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Physical Efficiency Tests: Information for Teachers and Sports Coaches

Abstract

The purpose of the research was to determine the physical and gestural state of students between eight and nine years of age in a Peruvian educational institution, as well as to provide Physical Education teachers with useful scales to evaluate what concerns physical abilities. and motor skills by age, from simple but validated tests, called Physical Efficiency Tests. It is a descriptive cross-sectional investigation. For this, the physical capacities resistance, strength, speed and flexibility were measured; managing to measure up to two capacities per session, also bringing together capacities that are directly proportional, such as resistance with flexibility and strength with speed. Population: 100% of the students participating in the study (95) distributed in 54 girls and 41 boys. For data collection, Microsoft Excel and SPSS v.25 were used. Conclusions: The results show that Peruvian Physical Education teachers do not have the necessary tools to know how much they can increase or decrease the internal and external loads of physical activity on their students. A deterioration in the conditional capacities and motor skills of the evaluated population is observed. Participating students are at levels of physical efficiency below expectations, especially those who are in the third and fourth levels.

Keywords: Physical Efficiency, Physical Abilities, Motor Skills.

Introduction

Due to the scientific nature that Physical Education and sports have taken in the world, it is essential for sports coaches to know those students who meet both physical and gestural conditions to be inserted in high-competition sport (Calahorro Cañada et al., 2012).

Physical Education, in its function of training skills and abilities, is the promoter of determining those people with that minimum of gesture-ability that sport requires, being the teacher of this specialty, the first to have this in their hands. future sports talent or as mentioned in the current bibliography "expert". Physical Education promotes the bases of the high performance pyramid at level V (sports massiveness), translating this into the acquisition of the basic elements of a sport, starting from the class of the aforementioned subject, being able to visualize this when applying the Physical Efficiency tests (Odoardo Fonseca & Odoardo González, 2010).

The practice of systematic physical exercise, also known as physical activity, provides practitioners with motor skills which can be adequately modified to be used in recreational sports activities at the beginning, and sports later. Studies on this subject have determined that physical activity is any voluntary body movement of muscle contraction, with energy expenditure greater than rest; understood as a voluntary human behavior, which provides a set of health benefits, exemplified by sports, physical exercises, dances and certain daily recreational activities (Vásquez et al., 2015).

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Among the multiple ways of measuring the physical condition of an individual, is the Eurofit battery, the same one that entails an implementation for its use that is not accessible to all educational institutions in the country, being of little use by teachers of this subject. The Physical Efficiency tests, on the other hand, are based on simple, validated and standardized tests worldwide and that are accessible to any teacher regardless of their level of knowledge and resources. On the other hand, these measure the various activities comprised within the school curriculum, allowing the teacher to assess the level reached by the evaluated student at a certain point in the school year; enabling the coach to know the student with both the morphological characteristics and the ideal motor skills for the practice of their sports discipline. There are teachers in Peru who do not use Physical Efficiency tests to diagnose the teaching-learning process, as well as having a scale that allows students to be evaluated with better criteria according to the results obtained. Additionally, the National Curriculum that governs the subject in the country does not include the way in which students will be evaluated, reflecting a scale that favors the determination of the student who is in better or worse shape (Minedu, 2018).

Investigations carried out in Cuba and Guatemala demonstrate the benefits of these tests, which have not taken a long time in their application, can be carried out within the Physical Education class with an exercise to which the evaluated is already accustomed, achieving participation of all the students, motivating them to raise their own marks so as not to be among the laggards (Gautier du Défaix Gómez et al., 1989).

Physical Education in its different Edges

Since its creation, Physical Education has been the preamble to sports, so the teachers' vision must be performance-oriented, an aspect that the new Peruvian educational reform ignores. The methods, contents and time are oriented to attitudes and knowledge of the activities inherent to this curricular area, which takes us away from the growing eagerness of the student to go out to the sports area to vent the movements observed in the sports modality of your preference (Bernal Rubio & Daniel Huerta, 2016).

Physical Education is the pedagogical process that is carried out in schools, aimed at the development of the physical performance capacities of the individual, based on the morphological and functional improvement of the organism, the formation and improvement of their motor skills, the acquisition of knowledge and the development of their convictions in such a way that they are in a position to fulfill the tasks that society indicates from the labor, military and social point of view (Cornejo López et al., 2011). This curricular experience must base their actions on the experience of motor actions that promote future sports movements on an ascending scale.

Nowadays, the evaluation of Physical Education is more relevant, one of the aspects on which this research is based, since it allows the teacher to know the state of their teaching and the degree to which their students assimilate the process. Evaluate, is to establish comparative parameters at a moment of the teaching-learning process to determine the progress or setbacks of the same, issuing a judgment and making decisions about it (Cano Ramírez, 2006).

In Peru, Physical Education is governed by three fundamental competencies, based on a primarily cognitive approach, health care, a socio-critical culture and the practice of physical activity. In the same way, it establishes learning standards that would evaluate the aforementioned competencies, which when analyzing each of these, there is no evaluative parameter that establishes at what level the student being evaluated is (Minedu, 2018). There is a discrepancy between Peruvian teachers in the way in which the evaluation of Physical Education is assumed at different levels of education, since some accept and work by the traditional model (defined by their actions) and others by the alternative model (accentuated by educational formats), so future sports talents are not envisioned, even if they possess the physical conditions and motor skills.

When analyzing the aforementioned, from the viewpoint of the sports coach, the evaluation must establish the results of a series of actions planned in advance, which will be controlled in the different phases of the school year and will be restructured depending on the advance or delay of the practitioners (González Gutiérrez, 2013).

On the other hand, there is confusion when applying sports within the Physical Education class, in terms of application and in the evaluation by teachers in the area. Each biological age is inherent in a series of motor skills (Riera Riera, 2001b), those that, standardized, would provide the physical capacity necessary for age (Ortín Gil & Villegas Jaén, 2010), both structures being the pillars on which the subject is based.

This research aims to provide Physical Education teachers with different scales that will serve to more effectively assess physical abilities and motor skills by age, from simple, but validated tests called Physical Efficiency Tests, in addition, these will provide to sports coaches, the payroll of students with greater aptitude for the practice of sports, a determining factor so that in a shorter time, competent athletes can be counted on to face the complex situations that sports competition demands.

It can be accepted as a myth that the athlete is born with certain abilities. This responds to

many factors, which have been the subject of research by professionals in sports applied sciences. The main factor to achieve an athlete who is inserted in the maximum competition with exceptional results, is genetics (genes) (Rodríguez Quijada, 2016), although factors such as systematic training, the methodological sequence inherent to its preparation and feeding are also analyzed; without neglecting the competitive frequency that this student has to put into practice the skills and abilities acquired during the process.

Methodology

The research is descriptive cross-sectional, since only the research variables were identified, with the general objective being the determination of the physical and gestural state of the students between eight and nine years of the Señor de Huamán educational institution, Víctor Larco district, Trujillo, Peru. The study was developed in the Physical Education class schedule, where the physical capacities Resistance, Strength (arms, trunk and legs), Speed and Flexibility were measured, managing to measure up to two capacities per session; agglutinating the capacities that are directly proportional, such as Resistance with Flexibility and Strength with Speed, although in any physical activity they are mixed, one of these having priority (Cuevas Velázquez, 2009). Subsequently, a set of motor skills was taken that children in the ages described above must master, these being races, jumps, throws, catches, driving the ball (with hands or feet) and a compendium of all of them grouped in a circuit (Riera Riera, 2001a).

The population was made up of all the students of the primary level of the aforementioned educational institution, assuming as a sample 100% of them, whose ages ranged between eight and nine years (54 girls and 41 boys), subdivided in turn by age and sex (21 eight-year-old boys and 20 nine-year-olds; 34 eight-year-old girls and 20 nine-year-old boys). For data collection, Microsoft Excel and SPSS v.25 were used, where the height and weight of those evaluated were reflected, necessary to calculate the Body Mass Index (BMI), establishing the different levels, physical capacities and motor skills of the degree, the same as described below:

Procedures

In the operationalization of this activity, organizational procedures were used that expedited data collection, such as:

a. For the Endurance test, students were trained by groups, which allowed a better measurement of the distance covered by those evaluated in the time stipulated by the test for this age (three minutes), since the objectives for this age group did not is to achieve optimal athletic performance, but rather the improvement of conditional physical abilities.
b. For the Strength test, the procedure was used in pairs, achieving the teacher and evaluator, observe the levels of error committed by those evaluated at the time of execution. Only in the long jump test without impulse running was the individual procedure used.
c. For the Speed test, those evaluated were formed in pairs with a space of 30 meters and a lithium stroke chronometer base three of 100 memories that facilitated the taking of times. For the second attempt, the teacher brought together the students with the best times to compete with each other, and those with the worst times to improve themselves and away the possibility of frustration on their part (Sánchez-Alcaraz Martínez et al., 2018).
d. For the flexibility test, the individual procedure was used, this facilitated the teacher to observe the correct execution of the movement and its future measurement, visualizing the age of those evaluated and the benefits that this activity brings to the body, taking into account for its evaluation (Valcarce & 2014, 2014).

Motor Skills

In the case of the measurement and evaluation of motor skills for these ages, the following elements were taken into account:

- The throw: it was observed that the evaluated executed the technique over the shoulder, placing the armed arm above the head.
- The catches: for this dimension, the three types of receipts or catches, the low, medium and high, were taken into account, having as a fundamental premise the placement of the hands on the different types of receipts.
- Driving: driving was assessed in the manner of basketball and football, emphasizing that the movement was fluid, measuring bimanuality in unison.
- The jumps: for these ages three types of jumps were appreciated, length, height and depth; evaluating in the first the arm-leg coordination, in the second, the flexion of the legs for the takeoff, for the third, the same flexion of the legs for the fall.
- The combinations of elements: activity used to check all the skills seen

separately, put into practice as a form of minor games.

For a better understanding and evaluation of these, four levels were established, which will express the degree of completion of the suggested activity.

Table 1.

Levels of achievement reached by the boys and girls participating in the study

Level	Achievement	Description
I	Outstanding	The student manages to bring together learning with an attitude and values above the rest of the class group
II	Provided	The student has completed the programmed learning
III	Process	The student has breached some aspects of the curriculum that do not allow a link with the contents of the next higher grade
IV	Start	Qualification not seen in the educational system, but that implies a student with some condition that prevents him from reaching the expected minimum

Ethical Considerations

The research assumed two fundamental ethical principles: 1. Informed Consent, 2. Confidentiality and Anonymity (World Medical Association Declaration of Helsinki, 2013). Therefore, the cited authors were referenced, the identity of the participants was zealously preserved, who were not induced to issue expected responses, much less to modify the versions of their interviews. Transversally, the research was guided by the principles of beneficence and non-maleficence.

Results and Discussion

This section presents and analyzes the results of the different tests carried out on the research sample, where two ages and two dimensions were analyzed.

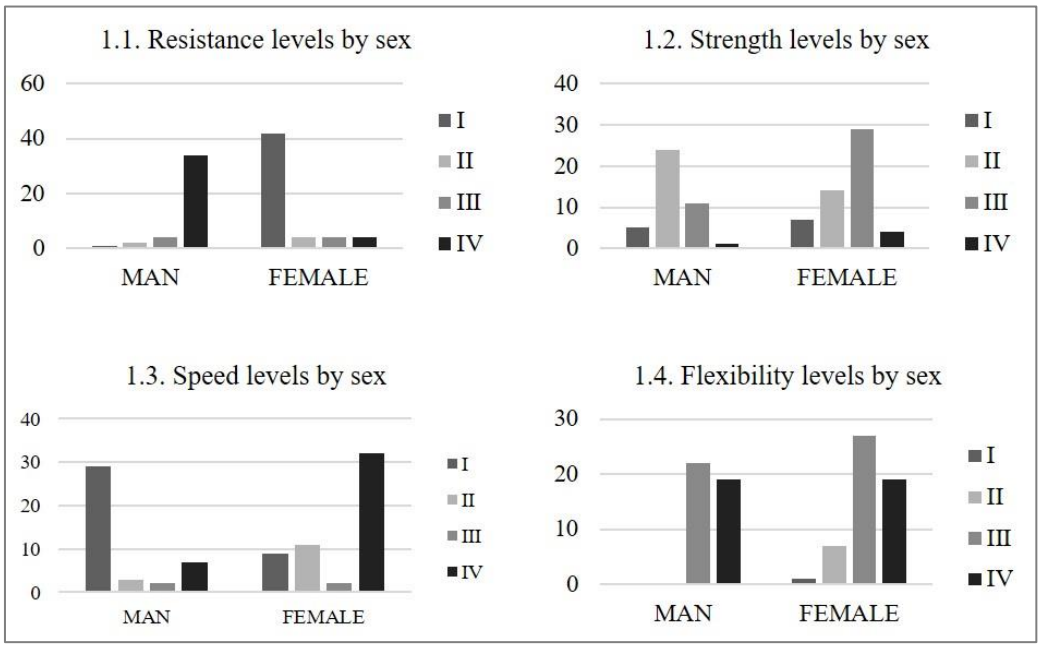

Figure 1.

Physical capacities of children between eight and nine years' old

Figure 1 reflects the physical capacities observed in children from 8 to 9 years old distributed in frequencies by levels

In the Resistance capacity, it can be seen that women placed 42 of them in the first level, representing 44. 2%; to four in levels II, III, IV, representing 7.4%. The men placed one of them in the first level, which represents 2.4%, two in the second, for 4.8%, four in the third, for 9.7% and 34 in the fourth level, for 82.9%. As can be seen,

women maintain a performance above men. In the Force, women placed seven in the first level, for 12.9%, 14 in second for 25.9%, 29 in third for 53.7%, four in fourth for 7.4%. In the case of men, they placed five of them in the first level, for 12.1%, 24 in the second level, for 58.5%, 11 in the third level, for 26.8%, and one in the fourth level, for 2.4%. As no updated scientific evidence is found to justify these results; The opinion of five experts on the subject was used, who agreed that this situation was linked, mainly, with the natural physiological development of women for these ages and therefore this condition would vary over time as the conditions of physical development of these children. However, the child's motor development does not occur in isolation because the process is influenced by biological characteristics, both genetically inherited and those acquired through own or assisted learning, resulting in new motor behavior (Garcia Caicedo, 2015). It is also related to differences in children's height, weight, and build (León Pérez et al., 2016).

In Speed, the opposite occurred, women placed nine in the first level, for 16.6%, 11 in the second level, for 20.3%, two in the third level, for 3.9%, also 32 in the fourth level, for the 62.7%. Men placed 29 in the first level, for 53.7%, three in the second level, for 7.3%, two in the third level, for 4.8%, and seven in the fourth level, for 17%. As can be seen, men maintain a performance above women. This is due to the fact that women obtained better results in arm strength, while men demonstrated better performance in leg strength, hence the explanation that the performance is superior to men in this capacity, confirming in both cases that Speed is a determining physical ability for sporting success, and at the same time, being well controlled by the teacher, it allows making the right decisions and the physical evolution of these children (Romero Frómeta et al., 2019).

In Flexibility, women placed one of them in the first level, for 1.8%, seven in the second level, for 12.9%, 27 in the third level, for 50%, 19 in the fourth level, for 35.1%. The men did not place any of them in the first or second level, while they placed 22 in the third level, for 53.6%, 19 in the fourth level, for 46.3%. It is striking that only one child is located in the first level, therefore, all children have deficits in the range of movements. According to the opinion of five experts on the subject, this situation responds to several causes; the first to the lack of exercise necessary for the development of capacity in Physical Education classes, indicating that this specific capacity must be worked on in each class session. In agreement with this, a study confirmed that it is a natural ability, but educable-trainable (Taborda Chaurra, 2017). The second is due to the lack of motivation not only to exercise in classes, but also in a self-taught way or in extracurricular activities.

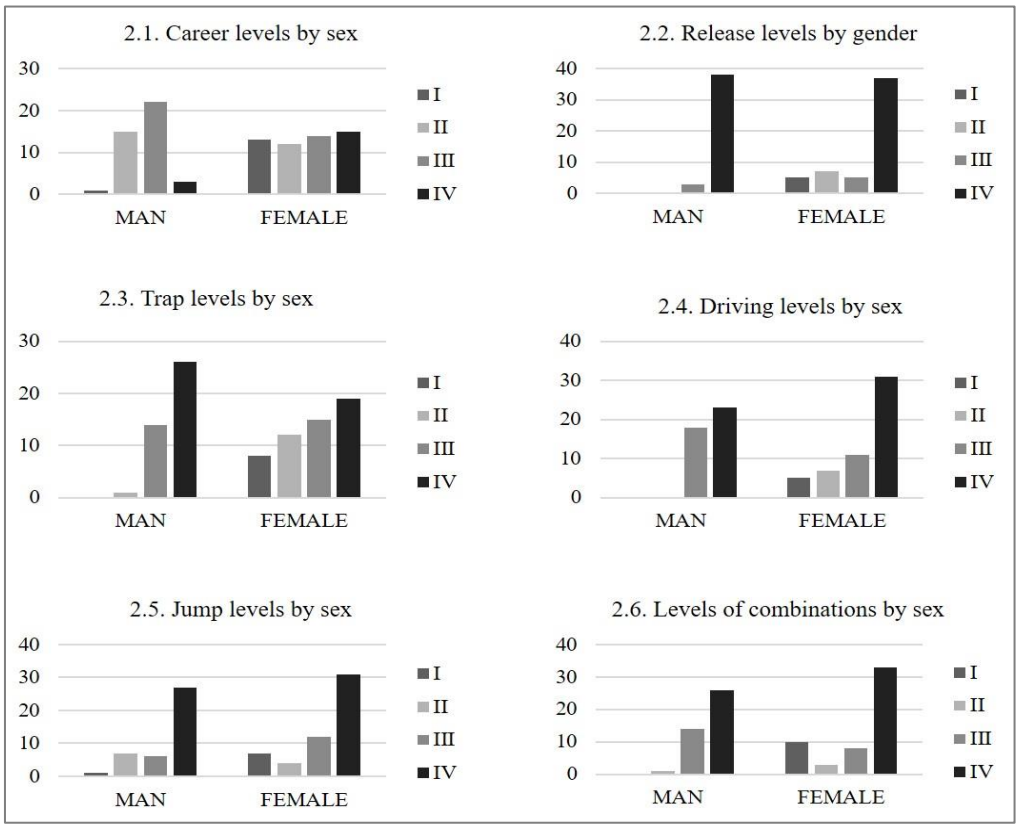

Figure 2.

Motor skills of children between 8 and 9 years' old

Figure 2 reflects the motor skills observed in children of both sexes from eight to nine years old, distributed in frequencies by levels.

In Career by sex, men placed one in the first level, for 2.4%, 15 in the second level, for 36.5%, 22 in the third level, for 53.6%, and three in the fourth level, for 7.3%. Women placed 14 in the first level, for 25.9%, 12 in the second level, for 22.2%, 13 in the third level, for 42.5%, and 15 in the fourth level, for 27.7%. In the Launch by sex, the results showed that the men did not place any of them in the first and second level, three in the third level, for 7.3%, and 38 in the fourth level; while, the women, the results flowed like this: five in the first level, for 92%. The women placed seven of them in the second level, for 12.9%, five in the third level, for 9.2%, and 37 in the fourth level, for 68.5%. In the Traps by sex, the men failed to place any student in the first level, one in the second level, for 2.4%, 14 in the third level, for 34.1%, and 26 in the fourth level, for 63.4%. The women placed eight of them in the first level, for 14.8%, 12 in the second level, for 22.2%, 15 in the third level, for 27.7%, and 19 in the fourth level, for 35.1%. This result, especially in men, is consequent to the little development of the manual eye. In Peru, whose national and most preferred sport from an early age is soccer, men develop pedic eye coordination with greater prevalence. It should be noted that this type of coordination at an early age helps children to enhance their abilities and skills, for their school performance and their daily life (Lomas Cobo, 2020). In the case of women, the preference is volleyball where catching, receiving and volleying have a greater incidence in the development of manual eye coordination. A recent research, whose main objective was to compare eye-hand coordination between boys and girls aged six to twelve, found that girls have better hand-eye coordination than boys (Guaman Rodríguez et al., 2020). This explains the superior result of females in this dimension. In Driving by sex, men did not place students in either the first or the second level, 18 of them in the third for 43.9%, and 24 in the fourth level, for 58.5%. The women placed four of them in the first level, for 7.4%, eight in the second level, for 14.8%, 11 in the third level, for 20.3%, and 31 in the fourth level, for 57.4%. Although women show better indicators, we are facing a lack of motor coordination necessary for a good result; therefore, it is necessary to improve motor deficiencies through Physical Education that allow optimal motor development, with egalitarian activities and greater opportunities for participation (Ochoa Martínez et al., 2020). This assertion also coincides with the experts interviewed, who advocate that in Physical Education classes the execution of physical motor activities should prevail, where all participants demonstrate their skills in this regard.

In jumping for sex, an activity that encourages elements of strength and speed, but which, in turn, encourages skills for the sports that the boy will perform in his student or sporting life (González Martínez, 2020), the men placed a student first level, for 2.4%, seven at the second level, for 17%, six at the third level, for 14.6%, and 27 at the fourth level, for 65.8%. Women placed eight of them in the first level, for 14.8%, four in the second level, for 7.4%, 12 in the third level, for 25.9%, and 31 in the fourth level, for 57.4%. In the Combinations of exercises by sex, the men did not place any student in the first level, one in the second, for 2.4%, 14 in the third level, for 34.1%, and 26 in the fourth level, for 63.4%. Women placed ten students in the first level, for 18.5%, three in the second level, for 5.5%, eight in the third level, for 14.8%, and 33 in the fourth level, for 61.1%. According to these results, it is corroborated that motor skills are directly proportional to physical capacities, and as a consequence, women maintain better performance than men at these ages. This statement is supported by the opinion of five experts on the subject who argued that it was correlated with the natural physiological development of women for these ages. Likewise, with the biological characteristics, both those inherited genetically and those acquired through own or assisted learning, as well as differences in the height, weight and texture of children (Garcia Caicedo, 2015); (León Pérez et al., 2016).

Conclusions

The Physical Education curriculum of Peru suffers from recreational activities that improve in children of the evaluated ages, symmetry, appropriate muscle tone for their subsequent performance in school sports as proposed in the aforementioned parchment, substantially delaying the work of sports coaches. Likewise, Physical Education teachers in Peru do not have a tool that allows them to know how much they can increase or decrease the internal and external loads that this subject originates. As a consequence, the country does not have a training process that begins in schools and that helps coaches to detect people with the ideal conditions to enter sports.

A substantial deterioration in the conditional capacities and motor skills of the evaluated population is evidenced, provided by the work-rest ratio derived from the frequency of this subject in the teaching-learning process (once a week), which contradicts studies such as the proposed by (Escalante, 2011), who states that a day of application of a stimulus does not generate anything, three times a week, generates progress, ideally, five times a week with a duration of one hour of work.

In physical capacities such as strength and speed, men maintained a slight performance above women, who showed better performance in capacities such as resistance and flexibility. This situation can be improved with the standardization of minor games that enhance the aforementioned capacities, appropriating the child of movements such as running, throwing, catching, jumping, pushing and pulling.

The motor skills measured in this study are part of its novelty, since similar studies only point to the evaluation of physical condition, avoiding important motor tasks for the future incorporation of the child to sport, which would provide ideal motor coordination.

Finally, the students involved in the study are at very high levels, such as the third and fourth levels, which infers that they do not have the proper motor skills for their age or to get involved in sport and to do so, it would involve an important time in the acquisition of these.

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