

26

Presentation date: August ,2023

Date of acceptance: October, 2023

Publication date: November, 2023

EVALUATION

OF THE IMPACT OF PROJECTS EXECUTED IN HIGH-PERFORMANCE SPORTS

EVALUACIÓN DEL IMPACTO DE PROYECTOS EJECUTADOS EN ÁREAS DEPORTIVAS DE ALTO RENDIMIENTO

Norma Martínez Ruiz¹

E-mail: norma.martinez1163@gmail.com

ORCID: <https://orcid.org/0000-0002-6017-8631>

Belkis Hortensia Pentón Hernández¹

E-mail: belkis.penton@umcc.cu

ORCID: <https://orcid.org/0000-0002-5510-8698>

Maria de Lourdes Artola Pimentel¹

E-mail: lourdes.artola@umcc.cu

ORCID: <https://orcid.org/0000-0002-6609-7701>

William Francisco Rodríguez Heredia²

E-mail: rodriguezherediawilliamfrancis@gmail.com

ORCID: <https://orcid.org/0000-0002-6358-4862>

¹Universidad de Matanzas, Matanzas, Cuba.

²Universidad de Ciencias de la Cultura Física, La Habana, Cuba.

Suggested citation (APA, seventh ed.)

Martínez Ruiz, N., Pentón Hernández, B. H., Artola Pimentel, M. L., & Rodríguez Heredia, W. F. (2023). Evaluation of the impact of projects executed in high-performance sports. *Universidad y Sociedad* 15(6), 261-271.

ABSTRACT

The process of evaluating the impacts of the results of scientific work on high sports performance, specifically research and development projects, is a matter of high relevance for sports development in the country, however, despite the guidelines of the Ministry of Science, Technology and Environment and INDER's own difficulties are seen in the recognition of the transformations and contributions of scientific activity carried out in areas dedicated to the practice of sport, which affects the process of evaluating the impacts of the results, for this reason, therefore, the author has proposed to show the result of the study of a methodology for the evaluation of the impact of projects implemented in high performance sports areas. In this sense, the methodology used includes theoretical and empirical methods such as the survey, as well as expert and user criteria as verification tools. As a novel element, the research offers tools that favor the evaluation of the results of impacts in the executed projects (questionnaire to collect information, Evaluation Tool to capture, process, evaluate the results and a scale to indicate the level of impact), which They constitute valuable contributions to the assessment of the results of projects in high-performance sports areas.

Keywords: sports areas, impact evaluation, methodology, projects.

RESUMEN

El proceso de evaluación de impactos de los resultados del trabajo científico en el alto rendimiento deportivo, concretamente de los proyectos de investigación y desarrollo es asunto de alta relevancia para el desarrollo deportivo, sin embargo, a pesar de las orientaciones del Ministerio de Ciencia, Tecnología y Medio Ambiente y las propias del INDER se aprecian dificultades en el reconocimiento de las transformaciones y aportes de la actividad científica en áreas deportivas de alto rendimiento, lo que afecta el proceso de evaluación de impactos de los resultados, por ello la autora se ha propuesto exponer una metodología para la evaluación del impacto de proyectos ejecutados en áreas deportivas de alto rendimiento. En ese sentido, la metodología empleada comprende métodos teóricos y empíricos como la encuesta, como herramientas de constatación se apela al criterio de expertos y de usuarios. La investigación ofrece como elemento novedoso herramientas que favorecen la evaluación de los resultados de impactos en los proyectos ejecutados (cuestionario para recoger la información, Herramienta Evaluativa para plasmar, procesar, evaluar los resultados y una escala para indicar el nivel de

impacto), los que constituyen valiosos aportes a la valoración de los resultados de proyectos en áreas de deporte de alto rendimiento.

Palabras clave: áreas deportivas, evaluación de impactos, metodología, proyectos.

INTRODUCTION

In the high performance sports area, the impact evaluation process is a highly relevant issue because it is the result of scientific work, specifically of research and development projects, since it is an activity carried out by man and it can be evaluated in different spheres of society, evidencing professional development and at the same time creating new sources of resources for the economy.

Any activity performed by man must go through a process of analysis and assessment understood as evaluation. Many authors have been exponents of definitions of what they understand by evaluation. They have taken into account in their definitions relevant aspects in which they converge, such as: they must be linked to an objective, they imply an interpretation and they determine a level of efficiency, aspects that are determinant for a good evaluation.

The criterion is shared that evaluation is the systematic, methodical and neutral process that makes it possible to measure the effects of a program in relation to the proposed goals and the resources mobilized (Carrera et al. 2022, p. 58).

Among the relevant aspects included in the above definition are: linked to an objective, it implies an interpretation and determines a level of efficiency, it is a process, it is systematic, it makes it possible to measure effects and it favors the analysis of the situation.

The study allows the author to assert that evaluation is the systematic process of gathering information to carry out control, analysis and comparison of data, with a view to verifying the transformations resulting from the work carried out, which will favor decision making.

In the case that the evaluation is related to impacts, then it is "the process aimed at measuring the degree of significance that the object to be evaluated has in the specific socio-economic environment, in order to assess its effect on the applied objects and ensure the improved selection of new evaluation objects" (Mena et al. 2019, p. 3).

Another element to be assessed are the benefits of impacts, as important elements in the results of any project, they are irreplaceable to know the degree of contributions achieved with the implementation of a certain activity.

In most of the concepts of impact given by different authors, such as: Mena et al. (2019), Gomez et al. (2020) among others, the word change or effect is present, so it is understood that it is a "transformation produced by an intentional action, for example: the environment, programs, projects or some specific population group", according to (Mena et al. 2019, p. 5).

The aforementioned authors converge in that there must be changes or set of changes that will be reflected in different elements of society, especially in people and these will modify the existing.

The above approach is important because of the need to identify and quantify impacts and to be clear that it is not only the result that is obtained, but its effect, its repercussion on people, elements also addressed by Arteaga & Silvera (2019), Salas (2020), Del Castillo (2021), Garcia (2022), Lizcano & Hennig (2022), Maso et al. (2022), Vera et al. (2023) who have expressed the importance of assessing impacts for the growth of society.

Impact is defined as "a result of the effects of a project, the determination that this requires, the establishment of operational objectives that allow linking the project with the effects resulting from its implementation" according to Gomez et al. (2020, p.5). In this way, the author ascribes to this concept of impact, since it embodies the idea of change or transformation caused by a certain action produced in people and/or society, by the effect of the application of actions on certain indicators that are modified.

On the other hand, it should be noted that the need to evaluate impacts has become increasingly evident.

On the conceptualisation of impact assessment, the definition of the International Association for Impact Assessment "is the process of identifying the future consequences of a current or proposed action" Villalonga, et al. (2023, p. 4) is an obligatory reference.

Impact assessment for Lopez et al. (2023). "is dedicated to investigating the transformative actions (whether for or against) that an explicit mediation stimulates, while becoming an intervening process, which materialises at different levels: local, influences on organisations or successions of projects with activities aimed at improving the capacity of a community in various areas: scientific, technological, economic, social or environmental" (p. 255).

Based on these concepts, it is possible to understand that impact evaluation is the evaluative process aimed at measuring the results of interventions, in quantity, quality and extent according to pre-established rules Mena et al. (2019, p. 6). Thus, the measurement of results constitutes the main characteristic of this process that allows

comparing the degree of achievement reached with the desired one and, in turn, compares the planning with the result of the execution.

As evidenced in the above definitions, it is important to identify and quantify the impacts and to be clear that it is not only the result obtained, but also its effect, its repercussion on people, economy, environment or other sectors.

This leads the author to state that impact assessment is the systematic process of taking information for control, comparison, analysis of changes, transformations caused by a given action, with the possibility of giving results in the short, medium or long term.

In Cuba, science, technology and innovation are managed by macro programs, programs and projects. Every scientific research project must be evaluated based on the guidelines of the current Decree Law 7/2019 of the Science, Technology, Innovation and Environment System, the implementation of Resolution 287/2019 and the indications of the Manual for the Management of the Science, Technology and Innovation Programs and Projects System (2022) of the Ministry of Science, Technology and Environment (CITMA).

The National Institute of Sports, Physical Education and Recreation (INDER) is the agency of the Central State Administration in charge of proposing and, once approved, directing and controlling the State and Government policy related to sports, physical education, recreation and physical activity, which contributes to obtain satisfactory sports results and to raise the health and quality of life of the population.

The achievements shown today by the Cuban sports movement have had as a fundamental element the role played by the application of science and the advances of scientific-technical knowledge in the solution of problems related to the fulfillment of the mission of the Cuban system of Physical Culture and Sport.

This organization is linked to CITMA's policy and establishes actions to be carried out in priority areas for scientific-technological activity, particularly with regard to achieving or maintaining excellence and competitiveness in the services it offers.

Despite the achievements of Cuban sport and international recognition, there are deficiencies in the evaluation of projects implemented in high-performance sports areas. In the systematisation of the research topic, analysing the criteria of various authors such as: Mena et al. (2019); Vento et al. (2022); Martínez et al. (2023) among others,

and the application of different research methods, the following deficiencies were detected:

- the CITMA system of INDER presents difficulties, as the control and evaluation of the impact of scientific projects that contribute to sport for all and sports strategy is still insufficient.
- Insufficient understanding of the mediating mechanisms between the production of knowledge and the evidence of impacts in sports areas.
- Weaknesses in closing the science cycle in science, technology and innovation projects.

These difficulties hinder the need for evaluation of transformations in areas of high sports performance and projects that contribute to sports strategy, giving importance to obtaining a scientific result that can provide a solution to these shortcomings. For this reason, the present research aims to show the results of the study of a methodology for the evaluation of the impact of projects implemented in high performance sports areas.

MATERIALS AND METHODS

The research was a descriptive, non-experimental, cross-sectional study with a qualitative approach. The selection criterion was a non-probabilistic sampling with the purpose of intentionally choosing the most representative group. Taking into account the criteria of (Estevez, quoted by Jorin 2022).

A total of 145 professionals, teachers and leaders were surveyed, 77 workers in the areas of municipal sports teams and 64 in the provincial sports training center.

For the validation of the methodology, the criteria of experts, composed of 31 professionals, was used. The average number of years of experience is 31.6. Of them, 47 % are Doctor of Science and 52.9 % are Master of Science.

In the validation of the methodology in practice, 20 professors from different Faculties of Physical Culture collaborated, participants in projects developed in their universities. Of them, five are PhD in Science, eight have a Master's degree in Science, one has a degree in Physical Culture and one is a Specialist, with 25.2 years of work experience.

Theoretical methods are used, considering the criteria of (Hernández et al. cited by García-Ponce de Leon, 2022), the historical-logical: it ensured that the historical development of the object of study was analysed, the internal logic of the development of science and the evaluation of the impact of the results of research in the area of sport was found, as well as channelling the research through a coherent thread, in accordance with the proposed

objectives and drawing on information on the background of the subject being dealt with. The analytical-synthetic: it contributed to the systematisation of the scientific knowledge related to the object of study, allowing it to recognise the multiple relationships and components of the problem by approaching them separately, and then integrating them into a whole as it is presented in reality, it was the way through which the interpretation of the information collected in the diagnoses was carried out and helped to reach the corresponding conclusions of this research. The hypothetical-deductive: it allowed us to make logical deductive inferences and to elaborate the theoretical support that will later be demonstrated in practice. The inductive-deductive: was used after obtaining the results of the diagnosis, to deduce the logical order and content of each step of the proposed methodology, establishing the links between them and the theoretical foundation. Its application made it possible to evaluate the results of the different scientific methods, to provide the steps and orientations to be taken into account for the application of the proposed methodology and to make projective recommendations for new studies. Systemic-structural-functional: by taking into account that the task as a basic level in the realisation of the objective must be structured as a system, in order to be able to organise the different stages and the general design of the methodology. Modelling: provided the resources to elaborate the stages that make up the methodology; in the analysis, it contributed to making the relevant adjustments to refine the guidelines of the research process.

The empirical methods used were the survey to diagnose the current state and to obtain criteria from the professionals working in the field and carrying out the impact evaluation.

The experts' criteria made it possible to check the validity of the methodology for impact assessment, once the questionnaire is applied for the selection of experts and the expert's competence coefficient is determined. The number of experts to be selected is between 15 and 30, and they are selected according to their competence coefficient, providing the characterization of the experts. The pairwise comparison methodology is selected, which puts the methodology for impact assessment under consideration and evaluation, based on a questionnaire for its validation, as well as its evaluation method is typical of the pairwise comparison methodology and the results obtained are analyzed and interpreted by means of these procedures. According to (Ramirez, as cited in Garcia-Ponce de Leon et al. 2022).

User criteria: selected with the aim of issuing criteria regarding the proposed methodology. It assumes that referred to by Guardo, as cited in Jorjin 2021).

The data were processed with the mathematical-statistical method and the descriptive and inferential statistical technique. The survey data are processed by means of empirical distributions of absolute and relative frequencies, especially in the responses in each of the indicators. From the latter, a percentage distribution is obtained to facilitate their qualitative interpretation. Contingency tables are used, to which graphic representations are added. Descriptive measures are calculated according to the level of measurement of the variables involved in the study, the empirical distributions of absolute and relative frequencies, especially in the responses in each of the indicators. From the latter, a percentage distribution is obtained that facilitates their qualitative interpretation.

To determine the degree of significance of the responses obtained with the applied methods: not very significant (PC); significant (S) or very significant (MS), the Excel sheet for the Calculation of the Critical Points of the Binomial Distribution" based on the Buka algorithm is used, for the statistical significance of the percentages, elaborated by (Folgueira cited by García-Ponce de León, 2022).

RESULTS AND DISCUSSION

Results of the survey applied to the professionals who measured the impact on their work centers. Figure 1 shows the responses of indicator 1 on impact measurement and shows that they have not measured impacts using CITMA indicators, since they have evaluated it in different ways, but not using science and technology indicators, so it is considered as impacts are subjective criteria or sporting results.

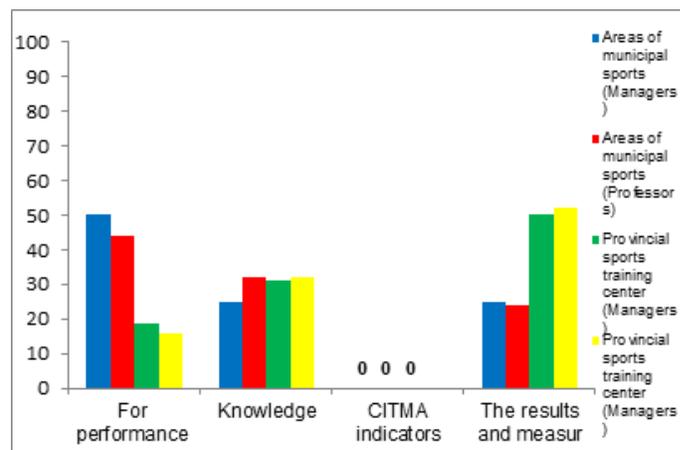


Figure 1. Results of indicator 1 on the measurement of impacts on combined sports and provincial centers and provincial centers.

Source: Own elaboration

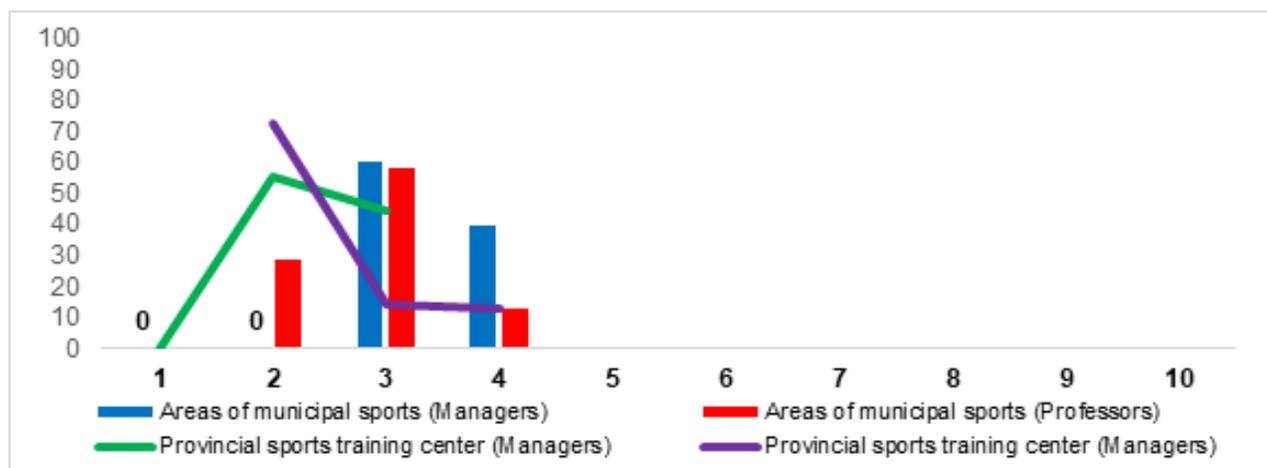


Figure 2. Results of the criterion on the lead agency's guidance for impact assessment for impact assessment.

Source: Own elaboration.

The following figures show the results of indicators 2 and 3, where respondents are asked to evaluate on a scale of 1 to 10 their knowledge about the efficiency of the guidance for a correct evaluation of project impacts offered by the existing tools and to evaluate their knowledge of the indicators offered by CITMA. Higher numbers correspond to higher knowledge, lower numbers to poorer knowledge. Figure 2 shows the results of the responses to indicator 2, concentrating the responses in values from 2 to 4.

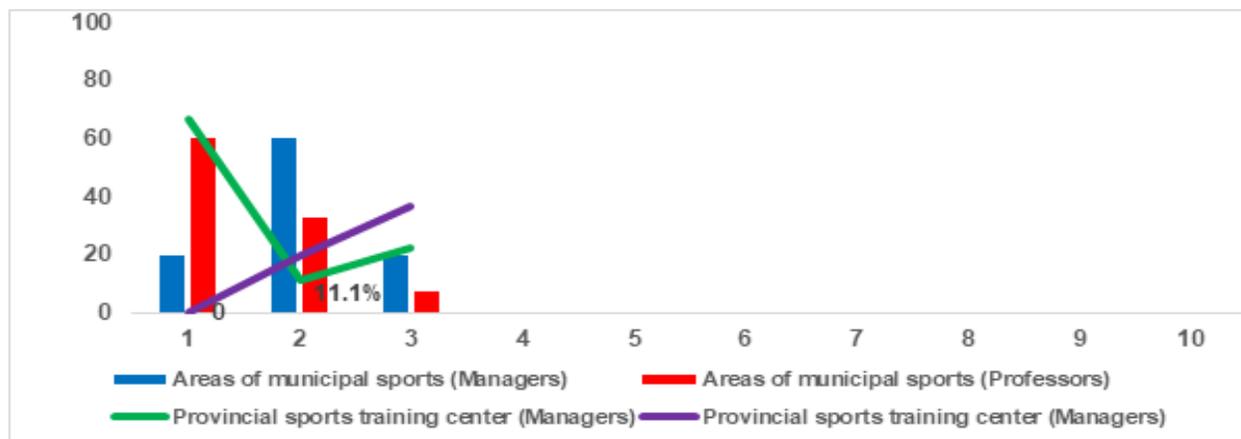


Figure 3. Results of the criterion on the main impact indicators.

Source: Own elaboration.

In the centers belonging to municipal INDER, there are greater references to the issue addressed by the directors, grouping the responses between 3 and 4 (60 % and 40 % respectively), even so, these are low values since the document should be used in all institutions in the country.

The teachers show the lowest values of 29 % in the 2, 58.2 % in the value 3 and 12.7 % point to 4, that they do not have knowledge that allows them to make good use of the document.

In the case of the provincial centers, 55 % of the directors say that the efficiency is a value of 3 and 44.4 % give it a value of 4.

It is inferred that they know the document, but it is difficult to use it to evaluate the achievements of the introduction of science in the areas of work. Figure 3 shows the responses to indicator 3, in the considerations on the CITMA indicators, the results are grouped on the scale in the values from 1 to 3.

In relation to the criteria that the respondents have about the main impact indicators declared by CITMA, it is obtained that:

In the municipal directorates of INDER, 20 % of the managers surveyed give it a value of 1, while 60 % consider it to be 2, the rest, that is, 20, point to 3, this group recognizes what is little known to them. Sixty percent of the teachers in these centers believe that their notions about the indicators correspond to a value of 1, 32.7 % believe it corresponds to a value of 2 and 7.2 % believe it corresponds to a value of 3.

Something similar occurs with the managers and teachers of the provincial centers of sports preparation, where 6.6 % of the managers mark the value 1, only 11, 1 % 2 and 22, 2 % 3. In the case of the teachers 43, 6 %, 20 % and 36.3% for the values 1, 2 and 3 respectively. These professionals are unaware of the impact indicators, however, many researches and projects are directed towards these centers because they concentrate the highest quality of athletes in the province, and it would be beneficial to have more control over them.

Figure 4 addresses the response of indicator 4 on the importance of obtaining a more effective tool, the results are very significant (MS), 100 % of the managers of both institutions agree on the need for a new tool, as well as the professors give answers above 80 %. There are favorable criteria for obtaining it, since the respondents see in this result the way to help professors and researchers to evaluate the impact of the scientific work carried out in their areas.

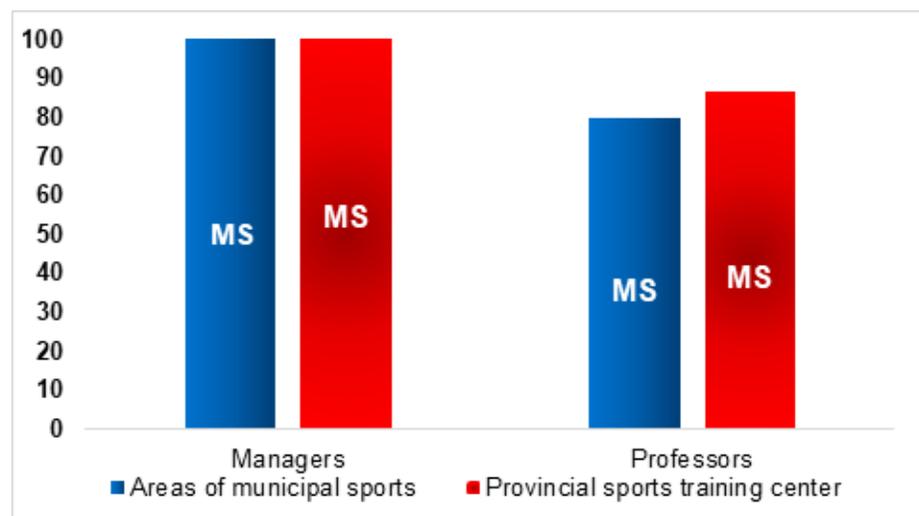


Figure 4. Results of the criterion about the need for a new tool.

Source: Own elaboration.

Results of the expert criterion

In the determination of the validity, professionals who offered their evaluations of the scientific result participated, this is applied from the Peer Comparison methodology.

The selection of the experts was comprised in the range of 31 expert professors-researchers of the Faculty of Physical Culture Sciences with categories of Doctors of Science and Master of Science, the number is within the range of experts to be selected, with a margin of error of only 1 %.

They evaluated each of the aspects that make up the methodology, the criteria given by them are shown below (to see chart 1).

Table 1: Results of experts' criteria.

No.	Aspects to be evaluated	N/P	Category
1	Objective of the methodology	-0,61	Very Adequate
2	Foundation	-0,67	Very Adequate
3	Stages of the methodology	-0,57	Very Adequate
4	Procedures for each stage	-0,61	Very Adequate
5	Evaluation of each stage	-0,61	Very Adequate
6	Graphical representation	-0,61	Very Adequate
7	Recommendations for its implementation	-0,67	Very Adequate
8	Evaluation of the methodology	-0,57	Very Adequate
9	Integral evaluation of the methodology	-0,67	Very Adequate

Source: Own elaboration

The final result of the cut-off point analysis of the experts' assessment of the four questions was a category of very adequate, as the average values given by the experts are between - 0.57 and -0.67.

As shown in the table above, if the results of the difference (N-P) for each step of the methodology are compared with the cut-off points shown in the table above, it can be seen that the structure and content of each of the components of the methodology are rated as very adequate for the purpose for which they were conceived. The overall evaluation of the document, its coherence and functionality as a whole was also assessed as very adequate, therefore, the methodology is accepted.

Result of the users' criteria

Once the validation has been carried out, it is time for the users to issue their considerations of the methodology. Once they were able to carry it out in the project (R&D) of the Applied Research type, executed from 2017 to 2021 named "Social Interaction", associated with non-business entity and the task: "Management of sport activity in the social and university environment", executed by the Faculty of Physical Culture Sciences of Matanzas, for having the required characteristics.

The professionals carried out the different stages of the methodology, applied the new instruments for data collection, control and evaluation of the results and compared the results of the project in 2018 and 2021, subsequently offering their criteria.

The aspects assessed in the analysis of the application of the methodology were carried out according to the following scale: 5 (Excellent); 4 (Good); 3 (Fair) and 2 (Poor).

As for the content, they considered: dimensions, relation of evaluation components, results achieved, indicators, considerations on mathematical processing, 81.2 % gave criteria of 5 and 18.7 % of 4 values, which shows acceptance with these elements.

The functionality dimension which covers the contextualization achieved with the methodology, the relation of indicators and indexes respond to the activities in the sports centers, relation of the stages and valuation of the results achieved with the methodology, 83.7 % of the users showed their approval with a score of 5, 12.5 % considered it to be 4 and 3.8 % reached values of 3.

In the next point, the general evaluation was made up of specific questions on the criteria of the methodology, the users expressed favorable criteria regarding the results in the evaluation of the transformations and contributions, results of the methodology for high performance sport, the fulfillment of the objective 83.3 % reasoned that it has an evaluation of 5 and 16.7 % considered it to be 4, so it is useful to arrive at a correct evaluation of the results of the impacts of the projects that are carried out in the areas of sport.

The dimension of impact faces the expectations that the users had with the methodology in its beginnings, the satisfaction that they have of the scientific result and fulfillment of the expectations, the results show that 90 % declare values of 5 in the scale, 10 % of 4.

The results shown in detail for all the dimensions provided sufficient data to consider that 82.7 % of the users agree with the methodology, being a significant result (S), in the first element (content) and very significant (MS) in the rest of the aspects evaluated (functionality of the methodology; general evaluation and impact) since more than 16 professors consider it valid for the purpose for which it was created.

Based on the results of the diagnosis, a methodology is proposed with the general objective of evaluating the impact of projects implemented in high-performance sports areas.

Stages and procedures of the methodology for the evaluation of the impact of projects implemented in high performance sports areas.

Stage 1- Orientation

Objective: to train evaluators in the use of the tools and methodology in general.

Procedures

The training course is planned for the members of the evaluation group, the materials and bibliography are organized, and classes are given on the guidelines to be used according to the governing bodies and the new tools, so that they are familiar with them.

The topics of the course are shown below:

Topic 1- Characteristics of the evaluation of Science, Technology and Innovation. CITMA Resolution 287/2019

Topic 2- Generalities of impact results assessment.

Topic 3- Particularities of science evaluation in the field of sports New instruments.

Evaluations are carried out systematically, each topic is evaluated through a workshop and culminates with an integrative workshop where participants demonstrate the knowledge acquired.

Evaluation of the stage: The fulfillment of the objective of the first stage will be achieved to the extent that the evaluators show satisfactory results in the workshops where the contents of each topic of the course are evaluated and expose their knowledge in the final workshop.

Stage 2- Intervention

Objective: to manage the data for the evaluation using the proposed instruments.

The second stage of the methodology is made up of several moments, one for the selection of the project and the other for the application of the proposed instruments.

Procedures

- First step

Project selection

It is carried out by choosing, among those that are executed in the sports areas, the one that has been in execution for more than 1 year.

There must be knowledge of the particularities of the territory and the center where the project is developed.

A schedule of activities is drawn up and the objectives to be achieved are specified.

The project leader and task managers are officially informed of the start of the evaluation process, the objectives, the schedule of activities, duration and its particularities.

- Second moment:

The instruments are used to collect, process and evaluate the information, on which the evaluators have already been trained.

The first instrument is applied, called: **Questionnaire** for the collection of information. It contains the questions to be asked by the evaluator to the project leaders, each question refers to an indicator and the items have to do with the indexes.

The second instrument is applied to record, process and evaluate the information acquired with the questionnaire, **called the Evaluation Tool**.

The evaluator gives a value of one (1) in each box of column (C) as an indicator fulfilled in case of an affirmative answer, leaving blank () if the answer is negative, which allows calculating the number of indicators achieved.

The dimensions that make up the instrument are:

- Social Dimension, it has 2 indicators that have to do with the training of professionals and participation of professors and students in the project.
- Scientific-Technological Dimension, nine indicators: Events, new scientific tasks and sub-tasks; generalization of results, Patents; Awards; publications, new products; new knowledge.
- Sports Dimension, 7 indicators: Sports results; selection and recruitment of athletes; influence of the project on the athlete's preparation; referees; multidisciplinary groups; sports calendar; promotions to national or provincial centers.
- Environmental dimension, 2 indicators: indicators on care for the environment and sustainable development of the athlete.
- Economic Dimension, 2 indicators: foreign currency capture and savings from technologies.

Project evaluation method:

To obtain the result in each dimension, the average of the indicators that contribute effects with respect to the total is calculated.

In other words, the number of indicators that achieve results is calculated with respect to the total that make up each one, and the percentage value is calculated for each dimension.

The following formula is used for this operation. (See formulas 1 at 5))

Dimension= indicators met / total indicators.

Examples:

Social Dimension, $S = \frac{S_1 + S_2}{2} \times 100$
(1)

2

$$\text{Scientific-Technological Dimension, CT} = \frac{\text{CT1} + \text{CT2} + \text{CT3} + \text{CT4} + \text{CT5} + \text{CT6} + \text{CT7} + \text{CT8} + \text{CT9}}{9} \times 100 \quad (2)$$

$$\text{Sports Dimension, D} = \frac{\text{D1} + \text{D2} + \text{D3} + \text{D4} + \text{D5} + \text{D6} + \text{D7}}{7} \times 100 \quad (3)$$

$$\text{Environmental Dimension, MA} = \frac{\text{MA1} + \text{MA2}}{2} \times 100 \quad (4)$$

$$\text{Economic Dimension, E} = \frac{\text{E1} + \text{E2}}{2} \times 100 \quad (5)$$

Subsequently, for the final evaluation (EF), the average of the total for the entire project is obtained by adding the result obtained previously for the dimensions, i.e. (the number of indicators with positive results in each dimension), dividing it by the total number of indicators (22) and calculating the percentage value.

In this case it is achieved as follows: See formule 6)

Final Evaluation = indicators fulfilled / total indicators x 100

$$\text{EF} = \frac{\text{S}(x) + \text{CT}(x) + \text{D}(x) + \text{MA}(x) + \text{E}(x)}{\text{Total indicators}} \times 100 \quad (6)$$

Total indicators

Legend:

(S) Social; (CT) Scientific-Technological; (D) Sports; (MA) Environmental; and (E) Economic.

Once the final result of the project evaluation has been reached, the third instrument, the **Scale for impact levels of the results, is used.**

Scale

- Level 1- Very high impact, expresses positive changes between 100 % and 81 % of the indicators, transformations can be observed.
- Level 2- High impact, expresses positive changes between 80.9% and 61% of the indicators.
- Level 3- Medium impact, expresses positive changes between 60.9 % and 41 % of the indicators.
- Level 4- Low impact, expresses positive changes between 40.9% and 21% of the indicators.
- Level 5 - very low impact, expresses positive changes below 20.9 % of the indicators.

Evaluation of the stage: This stage is fulfilled when the evaluators show good performance using the Questionnaire, manage to capture the data in the Evaluation Tool, linking them to the new dimensions, indicators and indexes, use the mathematical processing, apply the methodological guidelines and carry out the procedures to obtain the final result of the indicators fulfilled in the project and compare it with the scale for the level of impact.

Stage 3- Analysis

Objective: Carry out the analysis of the impact evaluations of the project results in high performance sports centers.

Procedures

- - the final evaluation of the project is provided
- The qualitative analysis resulting from the level of impact is carried out.
- The achievements in each dimension are specified, which will help in the project's analysis
- The indicators with favorable and deficient results are analyzed.

Evaluation of the stage: Successful completion of this stage is confirmed when the evaluators express the level of impact, carry out the analysis of the evaluation, recognize the contributions achieved in each dimension, indicator and in general of the project.

General evaluation of the methodology: when the objectives of the three stages and the general objective are met, based on the implementation of the methodology as a whole.

Steps for the implementation of the methodology

1. Train the people who will carry out the impact results evaluation.
2. Comply with the order established for the preparation of the topics in the training course.
3. Verify that the evaluators have mastered the dimensions, indicators, indexes and procedures.
4. Analyze the characteristics of the project for the correct application of the methodology, bearing in mind that the project has been in execution for more than one year.
5. Execute with the order indicated the different stages and procedures contemplated in the methodology, guaranteeing the continuity of all procedures.
6. To have the questionnaire ready to be applied to project leaders.
7. To have clarity at the moment of pouring the results of the questionnaire in the evaluative tool.
8. To take into account the way of assessing the fulfillment of the indicators.
9. To carry out the evaluation report according to the planned results.
10. Take into account that due to the characteristics of the center and the project, new indicators and indexes may appear.
11. To take into account the CITMA guidelines.

The study has as a starting point the one referred by (Moya, as cited in Martinez et al. 2023) which proposes dimensions, indicators, indexes and mathematical processing to evaluate the impact of the SUM of Physical Culture of Matanzas in the community, but they are different in that it is carried out in high performance sports areas, so the objectives are different, as well as the stages.

The indicators were selected based on the diagnosis carried out and the participation of experts, who in consensus determined the dimensions, indicators, indexes that should be present in the evaluation of scientific projects carried out in sports areas, respecting the criteria by Cura

& Romero (2023), who state that the evaluation of impacts should not be seen as something voluntary, but should be guided and inserted in a strategic plan.

It can be stated that the methodology provides a solution to the need for organization, in terms of the development, application and results of Science, Technology and Innovation, as proposed by Vento et al. (2022), since the proposed instruments allow the control, settlement and evaluation of the results.

It is agreed with Mena et al. (2019) that the evaluation of impacts should be a continuous process, aimed at assessing not only the results, but also the quality of the actions applied, which is represented in the methodology that can be applied at different times or stages of a project that is carried out in sports areas that collects the way in which the indicator is met.

CONCLUSIONS

The study carried out on impact evaluation of projects executed in high performance sports areas from the perspective of the professionals investigated, these do not have knowledge of how to evaluate with certainty and security this subject, rather few of them carry out any action under the guidelines of CITMA.

In view of this, the need to achieve a scientific result that allows overcoming the existing difficulty is recognized.

A methodology is proposed to monitor and evaluate the impact of projects, taking into account the incorporation of dimensions, indicators and indexes appropriate for this sector, with the procedures to develop the valuation of the scientific results of projects executed in this area.

REFERENCES

- Arteaga, Y., & Silvera, F.A. (2019). Procedure for evaluating the impact of academic programme training for social development. *Cooperativismo Y Desarrollo*, 7(2), 243-253. <https://coodles.upr.edu/cu/index.php/coodles/article/view/224>.
- Carrera, M. A., Mesa, N., & Padilla, Y. (2022). Methodology for assessing the impact of postgraduate education. *Transformación*, 18(1), 53-69. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S20772955202200100053&lng=es&tlng=es.

- CITMA (2022) Manual for the management of the Science, Technology and Innovation programmes and projects system. Revista CITMA. [https://www.google.com/search?q=CITMA+\(2022\)+Manual+para+la+gesti%C3%B3n+del+sistema+de+programas+y+proyectos+de+Ciencia%2C+Tecnolog%C3%ADa+e+Innovaci%C3%B3n.&oeq=CITMA+\(2022\)+Manual+para+la+gesti%C3%B3n+del+sistema+de+programas+y+proyecto+de+Ciencia%2C+Tecnolog%C3%ADa+e+Innovaci%C3%B3n.+&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQRRg7MgYIAhBFGDzSAQoxMDc0MWowajE1qAIA&sourceid=chrome&ie=UTF-8](https://www.google.com/search?q=CITMA+(2022)+Manual+para+la+gesti%C3%B3n+del+sistema+de+programas+y+proyectos+de+Ciencia%2C+Tecnolog%C3%ADa+e+Innovaci%C3%B3n.&oeq=CITMA+(2022)+Manual+para+la+gesti%C3%B3n+del+sistema+de+programas+y+proyecto+de+Ciencia%2C+Tecnolog%C3%ADa+e+Innovaci%C3%B3n.+&gs_lcrp=EgZjaHJvbWUyBggAEEUYOTIGCAEQRRg7MgYIAhBFGDzSAQoxMDc0MWowajE1qAIA&sourceid=chrome&ie=UTF-8).
- Cura, Y. & Romero, E. (2023) Impact of the training of the cadres of the provincial prosecutor's office of Vila Clara. *EduSol*, 23 (82), 17- 29. <https://EduSol.cua.co.cu:443/article/view/464>.
- Del Castillo, J. M. & Del Castillo, A. (2021). The impact of COVID-19 on higher education faculty and their conceptions of assessment. *Campus Virtuales*, 10(1), 89-101. <http://www.uajournals.com/campusvirtuales/en/component/content/article/9-uncategorised/278-10-1-art7.html>.
- Garcia, C. (2022). The evaluation of scientific impact in educational research. *Revista Cubana De Educación Superior*, 41(Special Issue 2), 523-533. <https://revistas.uh.cu/rces/article/view/152>.
- Garcia Ponce de Leon, A. (2022). Sprint training using sleds and parachutes. *PODIUM- Journal of Science and Technology in Physical Culture*, 17(1), 177-195. <http://scielo.sld.cu/scielophp?script=&pid=S199624522022000100177&lng=es&tlng=en>.
- Gomez, J., Cruz, R., Paez, M. & Gonzalez, Y. (2020). Methodological indications for the activity of science, technology and innovation programmes and projects. *Revista CITMA*. <http://redciencia.cu/uploads/CITMA%20INDICACIONES%20METODOLOGICAS%20SPP>.
- Jorin Carbo, E. M., Quintana, D., & Kessel, J. G. (2021). Preliminary study of the orientation of the statistical content during the training process of the Physical Culture professional. *PODIUM- Journal of Science and Technology in Physical Culture*, 16(2), 576-592. <https://podium.upr.edu.cu/index.php/podium/article/view/994>.
- Lizcano, A., & Hennig, C. (2022). Factors, outcomes and evaluation of the impact of communities of practice on the development of technological competencies in higher education. A systematic literature review. *Revista interuniversitaria de formación del profesorado*, V. 36(2), N. 97. <https://digitum.um.es/digitum/handle/10201/123087>.
- Lopez, A., Garcia, M., & Ortiz, T. (2023). The impact evaluation of doctoral training. Experience of CEPES of the University of Havana. *Revista San Gregorio*, 1(54), 250-268. <https://doi.org/10.36097/rsan.v0i53.1720>.
- Martinez, N., Penton, B.; Rodríguez, W. & Ponce de Leon, A. (2023). Tasks for impact assessment in the research project "Physical Activity Management". *Atenas Revista científico pedagogica*. Nro 61, e10272, 1-13. ISSN 1682-2749.
- Mena, S. M.; de la Paz, L.; Govea, Y. & Machuat, G. (2019). Impact assessment in postgraduate sport specialties. Theoretical foundations. *PODIUM- Journal of Science and Technology in Physical Culture*, 14(3) <https://podium.upr.edu.cu/index.php/podium/article/view/846>.
- Maso, M.Z., Gonzalez, M.D.L.C.B., Grau, I.B., Lima, L., & Pausa, M.M. (2022). Evaluation of the social impact of the stomatology degree. *Educación Médica Superior*, 36(2). http://scielo.sld.cu/scielo.php?pid=S086421412022000200023&script=sci_arttext&tlng=pt.
- Salas, R. A. (2020). Perception of students on blended learning considering data science and machine learning. *Campus Virtuales*, 10(1), <http://www.uajournals.com/campusvirtuales/es/component/content/article/9-uncategorised/255-9-1-art10.html>.
- Vento, O., Ilisastigui, M. & Losada, M. (2022) Diagnosis of the Science, Innovation, Technology and Environment System of Physical Culture and Sport. *PODIUM- Journal of Science and Technology in Physical Culture*, 17 (3), 1079- 1093. <https://podium.upr.edu.cu/index.php/podium/article/view/1358>.
- Vera, G., Reyes, C., Lozano, V., López, A. & Juárez, Y. (2023). Considerations for the socio-environmental impact assessment of the Felipe Angeles International Airport. *REALITY, DATA AND SPACE INTERNATIONAL JOURNAL OF STATISTICS AND GEOGRAPHY*, 14(1), 76-91. [5]. <https://rde.inegi.org.mx/wpcontent/uploads/2023/PDF/RDE39/RDE39.pdf>
- Villalonga, Y., Tarifa, L., Artola, M., Gonzalez, E., & Acosta, J. (2023). Training for the development of competencies in social impact assessment for project managers. *Revista Médica Electrónica*, 45(4), e5232. <https://revmedicaelectronica.sld.cu/index.php/rme/article/view/5232>.