MENDIVE
REVISTA DE EDUCACIÓN

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Methodology to evaluate basic motor skills in students of primary basic education

Metodología para evaluar las habilidades motrices básicas en estudiantes de la educación básica primaria

Metodologia para avaliação de habilidades motoras básicas em alunos do ensino fundamental básico

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ABSTRACT
This research is based on the development of basic motor skills as a social need aimed at the integral development of the human being, of which motor development is part. Basic motor skills and their classification are characterized. Aspects that serve as a basis for achieving the objective of assessing the way in which the basic motor skills of balance and displacement are conceived in the Institutional Educational Project, the Area Plan and the Classroom Plan of the Official Educative Institution "Maricé Sinisterra" in Santiago de Cali, Colombia and assess, in addition, the degree of development of these skills in a group of third grade students of Primary Basic Education of the aforementioned institution. To achieve the objective, a methodology is applied consisting of actions that allow characterizing the context of the Colombian educational institution in which the research is carried out. As particular methods are applied the review of documents, interviews with teachers, observation to classes, test for the evaluation of the integral physical development of students and a pedagogical test, the latter elaborated by the authors. As a result, it is concluded that there are shortcomings that point to a learning teaching process that is not conceived from an informed and systematic pedagogical direction which results in low results achieved by students in the development of skills basic motors.

Keywords: evaluate; skill, development; physical education.

RESUMEN
En esta investigación se fundamenta el desarrollo de habilidades motrices básicas como una necesidad social encaminada al desarrollo integral del ser humano, del cual es parte el desarrollo motor. Se caracterizan las habilidades motrices básicas y su clasificación, aspectos que sirven como fundamento para cumplir el objetivo, que consiste en valorar el modo en que se conciben las habilidades motrices básicas de equilibrio y desplazamiento en el Proyecto Educativo Institucional, el Plan de área y

el Plan de aula de la Institución Educativa Oficial "Maricé Sinisterra", en Santiago de Cali, Colombia. Para cumplir el objetivo se aplica una metodología consistente en acciones que permiten caracterizar el contexto de la institución educativa colombiana en que se realiza la investigación. Como métodos particulares se aplican la revisión de documentos, entrevistas a docentes, observación a clases, test para la evaluación del desarrollo físico integral de los estudiantes y un test pedagógico, este último elaborado por los autores. Como resultado se concluye que existen carencias que apuntan a un proceso de enseñanza-aprendizaje que no se concibe desde una dirección pedagógica fundamentada y sistemática, lo que trae como consecuencia bajos resultados alcanzados por los estudiantes en el desarrollo de habilidades motrices básicas.

Palabras clave: evaluar; desarrollo; habilidad; educación física.

RESUMO
Esta pesquisa fundamenta o desenvolvimento das habilidades motoras básicas como uma necessidade social voltada para o desenvolvimento integral do ser humano, da qual o desenvolvimento motor faz parte. São caracterizadas as habilidades motoras básicas e sua classificação, aspectos que servem de base para o cumprimento do objetivo, que consiste em avaliar a forma como as habilidades motoras básicas de equilíbrio e deslocamento são concebidas no Projeto Educacional Institucional, no Plano de Área e na Plano de aulas da Instituição Educacional Oficial "Maricé Sinisterra", em Santiago de Cali, Colômbia. Para atingir o objetivo, é aplicada uma metodologia que consiste em ações que permitem caracterizar o contexto da instituição de ensino colombiana em que se desenvolve a pesquisa. Como métodos particulares, são aplicados a revisão de documentos, entrevistas com professores, observação de aulas, testes para avaliação do desenvolvimento físico integral dos alunos e um teste pedagógico, este último elaborado pelos autores. Como resultado, concluise que existem deficiências que apontam para um processo de ensino-aprendizagem não concebido a partir de uma direção pedagógica fundamentada e sistemática, o que resulta em baixos resultados alcançados pelos alunos no desenvolvimento das habilidades motoras básicas.

Palavras-chave: avaliar; em desenvolvimento; habilidade; Educação Física.

INTRODUCTION

UNESCO (2016) recognizes the importance of body control. Given this, states are oriented to implement teaching-learning processes that lead the student towards the formation of knowledge and skills, with the aim of forming a social being in accordance with the circumstances of the world in which they live. Therefore, the school has the responsibility of transmitting, from generation to generation; the accumulated historical o r social experience and preparing children for their inclusion in active life, so that they are able to play a leading role in an independent way and at the same time insert them into society (Roa, Hernández & Valero, 2019, p.387).

According to Cenizo *et al.* (2019), with whom the author agrees, skills constitute particular psychological structures that allow assimilating, conserving, using and exposing the knowledge that "has been stored by cognitive processes". In its essence, the interaction of mental actions with reality, social practice, through exercise is evidenced, becoming ways of action that provide solutions to theoretical and practical tasks.

Translated from the original in Spanish

In the field of Physical Education and sport, motor skills are studied. Physical Culture is formed as a formative, cultural, personal and social process through physical activity and promotes a multilateral formation of the individual (Gómez, 2018).

In this sense, motor skills are classified into basic motor skills and specific motor skills or specific to particular sports (Garófano & Guirado, 2017).

Motor development, understood in its broadest sense, is a key area for the overall development of the person, and this cannot be conceived without the improvement and mastery of basic motor skills (Di Palma & Ascione, 2020).

In relation to basic motor skills, we understand those motor acts that are carried out naturally and that constitute the basic sensor motor structure, support of the rest of the motor actions that the human being develops (Arana, 2018).

The previous authors value the particular characteristics that make a motor skill be basic, these are: being common to all individuals, having facilitated/allowed the survival of the human being and being the foundation of later motor learning (sports or not).

Although there is a diversity of criteria in the classification of basic motor skills, the one offered by Cenizo *et al.* (2017), Who, base on the existing classifications, distinguish two groups:

- Those movements that require mastery and control of one's own body and, therefore, the management and control of all or almost all of our body: movements, jumps and turns.
- Those movements that require mastery and control of a mobile or object, that is, the handling of mobiles: launches, receptions and boats (p. 189).

In this work, both groups of skills will be included in the study. As for the skills included in the first group, balance, movement in space, gallop, jumping, walking will be understood (Farnsworth, 2017). The skills included in the second group are understood, according to Cenizo *et al.* (2017), who declare throwing, catching and bouncing as "basic motor skills".

The methodology for diagnosing basic motor skills of balance and movement aimed to assess how the basic motor skills of balance and movement are seen in the Educational Institution Project, the Area Plan and the Plan of classroom of the Official Educative Institution "Marice Sinisterra" in Santiago de Cali, Colombia. In addition, the degree of development of these skills was evaluated in a group of third grade students of Primary Basic Education from the aforementioned institution.

Regarding the evaluation of motor skills, we agree with Cenizo *et al.* (2017), who have carried out an extensive review of basic motor skills assessment methodologies and state that "It can be stated that test batteries to assess basic motor skills present a scarce number of tasks, more or less global, that they do not always constitute the total of the different motor patterns that make up basic motor skills" (p. 193).

As a result of the research, the relationship between the current state of the teaching - learning process of Physical Education and the possible consequence that the way of conceiving it may bring in the development of basic motor skills in students will be characterized.

Regarding the evaluation of motor skills, we agree with Cenizo *et al.* (2017), who have carried out an extensive review of basic motor skills assessment methodologies and state that "It can be stated that test batteries to assess basic motor skills present a scarce number of

tasks, more or less global, that they do not always constitute the total of the different motor patterns that make up basic motor skills" (p. 193).

However, it is essential to carry out, in the school environment, "an evaluation work with a certain degree of depth on what students are capable of doing in the different basic motor skills" (Di Palma & Ascione, 2020).

According to Webster & Ulrich (2017), in the evaluation of the basic motor skills of displacement,
their concrete operationalization in the career intervenes, which should be taken into account as distinctive features: global coordination of movement, arm - leg alternation and correct support and momentum of the feet. These authors suggest, moreover, that these features can serve as criteria for the development of traversing tasks.

Regarding the tests for basic motor skills, the Test
of Gross Motor Development 2nd edition (TGMD -2) (Webster & Ulrich (2017) was consulted:

> This tool seeks to identify children with gross motor development deficits, between the ages of three and 10, evaluating 12 basic motor skills grouped into two subtests: one for loco motor skills, and the other for object control skills. It is a test focused on the process and the quality of movement of a certain basic motor skill. It allows to compare the performance of each individual with pre- established criteria, quality of movement, or with the normative results of a statistical and representative sample of the population in which the test is validated (Cited by: Cano *et al.*, 2015).

Another test that measures motor development is the Purdue Perceptual-Motor Test, which "allows a large number of perceptual-motor observations, based on the principle that learning is based on the sensory- motor experiences of children, applied to children aged 6-12 years, even older" (Arana, 2018). This test is applied when there are suspicions of alterations in motor development.

In the bibliography there are also instruments for measuring specific aspects of perceptual-motor capacities such as the orientation tests, the laterality tests, the Body Scheme Test and the Temporal Organization Test, among others (Arana, 2018). The difficulty in applying these tests is that, being specific, a standard character is given, for this reason it is preferable to look for new forms of diagnosis that are more suited to this research and allow determining the state of development of basic motor skills in students of the sample.

Other authors propose non-standardized tests, but rather they are elaborated by the authors themselves, according to the specific objectives of their research (Roa, Hernández & Valero, 2019). These authors propose specific tests to measure the indicators: walking, running, jumping, throwing, and they use a three-point Likert-type scale: good, fair and bad.

Another particular study is the proposed Campaign (2020) who proposes a test to the students to focus on the balance (static and dynamic) (p.55).

It coincides with Paez (2016, p.180), who states that: "The transit by methodological steps brings to the professional who teaches Physical Education a valuable methodological tool for performing diagnosis and monitoring in class of Physical Education".

In this research a test was developed, by the authors, which is integrated into a methodology in which a sequence of steps for fulfilling the purpose of it that it intends to assess how motor skills are conceived the basic balance and displacement students of basic Primary Education of the official Educative institution "Marice Sinisterra" in Santiago de Cali, Colombia.

MATERIALS AND METHODS

The selected sample consisted of 18 students of the third grade of Primary Basic Education, from the Educational Institution "Maricé Sinisterra". The ages of the students range between 8 and 11 years of age, with an average of 9- 8 years. The educational institution is located in an area of social stratum two; so many students come from dysfunctional families, with very low-income households.

The methodology consists of several actions developed by the authors:

Action 1. Determine the dimensions of basic motor skills in the sample students. For this, three dimensions are proposed:

- Perceptual- motor: indicates the relationship between the perception of the stimulus and the motor response to what is perceived. In this dimension, the displacement is measured, with and without change of direction, with and without change of plane. Balance with one foot and balance of objects with the hands is measured.
- Combined motor skills: indicates the coordination between the various forms of movement and between the various forms of balance (walking and running, walking and jumping, walking on one foot and jumping, among others).
- Motor skills with objects: indicates movement and balance with objects (throwing balls from different positions and directions, driving, hitting and holding objects with different parts of the body).

Action 2. The method of document review, using a guide that inquire about the following aspects was applied:

- Curricular conception of the Physical Education area.
- Objectives related to the development of motor skills, particularly in the third grade of Primary Basic Education.
- Conception regarding the formation of motor skills in the third grade of Primary Basic Education.

Action 3. Observation of classes using the covert observation technique.

Action 4. Carrying out a comprehensive physical examination of the students in the sample.

The objectives of the comprehensive physical examination were: to determine the level of functional independence, identify alterations in posture, evaluate static and dynamic balance, and evaluate sensor motor functioning.

The tests applied in the comprehensive physical examination were:

> The functional independence measure for students (WEEFIM) (Rodríguez, Lara & Rodríguez; 2018), which indicates the level of functionality and independence of schoolchildren in the activities of daily living in the self-care categories

(bathroom, clothing, feeding, grooming, urination and evacuation, intimate hygiene and use of the bathroom), functional mobility (movement and transitions) and communication (understanding and expression); the maximum score is 126/126.

Evaluation of bipedal posture through participant observation of the students, in the different anatomical planes, such as: the anterior plane, left and right lateral planes and posterior plane. The sitting posture was also evaluated in relation to the position they adopt at the classroom desks to carry out school activities.

The following tests were applied to assess the balance of the students. To evaluate the static balance: test euro fit of flamenco; it is equilibrium euro fit at T.

Proof of clinical observations are also conducted to evaluate the performance sensor motor related to sensory, tactile, vestibular and proprioceptive processing in which the performance of the observed student during the course of the following items: alternating movements of your pronation and supination of the forearm (diadokinesis), digit sequencing, finger - nose test, free and directed eye movements. A pencil was placed in front of the students, which they had to follow and fix with their gaze, reaction to sensations, response to vestibular information and movement during the game.

Action 5. Evaluate the degree of development of the basic motor skills of balance and displacement in the students of the sample. For this, the following pedagogical test was developed:

1. Carry out motor activities based on orders given by the teacher.

Objective: measuring the dimension motor-perceptive by performing motor actions and balance, from motor actions that are performed according to a given stimulus.

Task description: It has been performed individually to each student. From an initial position an order is given to the student (run to the right), after about 20 seconds another order is given (run between obstacles). Thus, orders must be repeated to see the response to the stimulus by the student. Up to five orders will be reached for each student.

Environment: Yard of school.

Starting position: Sitting

Rating Scale: An ordinal scale with high categories, medium and low with the following meaning: tall is not wrong in any of the five orders, half is wrong on two orders and low errs in more than two, will be used.

2. Carry out combined motor activities.

Objective: To measure the dimension motricity combined by the embodiments of motor actions and balance oriented by the teacher.

Description of the task: it is carried out individually for each student. The student is previously explained that the task consists of touring the circuit in the schoolyard. In this trajectory, five reference points (with cones) have been indicated. From the first cone you must run to the second, from this to the third you will get jumping on one foot, to the next by squatting and to the last by walking normally.

Environment: Yard of school.

Cones to mark reference points that will expand: between the first and second 9 m; up to the third 3 m; up to the fourth 3 m and up to the fifth 7 m.

Initial position: stand on the first cone.

Rating Scale: An ordinal scale with the categories: high, medium and low with the following meaning: top (takes a balanced arms alternately with legs without parasitic movements, controls balance, bend correctly knees), medium (makes up to two mistakes) and low (makes more than two mistakes) will be used.

3. Motor skills (balance and movement) with objects.

Objective: To measure dimension motricity objects by embodiments of motor actions with objects oriented by the teacher.

Job description: It is performed individually to each student. The student is previously explained that the task consists of throwing a ball.

Setting: schoolyard, baseball ball.

Initial position: standing at a point indicated by the teacher.

Rating Scale: An ordinal scale with high, medium and low categories, with the following meaning: high [to throw, located below the opposite leg to the arm of the release; when throwing, the arm that propels the ball, extends from back to front, up, over the head; accompanies the action of the throw with successive movements of the legs, trunk and arms; shifts the weight of the body by advancing the leg that is behind at the moment of throwing and throws in the absence of parasitic movements (without kinesia or involuntary movements of any part of the body)], medium [makes at least two errors] and low [commits more of two errors] will be used.

RESULTS

The Educational Institution is of a formal nature, linked to the State. Its vision, for 2021, is to be one of the best educative institutions of Santiago de Cali, with high recognition of academic and training in human values, through skills development.

The student's profile is in correspondence with the training of creative students, critics, leaders, self-employed and entrepreneurs, in order to strengthen the social, economic and cultural development of the region (Educational Institution "Maricé Sinesterra", 2020).

From document analysis it evidenced that the Physical Education curriculum at the national level has an open character, which gives autonomy to educational institutions to develop the curriculum at the institutional level; However, in these institutions the curricular planning is not achieved, which affects the preparation of poorly contextualized documents that do not facilitate the work of the teacher in the development of Physical Education classes.

100 % of the managers and teachers consulted recognize that there are difficulties in the teaching - learning process of Physical Education and, in particular, in the development of motor skills; 80 % of managers recognize the need for training to teachers so they can design and develop teaching - learning designed to overcome this difficulty and pedagogical approaches and teaching strategies that help teachers plan their classes are needed, so that they can do systematic work with motor skills. The teacher survey showed that 100 % declare that there are difficulties

in the theoretical knowledge they have about didactics to form motor skills.

Observation of classes confirmed that 25 % of Physical Education classes are suspended and that those taught are based on free play, without a pedagogical direction of the process. In the 25 % of cases community leaders are contracted (specialists in PE) to teach the classes, but in the classes observed it was found that they use traditionalists methods and do not include playful in their classes. 80 % of the students stated that they like Physical Education classes, but they do not feel very motivated for them because sometimes they are suspended or replaced by free games or taught with very rigorous methods.

100 % of the students in the sample are located in socioeconomic strata one and two. They are students belonging to extended and single-parent families, the adults in charge of the household generally spend a great deal of time in their workplace, the majority of women work in domestic chores plus other occupations and some as single mothers answering for home, men in the construction, among other occupations are: mechanics, carpentry, various offices, recycling, casual sale o ambulatory and surveillance.

Being away from home for so long causes little time to accompany their children and increases school dropouts; This, coupled with the low educational level achieved by parents and/or guardians, where it is found that only 27 % have completed elementary school and only 2 % have completed higher education (university) (Institutional Educational Project, 2020).

In the 100 % of classes, students are participatory, supportive, good companions, responsible with their school activities, academic performance, like activities where you have to play with words by riddles, stories, tongue twisters games to air free, explore nature and have contact with people. Their vocabulary should be enriched and their personal experiences should be enhanced.

The results of the comprehensive physical examination are as follows:

The functional independence measure for students (WEEFIM) yielded a student with 123/126, indicating that they have modified independence. The mother reports that she needs support for bathroom hygiene, as the arm is very short. The 85 % of students achieved a result indicating that nondisabled and can perform activities of daily living independently.

Bipedal posture: 11 students present any of the following alterations in posture: forward position of hand and forearm in relation to the midline, slight stooped posture, deviation from the midline to the left or right side, slight deviation from the line middle back, lateral head tilt, slight drop of the shoulders, misaligned shoulders, slight misalignment of the ankles, slight rotation of the left half body. Of these 11 students, six present two of the alterations in posture mentioned above, and one presented five. The rest of the students (seven) do not present difficulties.

In one student, the lateral view presents thoracic kyphosis, in three there is mild scoliosis of the spine. In all these cases a medical evaluation is recommended to start treatment.

In the sitting posture, it was observed that 13 students adopt a posture outside the comfort angles, which generates risks of acquiring musculoskeletal injuries. The rest adopt a normal posture.

Regarding the static balance, the following difficulties were detected: slight oscillations with the eyes closed

(five students), resists less than 30 seconds in the flamenco position, requires more than three attempts to achieve this position and they need to change their feet (seven students), assume the T position with difficulty, lose balance in less than a minute (seven students).

In dynamic balance: they fall off the bar (eight students), show little fluency when walking on the bar (10 students), walk as a block (three students).

Regarding sensory-motor functioning, no difficulties were detected.

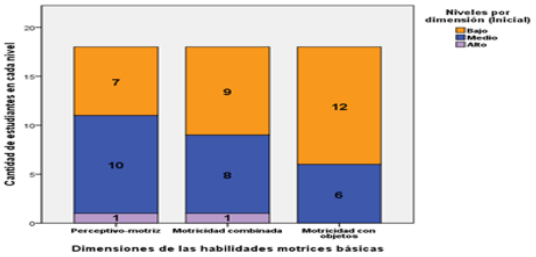
Results of the pedagogical test:

In the first item aimed to measure the dimension motor- perceptive it was found that seven students are located on the lower level. This is due to the fact that they presented motor planning barriers requiring verbal support for their execution and they present difficulties in motor execution, 10 students are located in the middle level for presenting slight difficulties in coordination of movements and only one student performs the test without any difficulty (high level).

Regarding the measurement of the combined motor skills dimension, nine students are scored at the low level (they have difficulties in alternating swinging of the arms or have parasitic movements, collide with the cones and fall); eight are located in the middle level (four due to difficulties in flexing the knees, two due to parasitic movements and two due to colliding with the cones). Only one student ranks high.

In the third dimension, motricity with objects, 12 students are located at the level under presenting the following difficulties: no later located the opposite leg to the arm of the release; does not extend from back to front arm drives the ball or raises it above his head, no action accompany the release with successive movements of legs, trunk and arms. The rest is located on the middle level, being the more difficulty more repeated, the presence of parasitic movements (graphic 1).

These results corroborate that basic motor skills are affected.



Graph. 1- Results of the pedagogical test for each of the dimensions of basic motor skills measured in the students of the sample.

Regarding the triangulation of results, this evidence shows that the difficulties detected in the students are:

- They are not due to physical disabilities, as all were negative in the test of WEEFIN except a student who has a remote capacity to have shorter arms than normal. In the case of four students, a medical evaluation is recommended to treat mild scoliosis of the spine.
- They can be mitigated if adequate pedagogical attention is offered, in which cases, it is recommended to plan activities aimed at correcting alterations in posture and balance, both static and dynamic.

DISCUSSION

The difficulties presented point to a teaching-learning process that is not conceived from a well-founded and systematic pedagogical direction, which results in the low results achieved by the students in the pedagogical test, which

show that both motor ability and each one of its dimensions are seriously affected (in all dimensions and even in ability as a whole, around 90 % of students are in the low and medium categories).

The study to diagnose how basic motor skills are conceived balance and movement in the Project Educational Institution, the Area Plan and the Plan of classroom in the official educative institution "Marice Sinisterra" in Santiago Cali, evidenced difficulties that point to a teaching - learning process that is not conceived from a well-founded and systematic pedagogical direction, which results in the low results achieved by students, which show that both motor skills and each of their dimensions are seriously affected.

These results corroborate the need for a didactic strategy aimed at the development of basic motor skills: movement and balance in third grade students of Basic Primary Education.

As for the students in the sample, it is concluded that there are difficulties in the development of basic motor skills; however, the fact that their integral physical development is normal indicates that such difficulties may be caused by inadequate curricular development that does not take into account the intended didactic treatment for the development of motor skills.

From a qualitative point of view this could be associated with the fact that physical education classes are developed through free play, causing such abilities developed in a spontaneous way, without proper educational guidance. Given the fact that basic motor skills are the starting point for the development of sports skills, which begin to be formed from the fourth grade in the preparation stage, the importance of outlining pedagogical strategies aimed at their development is recognized in the first cycle of Primary Basic Education from the Physical Education class.

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Conflict of interest:

Authors declare not to have any conflicts of interest.

Authors´ Contribution:

Laura Milena López Abella*:* Conception of the idea, authorship coordinator, general advice on the topic addressed, literature search and review, translation of terms or information obtained, preparation of instruments, application of instruments, compilation of information resulting from the instruments applied, statistical analysis, preparation of the tables, graphics and images, preparation of the database, drafting of the original (first version), revision and final version of the article, correction of the article, revision of the applied bibliographic norm.

Blas Yoel Juanes Giraud*:* General advice on the topic addresseda, literature search and review, translation of terms or information obtained, preparation of instruments, statistical analysis, revision and final version of the article, correction of the article, revision of the applied bibliographic norm.