

Translated from the original in spanish

Original article

## Teaching aid for the development of basic motor skills in children in their sixth year of life

### Medio de enseñanza para el desarrollo de habilidades motrices básicas en niños de sexto año de vida

### Meio de ensino para o desenvolvimento das habilidades motoras básicas das crianças no sexto ano de vida

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## ABSTRACT

Education is the process that aims to form the human being in an integral way; this means developing to the maximum the motor, cognitive, personal and social potentialities of individuals in order to be able to fully exercise all the faculties in all areas of life. The aim was to develop basic motor skills in children in the sixth year of life or pre-school age by creating a teaching environment, based on an experience with children in the sixth year of life who attend The Day care centers in La Isla de la Juventud, as well as the formation of habits, basic motor skills and their treatment in the pedagogical process of Physical Education. Research methods were used at the theoretical level: documentary, historical and logical analysis, analysis and synthesis and hypothetical deductive. From the empirical level: survey of educators, observation, interview of educators and the statistical method. The sample was made up of 50 children in the sixth year of life of the "Alegres Mineritos" Day care centers (La Demajagua town), "Edad de Oro" and "Mambisito" (Nueva Gerona). The contribution is given in the development of a teaching aid that allows a more objective control that contributes to the development of basic motor skills (walking, running, jumping and throwing); supporting the other motor skills that give fulfillment to the physical, psychological and intellectual development of the child; it provides a scale of values that can be used in a simple and economic way by the educators. The Multipro teaching aid for the development of basic motor skills in children in the sixth



year of life has demonstrated that it not only contributes to the improvement of the development of basic motor skills, but also to the development of creativity through the solution of real situations

**Keywords:** teaching aids; game; basic motor skills; physical education.

## RESUMEN

La educación es el proceso que tiene por finalidad formar de manera integral al ser humano; esto significa desarrollar al máximo las potencialidades motrices, cognitivas, personales y sociales de los individuos para poder ejercer a plenitud todas las facultades en todos los ámbitos de la vida. El objetivo consistió en desarrollar las habilidades motrices básicas en el niño de sexto año de vida o edad preescolar mediante la creación de un medio de enseñanza, a partir de una experiencia constatada con niños del sexto año de vida que asisten a Círculos Infantiles de la Isla de la Juventud, así como la formación de hábitos, habilidades motrices básicas y su tratamiento en el proceso pedagógico de la Educación Física. Se utilizaron los métodos de investigación del nivel teórico como el análisis documental, histórico y lógico, análisis y síntesis e hipotético deductivo; del nivel empírico, la encuesta a educadoras, la observación, la entrevista a las educadoras y el método estadístico. La muestra estuvo constituida por 50 niños, del sexto año de vida de los Círculos Infantiles "Alegres Mineritos" (poblado La Demajagua), "Edad de Oro" y "Mambisito" (Nueva Gerona). Se conformó una muestra de 44 niños que representa el 88 % de dicha población. El aporte está dado en la elaboración de un medio de enseñanza que posibilite un control más objetivo y que contribuya al desarrollo de las habilidades motrices básicas (caminar, correr, saltar y lanzar); sustenta además a las demás habilidades motrices que dan cumplimiento al desarrollo físico, psíquico e intelectual del niño; proporciona una escala valorativa que pueda ser utilizada de manera sencilla y económica por las educadoras. El medio *Multipro* para el desarrollo de habilidades motrices básicas en niños del sexto año de vida ha demostrado que no solo contribuye al mejoramiento del desarrollo de las habilidades motrices básicas, sino que, contribuye al desarrollo de la creatividad mediante la solución de situaciones reales.

**Palabras clave:** Medio de enseñanza; juego; habilidades motrices básicas; Educación Física.

## RESUMO

A educação é o processo que visa formar o ser humano de forma integral; isto significa desenvolver ao máximo as potencialidades motoras, cognitivas, pessoais e sociais dos indivíduos, a fim de poder exercer plenamente todas as facultades em todas as áreas da vida. O objectivo era desenvolver capacidades motoras básicas nas crianças no sexto ano de vida ou em idade pré-escolar, criando um ambiente de ensino, baseado numa experiência com crianças no sexto ano de vida que frequentam Círculos Infantis na Ilha da Juventude, bem como a formação de hábitos, capacidades motoras básicas e o seu tratamento no processo pedagógico da Educação Física. Foram utilizados métodos de investigação a nível teórico: análise documental, histórica e lógica, análise e síntese e hipotética dedução. A partir do nível empírico: inquérito aos educadores, observação, entrevista aos educadores e o método estatístico. A amostra foi composta por 50 crianças no sexto ano de vida dos Círculos Infantis "Alegres Mineritos" (a localidade de La Demajagua), "Edad de Oro" e "Mambisito" (Nueva Gerona). A contribuição é dada no desenvolvimento de um meio de ensino que permite um controlo mais objectivo que contribua para o desenvolvimento das capacidades motoras básicas (caminhar, correr, saltar e



lançar); apoiar as outras habilidades motoras que dão realização ao desenvolvimento físico, psicológico e intelectual da criança; fornece uma escala de valores que pode ser utilizada de uma forma simples e económica pelos educadores. O meio Multipro para o desenvolvimento das habilidades motoras básicas nas crianças no sexto ano de vida demonstrou que não só contribui para a melhoria do desenvolvimento das habilidades motoras básicas, mas também para o desenvolvimento da criatividade através da solução de situações reais.

**Palavras-chave:** meio de ensino-aprendizagem; jogo; habilidades motoras básicas; Educação Física.

## INTRODUCTION

Education is the process that aims to form the human being in an integral way; this means developing to the maximum the motor, cognitive, personal and social potentialities of individuals in order to be able to fully exercise all the faculties in all areas of life. In the search for this philosophical principle, physical education (PE in Spanish) plays a major role: educating in, from and for motor skills (Abete, V. 2015).

It is through motor skills that children develop in an integral manner, helping them to discover their own capacities, to develop their motor, personal and social skills (Gutiérrez *et al.*, 2017).

Ponce de León (2009), like the previous authors, defends that motor education has to be essential in the educational field because movement is a primary need or motivation in children with adequate development and growth.

In such a way, it is understandable that Nista-Piccolo (2015) defends that an education that does not take into account the child's motricity is an education that does not contemplate the child's real condition, since it intends to transform the child quickly into a productive being, when, truly, this one exercises his motricity as he discovers the environment that surrounds him.

Motor development, understood in its broadest sense, is a fundamental area for the overall development of the individual and this cannot be conceived without the improvement and mastery of basic motor skills (HMB in Spanish) (Thelen, 2000; Gallahue and Ozmun, 2012).

The child from 0 to 6 years old, in the context of Physical Education (PE), finds in his body and in movement the main ways that allow him to get in contact with the reality that surrounds him, thus acquiring the first knowledge of the world in which he grows and develops integrally in its physical, social and cognitive aspects, that is, through the development of motor skills (López & López, 2012), (Gil, P., Contreras, O., Gómez V, S., & Gómez B, I. (2008). This is the stage of HMB acquisition: walking, running, jumping, climbing, quadrupedal, reptilian, throwing and capturing.

In the strictly school environment, the authors agree with Zaldivar, N. (2014). Pons, R. and Arufe, V. (2016) when they point out that one of the fundamental objectives of the PE is the development of motor skills. This notion of competence is closely linked to the mastery and control of HMB, especially at the earliest ages. The evaluation in the area of PE, at the initial level, makes us reflect on: what, why and for what is taught (Astin, 2012), hence it is necessary and important to assess, which are the skills that children already possess and which are the fruit of intentional



teaching planned at school, which will help to clarify and to bear in mind what content was taught and what will be evaluated.

In the case of Physical Education, where the content is mainly aimed at the development of physical abilities and HMB, the role of the teaching aids for the construction of knowledge, the development of habits, skills and capacities is so significant that it could be assured that without them it would not be possible to achieve the objectives set by this programme in the Day care centers (Morales, Ramírez and Lozano, 2014). The teaching aids act as "material support for the methods", making it possible to materialize the different routes selected by the teacher for the presentation of the teaching material.

Colors and design also have great significance in its construction, mainly at this age, as they allow the child to be more motivated and interested in it. Their use within the process must be in accordance with the age and type of teaching, so that the transmission of the message serves to learn to control what the child has learned.

In the preschool Physical Education programme, guidance is given on what activities to do and how to do them, based on the traditional means that exist (Swedish drawer, gymnastic bench, balls, hoops, etc.), but no reference is made to other means that can be used within the fundamental activity that the child performs: play.

In Early Childhood Education, Hernández-Martínez and González-Martí (2013), state that teachers consider play to be the best means of facilitating and encouraging learning, and therefore believe that play should act as the organizing axis of school work due to its motivating and pleasurable capacity, the security of activation (movement) it offers and its organizational flexibility. In other words, play is considered to be "a fundamental physical and mental activity, which favours the development of the whole person, since it is a means used by children to reproduce their relational experiences with the environment".

In the Day care centers in La Isla de la Juventud, teaching aids created by the educators have always been used. This trend has also been affected over the years, so that the teaching means necessary for the development of Physical Education do not exist and, consequently, it affects the evolution of the HMB of children in the sixth year of life. There is also insufficient creativity in the development of these. All of the above was confirmed in the observations made, the results of which are reflected in this article.

The aim of this research is to develop basic motor skills in children in the sixth year of life or pre-school age by creating a teaching environment, based on an experience with children in the sixth year of life who attend Day care centers in La Isla de la Juventud, as well as the formation of habits, basic motor skills and their treatment in the pedagogical process of Physical Education.

## **MATERIALS AND METHODS**

From a population of 50 children, in the sixth year of life of the Day care centers "Alegres Mineritos" (La Demajagua town), "Edad de Oro" and "Mambisito" (Nueva Gerona), a sample of 44 children was formed, representing 88 % of that population.

Twenty-two children from the "Alegres Mineritos" Day care center were selected as the experimental group, while two control groups of 11 children each were selected



from the "Golden Age" and "Mambisito" day care centers, which have similar characteristics.

The selection of the control and experimental groups was made by means of intentional non-probability sampling, as they had the appropriate characteristics for the work and taking into account the material resources available to carry out the research.

Different research methods were used, both at the theoretical and empirical levels:

### **Research methods**

#### **From theoretical level**

Documentary analysis: it was used for the analysis of different sources of information related to pedagogical literature about teaching media and the development of basic motor skills in preschool children.

Historical and logical: they facilitated the analysis of teaching aids in terms of preschool children's motor development and made it possible to know what they consist of and what currently exists according to the characteristics of preschool children. It also made it easier to know the history of the problem.

Analysis and synthesis: as a dialectical unit, it made possible the study of the theories related to the objectives proposed in this research, using the different instruments applied and the normative and methodological documents to project, in a concrete way, the teaching means for the development of the basic motor skills, in the children of six years.

Hypothetical-deductive: it was used to specify the role of the teaching media in the development of basic motor skills and to establish, on the basis of practical experience, tables with indicators measuring the degree of development of motor skills.

#### **From the empirical level**

Survey to Educators: It was applied to educators to verify the validity of the problem, as well as to deepen the results of the inventory.

Observation: to check the quantity and quality of teaching aids used in Physical Education teaching activities with the aim of developing basic motor skills.

With the application of the interview to the educators, the validity of the proposal was evaluated, as well as the results of the use of the teaching means were deepened.

#### **Statistical method**

Once the data taken from the input and output diagnosis had been collected, reorganized and tabulated using the group record sheet on the selected sample, it was required to submit the results to some statistical processing, in order to obtain objective and scientific conclusions that would support the results and certify the decision making.



The above involved applying two tests of inferential statistics, the non-parametric Ji-square test to analyze possible discrepancies between observed and expected frequency in one of its variants and the test for two proportions, which allowed to analyze if there are significant differences in both proportions, before and after.

If the above is assumed to be true, it can be stated that the level or levels, which are most repeated in the results of the input and output diagnosis, will constitute the development of basic motor skills in children of the sixth year of life in the Children's Circles of the Isle of Youth and will therefore be the parameters by which the behaviour of motor development in children of this age is distinguished.

## RESULTS AND DISCUSSION

The 38 educators from Day care centers on La Isla de la Juventud, who work or worked with children in their sixth year of life, were surveyed to find out their opinion on the development of the basic motor skills achieved by the children. 28 of them rated the development of the HMB as regular, for 73.68 % and 10 rated it as bad for 26.32 %. 100% of them consider that there is a deficit in teaching means and that the existing ones are not of the necessary quality. They point to this situation as the cause affecting the improvement and development of MBH in preschool children in day care centers.

These results corroborate the various trends that have been observed in the day care centers on La Isla de la Juventud, including:

1. There are no teaching aids necessary for the development of Physical Education and, consequently, it affects the evolution of children's motor skills.
2. Partial difficulties in the development of basic HMB are evident in children in the 6th year of life.
3. Insufficient creativity in the development of teaching aids

At the beginning of the research, in order to check the quantity and quality of the existing teaching aids for the development of HMB, an inventory of existing teaching aids in the Children's Circles of the Isle of Youth was made (Table 1).

**Table 1.** - Inventories of children's educational facilities

Teaching aid.	Quantity		Good	%	Regular	%	Bad	%
	Total	Real						
<b>Industrial Construction</b>	162	52	20	38.4	25	48.1	7	13.5
<b>Made by the teachers</b>	102		50	49	35	34.3	17	16.6

It could be observed in table 1 that the means of industrial construction, of 162 registered by regulations, there are only 52 real ones, for 32 %; of these, 38.4 % have the quality of (Good); 48.1 %, of (Regular) and 13.5 of (Bad) and in those elaborated by the master, 49 % have the quality of (Good); 34.3 %, of (Regular) and 16.6 % of (Bad), which corroborates the initial idea that there is a deficit in teaching resources and that the existing ones do not have the necessary quality for the development of HMB in the Day care centers of La Isla de la Juventud.



In an interview with educators, the aim was to assess their knowledge and use of teaching aids in the development of HMB in 6th year children. The results were as follows:

- The 100 % of the educators think that the activity of Physical Education should not be developed in these ages, without the presence of teaching means since they stimulate the actions of the child and allow a more active participation in the activities that they carry out
- The 100 % of the educators consider that the teaching media are of great importance in the motor development of the child, since they contribute to the physical and intellectual development at this age (Mora, D.J., García Pinillo, F. and Latorre, P., 2017).
- The 100 % of the teacher's state that, even when the teaching means are not sufficient to develop Physical Education, they use the natural environment for the development of skills (walking, running, jumping and throwing).
- The 100 % of the teachers are convinced that the varied use of teaching aids does contribute to the development of HMB in children of this age.

### **Multipro teaching aid for the development of basic motor skills in children of the sixth year of life**

This multi-purpose teaching aid is aimed at preschool education and, within it, at the development of basic motor skills. In addition, it is aimed at solving the shortage of means for the development of motor skills at these ages.

The use of the teaching aid with adult guidance serves to:

- To perform throwing, the educator must guide the use of both hands.
- To go around obstacles.
- To perform quadrupeds around posts.
- Lowering the net serves to perform jumps.
- To pass from one side to the other, in different ways.

In each of these aspects, variability will be taken into account for the work. It can be used in programmed and independent activities, taking into account that the exhibition develops active thinking through problem teaching.

When making the medium, we took into account that the materials should be within the reach of those interested, while its design should be simple and pleasant for children, so that the drawings and figures should be in accordance with the age.

Name of the teaching aid: *Multipro*.

Preparation: various materials.

- Two black steel bases (1 cm. thick, 20 cm. long and 13 cm. wide)
- Two supports (black steel tubes), 65 cm. high each.
- Two rods (downpipes) 110 cm. high each.
- Two aluminum rings of 25 cm. diameter adjusted in its arm by two passing screws of 8 cm. long.
- Two wooden boards of 20 cm. each side, each one adjusted by two 8 cm. pin screws in its spleen.
- Four riveted rings to hold the ring next to the stem.
- Two nets for the rings (these can be disposable nets or nylon bags).



- A net of sisal or nylon volleyball bag, 54 cm wide by 2 m long.
- Four rustic extenders to support the net, at both ends.
- The support will be held by 6 legs, each one 54cm. long (black steel). The back legs of support or counterweight will have a weight of 5 kg, with a support of 9 cm. in its area.
- Two wooden triangular-shaped covers that will serve to protect the child from other accessories in the middle, fastened by 6 screws 8 cm. long.
- A height regulator, located in each support to control the height of the lowering stem (black steel tubes).

The figure 1 shows the MULTIPRO teaching aid that can be used in programmed and independent activities, all aimed at the development of motor skills in children.



**Fig. 1** - Teaching aid: Multipro

### **Methodology for the use of the teaching aid (Multipro)**

The teaching aid due to its characteristics, it should be installed in a flat area, which allows the child's mobility in an affordable way, there should be no limitations in the performance of the movements.

The groups should not be selected without the participation of the child; they can receive the name they choose, bearing in mind the participation of the educator, who, in order to motivate the activity, will select several names that are significant for the children. Examples: The little blue horse, the kites, the little minerals, etc.

When assembling, it must be taken into account that the accessories are fixed, which will allow a better securing and protection of the child. When dismantling, it is recommended to take care of the accessories that make up the teaching aid in order to preserve it in a perfect state of use.

### **Form of construction**

The base will be welded to the support tube and the legs in the same way, the stem will have six holes to control the height of the net.

This teaching aid alone should be a motivation to develop basic motor skills (BMH) in the sixth year of life, it should become a stimulator for the practice of physical exercises in correspondence with the child's age under the guidance of the adult, it should also make it possible to develop coordination skills in preschool education and enable teachers to carry out the activity in a more enjoyable and effective way, providing material support for teaching methods to enable the proposed objectives to be achieved (Gómez, A.; López, M.F. and Sánchez-Alcaraz, B.J. 2015).





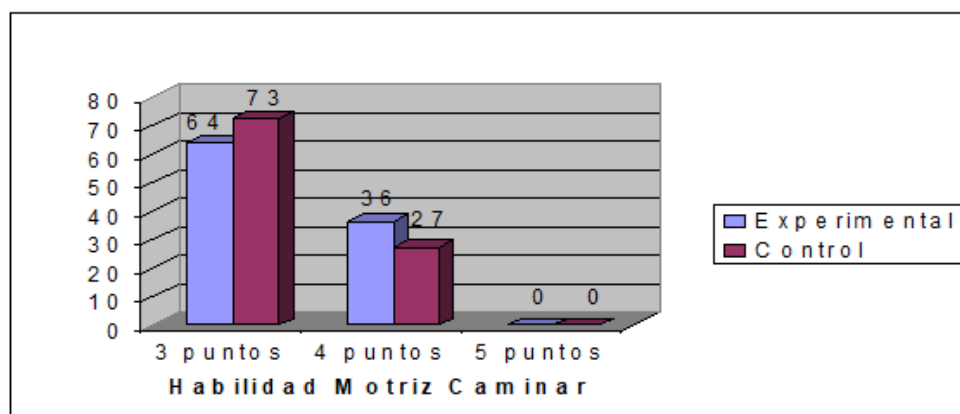
In a study carried out on the characterization of the Cuban child from five to six years old (González Catalina, 1998), there is a test to measure the development of the different skills that the child must achieve in the day care center; this served as a reference to select the indicators that influenced the diagnosis to be carried out in the groups belonging to the sample.

In order to know the level of development of the basic motor skills in which the children corresponding to the control groups were, a model was developed that contained four fundamental tests in their development, with the aim of being able to diagnose and know the development of the motor skills: walking, running, jumping and throwing.

This test (diagnosis) was applied in two moments of the implementation of the research. The first moment had as objective to know the behavior of the basic motor skills in the children, before the introduction of the teaching aid; the same one allowed to give monitoring during a period of six months, later the means of new creation is introduced in the experimental group and the control group continued working with the traditional teaching aids that the day care center of residence had.

The second moment was aimed at checking the results obtained between the beginning and the end of the diagnosis.

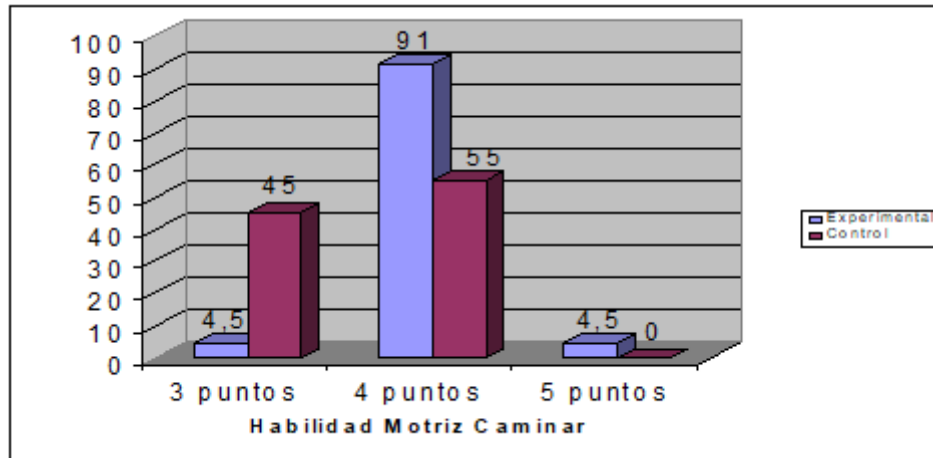
Its results were as follows:



**Fig. 2** - Initial diagnosis

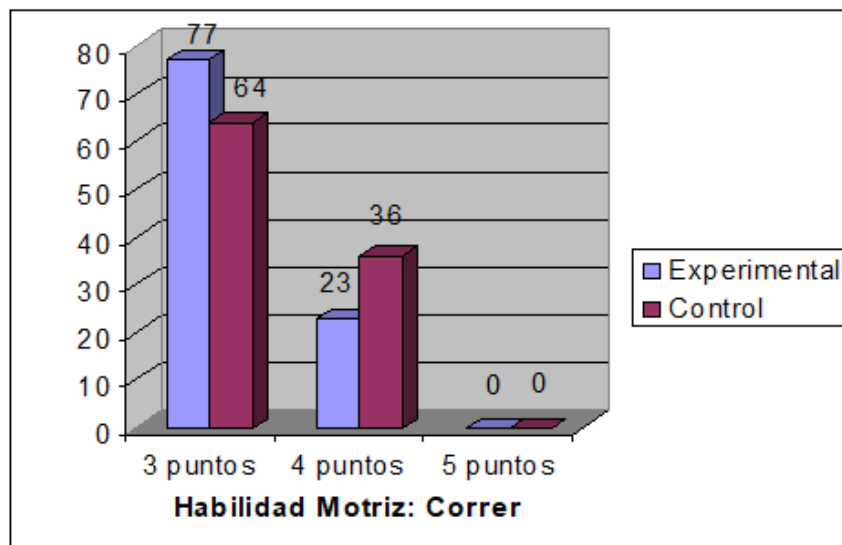
In the initial diagnosis of walking skill, 22 children, representing 50 % of 44, were evaluated with three points and 22, representing the rest, were evaluated with four points. As can be seen, in both the control and experimental groups there are no significant differences (Figure 2).





**Fig. 3** - Final control

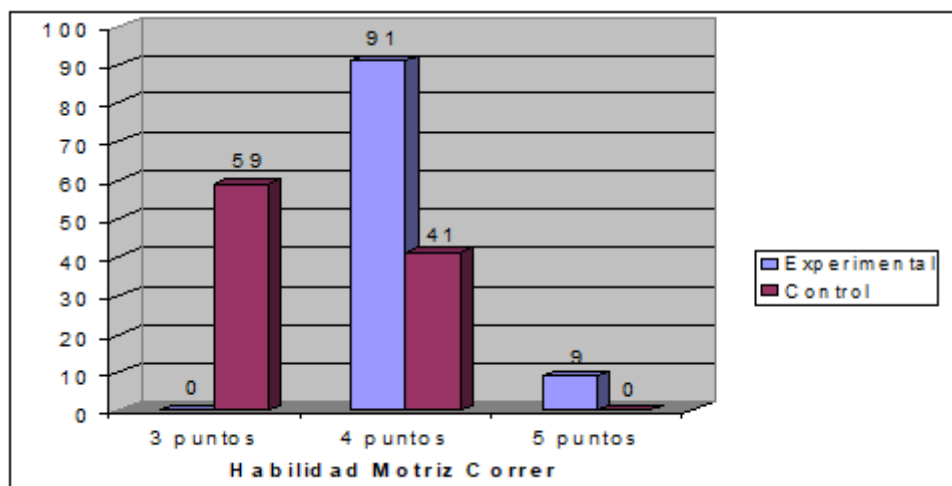
In the final diagnosis for the control group, 10 children, representing 45 % of 22, were evaluated with three points; 12, with four points for 55 %; in the experimental group one child, representing 4.5 %, was evaluated with three points; 20, with four points representing 91 % and one child with five points for 4.5 %. As can be seen, there are significant differences (Figure 3).



**Fig. 4** - Initial diagnosis

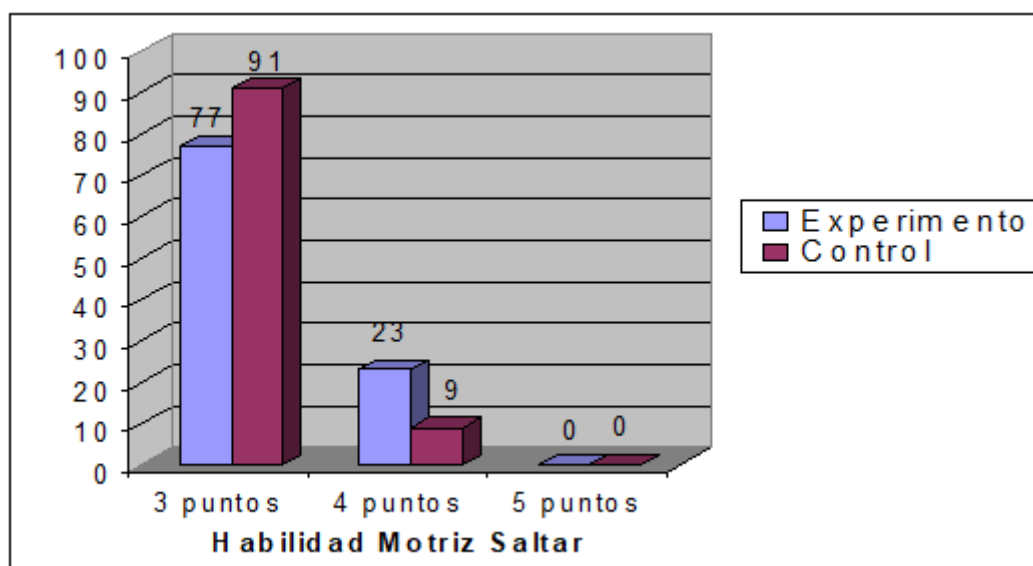
In the initial diagnosis of running skill, 17 children, representing 77.3 % of 22 in the control group, were evaluated with three points and five, representing 22.7 %, were evaluated with four points. In the experimental group, 14 children representing 63.6 % of 22, were evaluated with three points; eight representing 36.4 % of 22, were evaluated with four points. As it can be seen, in both groups there are no significant relevant differences (Figure 4).





**Fig. 5 - Final control**

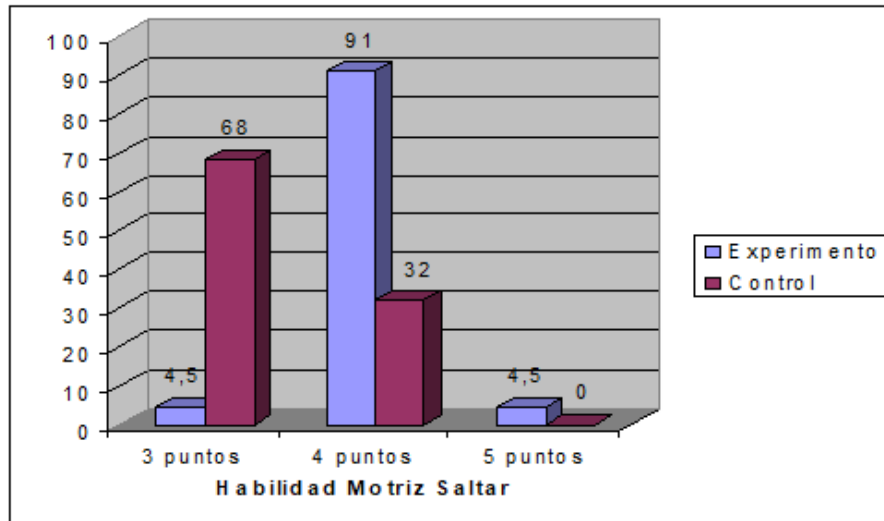
In the final diagnosis of running skill in the control group, 13 children, representing 59 % of 22, were evaluated with three points and nine children, representing 41 %, were evaluated with four points. In the experimental group, 20 children, representing 90.9 %, were evaluated with four points, two children, representing 9.1 %, with five points. As can be seen, there are significant differences in the experimental group compared to the control group (Figure 5).



**Fig. 6 - Initial diagnosis**

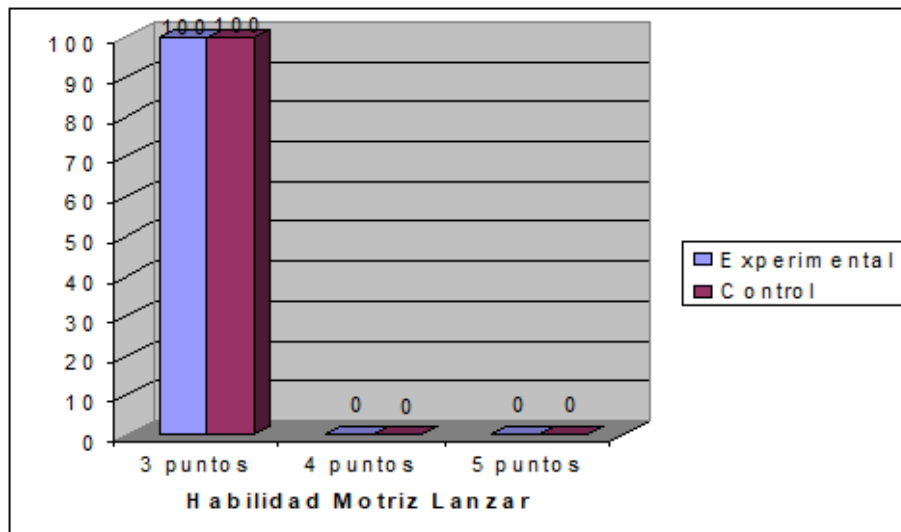
In the initial diagnosis of jumping skill, in the control group, 20 children, representing 90.9 % of 22, were evaluated with three points and two children, representing 9.0 %, were evaluated with four points. In the experimental group, 17 children, representing 77.3 % of 22, were evaluated with three points and five children, representing 22.7 %, were evaluated with four points. As we can see there are no significant differences (Figure 6).





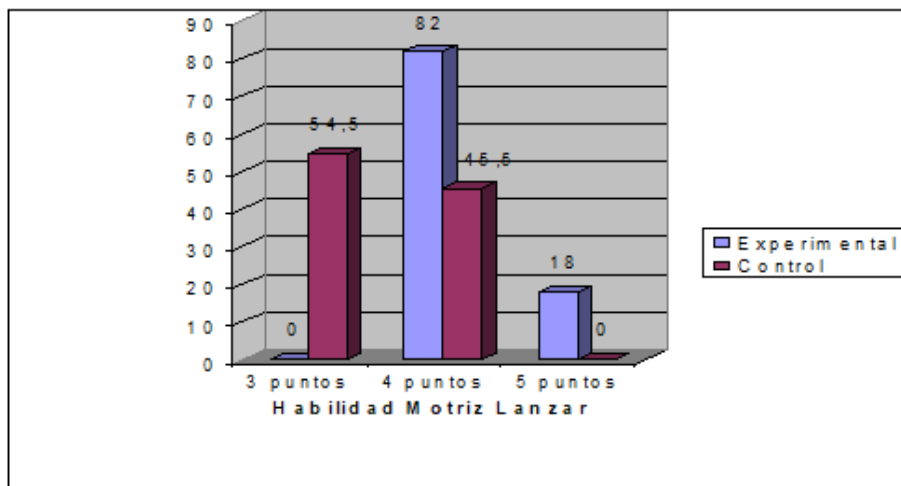
**Fig. 7** - Final control

In the final diagnosis of jumping skill, in the control group, 15 children, representing 68.2 % of 22, were evaluated with three points and seven children, representing 31.8 % of 22, were evaluated with four points. In the experimental group, one child, representing 4.5 % of 22, was assessed with three points; 20 children, representing 91 % of 22, were assessed with four points and one child, representing 4.5 % of 22, was assessed with five points. As can be seen, there are significant differences between the experimental and control groups (Figure 7).



**Fig. 8** - Initial diagnosis





**Fig. 9 - Final control**

In the initial diagnosis of the throwing skill, both in the control and the experimental group, 100 % of the children in both groups were evaluated with three points (Figure 8).

In the final diagnosis of the throwing skill, in the control group, 12 children, representing 54.5 % of 22, were evaluated with three points and 10 children, representing 45.5 % of 22, were evaluated with four points. In the experimental group, 18 children, representing 81.8 % of 22, were evaluated with four points and four children, representing 18.2 % of 22, were evaluated with five points. As can be seen, there are significant differences between the experimental group and the control (Figure 9).

Making a general assessment about the initial and final diagnosis made, before and after the introduction of the teaching aid, it can be seen that after the introduction of the teaching aid, the results in the different skills developed in the children of 6th year of life in the day care centers in La Isla de la Juventud were higher than those of the control group.

Results achieved in the skill of walking

Final control

Hypothesis test for two proportions from independent groups

$P_1 = .9100$ ,  $N_1 = 22$

$P_2 = .5900$ ,  $N_2 = 22$

$Z = 2,451$  PROB. =  $7,123 \text{ E} - 03$  is less than 0.05. There is significance

Results of initial diagnosis and final control for running skill

Hypothesis test for two proportions from independent groups

$P_1 = .3640$ ,  $N_1 = 22$

$P_2 = .2270$ ,  $N_2 = 22$

$Z = .996$  PROB. = .1597



Hypothesis test for two proportions from independent groups

$P_1 = .9090$ ,  $N_1 = 22$   
 $P_2 = .4100$ ,  $N_2 = 22$   
 $Z = 3.492$  PROB. =  $2.393 \times 10^{-4}$ . Hay significación

Results of the initial diagnosis and final control achieved in the skill of jumping

Hypothesis test for two proportions from independent groups

$P_1 = .2270$ ,  $N_1 = 22$   
 $P_2 = .0910$ ,  $N_2 = 22$   
 $Z = 1.233$  PROB. = .1087

Hypothesis test for two proportions from independent groups

$P_1 = .9100$ ,  $N_1 = 22$   
 $P_2 = .3180$ ,  $N_2 = 22$   
 $Z = 4.033$  PROB. =  $2.752 \times 10^{-5}$ . Hay significación.

Results of the initial and final diagnosis reached in the skill of throwing

Hypothesis test for two proportions from independent groups

$P_1 = .8180$ ,  $N_1 = 22$   
 $P_2 = .4550$ ,  $N_2 = 22$   
 $Z = 2.503$  PROB. =  $6.158 \times 10^{-3}$ . Hay significación.

The results indicate that in the input diagnosis (1) there are no significant differences, that is, the groups in their initial state are in equal conditions, even more, it can be said that they are homogeneous. In the output results, the significance in favour of the experimental group for each of the HMB was found with 95 % confidence.

It can be stated that the Multipro teaching aid for the development of basic motor skills in children in the sixth year of life has demonstrated that it not only contributes to the improvement of the development of basic motor skills, but also to the development of creativity through the solution of real situations, which arise in the context of practical activity. Hence, it is important and necessary that there be a wealth of spaces and materials to be used in children's learning so that their experiences are meaningful. That is why the early education stage is perfect for the development of specific competencies in children, which will mark their personality and their subsequent development, both personally and academically (Silva, Neves and Moreira, 2016). In short, it allows them to interact with the world around them, which is essential for the acquisition of any learning.

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**Conflict of interests:**

The authors declare not to have any interest conflicts.

**Authors' contribution:**

The authors have participated in the writing of the work and analysis of the documents.



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