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Original article

Actions for the top-spin technique of backhand, in school table tennis athletes

Acciones para la técnica top-spin de revés, en atletas escolares de tenis de mesa

Ações para a técnica do backhand top spin em atletas escolais de tênis de mesa

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ABSTRACT

The present work is generated from the analysis of the results obtained by the table tennis athletes, of the under 13 years category of the Sport Initiation School (Eide in Spanish) of Pinar del Rio, in the national school championships 2017 and 2018, where good results were not obtained, due to difficulties in the effectiveness during the matches carried out. Therefore, in the search for higher competitive achievements, the objective was set: to conceive a system of strategic actions for the improvement of the top-spin technique on the downward effect, in real situations of the game that increases the effectiveness in table tennis athletes, in the under 13 years category of the Eide de Pinar del Rio. For this purpose, scientific methods were applied, such as: observation, interview, as well as the review of different bibliographic sources, which allowed, from the diagnosis of the phenomenon to be studied, to elaborate the system of actions to face the solution of the proposed problem.

Keywords: Technical preparation; Top-spin technique of backhand; Table tennis; School athletes.

RESUMEN

El presente trabajo se genera a partir del análisis de los resultados obtenidos por los atletas de tenis de mesa, de la categoría sub 13 años de la Eide de Pinar del Rio, en los campeonatos nacionales escolares 2017 y 2018, donde no se obtuvieron buenos resultados, presentándose dificultades en la efectividad durante los partidos efectuados. De ahí que, en la búsqueda de logros competitivos superiores, se planteó como objetivo: concebir un sistema de acciones estratégicas para el perfeccionamiento de la técnica top-spin de revés sobre el efecto abajo, en situaciones reales del juego que aumente la efectividad en los atletas de tenis de mesa, en la categoría sub 13 años de la Eide de Pinar del Río. Para ello, se aplicaron métodos científicos tales como: la observación, la entrevista, así como la revisión de diferentes fuentes bibliográficas, que permitieron, a partir del diagnóstico del fenómeno a estudiar, elaborar el sistema de acciones para enfrentar la solución de la problemática planteada.

Palabras clave: Preparación técnica; To spin de revés; Tenis de mesa; Atletas escolares.

RESUMO

Este trabalho é gerado a partir da análise dos resultados obtidos por atletas de tênis de mesa, na categoria menores de 13 anos da Eide de Pinar del Rio, nos campeonatos escolares nacionais de 2017 e 2018, onde não foram obtidos bons resultados, apresentando dificuldades de eficácia durante as partidas disputadas. Assim, na busca por conquistas competitivas superiores, o objetivo foi: conceber um sistema de ações estratégicas para o aprimoramento da técnica do backhand top spin no efeito downward, em situações reais de jogo que aumente a eficácia em atletas de tênis de mesa, na categoria menores de 13 anos da Eide de Pinar del Río. Para tanto, foram aplicados métodos científicos como: observação, entrevista, bem como a revisão de diferentes fontes bibliográficas, o que permitiu, a partir do diagnóstico do fenômeno a ser estudado, desenvolver o sistema de ações para o enfrentamento da solução do problema levantado.

Palavras-chave: Preparação técnica; A tosse gira para trás; Tênis de mesa; Atletas da escola.

INTRODUCTION

Table tennis is a sport that has become widespread in the universe, both in the federal and competitive field as well as in the educational and recreational field, being the third sport with more federated players.

Consequently, it is one of the most popular racket and paddle sports in the world. It is considered an opposition sport par excellence and even more so an opposition sport without collaboration, also catalogued as a sport of confrontation without physical contact between the rivals (Sáez, Ruano and Gutiérrez, 2019b).

In this sense, the previous authors assume that the tasks that the table tennis player must undertake during the course of a game are very complex and keep changing all the time since they are activities that are developed in a highly variable context; the undetermined nature of the playing environment is increased by rigid limits of time and space and by the low predictability of the rival's actions.

Consequently, both Munivrana, Petrinovic and Kondriè (2015), and Lino and Kojima (2016), consider table tennis as an intelligent game, with intentions, with a low organization of the actions where the sequence of movements is not known, neither in the development nor in the end of them.

According to Vizcaíno (2015), the training of modern table tennis has varied considerably due to the current development trends of sports in the world, responding to the many technical elements it has, which support the technical-tactical actions during the competition and as a result of these changes emphasis is placed on this aspect of sports preparation that plays a preponderant role in the sports results of the tennis player.

Offensive play prevails at all levels and most athletes use this technical-tactical profile whose effectiveness depends largely on the quality of the hitting in each of the technical elements.

Of all performance factors (technical, tactical, physical, psychological, anthropometric, coordination, material-related), technique is the most important and most studied element. This is because it determines the level of effectiveness with which physical capacities are expressed in competition and good technique is a predictive parameter of performance (Bermejo, 2013).

According to Buitrago, Jiménez and Rodríguez (2014), technical-sports preparation is the most effective way to solve a motor task in accordance with mechanical and biological laws and also with rules. We can point out that the most specific aspect of sports training is technical preparation. While tactical preparation provides the most effective ways of executing the technique. Its two fundamental tasks are the development of tactical solutions and the development of the ability to select the optimal solution or its adequacy.

Briefly, technique is the form and it is composed of three essential elements (rationality, economy and effectiveness), while tactics is the diverse way of using the technique.

Different authors have carried out studies concerning the characteristics and treatment given to the different technical elements of table tennis, among them: Gómez and Zissu (2002), Tielemann (2007), Pimienta and Jauregui (2013), Munivrana, Petrinoviæ and Kondriè (2015), Pradas *et al.,* (2016).

At the national level, the work done by Oliva (2012), Díaz and Arencibia (2014), Infante, Pinto and Pérez (2014), Vizcaíno (2015), Morales *et al.,* (2018), Sáez, Ruano and Gutiérrez (2019a).

Table tennis is a creative sport where players use different types of advanced techniques to make the game more efficient and stimulating. In this game, the player's goal is to hit the ball with a ping pong racket, printing different speeds, strokes and turns to win more points than his opponent.

When a player adds an effect to the ball, it causes major changes in the game of ping pong. A good stroke with effect can make the difference between an intermediate and an advanced player, so it is very important to become familiar with all the different types of strokes with spins and effects. What distinguish an excellent player from a good one is the amount and quality of the spin (effect) that can give in each stroke.

From the existing basic strokes, in table tennis, strokes are used in which the ball is given different types of effects, among which is the top-spin, on which this work is focused.

The top-spin is a very effective way to take the initiative in an offensive way and is an essential element within modern table tennis techniques. The Japanese players were the first to use this stroke around 1960, its etymology follows the English words TOP, which means "up", "high", etc., and SPIN, which means "effect" (Oliva and Gomez, 2012).

The top-spin is a more advanced stroke, in which the ball is given a very pronounced lift effect. This type of spin can be used for deep and speedy strokes as the ball, when it is hit, spins forward in the direction of the opponent. Unlike the back spin, when we return with the flat paddle, the ball will go up and miss the shot.

This type of stroke can be performed both forehand and backhand. To do it correctly, it is necessary to drive well with the legs when hitting and to accelerate the arm executing the shot to hit the ball smoothly but quickly.

Nowadays, the top-spin technique is aimed at increasing the tactical effectiveness, according to the current demands in table tennis, which allows to obtain points in the game and thus to win the match.

In the development of the 2017 and 2018 national school championships, the table tennis athletes of the under 13 category of the Eide of Pinar del Rio presented difficulties in the effectiveness of the strokes used during the matches performed, particularly the backhand top-spin, making errors in the performance of the same as: lack of coordination in the movement of the legs, trunk and arm, lack of body balance, bad positioning of the legs, incorrect angle of inclination of the racket. This affects the success in the performance of the technique in game situations to obtain the point.

Therefore, the objective of this research is to elaborate a system of strategic actions for the improvement of the top-spin backhand technique on the downward effect, in real situations of the game that increases the effectiveness in the table tennis athletes, in the under 13 category of the Eide of Pinar del Rio.

MATERIAL AND METHODS

Context and participants

The research was carried out at the end of 2017 and beginning of 2018; the six table tennis athletes, under 13 years old category, from Eide de Pinar del Rio were considered for its development; three are female and three are male, all of them continuous in the center.

They have an average weight of 45.2 kg, with an average height of 149 cm. Their average age is 12 years old.

These athletes are classic grip players, with an offensive style of play of short and medium distance, only three dominate the long distance. They are all straight and have more than four years of experience in this sport.

Their national results in the individual event are low, only two stand out in the lower categories, reaching gold medals, but not in the under 13 category.

In addition, a secondary sample was used, and the interview was applied to them with the purpose of knowing their criteria about the aspects related to the use of the backhand top-spin, constituted by the three coaches that work with this category.

Methods, techniques and instruments

For the development of the research, scientific methods were used, both of the theoretical and empirical order, as well as mathematical-statistical, such as: historical-logical, analysis-synthesis, documentary review, observation and interview.

Observation: six training sessions were observed where attention was paid to the indicators established in the research. These indicators consist of whether the coordination between the upper and lower extremities is taken into account, whether there is a link between the psychomotor possibilities necessary for the athlete to execute all the typical movements of the game of table tennis, and in this same order the use of the backhand top-spin effect for the solution of situations in the game of table tennis.

Documentary review: scientific articles published on the subject were reviewed, as well as the preparation program for the table tennis athlete and other documents that guide the training process in this sport discipline.

The author uses quantitative and qualitative values that allow to know the state of the object of the investigation that are in the range (5-2) where five is the maximum qualification granted.

RESULTADOS

Observation results

In general, as a result of the observations made when executing the backhand top-spin, the left foot passes it forward, they do not coordinate the movement of the legs, trunk and arm, they perform the movement with the arm only, they do not finish the movement properly, the support of the feet is performed on the heels and they do not bend the trunk when performing the stroke.

Of particular interest is the search for solutions for the correct performance of the backhand top- spin technique in the athletes, which the trainer has to achieve in order to reach an increasingly deeper preparation, which does not limit its action to the athlete assimilating knowledge and skills separately, but allows him to conform a system of knowledge, so that it contributes to the improvement of the techniques.

In the same way, a study was made in competition conditions (control matches) evaluating several indicators related to the use of the backhand top-spin, where the following results are shown (Table 1).

Table 1. - Observation results

Atletes	Backhand top-spin achieves direct point				With the performance of the backhand top-spin, it destabilizes the opposite				If the performance of the backhand top-spin achieves an easy return of the opposite				Backhand top-spin keeps opponent on the defensive			
	Total of actions	Possitive actions	Negative actions	% of effectiveness	Total of actions	Possitive actions	Negative actions	% of effectiveness	Total of actions	Possitive actions	Negative actions	% of effectiveness	Total, of actions	Possitive actions	Negative actions	% of effectiveness
1	92	34	58	39	104	42	65	39	75	26	49	34	104	38	66	36
2	105	40	65	38	95	37	42	39	87	33	54	37	112	42	70	38
3	87	32	55	36	102	42	60	41	79	29	50	36	103	39	64	38
4	110	48	62	43	83	34	49	40	92	36	56	39	108	48	60	44
5	81	31	50	38	89	36	53	40	80	30	50	37	94	39	55	41
6	87	35	52	40	91	33	58	36	76	29	47	38	82	30	52	36
Total	562	220	342	39	564	224	327	39	489	183	306	36	503	236	367	39

The behavior of the six players can be observed when the direct point is achieved through this stroke.

The athlete three presents a total of 87 actions carried out, hitting in the corresponding area of the opponent 32 positive balls and not hitting in the table of the opponent 55 negative balls, so it represents a 36 % of effectiveness, the worst result.

The athlete with six balls has a total of 87 actions performed, hitting 35 positive balls in the corresponding area and not hitting 52 negative balls on the opponent's table, which represents 40% effectiveness in this category, which, although evaluated poorly, is the best result in this indicator.

Collectively, this indicator shows 39 % overall in this category, which represents poor effectiveness in this category, which is poorly evaluated according to the values shown in the table.

At the same time, the performance of the backhand top-spin was analyzed in order to destabilize the opposite, where the highest % of effectiveness corresponded to the athletes three and four, however, they were evaluated badly.

In general, in this indicator a total of 564 actions were performed, hitting 224 balls in a positive way in the corresponding zone of the opponent and not hitting 327 balls in a negative way in the table of the opponent, which represented 39 percent in this category, thus showing the bad effectiveness in this category, it was evaluated badly.

Results of the observation to the execution of the backhand top-spin, when it destabilizes the opposite, the behavior of the indicator can be appreciated where it is valued if the execution of the backhand top-spin achieves an easy return of the opposite.

In this indicator, a general total of 489 actions were carried out, hitting 183 balls positively in the corresponding area of the opponent and not hitting 306 balls negatively in the opponent's table, which represented 37 %.

Another indicator of interest was whether the use of the backhand top kept the opponent on the defensive.

In the same way, in this indicator a general total of 603 actions were carried out, biting 236 balls in a positive way in the corresponding zone of the opposite one and not biting 367 balls in a negative way in the table of the opposite one, so it represented a 39 %, noticing the bad effectiveness and it is evaluated badly.

It was also possible to analyze the percentages of effectiveness by indicators, offering the following information: it was verified that, of a total of 2221 actions performed, 63.3% correspond to negative actions, which shows the bad effectiveness of the athletes in this technique.

Actions for topspin backhand technique in school athletes

In order to solve the difficulties detected in the table tennis athletes of the under 13 category, a system of strategic actions is proposed that is interrelated and has the function of guiding the coach in the organization and direction of the sports preparation of the table tennis athletes. It follows an optic where the general and the singular complement each other to give an answer to the game situations that the players present for the sport success.

The strategic actions are aimed at creating ways to ensure the implementation of a personalized, coherent and flexible system that favors the athletes, under the direction of coaches, the socialization of their professional experiences, in correspondence with the requirements of their sports performance, in the social task with which they are committed (Figure 1).

In relation to the previous objective, the following specific objectives are conceived:

- Determine the real needs of the athletes.
- To perfect the methodological preparation of the coaches.
- To become familiar with the most current trends in the field of sports training methodology, with emphasis on Table Tennis, which includes the use of technologies.
- To measure the effectiveness achieved with the application of the system of strategic actions through the proposed indicators.

The need to concretize, in practice, the theoretical proposals, requires the knowledge of the conditions that are in the context for the application of the strategic actions, for what the opportunities were determined that would favor the putting in practice of the same ones:

Opportunities:

- Teachers and athletes are interested in the proposal.
- There is an understanding of the need to raise the levels of development to face sports competitions by teachers, athletes and directors.
- Increase of options for the technical-tactical improvement of the athletes.
- Growing interest in the athlete population for learning and technical-tactical improvement.
- Introduction of new pedagogical strategies that require a better trained and prepared coach to face the changes in today's sport
- Coaches and athletes are interested in knowing the new trends in table tennis training in order to face the changes.

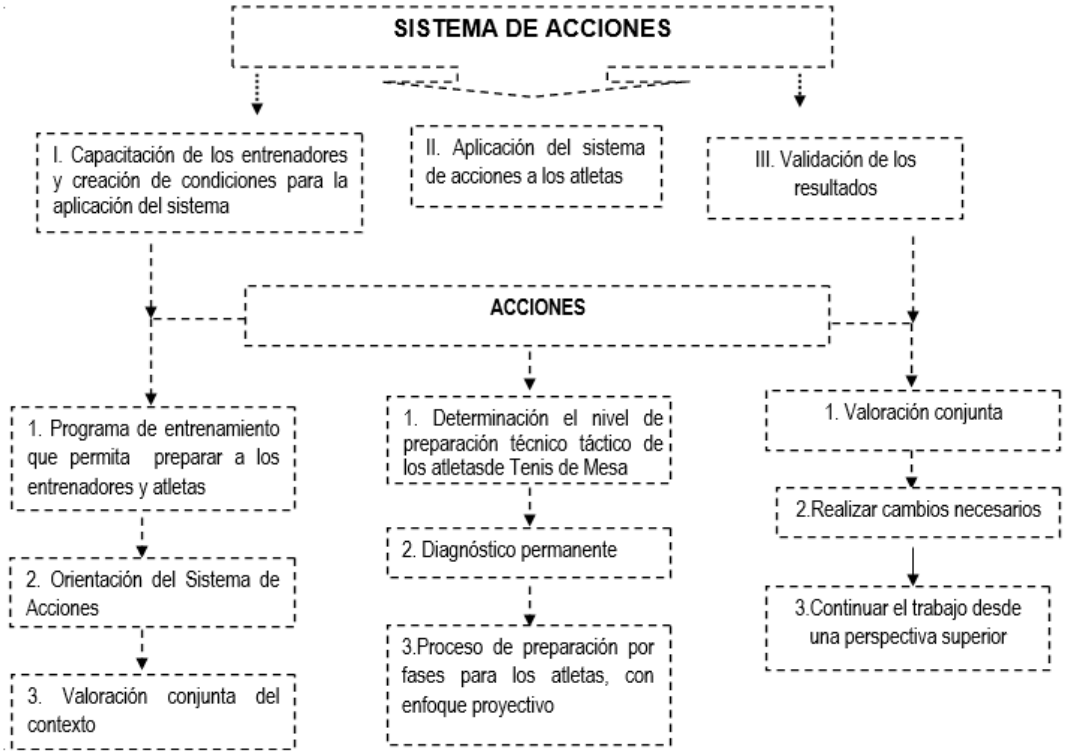

Fig. 1. - Graphic representation of the system of actions

An experimental check was applied, for which the instruments were validated and processed from predetermined dimensions and indicators, which allowed to evaluate knowledge and sport performance.

The system of actions is implemented from October 2017 to June 2019. Prior to its implementation, a meeting was held with the table tennis teachers of Eide de Pinar del Rio, with the provincial sports commission, with the provincial methodological technical section and with the sports group that attends this sport in the institution, in order to know their opinions about the proposal. In this meeting, all the participants in the analysis approved the designed actions and specified dates and responsible in each case.

In the stage of diagnosis and planning, the first step was the diagnosis by the teachers, from the application of instruments where the potentialities and needs were determined; then, they were guided to locate by order of priority the preparation needs and, finally, an inventory of consensus was made where the results of the initial diagnosis were analyzed and the topics to be treated in the process were discussed.

In this stage, a wide discussion was carried out, being approved the actions, being recommended for its implementation to incorporate to the group object of study the teachers of the base areas and the members of the provincial commission and responsible for grouping of sport, as entities of the formative process that is tried to carry out.

The third stage corresponded to the introduction of the actions designed for each phase, which were developed as planned. The first actions counted with the participation of 100 % of the teachers and athletes because they considered it opportune to incorporate all of them, as a previous condition for the remaining actions and those who dominated the activities were incorporated to assist their classmates.

The evaluation was carried out through a knowledge exchange workshop; the debate and reflection generated by this activity contributed to the increase and assimilation of the activities addressed during this period. The qualifications reached by the teachers allowed to move on to the organized actions, with an adequate evaluation.

The results and evaluations of the teachers and athletes showed that they had met the objectives set for the stage.

It was possible to verify the interest of the table tennis teachers in the planned actions. A closing workshop was held for each topic and several training sessions were held as practical activities; these were held at the agreed date and time and attendance was 98.6 %.

The evaluation was systematic and practical, although at the end of the period a workshop for knowledge exchange was applied; furthermore, it is worth mentioning that the self-evaluation was very useful to know the level of fulfillment of the objectives set.

Regardless of the results achieved, it was necessary to carry out individual and group consultations to give more specific guidance to table tennis instructors who were less proficient in the techniques discussed and in order to better provide information.

The analysis and discussion of the training process for table tennis generated very favorable opinions among the professors, who until that moment considered that the contents received in the undergraduate program and the experiences of daily work were sufficiently useful to face this process; in this sense, the incorporation of new scientific-methodological elements was of great help that allowed them to contextualize the knowledge acquired, in search of perfecting their training work.

The actions carried out were evaluated by the teachers themselves as excellent, for the knowledge and skills acquired. The preparation achieved by the table tennis instructors facilitated the systematization of the knowledge achieved, manifested in the development of the training units, specifically in the correct work-rest relationship, the individualization of the loads and the use of ideal methodologies for the individual characteristics of each player, among others; this constituted one of the highest quality activities and an example of the professionalism achieved by the instructors.

Twenty training units were audited, with the objective of checking how the Table Tennis teachers perfected their performance based on the knowledge acquired with the system of actions.

The greatest difficulties in the diagnosis were how to project the actions for the dynamics of the game, the capacity to create new tactical actions that respond to the situations of the game, how to start from problematic situations to be solved in the training to put them in force during the competition, as well as the constant study of the opponent to be able to guide the player in the context of table tennis; in this case, the teachers did not have all the knowledge to determine it and, at the request of the participants themselves, it was decided to carry out a workshop that would go deeper into this subject.

The support received by the Provincial Sports Commission in all stages of the investigation should be highlighted, but fundamentally, in the actions planned within the training units, where the greatest effort was always made to prioritize the activities planned in the system.

As a last step, a final workshop was held, in which the benefits and the mistakes in the implementation of the proposal were analyzed, suggestions for the future improvement of the actions were made and it was concluded with a satisfaction survey applied to the teachers.

The evaluation of the monitoring of the system of strategic actions can be developed through the impact evaluation or with other instruments such as a satisfaction survey to the participants. The latter makes it possible to highlight weaknesses, limitations and strengths in order to reach a qualitatively and quantitatively higher stage.

DISCUSSION

Table tennis is an opposition sport par excellence and even more so without collaboration. Pérez, R. (2011) assumes that the tasks to be undertaken by the table tennis player during the course of a game are very complex and keep changing all the time as they are activities that take place in a highly variable context; the undetermined nature of the playing environment is increased by rigid limits of time and space and by the low predictability of the opponent's actions.

On the other hand, Matytsin, quoted in Oliva, (2012) considers it an activity that is conditioned by the low predictability of the opponent's actions, while Malagoli, Di Michele and Merni, (2014) qualify table tennis as a direct duel between two players.

The Cuban National Commission of table tennis, in its program of preparation of the sportsman (2016), defines as one of the fundamental tasks within the technical-tactical preparation the development of complexes of game actions, establishing combinations where relations of mutual dependence between the actions that take place can be observed.

The relation actions of the rival - own actions - acquires in the table tennis a very specific bond, given by the specificity of the actions of answers determined by factors like: type of effect, depth, type of rubbers, that cause that for each action specific answers exist and, even, answers that are considered incompatible and that would inevitably bring as result to err Sáez Morales, G., Ruano Anoceto, O., & Gutiérrez Pairol, M. (2019a).

For Díaz, M.; Arencibia, A. (2014), the Top-Spin is executed with a fast movement of the arm from bottom to top, with the objective of giving the ball a lift effect of very special characteristics. It can be said that the ball is hit tangentially and the ball/racket contact is more prolonged than in other strokes. To be able to give this shot with the maximum guarantee, it is necessary to use smooth rackets with a thickness of 2 to 2.5 mm. of sponge, since other smooth models will be less adherent and less elastic if they have 1 or 1.5 mm. of sponge, and the Top-Spin will not be as effective. Trying to hit the Top-Spin with a spiked racket is almost impossible or the hit is ineffective. The studies presented on the Top-Spin always correspond to the hit made on a cut ball.

Hence, the system of actions proposed not only implies each element presented from the theories addressed, but as a fundamental requirement it complies with the methodology established by Pimienta, I. D. O., & Jauregui, J. C. A. (2013). That, although it is designed for untrained young people, it shows necessary elements of learning the basic technique in this sport and it is expressed in this way:

For very separated legs: make marks on the floor of the feet of athletes with this problem, then, mark them correctly in the distance already explained.

Another form of correction is to tie the students' feet with an elastic at the described distance and, when they feel the tension, to close their feet at the correct distance.

Unbent legs: for this problem, the teacher must first explain the position correct, then have the athletes jog and at the sound, visual or gestural signal the students must stop and take the corresponding position, repeat several times.

Another form of correction is to invite the athletes to sit in the air, always taking care that no accidents occur. Another way is that the athletes play "mirror", a student who does not have the problem with another who does, the one who does it correctly will be the model to copy, the other who presents the error will be the mirror.

Very upright trunk: for this type of problem, the demonstration by the teacher is primordial, then, the sportsmen will perform the basic fundamental position, raising their feet in the back; this is done repeatedly.

Exaggerated inclination of the wrist: this error is very frequent in this stage of teaching of table tennis; to be able to solve it, it is proposed to carry out exercises of throws of balls on the part of the trainer or professor, it is never due to say to the sportsman that the wrist leans, since this invites to the error, only the flexion and extension of the arm take place.

The system of designed actions is structured in three stages and directions, which allow to attend the theoretical, methodological and attitudinal needs of teachers and athletes. It is contextualized through the implementation of a system of actions that is coherently articulated from participatory discussion and intensive and systematic practice in and from the context where they work. It is distinguished by placing the athlete as the protagonist of the same process and by contributing to the transformation of the organization in the very scenario of realization.

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