



Original article

The integral management of doctoral training at the Cuban university

La gestión integral de la formación doctoral en la universidad cubana

A gestão integrada do treinamento de doutorado na universidade cubana

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ABSTRACT

The management of doctoral training in Cuban universities has been a complex process, which has gone through different management approaches. The Ministry of Higher Education, with the advisory body of the National Commission for Scientific Degrees, established the policy and legal and methodological regulations for managing doctoral training; however, the universities and research institutes have managed this process differently and the required quality standards were not always achieved. Therefore, this work aimed to establish the integral management of doctoral training at the Cuban university. The theoretical pillars were based on dimensions, sub-dimensions and indicators and on the dynamics of the management cycle of the theory of integral management of university processes. The principles of management of doctoral training and the contents of the dimensions and sub-dimensions of university management, with emphasis on pedagogy, were also established. As a general conclusion, the integral management of doctoral training at the Cuban university was based on theory and practice, contextualized to the current social, labor and economic conditions in Cuba. The work provides theoretical and methodological foundations for managing doctoral training at the Cuban university, which is a result of the research, development and innovation project with code PS223LH001-064, associated with the Higher Education and Sustainable Development sectoral program of the Ministry of Higher Education of Cuba.

Keywords: doctoral training; management; Cuban university.

RESUMEN

La gestión de la formación doctoral en la universidad cubana ha sido un proceso complejo, que ha transitado por diferentes enfoques de gestión. El Ministerio de Educación Superior, con el órgano asesor de la Comisión Nacional de

Grados Científicos, trazó la política y estableció las normativas legales y metodológicas para gestionar la formación doctoral; sin embargo, las universidades y centros de investigación autorizados han gestionado este proceso de manera diferente y no siempre se lograron los estándares de calidad requeridos, por lo que este trabajo tuvo como *objetivo* fundamentar la gestión integral de la formación doctoral en la universidad cubana. Los pilares teóricos se basaron en las dimensiones, subdimensiones e indicadores y en la dinámica del ciclo directivo de la teoría de la gestión integral de procesos universitarios. Asimismo, se establecieron los principios de la gestión de la formación doctoral y los contenidos de las dimensiones y subdimensiones de la gestión universitaria, con énfasis en lo pedagógico. Como conclusión general, se fundamentó desde la teoría y la práctica la gestión integral de la formación doctoral en la universidad cubana, contextualizado a las actuales condiciones socio-laborales y económicas de Cuba. El trabajo aporta los fundamentos teórico-metodológicos para gestionar la formación doctoral en la universidad cubana, lo que constituye un resultado del proyecto de investigación, desarrollo e innovación *Gestión del proceso de formación doctoral y su internacionalización*, con código PS223LH001-064, asociado al programa sectorial *Educación Superior y Desarrollo Sostenible*, del Ministerio de Educación Superior de Cuba.

Palabras clave: formación doctoral; gestión; universidad cubana.

RESUMO

A gestão da formação de doutores nas universidades cubanas tem sido um processo complexo, que passou por diferentes abordagens de gestão. O Ministério de Educação Superior, com o órgão assessor da Comissão Nacional de Graus Científicos, elaborou a política e estabeleceu as normas legais e metodológicas para a gestão da formação de doutores; no entanto, as universidades e os centros de

pesquisa autorizados gerenciaram esse processo de forma diferente e nem sempre foram alcançados os padrões de qualidade exigidos, de modo que este trabalho teve como objetivo fornecer uma base para a gestão integrada da formação de doutores nas universidades cubanas. Os pilares teóricos foram baseados nas dimensões, subdimensiones e indicadores e na dinâmica do ciclo directivo da teoria da gestão integral dos processos universitários. Da mesma forma, foram estabelecidos os princípios da gestão da formação de doutores e os conteúdos das dimensões e subdimensiones da gestão universitária, com ênfase na pedagogia. Como conclusão geral, a gestão integral da formação de doutores na universidade cubana foi baseada na teoria e na prática, contextualizada nas atuais condições sociolaborais e econômicas de Cuba. O trabalho fornece as bases teóricas e metodológicas para a gestão da formação de doutores nas universidades cubanas, resultado do projeto de pesquisa, desenvolvimento e inovação *Gestão do processo de formação de doutores e sua internacionalização*, código PS223LH001-064, associado ao programa setorial *Educação Superior e Desenvolvimento Sustentável*, do Ministério da Educação Superior de Cuba.

Palavras-chave: formação de doutores; gestão; universidade cubana.

INTRODUCTION

Doctoral training is essential for the development of future highly specialized academics and professionals. It is a continuous process of lifelong learning, where capacities, skills, values and attitudes related to scientific activity and creativity are developed, which contributes to the fulfillment of the objectives of the 2030 Agenda for Sustainable Development, particularly, Objective 4, which establishes the need for quality and inclusive education at all educational levels, including higher education (United Nations, 2018).

In the Cuban context, the training of doctors in science in a certain area of knowledge is of great relevance because it contributes to the economic and social development of the country; it supports Cuba's scientific potential, especially in universities; it becomes an immediate, cheap and efficient source of research results, which can have significant impacts and contribute to scientific and technological progress, as occurs in countries with good economic performance and by addressing complex and multidisciplinary problems. All this supports one of the pillars of government management in the country based on science and innovation (Díaz-Canel, 2022; Saborido, 2023).

Doctoral training is a crucial component in the university environment, so its management is essential both in Cuba and in the rest of the world. Efficient and effective management of this process maintains and improves the quality of training, for the socioeconomic development of the country. This management must consider the relationship between the university and society, as it involves promoting sustainable territorial and local development strategies (Saborido, 2023).

Internationally, there is no standard doctoral training management model. The landscape of doctoral education worldwide is quite diverse, with countries differing due to the institutional characteristics and outcomes of their doctoral education systems. Among the most widespread approaches include: (1) the traditional disciplinary approach, which focuses on training within a specific discipline, where doctoral students delve into their field of study and carry out original research in that area; (2) the interdisciplinary approach, which responds to the growing complexity of global problems; where collaboration between different disciplines is encouraged and doctoral candidates can work on projects covering various areas of knowledge and collaborate with experts from different fields; (3) the international approach, The programs offer opportunities for doctoral candidates to spend time abroad, collaborate with researchers from other countries and participate in international networks, thereby

broadening their perspective and giving them access to global resources and knowledge; (4) the professionalized approach, where doctoral candidates are prepared for both academia and the world of work outside it and focus on transferable skills such as communication, leadership and management, in addition to research; (5) the competence-based approach, focusing on the development of specific skills and competencies necessary for success in the academic or professional world, where doctoral candidates acquire technical, methodological and communication skills; and finally (6) the approach based on specific research projects, where PhD students work in multidisciplinary teams and apply their knowledge to concrete projects (Arias, 2020; Mendoza, Rizo and Beltrán, 2021).

In Cuba, starting in 2019, with the approval of the new Decree-Law 372 accompanied by a set of associated resolutions, a process of continuous improvement of the National System of Scientific Degrees began, with an impact on its management process.

Paradoxically, both internationally and in Cuba, the training of a doctor of science in a certain area of knowledge, who is capable of demonstrating theoretical-methodological mastery in that area of science, through the solution of pertinent scientific problems, in an innovative and creative way, with scientific honesty, autonomy and a socially responsible attitude, does not always come close to the required quality standards (Mantal & Marrone, 2022; Vargas, Ordaz, Marín, & González, 2023; Pérez, Ordaz, Pulido, & González, 2024).

The management of doctoral training, as a training process carried out in HEIs at an international level, such as in Cuba, requires a theoretical-methodological basis for its planning, organization, execution and control-evaluation.

The basis of this training process, it's considered by the authors of this work, is found in the *theory of educational management* proposed by the UNESCO representation in Peru (2011) and

systematized by researchers Pulido, Pérez and Bravo (2023), who presented a theoretical-conceptual framework made up of categories and their definitions, principles, dimensions and subdimensions, classification of university processes and management cycle, which supports the management of any university process.

The theoretical study on the definitions of *university management*, carried out by Pulido, Pérez and Bravo (2023), led to establishing the essences of this category, namely:

It is a global, complex, integrative and generative process; which has a theoretical-practical framework: principles, models, procedures, strategies, mechanisms and management styles, with pedagogical assumptions; which implies the leadership of the actors (decision-makers and managers) involved in the management of the processes; it allows for participatory, agile and pertinent decision-making; for the achievement of policies, objectives and goals aimed at improving mission, strategic and support processes (pp. 8-9).

The aforementioned researchers also constructed a *system of principles* that serve as pillars for the management of university processes. These principles are:

(1) the *integral character* given by the interdependence relationships established between the purpose, objectives and goals of the organization being managed; the missionary, strategic and support processes of the university; the institutional, administrative, pedagogical and community dimensions; and the management cycle of planning, organization, execution and control-evaluation; (2) the *procedural character* given by the dynamics and recursion established between the planning, organization, execution and control-

evaluation processes; (3) the *shared leadership* based on the protagonism of decision-makers and managers in decision-making when fulfilling the purposes, objectives and goals of the organization, with the active, responsible and innovative participation of decision-makers and managers; (4) the *communicability* from an ascending and descending communication, in the dynamics of the management cycle of planning, organization, execution and control-evaluation, by means of an assertive, empathetic, objective and truthful communication; (5) *making correct decisions* based on specific situations and objective conditions of the organization, attention to man placing him as the subject and object of the management process, by attending to the current and prospective development of the managed organization, with the leading role of decision makers and managers and (6) *continuous improvement* through monitoring, feedback and control-evaluation processes of the efficiency and effectiveness of the purpose, objectives and goals, to design and implement a Action plan to maintain and/or correct distortions in the goals, objectives, strategies, processes and targets of the organization (pp. 10-11).

The diversity of processes that originate in a university considerably complicates the fulfillment of the purpose, objectives, indicators and goals for the comprehensive and competent training of professionals.

Commonly, *three processes* are considered *substantive*, called *key* or *missional*, that is: *teaching* used in the training of undergraduate and graduate professionals, *research* with science, technology and innovation processes and, finally, *extension* with the purpose of preserving culture, in particular, that of the profession (Rojas and García, 2018; Gutiérrez, Rivera, Robaina, Mijares, 2019).

In parallel with these substantive processes, there are strategic processes, also known as cross-cutting, which include: human resources (human capital), information, communication, computerization, internationalization, the quality of higher education, educational work and political-ideological work (Rojas y García, 2018; Gutiérrez, Rivera, Robaina, Mijares, 2019).

In the university management process, support or support processes are essential, involving economic and financial management, logistics and assurance (Rojas y García, 2018; Gutiérrez, Rivera, Robaina, Mijares, 2019).

Table 1 summarizes these three groups of processes, which are decisive for efficient, effective and sustainable university management.

Table 1- Summary of university processes

KEYS (missionary or substantive)	STRATEGIC (transversal)	SUPPORT (backup)
Teaching: training of undergraduate and graduate professionals. Research: science, technology and innovation. Extension: preservation of culture	Human resources. Information-communication-computerization. Internationalization. Quality of higher education. Educational work. Political-ideological work.	Economic and financial management. Logistics and insurance.

The fulfillment of the purpose, objectives, indicators and goals of the university, the interaction between the actors of the university community (managers, professors, students, family, community and socio-productive sector), the relationships established between decision-makers and managers, the issues they deal with and the way in which they do so generate the environments and conditions for the training of comprehensive and competent professionals.

The interaction between all these elements, internal and external, coexist and are articulated with each other, in a dynamic way, which expresses different actions that can be grouped, according to their nature, into institutional, administrative, pedagogical and community, leading to the establishment of the dimensions and subdimensions of university management.

The following dimensions and subdimensions of university management were identified: (1) the *institutional dimension*, related to the forms of organization of the members of the university community for the optimal functioning of the institution, by offering a framework for the systematization and analysis of the actions related to those aspects of structure that in each institution account for a style of operation; (2) the *administrative dimension*, associated with the actions and strategies of management of human, material, economic, technical, time, safety and hygiene resources and control of information, related to the members of the institution; (3) the *pedagogical dimension*, which involves the fundamental process of the institution, since it deals with the training process and its curricular organization, the teaching-learning process and the methodological strategies that facilitate the training of a comprehensive and competent professional; Finally, (4) the *community dimension* refers to the way in which the university relates to the socio-community context of which it is part, by knowing and understanding its conditions, needs and demands, which allows it to integrate and participate in the socio-labor and community culture.

Table 2 summarizes the content of the dimensions and subdimensions of university management.

Table 2- The dimensions and subdimensions of university management

Institutional	Administrative	Pedagogical	Community
Organization chart. Structures. Instances.	Policy management and compliance with regulations. Establishment and supervision of functions. Process management. Implementation of strategies. Management of economic-financial, material, human and time resources. Information management.	Initial and ongoing training of professionals: instructive, educational and developmental. Curriculum: plans, programs. Didactics: teaching-learning developer process. Methodological work. Evaluation and accreditation. Preparation of the actors involved.	Response to socio-laboral needs. Knowledge transfer. University-environment relationship. University-family relationship. Local organizations. Community development projects. Local empowerment.

The comprehensive and competent training of professionals, as a fundamental mission of the university, presupposes the management of a series of multidisciplinary and complex processes, which comprehensively direct the functioning of the institution.

The complexity of the functioning of university processes is expressed in their implementation dynamics, which gives the *procedural character* to this management through the directive cycle of planning, organization, execution and control-evaluation. This management cycle allows for the optimization of the material, financial, technological and human resources available based on the comprehensive and competent training of professionals.

Figure 1 expresses the procedural nature of the management of university processes.



Fig. 1- The management cycle

The theoretical references on the management of university processes and the shortcomings in the management of doctoral training in the Cuban context led this research to outline as a *scientific problem to be solved* how to improve the management of doctoral training in Cuban universities and to formulate as an *objective* to base the integral management of doctoral training in contemporary Cuban universities.

This research is a result of the research, development and innovation project *Management of the doctoral training process and its internationalization*, with code PS223LH001-064, associated with the Higher Education and Sustainable Development sector program, of the Ministry of Higher Education of the Republic of Cuba.

MATERIALS AND METHODS

The *dialectical research paradigm* supported the research process, where theoretical and empirical methods and statistical techniques were combined. The logic of the general, the particular and the singular was assumed, based on the relationship between educational theory and practice.

The fundamental theoretical methods included *historical-logical analysis, modeling* and *systemic-structural analysis*, supported by the procedures of *analysis* and *synthesis* and *induction* and *deduction*, which allowed to describe the essential relationships of the management of doctoral training not directly observable, in the construction of knowledge that facilitated the conceptual interpretation of empirical data, the construction and development of theories around the management of doctoral training.

The search for the main theoretical references was carried out using the internet search engines *Google* and *Bing*, with the support of artificial intelligence.

The empirical methods used were the *analysis of documents* on materials dealing with doctoral training, in prestigious, authorized institutions around the world and the normative documents for doctoral training in Cuba. Interviews with academic directors (the president of the scientific degrees committee and the coordinators of the doctoral programs at the University of Pinar del Río), the doctors who are members of these faculties and the doctoral students in training provided objective criteria on the management of doctoral training.

The use of tables and graphs, as statistical techniques, allowed us to organize and process information and reach theoretical-practical generalizations.

RESULTS

The in-depth study of the management of doctoral training in Cuba involved carrying out a theoretical systematization, which revealed the theories, concepts and good practices on the management of this educational phenomenon in the international and Cuban contexts.

The contextualization of the theory of educational management to the management of

university processes and the approaches that are used internationally for the training of doctors constitute the theoretical bases on which the management of doctoral training in Cuban universities is based.

The management of doctoral training is a highly pedagogically complex process in which authorized training structures, national policies and strategies, the pedagogical conception of training and the impact on the social and labor contexts in which future graduates are inserted are intertwined.

In the international context, the management of doctoral training is diverse and responds to state and university governance policies; to the international, national and local scientific-technological development of the institutions; to the preparation of the human resources involved and to the economic-financial and material resources that the institutions possess. In this sense, six approaches are recognized, namely: (1) the *traditional disciplinary approach*, (2) the *interdisciplinary approach*, (3) the *international approach*, (4) the *professionalized approach*, (5) the *competency-based approach* and (6) the *approach based on specific research projects*.

Currently in Cuba, the management of doctoral training does not assume a specific approach, but rather integrates procedures from international approaches and the good practices of the different authorized institutions that train doctors.

DISCUSSION

The establishment of a theoretical-conceptual framework for the management of doctoral training, particularly in Cuba, leads to the following considerations by the authors of this work.

First, agree with the National Commission of Scientific Degrees (2005); Saborido (2018); Vargas et al. (2023) and Pérez et al. (2024) in

which doctoral training is defined as the set of processes, activities and resources for planning, organization, execution and control-Evaluation of the development of doctoral programs and the quality of doctoral theses. The highest level of university studies, which consists in conducting original and rigorous research on a specific subject, under the direction of a professor expert in that area of knowledge.

Second, agree with Aguirre and Porta (2021), Mantal & Marrone (2022) and Saborido (2023) that doctoral training aims to guarantee the academic, scientific and professional excellence of doctors, through the development of the competencies and skills to be an excellent researcher, capable of generating useful knowledge for society and contributing to the advancement of science. Likewise, doctoral training in Cuba aims to train doctors in science in a certain area of knowledge, who are capable of demonstrating theoretical-methodological mastery in that area of science, through the solution of relevant scientific problems, in an innovative and creative way, with scientific honesty, autonomy and a socially responsible attitude.

Third, the complexity of doctoral training implies, in the international context and in the Cuban university, the participation of various actors, such as: universities, doctoral schools, academic committees, coordinators, directors, tutors, doctoral students and evaluators.

Fourth, the management of doctoral training is based on a *system of principles*, which constitutes the set of general theoretical-practical standards taken into account for the conception, implementation and evaluation of the results of doctoral training.

The authors of this paper establish the following *principles for the management of doctoral training*: (1) *relevance*, which responds to the needs and problems of the Cuban context, to the global challenges of science, technology and innovation, by providing doctoral thesis topics linked to relevant research projects with

potential impact; (2) *quality*, related to compliance with the academic and scientific standards established by the National Commission for Scientific Degrees and by international accreditation agencies, in systematic, periodic and rigorous evaluation and accreditation processes, based on the results and indicators of doctoral training; (3) *integration*, when the articulation between the different areas of knowledge, higher education institutions and research centers is favored, by promoting collaboration with other actors in the National System of Science, Technology and Innovation, in which doctoral students and tutors actively participate in research groups and networks, both national and international; (4) *innovation*, which stimulates creativity, critical thinking and the ability to generate original and novel solutions to scientific and social problems and the development of skills for innovation management and its application to research processes; and (5) *comprehensive training*, related to the contribution to the human and professional development of doctoral students (scientific, ethical, social and cultural fields) and with training that allows them to assume their role as leaders, teachers, researchers and knowledge managers, from a holistic vision and committed to the sustainable and inclusive development of Cuba (National Commission of Scientific Degrees, 2005; Rubio and Hernández, 2018; Official Gazette of the Republic of Cuba, 2019; Mantal & Marrone, 2022; Saborido, 2023).

Fifth, the complex dynamics of doctoral training management are expressed in actions of an institutional, administrative, pedagogical and territorial-community nature, which leads to establishing the *institutional, administrative, pedagogical and territorial-community dimensions*, and each of them, with their respective subdimensions of the management of this process.

The *institutional dimension* is related to the organizational forms of the decision-makers and managers involved in doctoral training, for the proper functioning of the training structures, by offering a framework for the systematization and analysis of the actions related to those

organizational aspects that, in each structure, instance and/or dependency, reflect a style of operation.

The fundamental subdimensions of the institutional dimension are related to the organizational chart that shows the internal structure of the organization, in addition to the structures and instances (dependencies), involved in doctoral training.

At the institutional level, the Ministry of Higher Education establishes the general policies for doctoral training in the corresponding structures, namely: authorized universities and research centers, departments, institutions, faculties and teaching departments. At the same time, the National Commission for Scientific Degrees establishes the policies, norms, procedures and quality standards and the evaluation and accreditation of the programs and theses in the degree commissions, academic committees, departmental advisory bodies and doctoral students and tutors.

The *administrative dimension* is associated with the actions and strategies for managing human, material, and economic resources, technical processes, time, safety and hygiene, and information control, related to the members of the structures, bodies, and/or departments that manage doctoral training.

The subdimensions of the administrative dimension include policies; regulations; the establishment and supervision of functions; processes and subprocesses; strategies; economic-financial, material, human and time resources; information management, computerization and communication; and finally, the evaluation of the quality of doctoral training.

In the administrative dimension, the legal framework is established where the Council of State issued Decree-Law No. 372/2019 with the general provisions of doctoral training in Cuba; the Ministry of Science, Technology and Environment issued Resolution No. 287/2019 on the system of science, technology and innovation

programs and projects and the Manual for the management of the CITMA programs and projects system (2023) and the Ministry of Higher Education and the National Commission for Scientific Degrees issued a set of regulations, among which are: Resolution No. 139/2019, which regulates the doctoral training process and the requirements for obtaining scientific doctor degrees; Resolution No. 140/2019 approving the Regulations of Postgraduate Education of the Republic of Cuba; the Rules and Resolutions of the National Commission for Scientific Degrees (2005), with the Adjustments (2021), the doctoral programs of each area of knowledge; Resolution No. 3/2020 that updates the conception, development and responsibilities in doctoral training; Resolution No. 1/2020 on scientific publications; Resolution No. 16/2022 on the areas of knowledge; Instruction 1/2020 on the basic requirements of authorized institutions (CNGC) and Instruction 2/2020 on the authorization of defense with telepresence; among others.

In addition, doctoral training strategies were designed, which include the national strategy of the National Commission for Scientific Degrees and the strategies of the authorized universities and centers, according to the strategic planning for the period 2022-2026. Also part of this dimension are human resources, made up of decision-makers (commission presidents, academic committee coordinators) and managers (tutors and doctoral students), economic-financial resources, IT resources, material and logistical resources, and time resources.

The *pedagogical dimension* involves the fundamental process of doctoral training, as it deals with the training process and its curricular organization, the teaching-learning process and the methodological strategies that facilitate the training of a comprehensive and competent doctor with an international profile.

The *subdimensions of the pedagogical dimension* are intended for the most complex, multidisciplinary and decisive processes of

doctoral training, which include: (1) the development of research skills and abilities, carefully established in the doctoral training plan; (2) the doctoral training program, with the lines of research, the general and stage-by-stage objectives, and the training components, among other relevant aspects; (3) the didactics for managing the training; (4) the methodological work of the structures that manage doctoral training; (5) the evaluation and accreditation and (6) the preparation of the actors (decision-makers and managers) involved.

Sixth, the authors of this work agree that continuing postgraduate training, focused on obtaining scientific degrees, according to the criteria of Pérez et al. (2024), goes through three stages, namely: (1) the *process of entering a doctoral program*, considered as the stage prior to admission to the program, as an applicant, in which prior general preparation may occur (doctoral school); (2) the *doctoral training process* after official enrollment in the program, with the completion of training activities, as a doctoral student, which ends with the defense of the doctoral thesis; and (3) the *postdoctoral training process* once the scientific degree of doctor (Dr. C.) has been obtained, the results are generalized, highly complex academic and research functions are performed, continuing training is continued (postdoctoral training) and reproducibility actions are carried out (training new doctors).

Seventh, doctoral training was structured around *three components*, namely: (1) *scientific research*, with the highest percentage of credits; (2) *theoretical-methodological training* and (3) the component related to the *writing, pre-defense* and *defense* of the thesis.

The internal logic of this doctoral training process is based on the dialectical-materialist theory of knowledge *From living contemplation to abstract thought and from there to practice*, which is why *five moments* are conceived in this training process, namely: (1) *entry into the program*, where the research design is argued; (2) the *argumentation of the theoretical study of the*

research object; (3) the *characterization of the initial state of the research object*, (4) the *foundation of the proposed solution to the problem and its assessment* and (5) the *defense of the main theses of the research*. This training process has the singularity that, mostly, it is managed within the research project to which the doctoral student belongs.

The *optimal preparation* of decision-makers and managers involved in this complex training process is conceived through *three fundamental paths*, for example: (1) *postgraduate development* through workshops, online courses, internships, postdoctoral studies and self-improvement; (2) *methodological work*, which includes teaching-methodological and scientific-methodological work, in a cascade form in all structures (degree commission, academic committee, instance, dependency and faculty), through the (scientific)-methodological meeting, the methodological/open class, the seminar, the workshop and the conference; and (3) *scientific research* with the execution of R&D&I projects.

The *territorial-community dimension* refers to the way in which the university relates to the socio-community context of which it is a part, by knowing and understanding its conditions, needs and demands, which allows it to integrate and participate in the socio-labor and community culture, in solving problems in a creative and innovative way.

The subdimensions of the territorial-community dimension are: (1) the transformation of socio-labor environments, (2) the transfer of knowledge, (3) the use of science and innovation based on sustainable local empowerment and development, and (4) the promotion of community development projects.

Table 3 below summarizes the dimensions and subdimensions of doctoral training.

Table 3- The dimensions and subdimensions of doctoral training

Institutional	Administrative	Pedagogical	Community
(Forms of organization) Organization chart. Structures. Instances (dependencies)	(Management of all resources, regulations and functions) Policies. Regulations. Establishment and supervision of functions. Processes and threads. Strategies. Economic-financial, material, human, time resources. Information management, computerization and communication. Quality assessment.	(Training, teaching-learning and methodological processes) Training of research skills and abilities (doctoral training plan) Doctoral training program. Didactics for managing training. Methodological work on structures. Evaluation and accreditation. Preparation of the actors (decision-makers and managers) involved.	(University-labor sector-community relationship) Transformation of socio-labor environments. Knowledge transfer. Using science and innovation to promote sustainable local empowerment and development. Promotion of community development projects.

The aspects discussed in the discussion constitute the theoretical and methodological foundations for the management of doctoral training in Cuban universities.

In today's Cuban university, according to the criteria of the academic directors who manage doctoral training in the different management structures and the normative documents that govern their management, none of the six approaches most widely used internationally are followed, but rather, in an elective manner, those elements that contribute to the training of a comprehensive and highly competent doctor with an international vision are taken from them. Hence, the scientific problems that doctoral students solve through scientific research are interdisciplinary, from a global perspective, with a professional character, based on research and work skills, from a project that runs through the cycle of research, development and innovation.

The theoretical cores put forward in this research are made up of the theory of comprehensive management of educational processes and its categories, addressed by the UNESCO representation in Peru (2011), which was contextualized to the management of university processes, systematized by Pulido et al. (2023) and the good practices of doctoral training in international and Cuban universities, which, in the opinion of the authors of this research, are relevant and sufficient to support the comprehensive management of doctoral training in contemporary Cuban universities.

The comprehensive management of educational processes is relevant when establishing the relationships of interdependence and dependence between the dimensions and indicators as content of educational management, on the one hand, and the dynamics of the management cycle, which provides the comprehensive nature of management, on the other.

The pedagogical dimension with the training, teaching-learning processes and methodological actions transversally crosses the rest of the dimensions (institutional, administrative and community) and gives the educational character to management.

The theory of comprehensive management of educational processes infuses new qualities into the management of any university process, in particular, into the management of doctoral training, as it allows us to conceive in a holistic, systemic and systematic way the comprehensive and highly competent training of a doctor in a certain area of knowledge.

The new vision of university process management, put forward by Pulido, Pérez and Bravo (2023), allows for coherence and objectivity in the planning, organization, execution and control-evaluation of missional, strategic and support processes, seen from the institutional, administrative, pedagogical and community dimensions and subdimensions.

The procedural nature of the comprehensive management of educational processes lies in the dynamics of the Deming cycle; however, in the management of university processes, the authors of this research assume the dynamics of the directive cycle of planning, organization, execution and control-evaluation, widely used in the strategic and current planning of the MES in Cuba. In addition, control was conceived as a control-evaluation process because it includes monitoring, feedback and continuous improvement actions that allow decision-makers and managers to assess, quantitatively and qualitatively, the efficiency and effectiveness of a given process to make the pertinent decisions.

The management of doctoral training in contemporary Cuban universities assumes as a theoretical-conceptual framework the theoretical systematization of university process management by Pulido et al. (2023) and the good practices of international and national universities, where the pedagogical dimension is resized, with its training, teaching-learning, curricular and methodological processes, as a transversal axis of the rest of the institutional, administrative and territorial-community dimensions.

The management of this process in Cuba is carried out in different scenarios with the participation of universities, academic committees, coordinators, tutors, doctoral students and evaluators. The convenience of creating an autonomous structure (doctoral training school) to manage this process at the university is valued, as occurs in some European universities. It should be noted that in Cuban universities there are doctoral training schools with other functions, including that of preparing for entry into a training program.

The community dimension of educational management was contextualized to the aims and objectives of governance in Cuba and university governance, in which the role of the university in the transformation of the territory and the community is resized, which led to naming it as a *territorial-community dimension*.

The training of doctors in science in a specific area of knowledge is essential for scientific progress, economic development and social transformation in Cuba, as it benefits not only the doctoral students who pursue it but society in general. It is a process that must be carefully designed and supported to guarantee success and a positive impact on the sustainable development of society.

Doctoral training in Cuba is characterized by its relevance, quality and impact, as well as by its interdisciplinary, integrative, professionalizing, transformative and innovative approach, which takes place within a research project, based on the training of a comprehensive and highly competent doctor, with an international vision.

Doctoral training is closely linked to research, innovation and the sustainable and inclusive development of the country, responding to the priorities and needs of Cuban society.

The management of doctoral training in Cuba is considered a complex and multidisciplinary process, which requires adequate preparation of the decision-makers and managers in charge of putting it into practice. The pedagogical dimension in its management is overemphasized because it contains the training, curricular, teaching-learning and methodological process, based on a comprehensive and highly competent doctor, who demonstrates his capacity to transform in an innovative and creative way the socio-labor, territorial and community environments. The rest of the institutional, administrative and territorial-community dimensions support the purpose of the pedagogical dimension.

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