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Optimizing Research Processes Through Information And Knowledge Auditing

Jiahao Chen, Nan Xiang, and Ding Zhang ,
Department of Computer Science, Tsinghua University, Beijing, China

ABSTRACT

The objective of this work was to develop a comprehensive information and knowledge audit methodology for the improvement of the research process of the Center for Applications of Advanced Technologies. The analysis-synthesis, historical-logical methods were used to verify the theoretical and methodological bases of the different methodologies that make up the audit of information and knowledge. To analyze the knowledge management process, the *Nonaka* and *Takeuchi* Model was used . The needs of resources and information and knowledge flows were analyzed to achieve adequate management of the organization's processes, based on the identification, inventory and mapping of these for the Center's research process. The study had a quantitative approach, whose methodological procedure obtained was validated using the expert method, and a high competence coefficient was obtained from senior experts. The methodology used allowed us to know the current state of information and knowledge, and to formulate improvement plans for the management of these resources in the research process of the Center for Applications of Advanced Technologies.

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Keywords: Audit; information; knowledge; investigation; procedure

INTRODUCTION

Since the oldest times in history, information has been required; But since the end of the 20th century, with the advancement of information and communications technologies (ICT), this has become a determining factor in development and wealth creation. ICTs allow access to information from any point on the planet in less time and at less cost; However, the methods traditionally used to access, generate and transfer information do not reach the speed with which they are generated.

Organizations have begun to incorporate techniques and tools in the search for information, as well as in its adequate processing, to promote the generation and transmission of new knowledge. They realize that information and knowledge, managed efficiently, offer competitive advantages. However, constant efforts are required to improve information management (IG) and knowledge management (KM). The fact that resources as valuable as information and knowledge are found in the organization means that they need to be available to all areas when they need them.

In this sense, it is important to carry out information and knowledge audit processes that allow diagnosing the status of these important resources and the strategy for their management, in accordance with the objectives and goals of the organization. [1]

Independently, information audits provide a better understanding of the organization's capabilities, with an emphasis on explicit assets, and identify whether redundancy, duplication, inconsistency and incompatibility exist in the

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information system. [2] They also evaluate the competencies of the members of the organization, as well as the quality and usability of information services, together with the generation, protection and management capabilities, and identify the barriers that prevent the exchange of information.

On the other hand, knowledge audits are focused on the evaluation of human capital, based on how the knowledge they possess is developed and protected and how it contributes to organizational learning, with diagnostic tools that evaluate the processes of the management cycle. knowledge at the individual, group and organizational levels, but some authors consider interorganizational learning, which is generated with the exchange with external actors, which facilitates the transfer, use and protection of knowledge.

The specialized literature presents various models and methodologies of information audits (AI) and knowledge audits (CA), as independent audits, which are customized according to the characteristics of the organization to be audited and the approach to which they are directed: towards the organization's strategies, towards processes, towards resources and towards more than one of the aforementioned approaches. [3]

In Cuba, research has been carried out on the that exist between AI and AC; Methodological procedures have been developed that unify both audits, and have turned them into necessary tools for the initiation of organizational strategies regarding information and knowledge management, [3] applied in different organizations.

However, there are still organizations that do not identify information and knowledge, despite the importance it has for their research processes, a situation

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presented by the Center for Applications of Advanced Technologies (CENATAV), an organization dedicated to theoretical and applied in the area of pattern recognition and data mining.

At CENATAV, the current state of the information and knowledge generated is unknown, specifically in key processes such as research, and how its results contribute to improving useful information and knowledge at the highest global level on the subject of research of the organization, as well as to have the necessary resources to manage the research process and its future projects. Therefore, the objective of this work was to develop a comprehensive information and knowledge audit methodology for the improvement of the research process of the Center for Applications of Advanced Technologies.

METHODS

The historical-logical analysis-synthesis was used to verify the theoretical and methodological bases of some of the postulates on information and knowledge auditing, specifically those that make up these topics. The documentary analysis made it possible to locate the theoretical and conceptual aspects of interest for the research, in conjunction with different techniques in the collection, analysis and evaluation of the data, such as the consultation of the documents, direct observation and the interview, which allowed the development of the methodology and procedure.

Using the expert method, the methodological procedure obtained was validated. To identify the experts, the system of indicators was used to assess the training of an expert in a high-tech center, [4] and to analyze the knowledge management process, the SECI Model of *Nonaka* and *Takeuchi* was used . [5] 12 experts were selected,

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made up of information specialists at the national and international level, as well as consultants familiar with the research topic.

Agreement was obtained in the group of experts, with a competence coefficient greater than 0.78, and also, through the expert method in its variant of the Kendall coefficient, an agreement coefficient of 0.81 was obtained, which is satisfying. With the implementation of the Chi square hypothesis test, it was proven that there is strength in the agreement achieved by the members of the group of experts.

Analysis of the different methodologies that make up the audit of information and knowledge

Starting in 2000, research on information audits began to describe the relationships between both and their management. Of great interest is the methodology of *Susan Henczel* [6] in 2000, which describes the relationship between the information audit process and knowledge management. This methodology made it possible to explain how the organization uses information to achieve its strategic objectives, by generating the necessary knowledge with which to improve its competitive advantage.

Buchanan and *Gibb* , in 2007, published a work where they considered that the information audit should not only focus on data and information, but should also encompass the analysis of knowledge, and thus visualize a point of contact with the knowledge audit. [7]

On the other hand, *Ponjuán Dante* , in 2008, justified the need to have a comprehensive methodology to audit information and knowledge at the organizational level. [8] In 2011, *González Guitián* and *Ponjuán Dante* determined

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the main and relationships between information audits and knowledge audits. [9] The authors analyzed the causes that motivated their realization, the objectives they pursued and the methodologies and models to carry them out. At the same time, they supported the viability of the design of a comprehensive audit methodology in both disciplines and the construction of a "single instrument" that would allow its application in any organization.

Stable Rodríguez, in 2012, proposed a comprehensive methodology that unified the audit of information and knowledge, called Aud-InfoCon, [3] based on the main that exist between these processes and their application in any organization that is involved in starting information and knowledge management projects. It allowed us to know and analyze what information and knowledge was available, its flows and how both resources were being managed in the organization. He in turn noted that this type of audit was often performed by consultants and professionals outside the organization, but there was little reason why an organization should not audit itself.

Antúnez Saíz , Franch León and Hernández Ruiz , in 2014, designed a methodology for the management of information, knowledge and organizational learning, aimed at diagnosing how a study center manages its tacit and explicit knowledge in order to enhance learning. organizational through the key processes it develops, and allows the identification of gaps where action is necessary. [10]

In 2016 *González-Guitián* , *De Zayas-Pérez* , and *Martínez-Ríos* , presented the results of the application of an integrative information and knowledge audit methodology, carried out in a Research Center of the Ministry of Science,

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Technology and Environment of the province of Holguín, aimed at reviewing the strategy and management policy of these resources. [eleven]

In the literature consulted, the Aud-InfoCon methodology, [3] the diagnostic methodology of Information Management (IG), Knowledge Management (KM) and Organizational Learning (AO), [10] and the integrated audit methodology of Information + Knowledge, [11] address with a comprehensive approach the improvement in an organization with the use of information and knowledge, the evaluation of the current state of its management, and the establishment of a comprehensive policy that favors the culture of learning and the professional development of people. of the organization.

As shown in the following table , these methodologies characterize the organization, analyze the knowledge management process, prepare inventories, analyze flows, needs or shortcomings, propose corrective measures, redesigns in information and knowledge strategies, and prepare maps. .

Joint information and knowledge audit methodologies **table**

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	Metodología Aud-InfoCon (*Stable Rodríguez*, 2012)	Metodología de diagnóstico de la gestión de información (GI), gestión del conocimiento (GC) y aprendizaje organizacional (AO) (*Antúnez Saiz*, y otros 2014)	Auditoría integrada de información + Conocimiento (*González Guitián*, y otros, 2016)
Etapas	1. Determinación de la información estratégica de los procesos de la organización. 2. Análisis de los procesos claves de la organización según los criterios de medición de la gestión del conocimiento. 3. Obtención y análisis de los stocks y los flujos de información y conocimiento para cada proceso. 4. Elaboración del mapa de conocimiento.	1. Caracterización del centro objeto de estudio. 2. Diagnóstico de la situación actual. 3. Propuesta de soluciones.	1. Caracterización de la organización. 2. Planificación de la auditoría.
Implementación	- Instituto de Información Científica y Tecnológica (IDICT), Cuba. - Unidad de Preparación Gerencial (PREGER), del Ministerio de Transporte, Cuba.	Centro de Estudios de Técnica de Dirección (CETED), de la Universidad de La Habana, Cuba.	Centro de Investigación y Servicios Ambientales y Tecnológicos de Holguín, Cuba.

As can be seen, in one way or another, these methodologies present common stages, in correspondence with the type of organization where they have been developed and implemented, to determine if the information and knowledge resources they possess contribute to achieving the organizational objectives for the

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proper management of the organization. Some include the evaluation of the behavior of their flows, which allow obtaining a vision of how information and knowledge is accessed, located, acquired and transferred, inside and outside an organization, if possible, establishing its mapping or representation.

ANALYSIS OF THE RESULTS

After analyzing the methodologies that integrate the information and knowledge audit into a single procedure, the Aud-InfoCon, [3] Diagnosis of GI, GC and AO [10] and the Integrated I+C Audit [11] methodologies were taken as premises for the preparation of a procedure that allows auditing information and knowledge in a research center with the characteristics of CENATAV, which is a research center in which the process is carried out by specialists from the organization itself.

The proposal presented to audit information and knowledge in research processes (AI+C) was structured in four stages, as shown in Figure 1 , which includes, among other aspects, the analysis of needs, the carrying out of an inventory, the analysis of flows and the preparation of an information and knowledge map.

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Fig. 1 Information and knowledge audit for a research center.

Stage I - Audit Preparation

Objective: Plan the audit, assemble your audit team, as well as define its objectives and determine its scope.

Actions to take:

1. Form the team.
2. Determine the techniques for obtaining data.
    - Document review (reports, manuals, procedures);
    - Direct inspection, informal meetings, observation, organization's website and intranet, surveys.
3. Determine the scope of the process:
    - *Total:* the entire organization.
    - *Partial:* unit, department, area or processes of high importance.
4. Determine population and sample.
5. Determine the instruments for data collection, analysis and evaluation.

The questionnaire will be adjusted to the objectives pursued with its application, structured in the following blocks of questions:

- General data.
- Information and knowledge needs.
- Sources of information and knowledge.
- Organizational context.
- Assessment of information technologies.

Stage II - Diagnosis of the organization's strategic information

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Objective: Ensure that the personnel who carry out the AI+C know the general aspects of the entity, such as: historical aspects, mission, vision, corporate purpose and organizational structure.

Actions to take:

1. Analyze the strategic situation of the research center based on its mission, vision and objectives.
2. Analyze the organizational structure.

Stage III - Analysis of the current state of information and knowledge

Objective: Determine the causes that influence or limit the fulfillment of the organization's objectives and goals from the point of view of information and knowledge management.

Actions to take:

1. Identify information and knowledge needs.
    - Interview the organization's collaborators in order to find out what information or knowledge resources they need to develop or improve their work. The need to receive courses and/or training will be investigated.
2. Prepare the inventory of information and knowledge.
    - Composition of human resources. It will include the educational level, job occupation and location in the organizational structure and other aspects that the organization considers necessary for the research processes, such as: scientific degree, researcher category, connection to research projects, publications, among others.
    - Identification of sources of information and knowledge.

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- Composition of the bibliographic fund.
- Identification of experts. [12]
- Use of the indicator system to assess the training of experts in a high-tech organization. [4]

- Analysis of the current state of technology (hardware, space containing funds and information technologies used or available).

3. Analysis of information and knowledge flows.
   - Updating information sources (print and digital).
   - Availability, accessibility and use of sources of information and knowledge.
   - Existence and accessibility of databases.
   - Backups of information sources.
   - Use of the SECI Model (socialization, externalization, combination and internalization). [5]
4. 4. Preparation of the information and knowledge map.
   - The information and knowledge map must be prepared if the organization does not have one, and if it exists, it must be reviewed. [3]
   - It will be prepared based on the results obtained in the information and knowledge inventory.
   - Directories or graphics will be created to facilitate the location of information and knowledge within the organization.
   - The map will be displayed with the help of technology.

Stage IV - Proposal of solutions

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Objective: Present recommendations to the entity's Board of Directors to develop an action plan that facilitates better management of information and knowledge in the organization.

Result obtained in each of the stages

Stage I - Audit Preparation

CENATAV's fundamental mission is to assimilate, develop and introduce into social practice the most innovative aspects of the Theory and Practice of Pattern Recognition (PR) and Data Mining (MD), which allow us to respond to the needs of scientific progress. technical and socioeconomic of the country, as well as increasing the national scientific heritage, where AI+C is carried out by specialists from the entity itself (a specialist in human resources, two specialists in knowledge management and a specialist in information technologies).

The scope of the audit was partial, since it was only carried out to the investigation process. The population was made up of all the personnel who work in the CENATAV research teams (46 researchers). No sampling was carried out because the population was less than 100. The analysis period was between the years 2009-2017, only in the research process.

For the analysis of the organizational context, the structure, culture and organizational climate were analyzed, where it was obtained that the research process is associated with the basic research unit, the applied research unit and the research support unit. The organizational culture is hierarchical, but it has a climate conducive to the exchange of information and knowledge through the spaces available to do so.

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The center has the necessary technology, which is replaced by others with greater features, and access to the internet, email and chat. The interview carried out showed that 60% consider that the computer technologies they have to work with are not enough to perform their tasks. It has a website and its intranet has important aspects, such as the directory of researchers; but 40% consider that it should be improved. It also has to the most relevant journals for the organization in order to share its scientific results; for example: *International Journal of Pattern Recognition and Artificial Intelligence, EURASIP Journal on Image and Video Processing, Foundations of Computational Mathematics, Intelligent Data Analysis* , among others.

Stage II - Strategic information of the organization

The organization has a well-defined mission and vision, with its corresponding strategic objectives, which, according to the interview carried out with the workers, are known and shared by them.

The research process is nourished by the following areas:

- Basic Research Unit: Pattern Recognition Research Team; Data Mining Research team.
- Applied Research Unit: Image and Signal Research Team; Biometrics Research Team.
- Research Support Unit: Technology infrastructure services team; knowledge management team for research; coordination, analysis, documentation and project management team.

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It has a total of 58 workers, with an average age of 40 years; More than 90% are higher-level graduates, of which 18 are doctors of science and 5 have a master's degree.

The average age of the experts is 45 years, the maximum age is 65 years and the minimum is 31 years; However, all the experts with fewer years at the center began their working lives there, which has allowed for an appropriate training and development plan, where all have served as heads of research projects.

Stage III - Analysis of the current state of information and knowledge

In the third stage of the audit, an analysis of the current state of information and knowledge in CENATAV was carried out. Information and knowledge needs were identified; An inventory of resources was carried out, which included the composition of the bibliographic funds and the technological tools available for capturing, as well as the processing and analysis of information, elements that contribute directly to the knowledge management process. The information and knowledge was grouped into:

- Legal and regulatory aspects (laws and decrees 40%, resolutions 20%).
- Strategic and organizational (strategic planning 50%, economic information, human resources 30%, external actors 20%).
- Processes, procedures and work instructions (90% of standards, techniques and procedures are used).
- Research and development (publications 50%, scholarships and similar 20%, conferences and events 30%).

47% of those interviewed raised the need to update their research topic, 20% in programming, 20% in English language and 13% in different topics such as:

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management techniques, information management, engineering and statistics, knowing the center's experts, technological surveillance, information from journals with impact factor and the databases that reference them.

The knowledge management group, made up of specialists in Scientific Information and Library Science, is responsible for the management of the funds acquired by the Center, as well as the management and advice for the search for information at the request of researchers, who also contribute to the updating of bibliographic funds during their stays at universities and similar research centers (table 1).

Table 1 Composition of the digital background and the printed background of the Advanced Technologies Application Center

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Composición del fondo	
Fondo digital	**Cantidad**
Artículos de revistas	249 283
Memorias de eventos	101 354
Artículos serie LNCS	142 122
Artículos serie IFIP	2 031
Capítulos de libros	11 566
Cursos	62
Normas	28
Informes técnicos	297
Libros	3 853
Patentes	795
Tesis	1 259
Total	501 084
Fondo impreso	**Cantidad**
Libros	893
Publicaciones seriadas	666
Tesis	100
Total	1 059

The existence of 18 experts in the organization was identified, as shown in table 2 , who belong to two generations in the organization. The experts of the second generation were trained in direct interaction with those of the first, who are found by research area, but there is no graphic representation that shows where information and knowledge is related or exchanged between them.

Table 2 Experts from the Center for Advanced Technology Applications by research areas

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Investigation area	Expertise topic	Scientific grade	Years at the institution	Researcher Category	Scientific production
Pattern recognition	Combinatorial Logic Recognition	Dr. Cs.	12	Headline	280
	Chemometrics	Dr.	12	Headline	68
	Statistical recognition	Dr.	12	Headline	64
	Identification of people	Dr.	6	Aggregate	13
	Identification of people by their walk	Dr.	6	Assistant	eleven
	Chemometrics-drug recognition	MSc.	12	Assistant	22
Data mining	Data and text mining	Dr.	eleven	Headline	92
	Anomalies in data flows	Dr.	9	Aggregate	54
	Communities on social networks	Dr.	10	Assistant	25
	Association rules	Dr.	10	Assistant	17
Images and signs	Signals processing	Dr.	10	Headline	84
	Language recognition	Dr.	8	Headline	36
	Speaker recognition	Dr.	9	Aggregate	22
Biometrics	Application of	Dr.	12	Headline	Four. Five

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Investigation area	Expertise topic	Scientific grade	Years at the institution	Researcher Category	Scientific production
	biometric systems				
	face recognition	Dr.	10	Aggregate	39
	Similarity *vs.* distance		7	Aggregate	22
	Object recognition in images	Dr.	7	Assistant	12
	Fingerprint recognition	Dr.	6	Assistant	7

All human capital makes use of the available technology, including the directories held by each of the researchers and their scientific production, although in the interview carried out, 60% consider that computer technologies are not sufficient to carry out the new activities.

The flow of information and knowledge for the research process is carried out based on the researchers' requests on the topic of the project of which they are part, but 46% of those interviewed stated that they have difficulties searching for information and accessing databases. specialized data. Among the difficulties in acquiring knowledge, 60% of those interviewed mentioned lack of time, 6.6% limited internet sites, and 20% mentioned activities and meetings outside the investigative process.

To a lesser extent, researchers do not consult the funds available at the center, which results in duplication of information and causes loss of time, both for the researcher and for information specialists. The results obtained from the interviews

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showed that 100% use the Internet as a way to acquire information. Of them, 26% access specialized database websites when they are in a doctoral internship abroad. The workers' culture is to externalize and socialize knowledge (Fig. 2), which they do through internal and external seminars, the preparation of technical reports, participation in conferences and the publication of articles in magazines and book chapters.

Source: Spiral of transformation proposed by *Nonaka* and *Takeuchi* , 1995.

Fig. 2 Information and knowledge audit for a research center.

Knowledge of the research process is externalized through the articles, books and technical reports generated by the researchers who contribute to the process. These influence the improvement of a set of work algorithms by verifying the results of the CENATAV research with similar others that appear in other sources of

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information, which allows a new internalization of knowledge and is used in the projects of the research process. to socialization, through courses, conferences, seminars, work meetings and the corresponding advice provided by the tutors.

The information and knowledge map of the experts is shown in Figure 3 , which makes it possible for younger researchers, or those who have just joined the organization, to identify the knowledge leaders of the different topics. Each node represents the main research areas, associated with expert specialists who carry out information and knowledge exchanges, in the sense indicated by the dates.

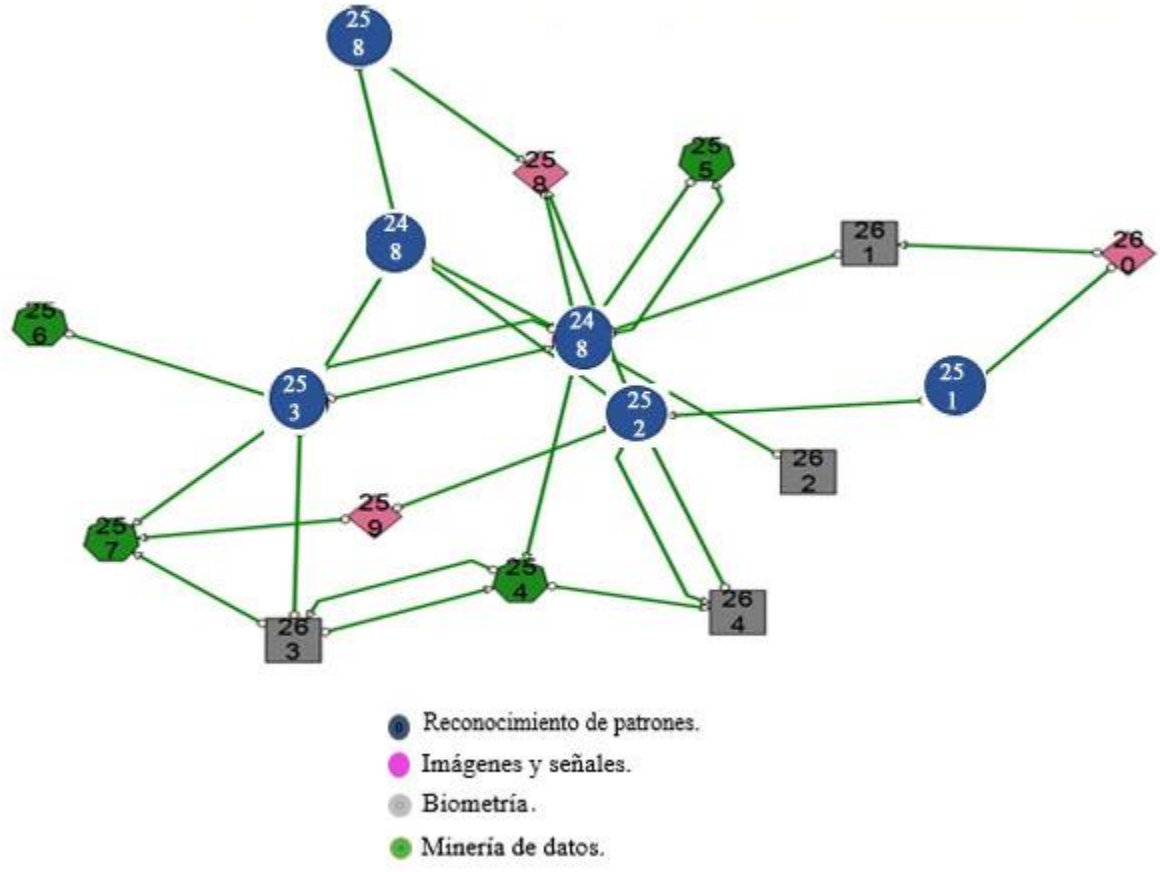

Fig. 3 Map of information and knowledge of the experts of the Advanced Technologies Application Center.

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Stage IV. Solution proposal

Based on the previous results, the following is proposed to CENATAV senior management:

1. Eliminate barriers to access to information related to the digital fund and include legal documents and project reports in it, with an information retrieval system that makes the process viable.
2. Create information flow diagrams and knowledge of the research process, which contribute to the improvement of the development of new products and services.
3. Improve the structure of the center's intranet as an output of its information system and include the directory of CENATAV researchers in a structured way; the scientific production that is developed by each of them; and relate the of the main databases where the document or its Abstract is indexed.
4. Identify external experts on the research topics developed at the center.
5. Reassess information and knowledge, using the developed audit stages (AI+C), to verify the implementation of the action plan and update the inventory, flows and expert map.

CONCLUSIONS

There are various models, methodologies and procedures for carrying out information and knowledge audits, but it is evident that they include as a general principle the identification of needs, the preparation of inventories, the analysis of flows and the preparation of information maps. and knowledge. The joint audit of information and knowledge comprehensively evaluates the current state of these two resources comprehensively in an organization.

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The application in CENATAV of the procedure that was developed in four stages to comprehensively audit the information and knowledge, made it possible to know the current state of the information and knowledge, and to formulate improvement plans for the management of both resources in the process. research of that organization. However, it is necessary to represent the center's external sources of knowledge, with the aim of visualizing those organizations and specialists whose experience can be used based on the information and knowledge needs necessary for the development of CENATAV.

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Utilizing Principal Component Analysis for Streamlined Measurement Indicators in Information Retrieval

Prof. Li Wei Chen
Institute of Information Technology, Peking University, China
https://shyflowersgarden.com

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ABSTRACT

An investigation is presented, whose objective was to verify the applicability of the principal components analysis technique, to measure competence in the search for information. A descriptive-correlational and quantitative study was carried out using the eight indicators concerning the information-seeking competence declared in the IL HUMASS questionnaire (which offers a user-centered diagnosis of their perceptions and the level of achievement acquired in informational competences).), which were located in a survey that was administered to 300 students from the first four levels of study who are studying Health Sciences careers at the Technical University of Manabí. The processing of the data, with the use of the SPSS statistical software, allowed us to obtain three main components: the first brought together four indicators referring to the advanced search in the databases using terms of the specialty; the second grouped two indicators pertaining to the use of automated catalogs and printed sources of information; and the third concentrated two indicators related to electronic sources of information (primary and informal). These components determined, through an Anova test, that there were statistically significant differences for the different careers in each component. *The post hoc* test with minimal significant difference made it easier to know which groups were statistically different in each component. In conclusion, the feasibility of applying this multivariate technique to carry out similar studies with many variables and numerous samples is observed.

Keywords: Information search competence; Health Sciences; principal component analysis; multivariate technique

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INTRODUCTION

Today's society demands an informed citizen, who can face the changes that occur in the environment and become the main actor in the progress of their community, region and country, since with their work they help the growth of the institution where they work. . Information is a resource that empowers people; It allows them to exercise their rights as citizens and contributes to their lifelong learning. That is why there is a need to train an individual with informational competencies.

Although informational competencies must be formed from the first levels of study, actions continue to be developed in universities, because at this stage of life, and considering the specificity of the professions, it is essential to have knowledge, skills and attitudes that promote know the theory and practice of careers, with the vision of the labor market where the future professional will work.

In this sense, *Pinto* , *Doucet* and *Fernández-Ramos* [1] argue that higher education should emphasize that students' competencies go beyond bibliographic and technological instruction. It is necessary that beyond instrumental skills, analytical questions, reflection, critical thinking and problem solving are included that are similar to those that students may encounter when they are working.

In the literature consulted, different models and standards are displayed. In this sense, the *Association of College and Research Libraries* (ACRL) [2,3] has created standards on skills for access and use of information in higher education, which have served as a guide for the identification and standardization of informational competencies and basis for other authors to create models, programs and tools that allow training, evaluating and diagnosing informational competencies, among which are the IL-HUMASS questionnaire [4,5] (which offers a user-centered

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diagnosis of their perceptions and level). of achievement acquired in informational competencies), and although it is a questionnaire designed to be applied in humanities and social careers, its formation was based on a detailed study of the main regulations for information literacy (ACRL, [2,3] CAUL, [6] SCONUL, [7]) so it is feasible to assume it for any degree.

Among the experiences that can be highlighted in the application of this questionnaire is the study carried out by *Sánchez,* [8] who diagnosed informational competencies in Information Sciences from the perception of the student at the University of Havana; She used all the indicators in each of the competencies contained in the questionnaire and measured the dimensions of motivation, self-efficacy and the sources, paths or learning habits of the students.

Another study worth mentioning is the one carried out by *Hernández-Ramos* , *Martínez-Abad* , *Olmos-Migueláñez* and *Rodríguez-Conde,* [9] who applied the IL-HUMASS questionnaire to 402 subjects, future secondary education teachers in Spain, and pointed out the importance of taking into consideration the two acquired dimensions, in addition to the theoretical dimensions when it is decided to propose scales related to the evaluation of informational competencies.

Likewise, another research to take into account is that carried out by *Fonseca* , *Escola* , *Loureiro* and *Carvalho,* [10] who compared the skills of university students at a Portuguese university with a Brazilian university. The competency scale aimed to evaluate the study methods and learning approaches of students in higher education, considering a questionnaire that grouped 16 items, whose evaluations were scored on a Likert-type scale, where 1 meant totally disagree and 6 totally agree. The data processing was carried out with the statistical

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software SPSS, version 23. Although in this research the skills were not directed at the search for information, it was considered pertinent to observe the statistical processing carried out even though the techniques differed from the analysis of the main components.

In the library field, an experience worth mentioning regarding the application of the multivariate principal component analysis (PCA) technique is that related to the work of *Tarango* , *Hernández-Gutiérrez* and *Vázquez-Guzmán* [11] on scientific production in Mexican state public universities. (2007-2011) using this technique. The authors start by identifying and classifying a set of indicators, grouped into 7 dimensions and 18 criteria, to finally identify 7 criteria as main components.

The aforementioned works, although none have applied the principal components analysis technique to informational competencies, do allow for an approach both from the perspective of the items for measuring competency in the search for information, and in the use of techniques. statistics in data processing, and the contribution of *Tarango* , *Hernández-Gutiérrez* and *Vázquez-Guzmán* [11] is considered very valuable for being linked to the area of Library Science.

Due to what was shown and considering the theoretical perspective presented, it was decided to begin the work planned in the project "Information literacy educational portal for Higher Education (ALFIN-ECU)", I Call UTM 2018-RHCU.UTM-No. 191-SO-03-2018, which has a phase of diagnosis of information competencies in all careers, a second phase of implementation of information literacy courses that will be available on the Portal and a final phase that aims to carry out evaluations of the use of the Portal and the skills acquired after having

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completed the proposed courses. In the diagnostic phase, the first studies include the Portoviejo city *campus with six faculties and a total of 17,553 students. Subsequently, the competencies of the students on the Lodana, Chone and Bahía de Caraquez campuses* , which total 2,027 students, will be diagnosed .

For this purpose, the first diagnosis was made at the Faculty of Health Sciences, which groups a total of five careers, whose population amounts to 1,273 students, in which the IL-HUMASS questionnaire [4,5] was taken as a basis. the measurement of competence in the search for information, from the student's perception of their self-efficacy. However, given the number of items to be measured and the number of students that make up the sample, it was decided to check the applicability of the principal components analysis technique, which in the field of scientific research is very feasible in data processing. quantitative by allowing multidimensional information or a set of simple indicators to be transformed into new variables or a set of composite indicators, known by components, which explain the majority of the original variables and their interrelationships. Likewise, to confirm the applicability of this technique, the new components were applied using the Anova technique and the *post hoc* least significant difference (MSD) test.

In this regard, the research problem presented is the following: How to measure informational competence in information search in Health Sciences careers, from the student's perception in relation to their self-efficacy, using the smallest number of variables possible and that shows a real result?

The hypothesis proposed is: $H_{1:}$ The multivariate statistical technique of principal components analysis is feasible for measuring competence in the search for

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information using the indicators of the IL-HUMASS questionnaire in Health Sciences students from perception. of the student in relation to their self-efficacy.

The objective of this research was to verify the applicability of the principal components analysis technique to measure competence in the search for information.

METHODS

A descriptive-correlational, quantitative study was carried out using the eight indicators concerning the information search competence declared in the IL HUMASS Questionnaire: [4,5]

1. Use printed sources of information (books, works, etc.).
2. Access and use automated catalogs.
3. Use electronic sources of primary information (magazines, yearbooks).
4. Use electronic sources of secondary information (databases).
5. Know the terminology of your specialty.
6. Search and retrieve information through advanced searches, directories, portals, etc.).
7. Use informal electronic sources (blogs, discussion lists, etc.).
8. Know information search strategies (descriptors, Boolean operators, etc.).

With these indicators, a survey was created that included general data and a total of 8 questions derived from the items presented. Each of the variables or items was framed in the self-efficacy dimension. Students had to place their response on a Likert scale from 1 to 9, where 1 was the lowest value indicating no mastery of the competence, and 9 was the highest mastery of the competence.

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A stratified random sample was selected that included 300 students belonging to the first four levels of studies. These levels were selected because they are the ones that receive new content following the approval of the curricular redesign of these careers. The total population of the faculty amounts to 1,273 students. We worked with 95% reliability and a margin of error of 5%. To calculate the sample, what was stated by *Ávila,* [12] in the expression was taken as a reference:

$$n = \frac{Z^2 NPQ}{Z^2 PQ + NE^2}$$

n= sample size

N= population size

Z= 1.96 normal distribution

P= Q= 0.5; then PQ= 0.25; considering equal probability in the type of response of the respondents

E= Allowed error= 0.05; for 95% power

To determine the sample of students from each school, its size (300), the number of students in the program and the size of the total student population (1,273) were taken. According to the populations of each school, the samples determined were those presented in Table 1 .

Table 1 Population data and career sample

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Número	Carreras	Población de estudiantes	Muestra
1	Enfermería	121	29
2	Medicina	316	74
3	Nutrición y Dietética	278	66
4	Optometría	205	48
5	Laboratorio Clínico	353	83
Total	-	1 273	300

After applying the questionnaire, the data were entered into a Microsoft Excel spreadsheet and the means corresponding to each of the variables that make up the competence in the search for information were found for each of the 300 students. Each race was identified with the number shown in Table 1. These data were located in the statistical software SPSS, version 23, and the multivariate technique of principal components analysis was applied, following the instructions of *Fuente* [13]) and *Terrádez- Gurrea*, [14] who propose that to study the relationships that arise between *p* correlated variables (that measure common information) the original set of variables can be transformed into another set of new uncorrelated variables (that do not have repetition or redundancy in the information). called set of principal components. Three new components or variables were obtained that allowed the analysis of behavior in the search for information, according to the students' perception of their self-efficacy. Subsequently, these components were used in an Anova test to determine if there were statistically significant differences for the different majors in each component. The *post hoc* test of least significant difference made it easier to know which groups were statistically different in each

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component. The results of the Kaiser-Meyer-Olkin test and the significance of Bartlett's sphericity test were analyzed.

RESULTS AND DISCUSSION

From the results reflected in the SPSS statistical software, in the correlation matrix the determinant is equal to 0.133, different from 0, which indicates that there is a correlation between the variables. The Kaiser-Meyer-Olkin test obtained a value equal to 0.714, which reveals acceptable sampling adequacy according to the values considered for the test. Bartlett's test of sphericity shows a significance of 0.000; value less than 0.05. The null hypothesis H_0 is rejected : there is no relationship between the variables. This indicates that the variables are correlated, and the multivariate statistical technique principal components analysis can be applied.

Communalities indicate the degree of variability of the variance with which each variable influences the pattern. It can be seen that all of them have an acceptable influence according to the values (table 2).

Table 2 Degree of variability of variances

Indicadores	Inicial	Extracción
Utilizar fuentes impresas de información	1 000	0,759
Acceder y utilizar catálogos automatizados	1 000	0,554
Utilizar fuentes electrónicas de información primaria	1 000	0,703
Utilizar fuentes electrónicas de información secundaria	1 000	0,612
Conocer la terminología de la especialidad	1 000	0,549
Buscar y recuperar información a través de búsquedas avanzadas	1 000	0,764
Utilizar fuentes electrónicas informales	1 000	0,774
Conocer estrategias de búsquedas de información	1 000	0,713

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Three main components of the variance are shown with eigenvalues greater than 1. The first component explains 34.96%; the second explains 19.85% and the third explains 13.03%. A total of approximately 68% of the total explanation of the variance is obtained (table 3).

Table 3 Total variance

Componente	Autovalores iniciales			Sumas de extracción de cargas al cuadrado		
	Total	% de varianza	% acumulado	Total	% de varianza	% acumulado
1	2 797	34,964	34,964	2 797	34,964	34,964
2	1 588	19,853	54,817	1 588	19,853	54,817
3	1 043	13,034	67,850	1 043	13,034	67,850
4	714	8,924	76,774	-	-	-
5	631	7,889	84,663	-	-	-
6	528	6,605	91,269	-	-	-
7	388	4,847	96,115	-	-	-
8	311	3,885	100,000	-	-	-

It can be seen in Table 4 that the first component is highly influenced by the variable “search and retrieve information through advanced searches” (0.870), followed by the variable knowing information search strategies (0.826), by the variable knowing the terms of the specialty (0.703) and by the variable using electronic sources of secondary information (0.658). This first component is called: searching and retrieving information through advanced searches in databases using the terms of the specialty. The second component is also highly influenced by the variable using printed sources of information (0.857) and by the variable “accessing and using automated catalogs” (0.609). This second component is called: using printed sources of information and automated catalogs. The third component is equally influenced by the variable using informal electronic sources (0.865) and by the variable using electronic sources of primary information

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(0.685). This third component is called: using electronic sources of primary information and informal electronic sources.

Table 4 Matrix of components rotated [to]

Variables	Componente		
	1	2	3
Utilizar fuentes impresas de información	-0,113	0,857	-0,107
Acceder y utilizar catálogos automatizados	0,339	0,609	0,260
Utilizar fuentes electrónicas de información primaria	0,183	0,448	0,685
Utilizar fuentes electrónicas de información secundaria	0,658	0,327	0,269
Conocer la terminología de la especialidad	0,703	0,188	0,138
Buscar y recuperar información a través de búsquedas avanzadas	0,870	-0,071	-0,039
Utilizar fuentes electrónicas informales	-0,098	-0,128	0,865
Conocer estrategias de búsquedas de información	0,826	-0,054	-0,166
Método de extracción: Análisis de Componentes Principales Método de rotación: Varimax con normalización Kaiser[a]	-	-	-

[a] The rotation has converged in 5 iterations.

With the results of the rotated component matrix, the value of the components was obtained for each of the subjects surveyed. With these three components, not correlated with each other, other statistical techniques can be applied such as the Anova test and the *post hoc* least significant difference (MSD) test. The Anova test used shows us that the *p* -value for each of the components is equal to 0.000, less than 0.05, which indicates that there must be statistically significant differences between some of the means of the races for each component. This shows that the perception that students have in relation to their self-efficacy in searching for information is different depending on the careers they study, and indicates in which careers students consider themselves more self-efficacious in each new component and in which they consider themselves less.

To determine which are the different means in each component and see the relationships between the races, the post hoc Least Significant Difference test was

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used , where the null hypothesis H 0 is assumed : The means for each race are equal in each component; and the alternative hypothesis H $_{1:}$ There are at least two different means. These data are seen in Table 5 , whose interpretation is as follows: in the analysis of component 1 (searching and retrieving information through advanced searches in databases using the terms of the specialty), it is shown that there are two visible groups: the first group where careers 1 and 2 (Nursing and Medicine) are found, which present a similar behavior of the means, since the differences between them are not statistically significant. In the second group are courses 3, 4 and 5 (Nutrition and Dietetics, Optometry and Clinical Laboratory), which present a similar behavior of the means, since the differences between them are not statistically significant. Yes, there are statistically significant differences between both groups, and the second group has better performance with respect to this first component, because the differences between the means of the careers that make up group 1 with the careers that make up group 2 are negative; Therefore, the means of the races in group 2 are higher than the means of the races in group 1.

Table 5 Comparisons between the means of the careers that make up both groups

Component 1. Search and retrieve information through advanced searches in databases using specialty terms

Group 1 races	Group 2 races	Difference in means between both groups
1.00	2.00	-0.21868052
	3.00	-0.96796343
	4.00	-0.72902799
	5.00	-0.97652071
2.00	3.00	-0.74928291

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Component 1. Search and retrieve information through advanced searches in databases using specialty terms

Group 1 races	Group 2 races	Difference in means between both groups
	4.00	-0.51034746
	5.00	-0.75784019
3.00	4.00	0.23893544
	5.00	-0.00855728
4.00	5.00	-0.24749272
Component 2 - Use printed sources of information and automated catalogs		
1.00	2.00	-0.51757721
	3.00	-0.60095549
	4.00	-1.12552109
	5.00	-0.82580631
2.00	3.00	-0.08337828
	4.00	-0.60794388
	5.00	-0.30822910
3.00	4.00	-0.52456560
	5.00	-0.22485082
4.00	5.00	0.29971478
Component 3 - Use electronic sources of primary information and informal electronic sources		
1.00	2.00	-0.14280368
	3.00	0.36095861

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Component 1. Search and retrieve information through advanced searches in databases using specialty terms

Group 1 races	Group 2 races	Difference in means between both groups
	4.00	0.60536403
	5.00	-0.30788458
2.00	3.00	0.50376229
	4.00	0.74816771
	5.00	-0.16508091
3.00	4.00	0.24440542
	5.00	-0.66884320
4.00	5.00	-0.91324862

In the analysis of component 2 (using printed sources of information and automated catalogues), clearly defined groups are not presented, so an analysis is carried out by career: career 1 (Nursing) presents a statistical behavior different from the average in relation to the means of the other races, because the differences between the means are statistically significant. It is also observed that since the difference is negative, the average for the Nursing major is lower than the rest of the averages for the other majors.

In career 2 (Medicine) a statistically similar behavior of the average is observed with the average of career 3 (Nutrition and Dietetics), since there are no statistically significant differences between the subtraction of means. However, when comparing career 2 (Medicine) with careers 4 (Optometry) and 5 (Clinical Laboratory), the statistical behavior of the mean is different, since there are statistically significant differences between the subtractions of their means, and it

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is lower the average of the Medicine major in relation to the average of the other two majors, since the subtraction of averages is negative.

Course 3 (Nutrition and Dietetics) shows a statistical difference from the average in relation to course 4 (Optometry), since there are statistically significant differences between the subtraction of the means, and the average for the Nutrition and Dietetics course is lower. When comparing course 3 (Nutrition and Dietetics) with course 5 (Clinical Laboratory), they present a similar statistical behavior of the means, since the subtraction of the means does not present statistically significant differences.

Course 4 (Optometry) presents a similar statistical behavior of its mean in relation to course 5 (Clinical Laboratory), since the subtraction of the means does not present statistically significant differences.

In the analysis of component 3 (using electronic sources of primary information and informal electronic sources) clearly defined groups are not presented, so an analysis is carried out by career: in career 1 (Nursing), the value of its mean does not present statistical differences with courses 2 (Medicine), 3 (Nutrition and Dietetics) and 5 (Clinical Laboratory), since the subtraction of their means is not statistically significant. In relation to career 4 (Optometry), the statistical behavior of the means of both careers, that is, career 1 (Nursing) and career 4 (Optometry) is different, because there are statistically significant differences between the subtractions of both means , and the average for the Nursing degree is better, since the difference in averages is positive.

The average of course 2 (Medicine) presents statistical differences with the averages of courses 3 (Nutrition and Dietetics) and 4 (Optometry), since there are

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statistically significant differences between the subtractions of their means, and the average of the course is better. medical career in each case, since the difference in means is positive. In relation to degree 5 (Clinical Laboratory), there are no statistical differences between the means of degree 2 (Medicine) and the mean of degree 5 (Clinical Laboratory), as there are no statistically significant differences between their means.

Course 3 (Nutrition and Dietetics) in relation to course 4 (Optometry) presents a statistical behavior similar to the means, since there are no statistically significant differences in the difference of means. When making the comparison with course 5 (Clinical Laboratory), there are differences between the statistical behavior of the means of course 3 (Nutrition and Dietetics) and course 5 (Clinical Laboratory), since there are statistically significant differences in the difference of averages, and the average of the Nutrition and Dietetics major is lower, since the subtraction of averages is negative.

Course 4 (Optometry) presents a different statistical behavior than the average in course 5 (Clinical Laboratory), since the difference in means shows statistically significant differences, and the Optometry course exhibits a lower average, because the difference in means is negative. .

These results show the feasibility of the principal components analysis technique to reduce variables that allow the applicability of statistical techniques such as ANOVA, and DMS *post hoc* tests to carry out analysis on the information search competence, from the student's perception of their self-efficacy, considering the indicators of the IL-HUMASS questionnaire, which verifies the proposed hypothesis.

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It is valid to point out that the variables have been included within the components with a lot of sense. In the first component, it is interesting to note that to carry out a search for information with certain relevance, knowledge of specialty terms is needed that can be combined in various advanced search strategies and databases are used. In the second component, the Library's automated catalog is consulted to find out the availability of the physical books it has; hence there is a logical relationship between these variables. In the third component, the use of informal sources such as blogs and discussion lists is important, since many times from this type of source you can learn about magazines that have published new issues or articles and books that are in free access. which would facilitate or be a way to also access electronic sources of primary information.

The contribution of the study is in the reduction of variables, with minimal loss of information, to determine the perception that students have about their self-efficacy in the search for information based on the applicability of the technique and use the new components in the measurement of the competition for searching for information for the races to be diagnosed.

It is concluded that by diagnosing the competence in the search for information from the student's perception of their self-efficacy, using the eight indicators declared in the IL-HUMASS questionnaire, it was proven that the number of variables measured that determine the skills of the competition to three main components without losing much information, which makes it easier to evaluate the competition and not have the need to collect a large amount of data.

It was found that there are statistically significant differences given by the variables included in the main components in the different careers. This

corroborates the need to implement the second phase of the project by incorporating information literacy courses in the Portal, which would improve self-efficacy from the perception of students in the information search competence.

For future lines of research, a more simplified model could be established to evaluate information search competence, from the students' perception of their self-efficacy, using the results obtained by the multivariate principal component analysis technique.

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Academic Contributions of Faculty of Health Sciences Thesis Jury Members: A Study of Scientific Publications in Peru

Prof. Ingrid Jensen Larsen
Center for Cognitive Neuroscience, University of Oslo, Norway

ABSTRACT

Given the problems of scientific production in health in Peru and the limited contribution of publications by teachers and students from the undergraduate level, the objective was to determine the frequency of publication of scientific articles by teachers who participated as a judging jury. thesis in a Faculty of Health Sciences of a private university in Peru. For this, an observational, descriptive and cross-sectional study was carried out in a population made up of 131 teachers who evaluated theses approved in the period 2015-2018. The search for articles was carried out in Google Scholar and the Scopus database. It was found that only 17.6% had any publication. Of this group, 9.2% did so in the last 5 years. Likewise, 6.9% achieved publications indexed in Scopus and 3 teachers demonstrated certification as researchers by the National Council of Science, Technology and Technological Innovation of Peru. It is concluded that the publication rate of teachers who evaluated thesis in a Faculty of Health Sciences in Peru is low and worrying.

Keywords: Database; academic thesis; electronic publications

INTRODUCTION

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The exercise of scientific research in health is fundamental for the development of science. Therefore, research in this field involves a process based on the scientific method that seeks to obtain systematized knowledge, which allows developing technologies, designing health policies and strategies, as well as generating evidence to solve scientifically based questions in order to care for well-being. of humanity. In this way, it is possible to obtain new knowledge and make it accessible, and promote the search for solutions to community problems in order to improve people's quality of life. In this sense, the situation of scientific production in health in Latin America is of interest and also a cause for concern, [1,2,3,4,5] especially in Peru, where the opinion of some researchers about how much there is to do and change in research in the field of health, gained relevance since 2015. [6,7,8] In this regard, several studies, when analyzing scientific production on health sciences, and especially some published in SCOPUS, [7,8,9,10] reported a scarce production of scientific knowledge in this area, although a recent study revealed that the situation has been showing some improvements, but based on the institutional licensing process of Peruvian universities, which seeks to ensure basic conditions of quality. [eleven]

In this context, Health Sciences faculties are one of the settings that promote health research in the world. This impulse is given through one of the most traditional means of research, such as graduate theses, considered as an opportunity for the student from the moment he enters the university to venture into the field of health research. [8,12] In this way, the support of the ideas and the finding of the thesis study falls to the judging jury, which verifies its quality and issues a judgment on the final version of the written document. However, the scientific production of the

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members of the judging jury is unknown, a situation that does not allow us to assess the work they have been doing, despite the guiding value they have with respect to the final version of the thesis.

That is why the present research aimed to determine the frequency of publication of scientific articles by teachers who participated as a thesis judging jury in a Faculty of Health Sciences of a private university in Peru. during the period 2015 - 2018.

METHODS

An observational, descriptive and cross-sectional study was carried out. 131 teachers were included who participated as a referee and later as a jury evaluator in the support of thesis that were approved in the period 2015 - 2018, in a Faculty of Health Sciences of a Private University of Peru. The identification of this group arose after reviewing 352 theses from the institution's digital repository, where 98 Nursing teachers, 219 Psychology teachers and 35 Nutrition teachers were found. In the case of the School of Medicine, as it only has files corresponding to the year 2019, it was not included in the search.

Variables such as gender (male and female), age (taken as quantitative), academic degree (graduate, master's degree or doctor), employment relationship (full or part-time dedication), research teacher (whether certified or not) were taken into account. ; and as the main variable scientific publications (also taken as quantitative), which were measured using a data collection form validated by three research professors with experience in scientific publication.

To identify the academic degree, the employment relationship and the category of research teacher, a search was carried out in the registry of degrees and titles of the

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portal of the National Superintendence of Higher University Education (SUNEDU), and in the National Registry of Researchers in Science and Technology (REGINA) of the National Council of Science, Technology and Innovation (CONCYTEC).

To identify the scientific production, a bibliographic search was carried out in the SCOPUS database and the Google Scholar search engine, for which combinations of names and surnames were used, adding Peru in each of the databases: " Lastname1-Lastname2" Peru; "First name1 Last name1" Peru; "First name First name2 Last name1" Peru. The number of publications during his career and publications in the last 5 years were taken into account.

Regarding ethical aspects, this research maintains the confidentiality of the data and the consent of the participants. Finally, the data were processed in an Excel matrix, which was built on the basis of the scores assigned in the case of categorical variables and the direct scores for quantitative variables; They were then transferred to SPSS 22.0 software for their respective analysis.

RESULTS

When analyzing the distribution of the population, the participation of female teachers was found to be in greater proportion (75.6%), who in greater numbers belong to the professional school of Psychology (38.1%). On the other hand, in terms of their academic training, a large number show that they only have a professional degree (38.9%), and their connection with the institution is full-time (47.3%). Finally, only 2.3% have certification as researchers from CONCYTEC of Peru.

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Regarding scientific publication, it was identified that 17.6% had the experience at some point in their lives. Of this group, 9.2% continued to make contributions in the last 5 years. However, of the total number of teachers with scientific production, only 6.9% managed to publish in journals indexed in the SCOPUS database (table).

Table Characteristics and scientific production of the judging jury of theses approved in the period 2015 - 2018, from a Peruvian Faculty of Health Sciences

Variable		**Frequency**	**Percentage**
School	Psychology	fifty	38.2
	Nursing	Four. Five	34.4
	Nutrition	36	27.5
Sex	Male	32	24.4
	Female	99	75.6
Academic degree	Graduate	51	38.9
	Master	62	47.3
	Doctor	18	13.7
Employment relationship	Complete	62	47.3
	Partial	69	52.7
Did you ever publish?	Yeah	23	17.6
	No	108	82.4
Have you published in the last 5 years	Yeah	12	9.2
	No	119	90.8
Did you publish in SCOPUS?	Yeah	9	6.9

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Variable		Frequency	Percentage
	No	122	93.1
Are you a research teacher?	Yeah	3	23
	No	128	97.7

DISCUSSION

The present study shows that more than half of the teachers who evaluated thesis in a Peruvian Faculty of Health Sciences were women. This finding implies that a greater participation of these professionals, as well as the greater proportion of full-time teachers with the same responsibility, would be reflecting the dynamics and processes of formative research, which generally assign responsibility for the assessment of degree work to teachers. with full-time dedication in the school where they are assigned.

Regarding scientific publication, the findings reveal a trend towards low percentages, which can be interpreted as low scientific production by the judging jury, who is responsible for evaluating and guiding the degree works so that they demonstrate scientific rigor and quality. methodological. The fact that this special group of teachers, for the most part, has not published a scientific article at some point in their lives, and furthermore, that there are a few who managed to do so in journals indexed in SCOPUS, could impact the quality of the theses issued by students. This is because it is expected that the research promoted in the undergraduate degree will not only achieve the approval of the work on the day of support, but also have the capacity to be disseminated in specialized scientific journals, which is par excellence the medium where the results of the research are communicated.

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These findings corroborate what was stated by similar research reported in the Peruvian scientific literature. For example, in the province, the study carried out by *Chachaima-Mar , Fernández-Guzmán* and *Atamari-Anahui ,* [10] found low production by medical teachers at a state university in Cusco. Specifically, 57.8% of a total of 90 had never published in a scientific journal, and of the group that did manage to do so, only 7% were published in journals indexed in SCOPUS. In another instance, such as the capital Lima, although with a smaller population, *Alarcón-Ruiz* and *Quezada ,* [9] concluded that the production of 19 thesis advisors from a Faculty of Medicine of a private university in Lima was also low. In this case, 63% had ever published, but only 16% in journals in the SCOPUS database. On the other hand, in the field of Psychology, *Mamani* [13] found a very low production of Psychology thesis advisors at a private university in Lima, including its two campuses, in Juliaca and Tarapoto; that of a total of 37 advisors, 73% never published in a scientific journal.

The fact that professors in charge of advising degree projects, as well as those who are responsible for their evaluation, do not demonstrate scientific publications, beyond revealing a deficit of competencies, would be revealing the deficiencies in the Peruvian university system, and on the other hand , the institutional weaknesses on the part of the universities; a reality that has become visible in Peru due to the latest events related to institutional licensing, where all Peruvian universities have to demonstrate basic quality conditions. One of them, and of fundamental nature, is the management of research for scientific production.

It is concluded that the publication of scientific articles by teachers who participate as a thesis judging jury is low, therefore, there is still much to do in the field of

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research processes and teaching in the Peruvian university context. , in order to increase scientific evidence of quality in health professionals.

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