Revista de Ciencias Médicas de Pinar del Río

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(2025): e6603

ORIGINAL ARTICLE

Methodology of a Teaching Task System for Information Management

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Received: December 9, 2024
Accepted: July 11, 2025
Published: October 21, 2025

Citar como: González-Corrales IB, González-Corrales SC, Pando-Camejo D, Loynaz-Perdomo S, Prado-Tejido D. Metodología de un sistema de tareas docentes para la gestión de información. Rev Ciencias Médicas [Internet]. 2025 [citado: fecha de acceso]; 29(2025): e6603. Disponible en: http://revcmpinar.sld.cu/index.php/publicaciones/article/view/6603

ABSTRACT

Introduction: currently, the Cuban university has distinguished itself by its role in transforming society, facing various challenges imposed by the development of sciences, technologies, and scientific research. It is a challenge to discern between the vast amount of existing information and the high-quality information available through various accessible media.
Objective: to design a teaching task system to develop the ability to manage relevant scientific information according to the professional acting mode in first-year students of the Nursing Bachelor's degree at the Pinar del Río Medical Sciences University.
Methods: the dialectical materialist method as a coordinator of the other methods used, among empirical methods employed: surveys, expert interviews, documentary analysis, and theoretical level methods: historical-logical, modeling, and structural systemic.
Results: a teaching task system is proposed for the development of the ability to manage relevant scientific information from a systemic, contextualized, and interdisciplinary approach based on the development of the professional acting mode.
Conclusions: a teaching task system is proposed from a systemic, contextualized, and interdisciplinary approach, which constitutes an auxiliary means for designing new tasks and applying them to achieve the general objectives of the medical training process, taking into account the specific characteristics of students and a didactic pathway for the training and development of the ability to manage relevant scientific information.

Keywords: Information Management; Aptitude; Education, Nursing, Baccalaureate.

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(2025): e6603

INTRODUCTION

Currently, the Cuban university has distinguished itself by its role in transforming society, facing the diverse challenges imposed by the rapid development of sciences, technologies, scientific research, socioeconomic changes, and globalization.[1]

The paradigm that identifies today's Cuban Medical University is to provide society with a well-rounded professional, competent (knowledgeable, skilled, and ethical) to meet the challenges of modern society, with a comprehensive scientific and humanistic education. This demand requires us to project an alternative model with different pathways to achieve a professional who can respond to the economic and social development of our environment.[2]

Managing information in nursing practice and healthcare systems requires the effective flow of information and knowledge. Advances in information and communication technologies have translated into powerful tools for education and for analyzing and managing information. Therefore, graduates must understand the possibilities and limitations of information technologies and knowledge management and be able to use them to solve problems and make decisions in the medical and educational fields.[3]

For professionals being trained in the nursing program, discerning between the vast amount of existing information and the high-quality information available in various media becomes a challenge.

Thus, it becomes a priority in the training process of nursing graduates to develop skills to manage relevant scientific information and construct knowledge from the managed information, so that professionals can conduct their academic, clinical, and research activities with greater rigor. Hence, the new educational model of the Cuban University addresses three vital concepts.[4]

In this regard, the authors recognize: learning, the use of ICTs, and research, which entails the need to design a teaching-learning process in which methodologies and strategies are conceived, and means are used that foster the development and systematization of the ability to manage relevant scientific information for the actions of the nursing graduate in medical assistance, healthcare management, and the scientific research process itself.

However, the curriculum of the Health Informatics discipline, which is responsible for overseeing the process of developing the ability to manage relevant scientific information considered in this research as a critical skill in the scientific research process, has deficiencies from its conception, which is manifested in the programs of each subject in this discipline distributed throughout the training process as follows:

The discipline consists of five subjects distributed over semesters as follows: Informatics in the first semester, Health Statistics in the second semester, Elements of Qualitative Research in Health in the third semester, Research Methodology and Introduction to Statistical Inference in the seventh semester, and Research Project Workshop in the eighth semester.[5]

Informatics, a subject in this discipline studied in the first year of the Nursing Bachelor's program during the first semester, where the training and development of this skill should begin, making efficient use of tools provided by information technologies, supported by a scientific research process that inevitably requires the development of statistical and investigative skills contributing to the professional acting mode of the graduate, from the development of their

ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(2025): e6603

research function, requires a design that allows: "...to prepare students to obtain, collect, summarize, calculate, and interpret data derived from the scientific research process."[5] In this way, this knowledge can be generalized in the development of the ability to manage relevant scientific information.

The research proposed the following objective: To describe the methodology of a teaching task system for developing the ability to manage relevant scientific information according to the professional acting mode in nursing bachelor's students at the Pinar del Río Medical Sciences University.

RESULTS

The present study was based on research framed within the process of developing the skill "manage relevant scientific information" through the treatment of the content proposed by the curriculum of the Computer Science course taken by first-semester Nursing students in their first year of training. The aim is to design a contextualized system of teaching tasks for the development of the skill "manage relevant scientific information," grounded in the professional model.

A. Type of research, period, and location. Define the population or study group.
This is a pedagogical investigation supported by the integration of qualitative and quantitative paradigms, resulting from the Master's in Medical Education, during the period from 2018 to 2023, at the University of Medical Sciences of Pinar del Río. The results are currently in a validation process.

B. Selection of the population and the sample
The population consisted of 350 first-year Nursing students, with a sample of 260 subjects, 61 first-year professors in the Nursing program, and a sample of 53 of them, 9 professors from the Medical Informatics discipline, and 25 methodological collective leaders during the 2016-2017 academic year.

C. Dimensions and Variables for the operationalization of the development of the skill to manage scientific information.
The following dimensions were defined for diagnosis:
1. Conception of the process of developing the skill to manage scientific information.
2. Preparation of professors to execute the Teaching-Learning Process (TLP) regarding the development of the skill to manage scientific information.
3. Student perception about the process of skill development.

The instruments applied were designed from the conceptual and operational definition of the research object, considered the dependent variable in the research.

To develop a valid concept of scientific information management for an operational definition, current international and Cuban relevance analysis trends and criteria about the skill to manage scientific information are combined, along with theories on curricular design in a dialectical relationship with the context of the nurse's training process at the University of Medical Sciences of Pinar del Río.[6]

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Thus, scientific information management is defined as both a result and a process, as follows: it entails the skills developed by users in using information and communication technologies, as a means to develop new learning forms in the classroom and virtual spaces, as well as a supportive tool for research in solving issues in the health field, along with values or attitudes of responsibility, honesty, diligence, and professional ethics in a social interaction environment, as an active member of a research team through practical work, mediated by methodological management at the disciplinary and academic year level.

Among the empirical methods employed are: observation (of classes, methodological activities); interviews (with Medical Informatics professors, career leaders, and students); surveys (with professors and students); documentary analysis (of regulations, resolutions, methodological teaching regulations, professional models, study plans, subject programs, methodological teaching plans, minutes of methodological activities of the career, academic year, discipline, and subjects); for the diagnosis of the current state of the skill to manage relevant scientific information at the University of Medical Sciences of Pinar del Río and to justify the existence of the problem to be resolved based on the scientific research process. Descriptive methodology was used in the research to obtain, organize, present, and summarize information derived from the instruments applied through frequency tables and graphs.

The structure of the teaching task adopted in this research references that proposed by Iglesias León in his doctoral thesis, which conceives the teaching task as constituted by objectives, actions, operations, and evaluation.[2]

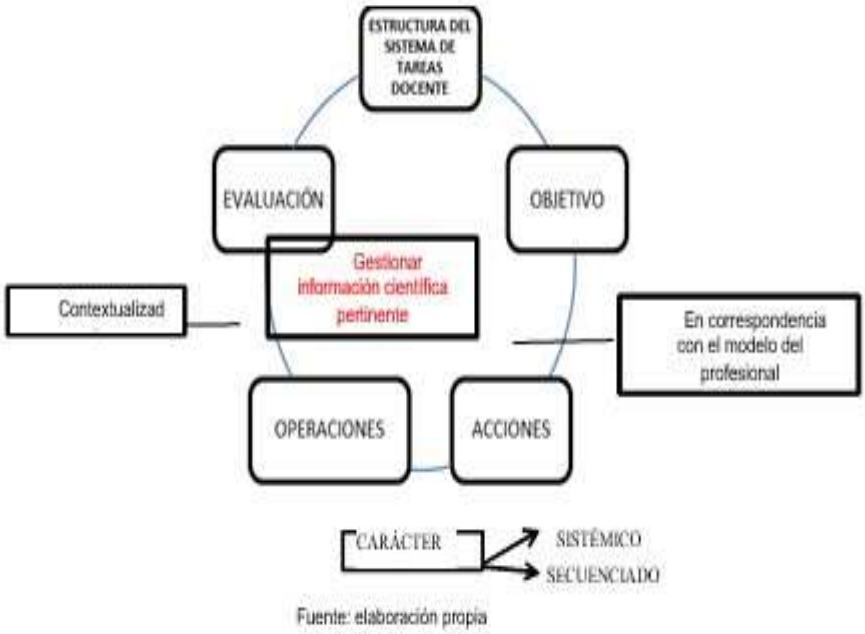

Fig. 1 Teaching task system.

ISSN: 1561-3194 **RNPS:** 1877
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The proposed system of teaching tasks has defined: (Figure 1)

General objectives for each: this objective didactically expresses a skill to be acquired by the student. This skill, in turn, constitutes an action to be executed by the student in managing relevant scientific information; the set of these skills makes up the functional invariants of the skill "manage relevant scientific information." Consequently, the student's systematization of the skills to be developed through each of the teaching tasks that make up the task system leads to the formation of the skill "manage relevant scientific information."

The actions to be performed by the student to achieve the goal encompass the execution (skill) intended to be developed in them, summarizing all the contents proposed in the topic of Computer Networks in Health Sciences. Information retrieval from the Computer Science subject is primarily supported by the problematic method.

The operations specified in each teaching task express the necessary conditions for the student to execute the actions contained in each teaching task that constitutes the system, leading to the achievement of the goal; the development of the skill to manage relevant scientific information.

Each teaching task defines the elements to consider in evaluation, in assessing the achievement of the objective; evaluation in which great weight is given to the student's self-evaluation, co-evaluation, and hetero-evaluation within the group. All of these are facilitated given that students have an appropriate mental representation of the skill to be developed based on the objectives, actions, and operations comprising the teaching tasks.

These objectives, actions, operations, and the conceived evaluation method pedagogically favor the process of developing the skill "manage relevant scientific information" from a set of actions and operations that constitute the functional invariants of the skill. Thus, the student's systematization with each of the teaching tasks forming the proposed task system will lead to the development of the skill in question. Moreover, analysis conducted at the level of the Computer Science subject will allow identification that the student's transition through the topic of Computer Networks in Health Sciences, and information retrieval proposed therein, will provide the necessary knowledge to resolve the proposed task system to develop the skill "manage relevant scientific information."

In this research, the integration of components occurring in the teaching task proposed as a system in function of the professional model is assumed.

Success in solving a teaching task is conditioned by the motivations and needs of the student. Hence, the teaching task should reflect, to the greatest extent possible, the main needs of each student and their motivations. This imposes new demands concerning the individualization of teaching.

When designing a system of tasks for a specific class, topic, and generally for a subject, it is essential to consider the importance of a systemic and sequenced nature, the didactic interrelationship of the components that comprise it, in which the student takes on the role of an active subject and protagonist of their own professional training process.

ISSN: 1561-3194 **RNPS:** 1877
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For this research, it is crucial to conceive the teaching task as a system contextualized to the professional model. In this sense, there are various system concepts addressed by different authors, characterized by regularities in the relationships among their elements to exist as such. The term system is frequently used in the literature of any contemporary knowledge branch and has seen increased use in pedagogy in recent years.

In the educational process, the teaching tasks developed to enhance the efficiency of the teaching-learning process must be designed as a system with a methodological character, where each task relates to the whole and its parts. The essential quality when considering it a system lies in the interdependence of the integrating parts.[7]

The concept of a system is assumed as the set of interrelated components from an aesthetic and dynamic perspective, whose functioning is directed toward achieving specific objectives that facilitate resolving a problematic situation under certain external conditions.[8]

With an adequate system of tasks, it is possible to create an environment in the classroom similar to that existing in a collective of researchers and perform actions that lead to appropriate self-learning. Although school scientific activity generally does not produce new knowledge for science, it does generate new knowledge for the group of students and eventually for teachers, leading to genuine discoveries from a subjective viewpoint.

The task system is fundamentally directed at:
The conscious assimilation of teaching material; the perfection and consolidation of knowledge, skills, and habits; the connection with prior knowledge; the achievement of class objectives, forming a dialectical unity; the independent search and solution of a mental or cognitive problem.

The task that the student performs outside of class must meet the general requirements of the task system, such as:
Reflecting the current curriculum of the subject and responding to the objectives of teaching and student development; anticipating a variety of tasks as well as the systematic increase in the complexity of the students' cognitive independence for their execution, and the content and methodology of these. Including elements of problem-based learning, being one of the variants in the application of students' independent work.

Throughout educational practice, it is noted that the structured task system with an ascending degree of complexity in content favors students' actions for problem-solving while appreciating their independence and creativity.

The teacher task system must go through three fundamental stages:
Orientation Stage: Guides, texts, and other materials are needed to explain the procedures to be used, the necessary interrelated content, as well as the preparation and motivation of students.

Execution Stage: Planned actions will be developed to achieve proposed goals, including the necessary human and material resources, corresponding to the organizational forms utilized.

Control Stage: The development and execution of the designed integrative teaching task will be evaluated, the results obtained will be assessed, and it will be reoriented if necessary.

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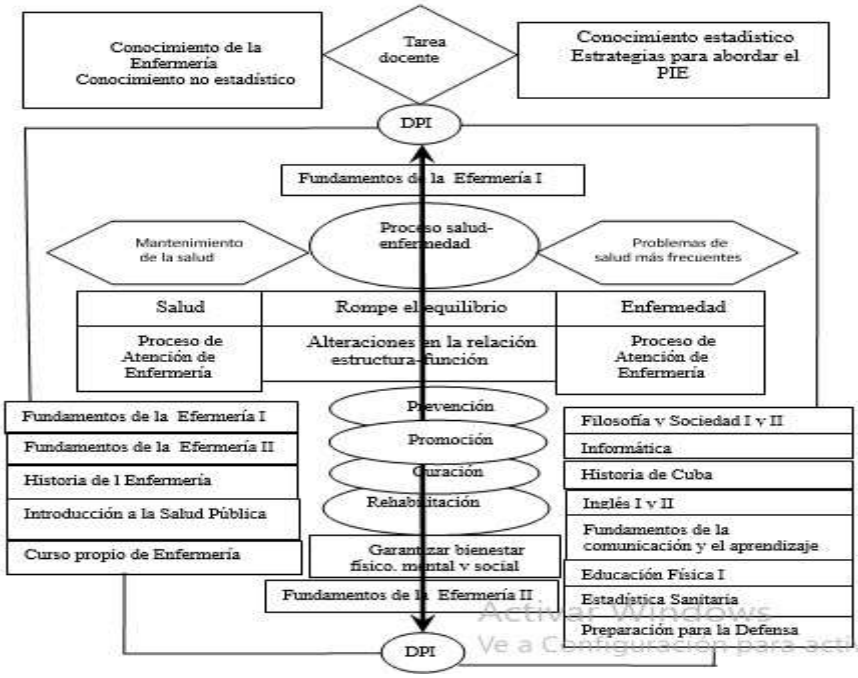
In this regard, it is important to have clarity on how to organize content, specifically, the systemic approach to the content of the study object and how the teacher guides the task considering the student's potential to perform a particular action, aiming to obtain a Guiding Base of Action (BOA) whose composition is generalized and complete.

Considering the previous elements guarantees the advantages of teaching tasks proposed by Sampedro R. that are assumed in this research.[9]

- ✓ They encourage students to dedicate more time to study activities.
- ✓ They enable the application of content in practice.
- ✓ They show students new content.
- ✓ They provide the opportunity to independently seek the necessary information to overcome
- ✓ the fundamental contradiction of the process.
- ✓ They form, consolidate, and develop skills for using the content.
- ✓ They allow for controlling and self-monitoring content assimilation.
- ✓ They guarantee students' preparation for new teaching tasks.
- ✓ Diverse in their complexity.
- ✓ Varied in the contexts in which they are presented.
- ✓ Related to the integral acquisition of a system of knowledge, skills, and values found in the internal structure of the skill "manage relevant scientific information."

Focused on the process and the result, where reflections derived from it are utilized, related to the analysis of difficulties, serving as a starting point for receiving new orientations and assistance (feedback), based on the scientific method of the profession: Health-disease process.[10]

Proposal for the structure of the teaching task to develop the skill to manage relevant scientific information.



ISSN: 1561-3194 **RNPS:** 1877
Rev Ciencias Médicas. 2025; 29(2025): e6603

DISCUSSION

The process of training and developing the skill to manage relevant scientific information materializes in the discipline of Computer Science with contributions from other disciplines in medical training, and is systematized with the curricular strategy of Computer Science and Research, executed as a transversal axis in the Medical career considering the role of the integrating main discipline (General Medicine) in coordinating the activities carried out to achieve the curriculum's objective.

To achieve these goals in the training process of the physician, the structuring of the skill to manage relevant scientific information was conceived, taking into account the system of actions and operations that characterize it in the various conditions under which the physician operates in professional practice. For the design of teaching tasks, themes related to content referring to the most frequent problems encountered in medical practice were employed, which are addressed in subjects such as: Molecular Biology, Cell, Tissues and Integumentary System, Human Ontogeny and SOMA, Introduction to MGI, Philosophy and Society I, English I, Physical Education I, Own Course in Basic Cardiac Pulmonary Cerebral Resuscitation, Nervous, Endocrine, and Reproductive Systems, Metabolism and Nutrition, Health Promotion, Biostatistics, Philosophy and Society II, English II, Physical Education II, and the Own Course of Introduction to Natural and Traditional Medicine, considering the coordinated work of the Computer Science Discipline and the leading subjects of the main integrating discipline in the first year of the program.[7]

The system of teaching tasks proposed as a result of the research suggests a space in which learning situations are generated, where knowledge must be constructed collaboratively by providing solutions to problems related to the health-disease process and its qualified care for individuals, families, and populations, considering the depth of addressing the solutions to the professional problems declared in the model of the professional and the frequency with which they occur in medical practice. Furthermore, it takes into account the levels of action required to resolve these issues in the exercise of the profession.

Tasks have been conceived with the purpose of allowing students to systematize the actions and operations that characterize the skill of managing relevant scientific information, considering the contributions from the subjects of the academic year, which is managed through the collaborative methodological work conducted by teachers in the year group directed by the subjects of the main integrating discipline (Introduction to General Medicine and Health Promotion).

The task system is based on the dialectical relationship between professional problems (considered as the most general and frequent issues inherent to the Analysis of the Health Situation), the mode of professional action, and the object of the profession.

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CONCLUSIONS

In its theoretical-methodological approach, the ability to manage scientific information is considered an essential condition for solving professional problems and a crucial component of research tasks, supported by infotecnological tools. This provides the educator with a methodological instrument that guides how to materialize the proposal in the direction of the teaching-learning process. The process of developing the ability to manage relevant scientific information has manifested itself in an asystematic, decontextualized manner, lacking interdisciplinary actions aimed at forming a professional mode of operation that takes into account the significant contributions of the results of scientific information management for solving professional problems. The system of contextualized teaching tasks for the development of the ability to manage relevant scientific information from the Computer Science course for first-year students in the Bachelor of Nursing program at the University of Medical Sciences of Pinar del Río is based on a structure that includes objectives, actions, operations, conditions, and evaluation, derived from the contents outlined in the Computer Science syllabus, centered on the problematic method as a means to achieve the relationship between disciplinary and transversal aspects of the curriculum in the training process of nurses, emphasizing the systemic, integrative, and co1. Pupo Ávila NL, Pérez Perea L, Alfonso García A, Pérez Hoz G,

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