



Current state of information management in the postgraduate department within the doctoral training process

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ABSTRACT

Introduction: information management in postgraduate departments is crucial for the efficiency and quality of academic programs, especially in the doctoral training process. Advances in information technologies offer opportunities to optimize these processes.

Objective: to determine the current state of information management in the postgraduate department, specifically in the doctoral training process of the Faculty of Medical Sciences "Dr. Ernesto Guevara de la Serna."

Methods: a descriptive, retrospective, and cross-sectional study was conducted between September 2023 and February 2024. The sample included the 4 workers of the department as well as regulatory documents and records from the period 2020–2023. Documentary analysis, semi-structured interviews, and non-participant direct observation were employed. Data were processed through thematic content analysis and methodological triangulation.

Results: insufficient technological infrastructure was identified: four computers, only one with internet access, and no specialized software. Workflow is manual, with information dispersed across paper files and non-standardized digital archives. Deficiencies include operational slowness, incomplete records (26,6 %), risk of information loss, difficulties in monitoring and report generation, and poor data security.

Conclusions: the current state is characterized by manual processes, limited infrastructure, and problems in the organization, availability, and security of information. These findings highlight the need to develop an IT solution to optimize workflow and doctoral student management.

Keywords: Information Management; Graduate; Software.

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INTRODUCTION

Information management is defined as the set of processes that control the data lifecycle, from its acquisition to its final disposition, constituting a fundamental pillar for organizational efficiency in any institution.⁽¹⁾ In the context of higher education, particularly in postgraduate studies, efficient information management is decisive for guaranteeing the quality, traceability, and control of academic-administrative processes.⁽²⁾

At the international level, postgraduate studies have evolved towards increasingly flexible formats, including face-to-face, blended, and distance modalities, supported by the use of Information and Communication Technologies (ICT).^(3,4) One of the main motivations for pursuing these programs is the opportunity to access higher-paying jobs and improve professional qualification, although access to and completion of these programs continues to be low in various contexts. Studies report that, in countries such as Mexico, less than 21 % of students who begin primary education manage to complete university studies, and only 4 % reach the master's level.⁽⁵⁾

In Cuba, postgraduate education is regulated by Resolution 132/2004 of the Ministry of Higher Education,⁽⁶⁾ which establishes the norms for the planning, development, and control of specialty, master's, and doctoral programs. In the health sector, postgraduate education in Medical Sciences has the responsibility of guaranteeing the systematic and continuous improvement of the human resources working in the National Health System, with the objective of updating, complementing, and specializing workers in correspondence with the policies and strategies of the Ministry of Public Health.⁽⁷⁾

At the "Dr. Ernesto Guevara de la Serna" Faculty of Medical Sciences of Pinar del Río, the postgraduate department is in charge of managing, among others, the doctoral training process. This process includes everything from the call for applications and selection of candidates, the management of required documentation, the academic follow-up of doctoral candidates, to the organization of pre-defenses and thesis defenses with the corresponding generation of minutes and written reports. Despite having an established regulatory framework and trained personnel, preliminary observation suggests that the management of information related to doctoral candidates is carried out in a predominantly manual manner, with limited technological support and without integrated computer tools that facilitate the process.

This situation generates a gap between the real needs of the department and the potential offered by ICT to optimize workflows, guarantee data security, and improve the availability of information for decision-making. Therefore, it is necessary to carry out an objective diagnosis that allows characterizing this reality as a starting point for future improvement proposals.

The objective of the present study is to determine the current state of information management in the postgraduate department, specifically in the doctoral training process at the "Dr. Ernesto Guevara de la Serna" Faculty of Medical Sciences.

METHODS

A descriptive, retrospective, and cross-sectional study was conducted, with the objective of diagnosing the current state of information management in the doctoral training process. The research was developed at the postgraduate department of the "Dr. Ernesto Guevara de la Serna" Faculty of Medical Sciences of Pinar del Río, Cuba, during the period from September 2023 to February 2024.

Population and sample

The study population consisted of all information management processes related to doctoral training in the postgraduate department. The sample, selected intentionally, included:

- The 4 workers of the postgraduate department (department head and 3 specialists).
- The normative documents and records used for the management of doctoral candidates, including: calls for applications, enrollment lists, candidate files, pre-defense and thesis defense minutes, and academic follow-up reports corresponding to the 2020-2023 period.

Methods, instruments, and data collection techniques

The following empirical methods were used:

- **Documentary analysis:** a documentary review guide was designed to examine the main documents that govern and evidence the doctoral training process. The following were reviewed: Resolution 132/2004 of the Ministry of Higher Education,⁽⁶⁾ MINSAP guidelines for academic postgraduate education, the institutional strategy of the university (2017-2021), and the department's working documents (calls for applications, enrollment records, defense minutes, doctoral candidate files).
- **Semi-structured interview:** an interview script was prepared for the 4 workers of the postgraduate department. The instrument inquired about: the characteristics of the current workflow, the technological tools available, the main difficulties faced in managing doctoral candidate information, and the perceived needs to improve the process.
- **Non-participant direct observation:** an observation guide was designed to record, during 10 working days distributed over two months, the work dynamics in the department. Special attention was paid to: the registration of new candidates, the organization and filing of documents, the search and retrieval of information, the use of computers and internet access, and the interactions between workers to share data.

Data collection process

Data collection was carried out in three stages. In the first stage, the corresponding authorization was requested from the faculty direction and coordinated with the head of the postgraduate department to access the documents and workers. In the second stage, the documentary review was carried out, reviewing a total of 15 doctoral candidate files and 15 defense minutes corresponding to the 2020-2023 period. Subsequently, individual interviews were conducted in a private space within the department, with an average duration of 30 minutes each, after obtaining informed consent from the participants. Simultaneously, direct observation was carried out, recording the incidents in the guide designed for this purpose.

Information processing and analysis

The data obtained from the different sources were processed through thematic content analysis. The interviews were recorded (with authorization from the participants) and transcribed literally, to then identify emerging categories related to the strengths, weaknesses, and needs in information management.

The information from the documentary review and observation guides was triangulated with the interview findings, which allowed contrasting the workers' perceptions with the documentary evidence and the observed reality. This methodological triangulation process guaranteed the validity and reliability of the obtained results, allowing an integral and objective characterization of the current state of information management in the doctoral training process.

RESULTS

Below are the main findings obtained from the application of documentary analysis, interviews with workers, and direct observation at the postgraduate department of the Faculty of Medical Sciences of Pinar del Río, regarding information management in the doctoral training process.

Available technological infrastructure

Direct observation allowed verifying that the postgraduate department has four desktop computers, of which only one has an internet connection. None of them has specialized software for database management or academic information systems. Digital information storage is performed locally on the hard drives of each computer, without a centralized server, an internal network that allows file sharing, or an automated backup or copy system.

Characterization of workflow and document management in the doctoral process Through triangulation of information obtained from interviews and observation, it was possible to reconstruct the workflow followed by information related to doctoral candidates:

1. **Call for applications and receipt of requests:** the call for doctoral programs is disseminated through institutional emails and printed announcements. There is no digital repository that centralizes historical calls.
2. **Management of candidate documentation:** this constitutes the most complex process. The required documentation (copy of endorsed university degree, grade certifications, curriculum vitae, photocopy of identity card, among others) is received mostly in physical format (paper). Department workers manually review, classify, and file these documents in individual folders. The registration of candidate and enrolled student data is carried out in lists and tables created in Microsoft Word or Excel, without a centralized or standardized database.
3. **Academic follow-up of doctoral candidates:** the control of the academic and research preparation of doctoral candidates, as well as the scheduling of pre-defense and thesis defense exercises, is managed manually. The information is dispersed in workers' personal files, agendas, and physical documents. The formation of committees, the generation of defense minutes, and the filing of written thesis reports are also carried out on paper support, which hinders their subsequent consultation and long-term preservation.

Main deficiencies identified

Content analysis of the interviews, complemented with observation and documentary review, allowed identifying the following deficiencies in information management:

- **Manual process and operational slowness:** the four interviewed workers agreed in pointing out that the high dependence on paper support and manual records makes the process slow, tedious, and prone to errors. The search for specific information (for example, the status of a doctoral candidate or the date of their next defense) can take several minutes or even hours if the document is not in its place

- **Dispersed and incomplete information:** there is no single source of truth for doctoral candidate information. The data are fragmented in different digital files (on different computers), physical folders, and loose documents. The documentary review evidenced that, in 4 of the 15 reviewed files (26,6 %), some required document was missing, and in 3 cases (20 %), the defense minutes were not correctly foliated
- **Risk of information loss:** the absence of a backup system and the handling of unique physical documents expose the information to a high risk of loss due to deterioration, misplacement, or accidental damage. During the observation period, a minor incident was recorded in which a complete file of a doctoral candidate could not be temporarily located.
- **Difficulties for control and report generation:** workers stated that controlling the number of active doctoral candidates, their academic status, and generating progress reports for higher authorities (MINSAP, vice-rectory) become complex tasks that require considerable manual effort and consume time that could be dedicated to other functions. This coincides with the complaints of two of the interviewees about the difficulty in meeting established information delivery deadlines.
- **Poor information security:** sensitive information of doctoral candidates (personal data, academic results) does not have adequate security measures. In its physical format, the files are located on shelves without restricted access control. In digital format, files are stored without passwords on computers shared by several users.

Based on the integration of all information sources, the following concrete deficiencies affecting information management in the doctoral process were identified:

1. The data that are recorded are not complete due to the eventual loss of documents on paper support.
2. The requested information is not provided with the speed required by users (doctoral candidates, academic authorities).
3. The control of new admissions and the follow-up of doctoral candidates who have been in the program for some time is difficult.
4. There is a limitation in the availability of reliable and lasting information that ensures the relevance of the evaluated variables
5. The available information is dispersed in multiple supports and locations.
6. The recovered information, on occasions, lacks organization or is incomplete.
7. The information lacks the necessary updating for timely decision-making.

In summary, the results evidence that the current state of information management for the doctoral training process is characterized by its eminently manual nature, insufficient technological infrastructure, and absence of integrated computer tools. This situation generates problems of security, organization, availability, and traceability of information, affecting the efficiency of the department's work and the effective control of the doctoral process.

DISCUSSION

The results of this research evidence a reality that contrasts with the needs and potential offered by Information and Communication Technologies (ICT) in contemporary higher education. Postgraduate training, and particularly the doctorate as the highest level of Cuban higher education,^(8,9) requires rigorous and efficient information management that guarantees the quality, traceability, and success of academic programs.⁽¹⁰⁾

However, the diagnosis carried out at the Faculty of Medical Sciences of Pinar del Río reveals a situation characterized by manual processes, obsolete technological infrastructure, and absence of integrated computer tools.

The deficiencies found—dispersion of information, incomplete records, slowness in processes, risk of data loss, and difficulties in report generation—do not constitute an isolated problem. Previous studies in the Cuban context have pointed out similar problems in postgraduate information management at other universities. Peña Cruz and cols,⁽¹¹⁾ identified the need to establish diagnostic criteria for the development of technological solutions in postgraduate management, while Oliva Recio and Escobio Torres,⁽¹²⁾ proposed a subsystem for information management in master's accreditation processes, which evidences a generalized demand for modernization and automation in this field.

The identified situation contrasts with the guidelines established in the Integral Policy for the Improvement of Society Computerization in Cuba, approved by the Council of Ministers, and Guideline 108 of the Economic and Social Policy of the Party and the Revolution,⁽¹³⁾ which establish as a premise advancing in the computerization of all sectors of society to achieve sustainable socioeconomic development. In the health sector and higher medical education, this necessarily implies the computerization of substantive processes. The reality of the postgraduate department, with only one computer with internet access out of four available, evidences a significant gap with respect to these national policies.

Various authors agree that the computerization of management processes not only expedites administrative work, but adds value, improves relationships with users, increases information security, and facilitates compliance with regulations.^(14,15) Hamidian Fernández and Ospino Sumoza,⁽¹⁴⁾ point out that information systems have become essential tools for competitiveness and organizational efficiency, allowing the integration of areas, the availability of real-time information, and greater response capacity. These benefits contrast directly with the limitations identified in the present study, where the lack of a centralized computer system for monitoring doctoral candidates negatively impacts the department's capacity to exercise effective control and respond promptly to information demands.

The identification of the seven concrete deficiencies in information management—incomplete records, delays in responses, control difficulties, dispersed, disorganized, and outdated information—provides the necessary empirical basis to justify the design and implementation of a computer solution.

A web application, for example, would allow centralizing doctoral candidate information, automating report generation, standardizing records, guaranteeing the availability of real-time information for authorized users, and establishing backup and security mechanisms, thus overcoming the observed limitations.

Among the main limitations of this study is the sample size, limited to a single postgraduate department, which restricts the possibility of generalizing the results to other contexts. However, the depth of the qualitative analysis carried out, through triangulation of sources and methods, allows a detailed and robust understanding of the problem in this specific context. Future research could expand the diagnosis at the provincial or national level, as well as advance in the development, implementation, and evaluation of the technological proposal that is justified here.

CONCLUSIONS

The study allowed determining that the current state of information management in the doctoral training process of the postgraduate department is characterized by the predominance of manual processes with limited technological support, which causes operational slowness, duplication of efforts, and risks of human errors. The available infrastructure is insufficient, with only one computer with internet access out of four existing and absence of specialized software, internal networks, or backup systems, in contradiction with national computerization guidelines. This situation generates dispersed and fragmented information, with a significant percentage of incomplete files (26,6 %) and poorly foliated minutes (20 %), which affects the reliability and traceability of data. Furthermore, the lack of physical and digital security measures exposes doctoral candidates' sensitive information to risks of loss or unauthorized access, limiting the department's capacity to exercise effective control, meet report delivery deadlines, and respond promptly to requests. These findings confirm the existence of a significant gap between the real needs of information management and current conditions, which justifies the need to design and implement a computer solution that optimizes the workflow, centralizes data, and guarantees its security and availability to contribute to the improvement of doctoral training at the institution.

Conflict of Interest

The authors declare that there is no conflict of interest.

Author Contribution

All authors participated in conceptualization, formal analysis, project administration, writing-original draft, writing-review, editing, and approval of the final manuscript.

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