall career skill learning score was calculated:

Career Skill Learning Assessment Results

Table 7 Evaluation results of career skill learning

| Technical parameters of career skill | N | Minimum | Maximum | Mean | Standar deviation |
|---|---|---|---|---|---|
| When pushing off, stretch your leg completely | | 1 | 3 | 2,23 | ±0,69 |
| Bring the arms at a 90 degree angle | | 1 | 3 | 1,80 | ±0,58 |
| Once the impulse is finished, the heel rises towards the gluteus | | 1 | 3 | 1,83 | ±0,75 |
| raise the knees when performing the stride | 300 | 1 | 3 | 1,80 | ±0,72 |
| Support is made with the front part of the foot and not with the heel | | 1 | 3 | 1,89 | ±0,63 |
| when putting the foot down, the knee is slightly bent but then fully extended. | | 1 | 3 | 1,57 | ±0,61 |
| The strides are wide | | 1 | 3 | 1,57 | ±0,61 |

The calculated score allowed the study sample to be categorized based on the scales constructed for its effect, into levels of learning the skill of mini athletics.

Learning levels of mini athletics skill

Tabla 8 Resultados de evaluación del aprendizaje de la habilidad de la carrera

| | N | Minimum | Maximum | Mean | Standar deviation |
|---|---|---|---|---|---|
| Career Skill Learning Score | 300 | 180 | 120 | 130 | ±3,12 |

The calculated score allowed the study sample to be categorized based on the nudes constructed for its effect, into levels of learning the skill of mini athletics.

Table 9 Levels of learning of the mini athletics skill

| Level | Frequency | Percentage |
|---|---|---|
| Very low | 95 | 31,66% |
| Low | 60 | 20% |
| Regular | 75 | 25% |
| Well | 40 | 13,33% |
| Very good | 30 | 10% |
| Total | 300 | 100% |

Results of analysis of the relationship between the level of basic motor skills and the level of learning the skill of mini athletics

The analysis of the relationship between the level of basic motor skills and the level of learning the mini athletics skill in the study sample was carried out through a cross table between the levels under study:

Cross analyzes between the level of basic motor skills and the level of learning the mini athletics skill.

Table 10 Cross analyzes between the level of basic motor skills and the level of learning of the running skill.

| Level of basic motor skills | Levels of learning of the mini athletics skill | | | | | Total |
|---|---|---|---|---|---|---|
| | Very low | Low | Regular | Good | Very good | |
| Regular | 55 | 45 | 40 | 35 | 10 | 185 |
| Good | 40 | 15 | 35 | 5 | 20 | 115 |
| Total | 95 | 60 | 75 | 40 | 30 | 300 |

The analysis of the relationship between the level of basic motor skills and the learning level of the running skill determined that: at a regular level of basic motor skills there were 185 members of the study sample who were distributed in relation to the learning level the running skill at the following levels; 55 at a very low level, 45 at a low level, average at a level 40 at a good level, and 10 at a very good level.

With a good level of basic motor skills, there were a total of 115 members of the study sample who, in relation to the learning level of the running skill, were: 40 at a very low level, 15 at a low level, 35 at a fair level, 5 at a good level, and 20 at a very good level.

## 4. Conclusions

• The level of basic motor skills was diagnosed in children aged 4-6 years from zone 1 of Ecuador, showing that the highest percentage of the study sample was at a good level (115 children – 38.33%), followed by a group with one less member at a regular level (185 – 61.66%), the tests in which they obtained the highest score in locomotion were the jumping with the right foot, while in the handling parameter the throwing with the right hand was also the highest.

• The learning level of the running skills in middle school general education students was evaluated, showing that the highest percentage of the study sample was at a very low level (95 children - 31.66%), at a low level. (60 children - 20%), at a fair level (75 children - 25%), at a good level (40 students - 13.3%) and at a very good level (30 students - 10%).

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