Medimay Electronic Journal 2026; Volume 33:e2945
ISSN: 2520-9078 RNPS: 2441 RNSW A1269

ORIGINAL ARTICLE

Competencias informacionales en la Educación Médica Superior

Informational skills in Higher Medical Education

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Cite as: Acosta Perdomo YD, Álvarez Morales. NE, Domecq Piña L, Bárcenas Grillo Y. Informational skills in Higher Medical Education[Internet].2026[cited: citation date];33:e2945. Available at: https://medimay.sld.cu/index.php/rcmh/article/view/2945

RESUMEN

Introducción: Las nuevas tendencias de la Educación Médica Superior, demandan la formación de competencias informacionales, en los profesores, para afrontar las exigencias del nuevo paradigma. **Objetivo:** Determinar el nivel de competencia informacional para la gestión del conocimiento científico, en los profesores de Ciencias Médicas. **Métodos:** Se realizó un estudio descriptivo y transversal, en la Facultad de Ciencias Médicas de Mayabeque, de enero a octubre 2024, la población fue de 305 profesores y por muestreo no probabilístico, intencional, por criterios; se seleccionó una muestra de 251 de ellos. Se estudiaron las variables de: competencia informacional, sus dimensiones y categoría docente. El análisis estadístico consistió en una distribución de las frecuencias absolutas, relativas y la prueba de Chi-cuadrado. **Resultados:** Predominó los niveles medios de competencia informacional con un 53.3 %, el puntaje más bajo fueron las dimensiones de la localización y la evaluación de la información, con el 73.3 y el 72.5 % de forma respectiva. El 76 % de los docentes tuvieron la categoría docente principal de asistentes, se encontraron diferencias estadísticas significativas, entre la categoría docente principal y el nivel de competencia informacional con un 95 % de confiabilidad. **Conclusiones:** Los profesores tienen un nivel medio de competencia informacional, las dimensiones más afectadas son localización y evaluación de la información, predomina en el claustro la categoría docente asistente. Existen diferencias estadísticas, entre la categoría docente y el nivel de competencia informacional.

ABSTRACT

Introduction: The new trends in Higher Medical Education demand the development of informational skills in professors to meet the demands of the new paradigm. **Objective:** To determine the level of informational competence for the management of scientific knowledge according to its dimensions in professors of Medical Sciences of Mayabeque. **Methods:** A descriptive and cross-sectional study was conducted at the Faculty of Medical Sciences of Mayabeque from January 2024 to October 2024. The population consisted of 305 professors, and through non-probabilistic, intentional sampling by criteria, a sample of 251 was selected. A questionnaire was applied to collect the information. The variables studied were informational competence, its dimensions, and teaching category. Statistical analysis consisted of absolute and relative frequency distributions and the Chi-square test. **Results:** A medium level of informational competence predominated among professors at 53.3 %; the lowest scores were in the dimensions of information location and evaluation, at 73.3 % and 72.5 %, respectively. 76 % of the teachers had the main teaching category of assistant, and statistically significant differences were found between the main teaching category and the level of informational competence with 95 % confidence. **Conclusions:** Professors have a medium level of informational competence; the most affected dimensions are information location and evaluation; the Assistant teaching category predominates in the Faculty. There are statistically significant differences between the teaching category and the level of informational competence.

Received:11/01/2026| | **Accepted:**11 /20/2026| | **Published:** 11/26/2026

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Palabras clave: competencia informacional, tecnologías de la información, educación médica superior, información científica
Descriptores: alfabetización informacional; tecnología de la información; enseñanza; aprendizaje; educación médica

Keywords: informational competence, information and communication technologies, higher medical education, scientific information
Descriptors: information literacy; information technology; teaching; learning; education, medical

INTRODUCTION

Changes in social contexts are related to the challenges that education must understand and decipher with clarity in order to respond to them in a critical and responsible manner through the formulation of policies within society; we are witnessing the so-called information and knowledge society.[1] The traditional education model has become obsolete in the digital era.[2] A new range of technological resources and methodologies are established as catalysts for change, generating greater commitment, motivation, collaboration, personalization, flexibility, inclusion, and innovation all critical competencies for interacting, producing, and working in the 21st century.

Higher education finds itself at a crossroads of innovation and adaptation. The integration of technologies such as artificial intelligence and virtual reality has revolutionized learning, while the focus on soft skills and methodologies such as hybrid learning responds to the changing demands of the modern world.[3]

Currently, educational spaces must be in tune with and support learning methodologies and dynamics so that students acquire the competencies and skills needed in the 21st century: communicating, collaborating, thinking creatively and critically, innovating, solving problems, and becoming competent users of technologies dedicated to both the consumption and production of knowledge. Educational processes are discovering new paths, where, based on new paradigms, alternative approaches are being built that attempt to respond to different contexts.[4]

Cuban Higher Education has taken on the challenge of introducing information and communication technologies (ICT) into the Universalization process through information management systems related to academic activity and the use of virtual teaching-learning environments.[5]

Digital technology changes the way we educate; ICT fosters a literate society that can access, evaluate, organize, interpret, and disseminate information in an increasingly digital format. The development of informational competencies in teachers becomes vitally important so that they can make responsible and effective use of information, which contributes to the development of autonomous and competent individuals capable of facing the challenges presented by today's society.[6]

In the health sector, Information Literacy (ALFIN) seeks, above all, the sustainability of processes through the empowerment of their actors; their documentation based on the evidence offered by biomedical, clinical, and health research, as well as the socialization of the knowledge obtained among the members of an organization or community with related interests.[7] And hand in hand with the ethical aspect of information,[8] these contexts influence the behavior that a person manifests toward information, which starts from information needs that arise together with other external factors and that lead the subject to act in a certain way to satisfy them, which is called informational behavior.[9]

ALFIN and the study of informational behavior are approaches that complement each other for the purpose of improving informational competence. The American Library Association (ALA) states that for a person to be considered information literate, they must be able to recognize when they need information and have the ability to locate, evaluate, and use it effectively. Information-literate individuals are those who have learned how to locate information and how to use it in such a way that others can learn from them.[9]

The authors subscribe to the concept of informational competence given by Castilla in 2021 and cited by Rodríguez Castilla in 2024,[10] as the set of systemic actions and operations that allows the researcher to access and process scientific information for the solution of informational problems during their research, as well as to disseminate new knowledge obtained, with autonomy, technological creativity, and collaboration.

Another author[7] defines informational competence as an instrumental skill that focuses on the use of technological tools and resources to access, process, and communicate information. Over time, this skill becomes a broader cognitive structure that involves the use of critical thinking skills, analysis, information synthesis, source evaluation, and effective communication.[6]

In the search for best teaching practices and tools to achieve better results in knowledge management, the teaching methodology of informational competencies facilitates meaningful learning, learning to learn, collaborative work, creativity, and communication of students in their relationships with information; achieving an adequate implementation of this methodology requires appropriating new roles attached to it and adequate teaching guidance on the particularities of cognitive processes. In this sense, it is an obligation of professors to acquire knowledge and skills for its use and thus face the challenges of the new trends in Higher Medical Education.[11]

Resolution 47/2022, Organizational Regulation of the teaching process and of the direction of teaching and methodological work for university degrees, in its article 20, referring to study modalities and types of courses, states that the use of virtual teaching-learning environments must be encouraged,[12] which is why the need for the formation of informational competencies in the professors of the Faculty of Medical Sciences of Mayabeque is imperative for the construction and dissemination of knowledge, the exchange of knowledge, and the raising of the quality of the teaching-educational process.

For the above reasons, the objective is proposed to determine the level of informational competence for the management of scientific knowledge according to its dimensions in the professors of the Faculty of Medical Sciences of Mayabeque.

METHODS

A descriptive, cross-sectional study was conducted from January to October 2024 at the Faculty of Medical Sciences of Mayabeque, Güines, Mayabeque province.

The population consisted of 305 professors from the Faculty of Medical Sciences of Mayabeque. For sample selection, non-probabilistic, intentional sampling by criteria was used; the sample consisted of 251 professors who met the following selection criteria.

-Inclusion criteria
Professors who belonged to the Faculty of Medical Sciences of Mayabeque and worked at the main site or in the municipalities of the province, and who gave their consent to participate during the study period.

-Exclusion criteria
Professors who were on mission during the study period or who left the institution during the study period.

The variables studied were:
-Informational competence; understood as the set of systemic actions and operations that allows the researcher to access and process scientific information for the solution of informational problems during their research, as well as to disseminate new knowledge obtained, with autonomy, technological creativity, and collaboration.[10]

To determine the level of informational competence, five dimensions and 20 indicators were determined, four indicators per dimension. Each indicator with a value of five points for a total of 20 points per dimension and 100 points in total.

Four levels of informational competence by its dimensions were defined based on the criteria established by Rodríguez Castilla, modified, and a category was introduced for the medium level. The categories studied were: very low, basic, medium, and advanced level, with their respective units of measurement, according to the scores to be evaluated in the survey.[10]

-Advanced with scores in the range of > 78 and up to 100.
-Medium from 52 and up to 77.
-Basic with scores > 26 up to 51.
-Very low if obtaining from 1 to 25 points.

To determine the level of competence according to its dimensions, a 3-level Likert scale was applied. Level 3 was determined as the highest level of competence per dimension with scores between 15 and 20, level 2, medium with scores > 5 up to 10, and level 1, low if obtaining in the dimension between 0 and 5 points.

-Dimensions of the level of informational competence

Dimensions	Indicators	Value
Location and adequate access	They access reliable sources of information	0 - 5
	They manage to identify search engines for specialized academic and scientific information	
	They know descriptors and use them	
	They know and use Boolean operators	
Organization and processing of information	They know and use bibliographic managers	0 - 5
	They are capable of identifying specialized information and reference materials on the internet	
	They are capable of writing academic and scientific articles	
	They cite the responsible authors in accordance with the journal's guidelines and know the Vancouver norms	
Evaluation of information for its authenticity	They are capable of recognizing relevance, pertinence, and currency	0 - 5
	They manage to evaluate information according to validity, reliability, and prestige of the source	
	They manage to classify the different reference materials according to type	
	They are capable of recognizing unreliable sources of information	
Communication and dissemination of information	They appropriately use the rules for writing and publishing scientific articles	0 - 5
	They know and use permanent identifiers ORCID, DOI.	
	They are capable of developing content for communication using information technologies	
	They know the basic norms and interact in virtual environments, forum spaces	
Integration of ethical and legal aspects	They know the legislation on intellectual property and current copyright law	0 – 5
	They recognize open licenses for using and sharing information	
	They respect the privacy, confidentiality, and integrity of data	
	They do not commit plagiarism or other ethical violations	

-Teaching category: Four of the categories established for the organization of the work of university professors were taken into account, according to article 1.1 of Resolution 145/2023; as Main teaching category: Full Professor, Associate Professor, Assistant, and the transitory teaching category: Instructor.[13]

For information collection, a structured questionnaire was designed with dichotomous and closed-response items that measured the level of informational competence for the management of scientific knowledge according to the dimensions the professor possesses, the way it is obtained, and considerations about its usefulness in the teacher and researcher.

It was designed by the authors of the study and validated by expert criteria—researchers with more than five years of experience in health information literacy—who participated in a discussion group that met on three occasions until the information was saturated, which allowed the design of the final version to be completed.

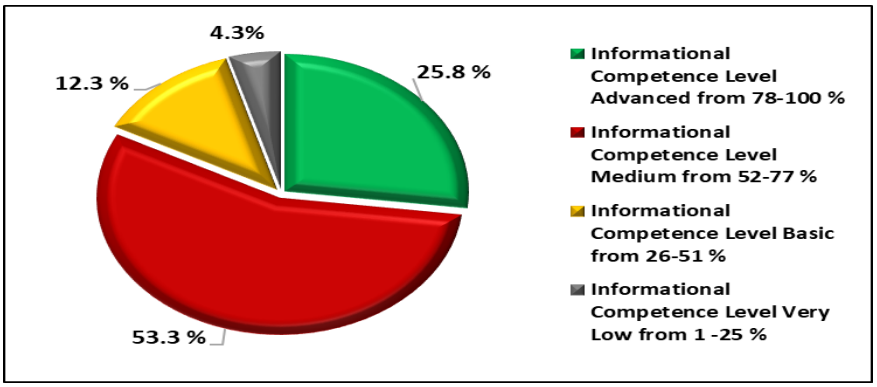
With the information obtained, a database was created using SPSS version 20.0 software, which allowed subsequent processing and analysis. A statistical analysis of absolute and relative frequency distributions was performed, as well as the Chi-square test, which allowed the summarization of the data and the presentation of the information in the form of tables and texts with Microsoft Word 2016 software in a Windows 10 environment.

All professors were informed of the objectives and importance of this work and of the anonymous nature with which the results were handled; they expressed their agreement to participate by previously signing the informed consent. The results obtained were used with the

sole objective of contributing to the improvement of the quality of the teaching-educational process of the Medical Sciences of the province.

RESULTS

A medium level of informational competence predominated at 53.3%, the advanced level was reached by 25.8% of the professors, 12.3% of the teachers had a basic level of informational competence, and only 4.3% had a very low level in the management of scientific information (Graph 1).



Graph 1. Information literaacy level of teachers

The dimensions that reached the highest values and determined the high level of informational competence (15-20 points) were: communication with 63.4 % and ethics with 58 %, and the most affected dimensions that delimited the low level of informational competence (0 to 5 points) were the dimensions of information location and evaluation, with 73.3 % and 72.5 %, respectively (Table 1).

Table 1. Level of informational competence of professors according to its dimensions

Level of informational competence	Dimensions									
	Localization		Organization		Evaluation		Comunication		Éthic	
	No.	%	No.	%	No.	%	No.	%	No.	%
Low level(0-5)	185	73.7	31	12.3	182	72.5	33	13.1	28	11.1
Medium level (+ de 5 to 10)	42	16.7	155	61.7	37	14.7	58	23.1	75	29
High Level (from 15-20)	24	9.5	65	25.8	32	12.7	160	63.4	148	58
Total	251	100	251	100	251	100	251	100	251	100

The category that predominated in the faculty was assistant professor with 90.9 %, and there was only one full professor, accounting for 0.39 %. Statistically significant differences are observed between the professors' teaching category and the level of informational competence, with 95 % confidence (Table 2).

Table 2. Distribution of professors according to level of informational competence and teaching category

Level of informational competence	Teaching category									
	Full Professor		Associate Professor		Assistant Professor		Instructor		Total	
	No.	%	No.	%	No.	%	No.	%	No.	%
Advanced from 78-100	1	1.5	44	67.6	20	30.7	-	-	65	100
Medium from 52-77	-	-	11	7.6	133	92.3	-	-	144	100
Basic from 26-51	-	-	-	-	28	90.3	3	9.6	31	100
Very low from 1 -25	-	-	-	-	10	90.9	1	9.0	11	100
Total	1	0.39	55	21.9	191	76.0	4	1.5	251	100

Chi-square test	Valor	gl	Asymptotic significance (two-sided
Pearson Chi-squaren	161.742ª	9.000	
Likelihood ration	150.797	9.000	N of valid cases 251

DISCUSSION

For some authors,[7,14] continuing education activities positively influence the acquisition of knowledge and skills by health professionals for the improvement of informational competence in health. Other authors(10) show a basic level of informational competence for information management in doctoral students in Educational Sciences.

A study[15] conducted at the Teaching Gynecobstetric Hospital in Palma Soriano, Santiago de Cuba, evidences a low level of informational competence in health professionals for searching scientific information, which is so necessary for the socialization of knowledge and the raising of the quality of medical care; in the present study, a medium level of informational competence predominates.

Another study[16] conducted with professors from the University of Medical Sciences of Havana, Havana City, Cuba, shows unsatisfactory results in relation to the informational competencies of professors, which leads to proposing preparation activities for the faculty.

The behavior of informational competence is analyzed in relation to its dimensions, and the lowest results are found in the dimension that includes Location and Evaluation of information; this coincides with other authors,[17] who detect lower levels of informational competence observed in the Search and Evaluation of information dimensions of professors, which shows the need for professional continuing education activities aimed at raising competencies.

In other research,[16] the dimensions of Evaluation, Acquisition, and Processing of information exhibit the worst results. The greatest difficulties in the dimension of Location of scientific information are found in a study conducted with Resident Physicians of the Pediatric Hospital of the National Medical Center of the Mexican Institute of Social Security (IMSS), Mexico.[14]

In the current research, professors with a main teaching category predominate (Assistant and Associate Professor categories). The result coincides with a study[10] conducted to evaluate the informational competencies of doctoral students at the José Antonio Echeverría Technological University of Havana, Havana City, Cuba.

The authors of this case series attribute the result to the fact that most of the professors who have been studied are people over 35 years of age, born before the digital era, and exhibit difficulties in handling technologies; the American writer and educator Marc Prensky defined them as digital immigrants. Increasing the level of informational competence is a premise for raising the quality of the teaching-learning process and the comprehensive training of health human resources.[18]

Researchers[19] highlight persistent challenges related to resistance to change and the lack of validated instruments; in contrast, there are concrete opportunities for the design of standardized instruments, hybrid programs, and the integration of ecological and ethical approaches.

The professors agree that informational competence is essential or necessary for the development of the teaching-learning process in the 21st century. For some authors,[8] the development of informational competence is transcendental and is part of the basic skills necessary to achieve full development according to the demands of the current information and knowledge society.

The present study evidences the need for preparing the Faculties of Medical Sciences to handle scientific information responsibly and ethically, in order to raise the quality of training and research processes for the sake of sustainable development and the contribution to the social relevance of the University; hence the need to enrich professional continuing education programs with didactic alternatives aimed at the formation of informational competence in the professors of the Medical Sciences of Mayabeque.

It is indispensable to develop professional continuing education activities to improve the level of informational competence in professors of the Medical Sciences and to raise the quality of the teaching-learning process, given the challenges that Higher Medical Education faces in the digital era.

It is concluded that the professors of the Faculty of Medical Sciences of Mayabeque have a medium level of informational competence; the most affected dimensions are information location and evaluation; the Assistant teaching category predominates in the faculty. There are statistically significant differences between the

teaching category and the level of informational.

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Conflict of interests.
The authors declare that there are no conflicts of interest for the publication of the article.

Authorship Contribution.
Participation according of the order agreed upon by each of the authors of this work.

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