

## Evaluative model of the physical preparation of the school exathlon athletes in the eastern zone

### Modelo evaluativo de la preparación física de las exalonistas escolares en la zona oriental

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#### ABSTRACT

The objective of the work is to elaborate an evaluative model that contributes to the improvement of the evaluation process of the physical preparation of the school exathlon athletes of Cuban athletics in the eastern zone. Different research methods were used: analysis-synthesis, modeling, the systemic approach, the measurement method and the scale of measurement relationships. The rules defined for the different levels of physical preparation by exathlon respond to the Technological Demands declared by the National Athletics Commission.

**Keywords:** Evaluative model; Physical training; School exathlon athletes; Athletics

#### RESUMEN

El trabajo tiene como objetivo elaborar un modelo evaluativo que contribuya al perfeccionamiento del proceso evaluativo de la preparación física de las exalonistas escolares del atletismo cubano en la zona oriental. Se emplearon diferentes métodos de investigación: análisis-síntesis, la modelación, el enfoque sistémico, el método de medición y la escala de relaciones de medición. Las normas definidas para los diferentes niveles de preparación física por exalón, responden a las Demandas Tecnológicas declaradas por la Comisión Nacional de Atletismo.

**Palabras clave:** Modelo evaluativo; Preparación física; Exalonistas escolares; Atletismo

## INTRODUCCTION

Dissimilar are the criteria of the specialists on the conceptualization of sports training. Fielder (1969), Harre (1973), Weineck (1978), Matveev (1983), Ozolin (1989), Sánchez (1993), Ranzola and Barrios (2000), Collazo & Betancourt (2006 p.8), among others, coincide in affirming that this is a pedagogical, complex, specialized and organized process of teaching, training, education and improvement of physical (capabilities), technical-tactical, (skills), theoretical (knowledge), psychological, educational, formation of values (ethical and aesthetic) and of the functional possibilities of athletes, which is based on laws, scientific principles and rules, where permanent adaptations to physical workloads, is the essence of the athlete's preparation, which has the objective is to guarantee the achievement of the sports form, through the selection and proper use of methods, procedures and means, to guide athletes to achieve maximum competitive performance in sport.

Therefore, from the above it is deduced the importance that sports specialists currently attach to the direction of the athlete's preparation; as this is considered a multifaceted process, which brings together a set of means, in order to ensure, according to Matveev (1966), *"the achievement and elevation of the predisposition to achieve sports results"*, based on the development of physical state, psychic and the improvement of technical and tactical mastery.

It is a general criterion among specialists to see the direction of the athlete's preparation as a system that conducts processes aimed at developing the adaptive possibilities of the athlete's body, which brings together sub-processes or phases: planning, execution, control and evaluation.

On this subject, the importance of planning is unquestionable, such as *"the systematic elaboration of the execution, control and evaluation of the training of an athlete or sports team, based on the objectives set in the short, medium and long term"* (Silva, 1996), which becomes more effective *"to the extent that it can be controlled"* (Forteza, 2001), therefore, controlling in training is considered *"the recording of the performance of each student through measurement, counting, observation and evaluation in a sport or discipline"* (Zatsiorski, 1989),

*“is the information about the athlete: the assessment of their work capacity, the state of the organism during training, the level of development of physical capacities, the degree of mastery of the technique of movements, the magnitude of the load, the change in sports results, etc.”* (Absaliamov and Timakova, 1990).

Control *“is the methodological and practical scientific activity that is carried out to verify the effectiveness of the training process”* (Ranzola, 1990), *“is the source of guidance for the trainer”* (Romero and Becali, 2014), whose objective is *“to verify the effect coach of each of the loads or the training status of each athlete”* (Zatsiorski, 1989), *“assert or modify the contents based on the fulfillment of the objectives, standards and performance forecasts”* (Ranzola, 1990), once the differences have been defined, by means of the comparison *“between the results obtained with the planned ones”* (Ruvalcaba and Loaiza, 2001).

Like the control, the evaluation of sports training is of great importance, given the degree of reciprocity of both phases of management. When evaluating, after controlling an activity, the efficiency of the work is being verified in correspondence with the proposed objectives. As a didactic category *“it checks to what extent students have achieved the pedagogical objectives”* (Rapp, 1975), it allows knowing, according to García, cited by Arbona and Aguirre, *“the changes or aptitudes that a subject possesses or has acquired through practice of a physical or intellectual activity and that are manifested or are present in their biological, physical and cognitive development”*, is to identify, capture and provide information, according to (Yucra, 2001), for decision-making, providing feedback to those responsible and participants of the approaches, actions and results of a program to which it is applied, this being *“both a quantitative description (measurement) and a qualitative one of the learning results”* (Rapp, 1975).

Therefore, the evaluation of the athlete's preparation at present includes the assessment of the components of the preparation by Matveev (physical, technical, tactical, theoretical and psychological), as well as the directions of training (functional and / or physical- motor), according to (Forteza, 2001).

For Baumgartner and Jakson (1975); Kemper (1981); cited by Yucra (2001), “*evaluating is the process of conferring meaning to measurements by judging them with reference to criteria or standardized standards*”. In this sense, the evaluation of physical preparation is based on quantitative results obtained through measurement, the assessment of which is carried out through comparison, either from the individual result itself, or with a standard, which, According to Zatsiorski, VM (1989), it is the “*limiting magnitude of the result that serves as the basis for including the athlete in one of the classification groups*”.

The aforementioned, constitutes the starting point of the contradiction that is revealed between the need to establish standards to evaluate the effectiveness, in the pedagogical (physical) order, of the preparation process of the athletes of the eastern zone of Cuban Athletics in the exathlon modality, and the existing pedagogical limitations, given the absence of evaluative criteria that have generated insecurity in the specialists, about which could be considered the adequate criterion of physical preparation, to successfully participate in the zonal competition of the 13-14 year-old category of this sport.

Analyzing in depth the subject at hand, it can be pointed out that scientific research has been found in several sports disciplines, including Athletics, which have in common the description of the algorithm for the formation of standards, but none has been applied in the creation of an evaluative model through standards for the female exathlon, as a new proposal for the athlete's development, through multiple events in the 13-14 year category, implemented in Cuba in 2018.

That is why the present work has been proposed to reveal as an important aspect, a model that contains standards, which provides sports specialists with a theoretical instrument that, with its application, contributes to the improvement of the evaluative process of this modality, during the season of preparation and competition.

The actuality of the work is evidenced by its link with the 2017-2020 national athletics sport project, related to the study of the sports reserve of our country, as a line of research.

The aforementioned intentions served as a guide to apply a diagnosis, which consisted in the application of the tests that were part of the program of the Athletics zonal competition in the exathlon modality, in which the lack of the theoretical instrument was evidenced, ignorance and the impossibility of developing an evaluation, based on scientific criteria.

## **METHODOS**

To carry out this work, an intentional sample of 73 female athletes participating in the competition for exathlons of Cuban Athletics in the 13-14 year category, belonging to the Comprehensive School Sports School (CSSS), an institution that concentrates athletes with the highest sporting level in each eastern territory, whose representation for each province is as follows: Guantánamo (16 athletes, constitutes 21.6%), Santiago de Cuba (15 athletes, constitutes 20.3%), Granma (15 athletes, constitutes 20.3%), Holguín (14 athletes, constitutes 18.9%) and Las Tunas (14 athletes, constitutes 18.9%).

Starting from table #1, the average attendance per exathlon is three (3) athletes (Exathlon: "A", "B", "C", "D", "E", "F"), while the average participation by exathlon and province is the following: the provinces of Santiago de Cuba, Granma, Holguín and Las Tunas is two athletes (2), being that of Guantánamo three athletes (3).

Table 1. Participation by exathlon and provinces of the exathlon athletes of the eastern zone of Cuba.

Provinces	Exathlon					
	A	B	C	D	E	F
Guantánamo	3	2	3	3	2	3
Santiago de Cuba	3	3	3	2	2	2
Granma	2	2	4	2	2	3
Holguín	3	3	2	1	2	3
Las Tunas	2	3	2	3	2	2

Source: self-made

The competition of the eastern zone, had as its main objective, to select the best competitors in this zone to participate in the national competition and it was developed within the competitive season in the seventh mesocycle of the macrostructure.

The measurements were developed on the synthetic track located in the city of Las Tunas, through the tests that made up each exathlon and were carried out by a specialized and prepared team of national judges.

The tests carried out, which are shown in table #2, were developed determining the first three places in the tests carried out, executing three attempts in the field events (jumps and throwing) and only one for the track events (races and sports walk).

Table #2. Tests applied for each exathlon programmed in the eastern zone competition

Exathlon					
A	B	C	D	E	F
50 m/p					
60m/hurdles	60m/hurdles	60m/hurdles	60m/hurdles	60m/hurdles	60m/hurdles
Long jump					
Shot put					
High jump	Pole vault	Javelin	Discus	Hammer	March
1200 m/p					

Source: self-made

The tests used were applied to measure the following aspects:

- 50 flat meters with low start: it was used to determine the level of speed of translation.
- 60 m / hurdles with low start: it was used to determine the level of speed of action and coordination.
- The jumps (length, height and pole), the throws (discus, hammer and javelin) and the Shot put: they were applied to determine the level of fast force.
- The Sports March and the Race of 1200 meters flat: they were applied to evaluate the level of aerobic resistance.

The units of measurement used by each test behave as follows:

- Seconds: in the Race of 50 meters flat and 60 m / hurdles, both with low start.
- Minutes: in the Sports march 3 kilometers and in the Race of 1200 meters.
- Meters: in the jumps (length, height and pole), the throws (discus, hammer and javelin) and in the Shot put.

The characteristics of the implements used are summarized as follows:

- Weight of the javelin: 500 grams.
- Bullet weight: 3 kilograms.
- Hammer weight: 3 kilograms.
- Disc weight: 0.075 kilograms.
- Height of the fences: 0.72 meters.

To complete the proposed tasks, different methods, techniques and procedures were applied, both at the theoretical and empirical level:

- At the theoretical level: the historical - logical method, analysis - synthesis, modeling, and the systemic approach were used.
- From the empirical level; the measurement method and the measurement relationship scale were used. For data processing, the SPSS v.26 Statistical Program was applied to determine the arithmetic mean, the standard error of the arithmetic mean, the standard deviation, the coefficient of variation and the accuracy. The non-parametric test of the signs was applied to establish the difference between the real value and the value obtained through the measurements made, and the three sigma rule to exclude the results that were below or above the  $3 \cdot \sigma$  value using In addition, the 99.73% confidence intervals, for the calculation of 4 levels of evaluation, through the formula:

$$"R = X \pm E":$$

The following criteria were adopted to define the levels of evaluation of the exercises where the results are obtained in length (meters):

Evaluation	Points	Criterion
Very good "VG"	5	$R \geq X + E$
Good "G"	4	$R \leq X + E$
Regular "R"	3	$X - E < R < X$
Bad "B"	2	$R < X - E$

In the research, the following criteria were adopted to define the levels of evaluation of the exercises where the results are obtained in seconds:

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Very good "VG"	5	$R \geq X - E$
Good "G"	4	$R \leq X - E$
Regular "R"	3	$X - E < R < X$
Bad "B"	2	$R < X + E$

## RESULTS

Once the accuracy was determined, from the product of the value of the normal distribution by the mean square error of the mean and subsequently determining the intervals, according to the formula stated above, the standards that make up the model were defined to evaluate the physical preparation of the Former school athletes from Cuban Athletics, eastern zone, which are reflected in table #4.

Its structure follows qualification levels, with the application of a scale of points. If an exathlon athlete shows an evaluated result of MB (Very Good), by the scale of points, this is awarded 5 points, a procedure that is carried out with all the other qualifications.

For the evaluation of the result based on the standards, the established ranges are taken into account, according to the qualifications and points to be awarded. Each level starts from a value lower than or equal to this, down to a lower value than the value of the higher level.

Starting from table 4, in exathlon A, in the Race of 50 m flat with low snatch (s.), An exathlon athlete would reach the evaluation of MB (Very Good) with 5 points, if her result in this test is equal or less than 6.72s. To give the evaluation of B (Good) with 4 points, the result must be between 6.97s and 6.71s. To grant the evaluation of R (Regular) with 3 points, the result must be located from 7.21s to 6.98 s to award the evaluation of M (Bad) with 2 points, the result must be located below 7.21s

Table #4. Standards to evaluate the physical preparation of the school exathlon athletes of the Cuban Eastern Zone Athletics

EXATHLON	Events	STANDARDS			
		MB	B	R	M
		5 pts	4 pts	3 pts	2 pts
A	50 flat meters with low start (s)	6.72	6.97	7.21	7.46
	60 meters hurdles (0.72 m) with low start (s)	9.07	9.70	10.33	10.96
	Long jump (m)	4.96	4.65	4.34	4.03
	High jump (m)	1.48	1.38	1.27	1.16
	Shot put de 3 kg (m)	8.67	7.71	6.74	5.77
	1200 flat meters (min.)	4.33.2	4.43.8	4.54.6	5.15.0
B	50 flat meters with low start (s)	6.80	6.95	7.10	7.25
	60 meters hurdles (0.72 m) with low start (s)	9.34	9.84	10.34	10.85
	Long jump (m)	4.70	4.49	4.28	4.07

	Pole vault (m)	2.33	2.10	1.86	1.62
	Shot put de 3 kg (m)	7.89	7.33	6.77	6.21
	1200 flat meters (min.)	4.45.6	4.52.8	5.01.0	5.23.0
C	50 flat meters with low start (s)	6.99	7.17	7.34	7.51
	60 meters hurdles (0.72 m) with low start (s)	9.70	10.31	10.92	11.52
	Long jump (m)	4.65	4.46	4.26	4.07
	Shot put de 3 kg (m)	9.09	8.72	8.35	7.98
	Javelin throw de 500 grams	30.04	27.72	25.39	23.06
	1200 flat meters (min)	4.38.4	4.46.8	4.54.6	5.08.0
	D	50 flat meters with low start (s)	7.07	7.36	7.65
60 meters hurdles (0.72 m) with low start (s)		10.39	11.24	12.08	12.93
Long jump (m)		4.47	4.31	4.15	3.99
Shot put de 3 kg (m)		10.18	9.23	8.28	7.34
Discus throw de 0.075 kg		32.24	27.56	22.87	18.18
1200 flat meters (min)		5.06.2	5.20.3	5.33.4	5.46.5
E	50 flat meters with low start (s)	6.91	7.29	7.66	8.04
	60 meters hurdles (0.72 m) with low start (s)	9.05	10.40	11.75	13.10
	Long jump (m).	5.05	4.50	3.95	3.40
	Shot put de 3 kg. (m)	9.08	8.37	7.66	6.96
	Hammer throw de 3 kg. (m)	34.48	30.38	26.29	22.19
	1200 flat meters (min)	4.49.9	5.03.9	5.35.8	5.39.6
F	50 flat meters with low start (s)	7.08	7.21	7.34	7.47
	60 meters hurdles (0.72 m) with low start (s)	9.93	10.16	10.39	10.63
	Long jump (m)	4.30	4.17	4.03	3.90
	Shot put de 3 kg. (m)	7.39	6.50	5.60	4.70
	Sports march 3 km (min.)	16.57.3	17.54.6	18.54.0	19.51.6
	1200 flat meters (min)	4.24.2	4.27.9	4.30.6	4.33.3

Source: self-made

The final evaluation of the exathlon athlete, which is shown in table #5, is made first from the average of the points accumulated in each of the tests that make up the exathlon and later consulting in table #6 the average of points with the final grading scale of the exathlon athlete.

Table #5. Final evaluation of the exathlon athlete, according to the application of the rules.

		Exathlon	Events						
#	Exathlon athlete		50 m/p	60 m c/v	Long jump	Shot put	High jump	1200 m/p	Average points

Source: self-made

Table #6. Award levels of the exathlon athletes' final evaluation.

Qualitative evaluation	Accumulated points
Very Good (VG)	5
Good (G)	4-4.9
Regular (R)	3-3.9
Bad (B)	Less than 3

Source: self-made

## DISCUSSION

The novelty of this proposal is materialized in the new relationships established by the evaluative model, which enables feedback on the fulfillment of the objectives of physical preparation of the former school athletes of Cuban Athletics, eastern zone.

In addition, there is a system of standards with their corresponding evaluative criteria that covers the exathlons from Exathlon A to Exathlon F, which allow the comprehensive measurement of physical preparation.

From Ranzola (2001) the conceptualization of the control of sports preparation that he needs in his book "Manual for initiation and development sport" is assumed, since the authors' criteria for using this activity to evaluate in the scientific-methodological order coincide, the effectiveness of sports training aimed at participating in zonal competitions in the Exathlon modality for the first time in Cuban Athletics in the school category.

It agrees with what was expressed by Romero and Becali (2014) in their book "Methodology of sports training, that control is an instrument that guides the coach in the process of directing sports preparation, which, according to our criteria, based on the characteristics of the structures of sports preparation planning, is located to evaluate the objectives that are proposed.

The provisions of Zatsiorski (1989) in his book Sports Metrology are assumed, agreeing that the control contributes to evaluating the trainer effect of training loads. In this sense, the idea expressed by this author is shared, since the evaluation of the cumulative effect of training loads is only possible from the implementation, in sports preparation, of different moments of control that favor the systematic evaluation and periodic adaptations to the training loads supplied.

The idea expressed by Razola of using control as the way to maintain or modify the contents of the preparation is shared, according to the fulfillment of the objectives, the standards and the performance forecasts. By taking into account the aforementioned, we can express the importance of systematic evaluation of the didactic components of the teaching process, as determining aspects in the quality of their fulfillment.

The criterion is taken from Zatsiorski that the evaluation of physical preparation is based on quantitative results obtained through measurement, the evaluation of which is made through comparison, either from one's own individual result, or with a standard, which allows the inclusion of the athlete in one of the classification groups. In our opinion, it is worth highlighting the significance of the proposed evaluative model, which defines tests and standards for the different exathlons, as a result of a prior process of measurement, processing, analysis and interpretation, based on what was proposed by this author. of the data, which allow at different moments of the preparation, through individual and collective comparison, to determine the achievements and weaknesses in the preparation of the exathlon athletes of the athletics sport of the eastern part of the country.

The authors of this work consider the significance of the evaluation for the verification of the changes in the psycho-functional, biological development, which according to Yucra (2001), are of the utmost importance for the identification, capture and contribution of information for making related decisions with the elaboration of the teaching programs and training plans and the observation of the progress of the training adaptations, based on the comparison of the test results, a conception that justifies the need for the research that is presented, given the insufficiency of standards to evaluate the preparation of exathlon athletes within the sports teaching process, both in sports training and in competitive activity.

Based on what the researchers refer to about the comprehensiveness that must be required in the evaluation of the athlete's preparation, the authors consider that in subsequent studies related to this issue, tests with their respective standards should be included to evaluate other aspects related to this aspect.

By way of conclusion, we can point out that one of the objectives of the research is fulfilled, showing an evaluative model that responds to new trends and the need to improve the control and evaluation of the physical preparation of the school exathlon athletes of Cuban Athletics Eastern Zone.

The levels of development diagnosed were characterized by a small and medium degree of dispersion, with greater homogeneity in the results achieved by exathlons in the Race of 50 m flat with low start, where the degree of dispersion ranged between 0-10%.

The model presented represents the characteristics in the physical order of the school exalonists of Cuban Athletics, eastern zone, which will be evaluated, based on the statistical definition of the standards for different levels of physical preparation by exathlon, as a theoretical instrument provided by the research that enables feedback on compliance with the objectives of the athlete's preparation system.

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