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# INFORMATIONAL COMPETENCIES: COGNITIVE STRATEGIES TO PROMOTE THE DEVELOPMENT OF RESEARCH IN TEACHERS OF A HIGHER EDUCATION INSTITUTION

*Gerardo Sánchez Ambriz*
Orcid.org/0000-0002-5296-3832

*Adriana Yañez Hernández*
Orcid.org/0000-0003-3361-7608

*Leticia Sánchez Ambriz*
Orcid.org/0000-0002-2950-3782

**Abstract:** The article discusses a mixed type investigation with an explanatory scope, its purpose is: to explain theimplementation of Information Competencies as a cognitive strategy that contributes to the development of research in teachers in a Higher Education Institution (HEI). Supported by an experimental research design, with a quasi-experimental study and a triangular approach (qualitative and quantitative).

To identify deficiencies on the topic studied, a diagnosis was carried out that evaluates the level of knowledge to know the skills in acquiring information that allows them to generate research through ICT and informational skills. The results obtained from the application of the change strategies to the teachers subject to study in the pretest made it possible to verify the hypothesis, the implementation of the change strategies to obtain informational competencies through the application of the measurement instrument. ALFIN allowed the subjects to improve their knowledge, skills and attitudes in investigative processes.

## INTRODUCTION

Science and technology remain in constant change to face current transformations in education-research; A pedagogical tool to confront them includes the acquisition of new skills and competencies in the educational context. Teachers must seek disruptive strategies that help discriminate the sources of scientific knowledge for the construction of their own knowledge that supports them to successfully face a challenge. globalized world with continuous changes, teachers must acquire critical, didactic skills with new approaches, getting involved in new trends and evolutionary processes in their field of work through research.

Educational institutions and Developed societies continue to promote technology in education and recent trends emphasize the development of decision-making competencies in HEIs in order to face highly globalized digital markets (Ji et al., 2023). For this reason, it is sought that human beings are informationally literate, for access to information as a means of creating and transmitting knowledge.

## STATE OF THE ART

### INFORMATION LITERACY

The notion of Information Literacy (IL) is derived from the translation of "information literacy"; An aphorism attributed, both in creation and use, to the lawyer Zurkowski (1974), he viewed IL as a result of the transformation of traditional library services into innovative information-supplying entities for the private sector, with the corresponding policies. IL was associated with the concept of effective use of information within a work environment, possibly business, and more specifically, with problem solving. Information literacy refers to people's ability to identify necessary information and retrieve, evaluate and use it effectively. (Lan Y.J., 2017).

The Association of College and Research Libraries (ACRL) define IL:"the set of integrated skills encompassing the reflective discovery of information, understanding how information is produced and valued, and using information to create new knowledge and participate ethically in understanding learning communities" (ACRL, 2015, p.8). IL must be understood as: the ability to locate, evaluate and use information to become independent, lifelong learners.

Almost 50 years have passed since the appearance of the concept in question; and since then IL has crossed the barrier of time, showing itself as a conception radically alien to passing situations and totally parallel to technological and informational needs. The

fortuitous appearance of IL brought with it questions that had not been considered in a rigorous and direct manner as real possibilities for personal, social, cultural, educational, work and professional growth and development.

At first the IL was exclusively linked to the library and its services; Unexpectedly, the library became a microsocial space directly correlated with society and its impulsive habits. The perennial agreement that exists between the library and society is based on an incessant and anarchic search for information; where prudence, serenity, equanimity, certainty and reasoning are abandoned before the overwhelming presence of promptness, frivolity, thoughtlessness and bias.

The function of ethics, as a philosophical discipline, has been, precisely, to help us take the step from mere opinion about the good to validated knowledge of it. In this case, ethics has also been a method for this purpose. The first philosophers with their ethical contributions made it possible because of this form of exploration and the development of this type of methodology. His task was, then, to take seriously the common man's questions about the good, along with his opinions on the matter, to turn them into knowledge.

The projection that CILIP presents regarding IL implicitly assumes a double approach, both cyclically and conceptually. It not only tries to enhance its scope, but also aims to configure a new dimension attached to the canons of traditional ethics. It is expected that the inclusion of ethics in the peripheries of IL will contribute to a more reasoned and consensual exploration, and less anarchic and wild. Rectitude and exploratory discipline could assume, in some way, a moderation in the management and dissemination of information.

We know in advance that the arrival of equanimity and sobriety in the management of information is rugged and inhospitable due to the improper practices that are permanently reproduced in the social fabric; Even so, the integrity and wisdom with which information must be treated cannot be relegated to a secondary level, since today more than ever, the era ofInformation and technology has confiscated the common sense of millions of humans.

Enhancing the skills of understanding, critical thinking, intercultural awareness and citizenship; In this sense, information literacy means: The basic competencies that allow citizens to interact effectively and develop critical thinking and lifelong learning skills for socialization that turn them into active citizens (Al-Tawisi, Ahamed & Al -Banna, 2016).

## PROBLEM STATEMENT

The use of technological tools in the educational field facilitates understanding, promotes digital literacy and helps develop greater critical thinking in teaching - learning. Teachers often use ICT applications in their personal lives; However, they lack the use of technology in educational environments, its use is precarious and is not related to a culture of research with the use of technological and information literacy [access, creation, management and evaluation of information, Senkbeil et al. (2019).

Not having the information skills and competencies for searching and evaluating information prevents them from carrying out research and with it the limited percentage of research, which makes it possible to formulate the problem by stating an initial question:

Is there a positive relationship between informational competencies for the development of research in teachers of an educational institution of higher education? Since new scientists in the country and especially academics in an HEI must be trained, not Doing so will lead to the

generational change becoming lost in the obsolescence of knowledge.

## JUSTIFICATION

Currently, citizens need a greater quantity and quality of education, since the challenges and contexts in which they must operate have complexity as a common characteristic or denominator,andThe human talent that makes up the HEIs needs to be competent to be able to use and appropriate information through digital technology; which makes it necessary to change behavior to obtain information, making it essential to acquire informational skills to access, retrieve and critically analyze information transmitted and collected through digital technologies (Nikou, De Reuver & Mahboob Kanafi, 2022). Digital literacy goes beyond functional technical skills and includes a rich set of behaviors, practices and digital identities (Hunter, 2018) allowing you to discriminate the optimal information to carry out the teaching-learning process and carry out research.

Information Competencies open the doors of innovative learning by facilitating teaching and learning through knowledge, cognitive skills and attitudes tothe generation of research projects to have access to the latest advances in science, technology and the humanities,So it is not enough to know how to read and write, putting words together, you have to know in a critical and reflective way the technological means, their advantages and disadvantages, the new communication codes, their training potential and how to develop the necessary skills to generate learning. significant that enables the use of technology to carry out research and generate innovation strategies.

## AIM

Explain the implementation of informational competencies as a cognitive strategy that contributes to the development of research in teachers of an HEI.

## HYPOTHESIS

Informational competencies provide models, strategies, programs and didactic activities, in favor of the understanding and strengthening of their informational competencies and formative research in teachers of higher education institutions.

## METHOD

The present investigation is of a mixed type with an explanatory scope, supported by a design ofexperimental type, with a quasi-experimental study and a triangular approach (qualitative and quantitative).

## STUDY ENTITY

It is an IES located in the Municipality of Cuautitlán State of Mexico founded by Decree on August 29, 1997 with its own legal personality and assets; Its objective is to train professionals, teachers, researchers through accredited educational programs and carry out scientific and technological projects. It links with the public, private and social sectors to consolidate the development of the community and promote regional, state, national and universal technological culture.

Population and sample: The population is given by all the teachers with PTC assignment (full-time teacher) of the universities under study.sample by the group of teachers with PTC assignment (full-time teachers), with a total of 13 teachers.

## DIAGNOSTIC INSTRUMENT

The measurement instrument (questionnaire) used is: ALFINVES: Literacy for Research (Pinto et. al. (2013) which diagnoses in postgraduate students their ability to manage information capabilities. The instrument is made up of forty-seven items related to the variables: Assessment

of knowledge, Initial training capabilities, Self-assessment of skills and Assessment of attitudes.

## DATA COLLECTION AND PROCESSING

The collection of information was carried out through the application of the ALFIN instrument through the Google forms tool to identify the level of productivity of teachers with PTC assignment, in the development of research. After collecting the data, we proceeded with the analysis of the pretest pto summarize, code and prepare the data using the Statistical Package for the Social Sciences (SPSS) program, version 25.

### PRETEST RESULTS

For the interpretation of the data, the p value must be less than alpha to have significant differences. The p value in the SPSS statistical program is indicated as sig. Bilaterally, in each test, this value is compared with an alpha of 0.05. If the value is greater than 0.05, there are no significant differences between the variable to be contrasted. However, if the p value or bilateral significance is less than alpha, there are significant differences in the variable to be contrasted., applied to the control and experimental group of the IES.

### KNOWLEDGE

According to the results obtained in the knowledge variable, the level of bilateral significance (p) is.001, being <.05 there are differences in the two groups in the knowledge variable in the decision of the topics for the approval of research projects, the different scientific information systems in the work area and in the management of the informational competence necessary to carry out research projects.

**Contrast statistics**

|  | Knowledge |
|---|---|
| Mann-Whitney U | 18,500 |
| Wilcoxon W | 96,500 |
| Z | -3,258 |
| Next asymptot. (bilateral) | .001 |
| Exact sig. [2*(unilateral sig.)] | .001b |

**Table 1.** *Knowledge*

## SKILLS

The skills variable is subdivided into sections including initiation of research projects, selection of the topic of the research project, exploration, formulation, collection and presentation of information. Below is the information for each one:

### SKILLS: SELECTION OF THE TOPIC OF RESEARCH PROJECTS.

The skills for selecting the topic in the research projects between the control and experimental group at the level of bilateral significance show.002, which is <.05, which represents that in the control and experimental group there are differences between both groups in summarize the topic in an exact sentence and find the equivalent phrases to express the same idea, as visualized in the table, selection of research project topic.

Ranks

|  | Cluster | N | Average range | Sum of ranks |
|---|---|---|---|---|
| Selection skills | Control | 12 | 8.33 | 100.00 |
|  | Experimental | 13 | 17.31 | 225.00 |
|  | Total | 25 |  |  |

**Table 2.** *Selection of the topic of research projects*

**Contrast statistics**

|  | Skills in selecting research projects |
|---|---|
| Mann-Whitney U | 22,000 |
| Wilcoxon W | 100,000 |
| Z | -3,094 |
| Next asymptot. (bilateral) | .002 |
| Exact sig. [2*(unilateral sig.)] | .002b |

**Table 3.** *Research projects topic*

## SKILLS: EXPLORATION

The data obtained in the bilateral significance of.051 >.005, representing no differences in the exploration in both groups in the review of information sources, the identification of authors or specific titles of the topic and in the use of indexes to locate information.

**Ranks**

| | Cluster | N | Average range | Sum of ranks |
|---|---|---|---|---|
| Exploration skills | Control | 12 | 10.04 | 120.50 |
| | Experimental | 13 | 15.73 | 204.50 |
| | Total | 25 | | |

Table 4. *Exploration*

**Contrast statistics**

| | Exploration skills |
|---|---|
| Mann-Whitney U | 42,500 |
| Wilcoxon W | 120,500 |
| Z | -1,953 |
| Next asymptot. (bilateral) | .051 |
| Exact sig. [2*(unilateral sig.)] | .052b |

**Table 5.** *Level of significance in the exploration.*

## SKILLS: FORMULATION

In the formulation section, you know the specific terminology of your research project, consult the databases as a terminological control instrument to carry out the search, develop advanced searches and, based on the results found, the level of significance is. 022 >.005 of the value which implies that there are no differences between both groups as seen in table 6 formulation and 7 skills in formulation.

**Ranks**

| | Cluster | N | Average range | Sum of ranks |
|---|---|---|---|---|
| Formulation skills | Control | 12 | 9.54 | 114.50 |
| | Experimental | 13 | 16.19 | 210.50 |
| | Total | 25 | | |

**Table 6.** *Formulation*

When formulating a research project, teachers require the skills to search for information, which will lead to obtaining optimal knowledge on the topic they are developing, promoting better results in their inquiries and investigations.

**Contrast statistics**

| | Formulation skills |
|---|---|
| Mann-Whitney U | 36,500 |
| Wilcoxon W | 114,500 |
| Z | -2,286 |
| Next asymptot. (bilateral) | .022 |
| Exact sig. [2*(unilateral sig.)] | .022b |

**Table 7.** *Formulation skills*

## SKILLS: GATHERING

In the skills for collecting information, the level of bilateral significance was obtained at.000 with <.005 which represents that there is a difference between both groups in the text, authorship, veracity, objectivity, authorship and summary if the complete text is not available for the creation of a personalized database with the relevant information, as seen in the table 8 collection of information.

**Contrast statistics**

| | Information gathering skills |
|---|---|
| Mann-Whitney U | 6,500 |
| Wilcoxon W | 84,500 |
| Z | -3,918 |
| Next asymptot. (bilateral) | ,000 |
| Exact sig. [2*(unilateral sig.)] | .000b |

**Table 8.** *Information collection*

## SKILLS: PRESENTATION

In the presentation the bilateral significance is.565 >.005 which indicates that there are no differences between the control and experimental group in working with a bibliographic manager, bibliographic styles for references and the dissemination of

information on the Internet in the results of research projects as identified in the table 9 presentation.

**Contrast statistics**

|  | Presentation skills |
|---|---|
| Mann-Whitney U | 67,500 |
| Wilcoxon W | 145,500 |
| Z | -.576 |
| Next asymptot. (bilateral) | .565 |
| Exact sig. [2*(unilateral sig.)] | .574b |

**Table 9.** Presentation

### ATTITUDES

Attitudes for the formulation or preparation of research projects during the research process, the bilateral significance is.001 < that alpha.005, which indicates that there are differences in the variable to be contrasted in the attitudes, that is, the control and experimental group in the attitudes for the development of research projects in the critical manner of the sources consulted and the use of citations. bibliographical as an instrument of recognition of the original source, as seen in tables 10 and 11.

**Contrast statistics**

|  | Attitudes preparation of research projects |
|---|---|
| Mann-Whitney U | 15,000 |
| Wilcoxon W | 93,000 |
| Z | -3,457 |
| Next asymptot. (bilateral) | .001 |
| Exact sig. [2*(unilateral sig.)] | .000b |

**Table 10.** *During the research process*

**Contrast statistics**

|  | Attitudes towards skills |
|---|---|
| Mann-Whitney U | 13,000 |
| Wilcoxon W | 91,000 |
| Z | -3,549 |
| Next asymptot. (bilateral) | ,000 |
| Exact sig. [2*(unilateral sig.)] | .000b |

**Table 11.** *Regarding skills*

The results of the application of the diagnosis allow the identification of strengths, opportunities, weaknesses and threats as shown in table 12, SWOT.

| Strengths | Opportunities |
|---|---|
| • Identifies the importance of research and support from advisors.<br>• Know the terminology in research projects.<br>• Use of the summary as an information filter.<br>• Review sources of information.<br>• Receptive position in the instructions of teachers or advisors. | • Learning, you can summarize in one paragraph the value of using information in your professional context.<br>• Know and access extensive information in specialized databases in the field of Administration for search and discrimination.<br>• Continue your postgraduate educational training at the doctoral level<br>• Competitive access in the national and international business environment. |
| Weaknesses | Threats |
| • Deficiencies in the systematization of knowledge in scientific research<br>• Lack of knowledge in scientific information systems.<br>• Limited knowledge of the functionality and importance of informational competencies in research processes.<br>• Poor debugging in the search based on the results found. | • Little knowledge in search profiles.<br>• Lack of knowledge of the appendices for locating information.<br>• No development of information search profiles.<br>• Academic and student activities are carried out in digital tools.<br>• Limited educational profile compared to other international studies. |

**Table 12.** *SWOT*

## CHANGE STRATEGIES

A course with a duration of 40 hours was carried out on the platformmoodle.

Online learning is an opportunity for academic staff to develop their skills and competencies (Chang, 2016), so there is a need to investigate how prepared academics are for these two levels of digital changes (in terms of their job responsibilities as community and as individuals).

| | Issue | Lessons | Conference time | Hours | Platform | Live or on video |
|---|---|---|---|---|---|---|
| **Module 1** | Welcome Birth of paper, digital skills | Six | 3:00 p.m. to 8:00 p.m. | Eight | Moodle | Live and on video |
| **Module 2** | ImRyd Model | Eight | 3:00 p.m. to 9:00 p.m. | Eight | Moodle | Live and on video |
| **Module 3** | Information Literacy | Eight | 3:00 p.m. to 9:00 p.m. | Eight | Moodle Zoom | Live and on video |
| **Module 4** | Intellectual property, patents, copyrights. | Five | 3:00 p.m. to 9:00 p.m. | Eight | Moodle | Live and on video |
| **Module 5** | Innovation in research | Eight | 3:00 p.m. to 9:00 p.m. | Eight | Moodle | Live and on video |

**Table 13.** *Modules*

| **Module 1. Birth of paper and digital skills** | |
|---|---|
| **Specific goal** | Identify the importance of digital skills in the educational field for optimal management. |
| **Learning strategy development** | Explanation of the topic to learn digital tools for the management and use of technology in the search for information. |
| **Resources** | Computer, software, digital platform.Classroom with computer equipment and internet access |
| **Activities** | Forum, synoptic table. |
| **Duration** | Eight hours |
| | |

| **Module 2. ImRyd Model** | |
|---|---|
| **Specific goal** | Know the stages of the ImRyd model and its formulation in the research processes, |
| **Learning strategy development** | Definition of the ImRyd model and exemplification of its formulation |
| **Resources** | Computer, software, digital platform |
| **Activities** | Examples of the application of the ImRyd model in articles, theses. |
| **Duration** | Eight hours |
| | |

| **Module 3. Information literacy** | |
|---|---|
| **Specific goal** | Know, design and execute teaching-learning activities for the management of institutional information resources, based on the development of competencies associated with information literacy. |
| **Learning strategy development** | Explanation of information literacy with its measurement parameters: knowledge, skills and attitudes, models and standards. |
| **Resources** | Classroom with computer equipment and internet access, scientific dissemination databases. |
| **Activities** | Forum |
| **Duration** | Eight hours |
| | |

| **Module 4. Intellectual property, patents, copyrights.** | |
|---|---|
| **Specific goal** | Acquire informational competencies for effective access to critical evaluation of and use of information in accordance with ethical and legal parameters. |
| **Learning strategy development** | Recognizes copyright, legal problems and ethics surrounding the use of information (protecting intellectual property, moral and patrimonial rights of authors, academic plagiarism). Established in the APA seventh edition standard, |
| **Activities** | Conduct research on outstanding topics in their academic area to formulate citations and bibliographic references, and assume other good practices for the use of online information, especially, and apply them in their academic production in order to base their work through the recognition of the sources that nourish it. Prepares documents (bibliographic syntheses, reviews, presentations, scientific articles, opinion articles, degree theses, and others) based on the content of other sources, from which it demonstrates mastery of the concepts, methods and procedures of its disciplinary field in order to make contributions to the advancement of knowledge in their discipline. |

| Resources | Computer, software, popular science databases. |
|---|---|
| **Activities** | Inquiry into a specific topic that enables the search for information for the application of methods applicable to informational competencies. |
| **Duration** | Eight hours |
| | |
| **Module 5. Innovation in research** | |
| **Specific goal** | Articulate the standards of informational competencies with the research processes of academics with work groups. |
| **Learning strategy development** | Training activities articulated with the development of research in accordance with the work groups and their academic training. |
| **Activities** | Concept map and infographic. |
| **Resources** | Classroom with computer equipment and internet access |
| **Duration** | Eight hours |

Table 14. Module activities

## POST-TEST RESULTS

### RESULTS OF THE COMPARISON BETWEEN THE PRETEST AND POSTTEST OF THE EXPERIMENTAL GROUP

From the results derived from the application of the post-test in the knowledge variable, an average of 19.46 was obtained in the pre-test and the results obtained in the post-test, the average was 26.46, which allows us to corroborate a difference of seven between before and after, as shown. see in table 15.

**Related Sample Statistics**

| | | Average | N | Typical deviation | Typical error of the average |
|---|---|---|---|---|---|
| Pair 1 | Pretest knowledge | 19.4615 | 13 | 3.07179 | .85196 |
| | Posttest knowledge | 26.4615 | 13 | 2.60177 | .72160 |

**Table 15.** *Related pretest and posttest samples.*

In the correlations of the related samples in the evaluation of the pretest and the posttest, the significance obtained was.940, which allows that in the pretest and posttests there are no significant differences, considering that the teachers to whom the instrument was applied have with some knowledge,

however in the findings the difference is observed in them showing that they acquired or refined the knowledge in the informational competencies.

**Correlations of related samples**

| | | N | Correlation | Next. |
|---|---|---|---|---|
| Pair 1 | Pretest knowledge and Posttest knowledge | 13 | .023 | .940 |

**Table 16.** *Correlations*

The following figure shows the difference in the knowledge acquired in the pretest and the posttest.
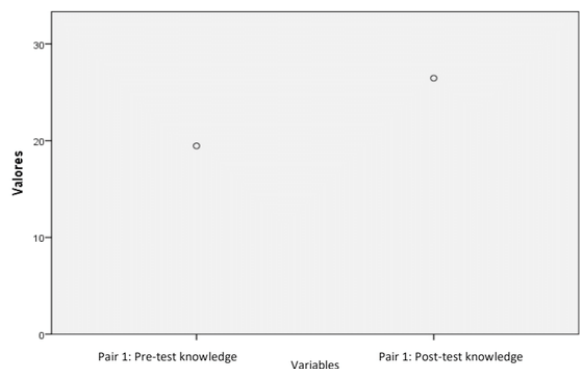


**Figure 1.** *Pretest and posttest knowledge.*

In the pretest and posttest measurement in the application of the Wilcoxon test, a significance of.001 <0.05 was obtained, which allows identifying the existence of differences

in both groups, accepting the alternative hypothesis, as identified in the Wilcoxon knowledge table.

**Contrast statistics**

|  | Posttest knowledge – Pretest knowledge |
|---|---|
| Z | -3.188b |
| Next asymptot. (bilateral) | .001 |

**Table 17.** *Wilcoxon knowledge*

The skills variable for informational competencies is divided into several sections: skills for selecting the topic of research projects, skills in exploration, skills in formulation, skills in collection, skills in presentation, each of them has its items in which the information was disseminated.

In the results obtained in the skills in the selection of the topic in the research projects, an average of 6.5385 was found in the pretest and in the posttest of 8.2308, as shown in the table, skills in the selection of the topic, which gives as a reference, an increase of 1.6923, allowing us to recognize that the selection of the topic is the most relevant step to enter the research processes by the academics of an educational institution.

**Related Sample Statistics**

| | | Average | N | Typical deviation | Typical error of the average |
|---|---|---|---|---|---|
| Pair 1 | Pretest Selection Skills | 6.5385 | 13 | 1.50640 | .41780 |
| | Posest Skills Selection | 8.2308 | 13 | 1.09193 | .30285 |

**Table 18.** *Skills in topic selection*

The correlations between the pretest and posttest are seen in the following table with a significance of 0.950.

**Correlations of related samples**

| | | N | Correlation | Next. |
|---|---|---|---|---|
| Pair 1 | Pretest Selection Skills and Postest Selection Skills | 13 | .019 | .950 |

Table 19. *Correlations of related samples in selection skills*

In the related samples of skills in selecting the topic of research projects, a significance of.006 <0.05 was obtained, identifying differences between both groups, as shown in the table, related samples in the selection.

The following figure identifies the differences obtained in the pretest and the posttest in the skills in selecting the research topic as an important element at the beginning of the process for investigating information.
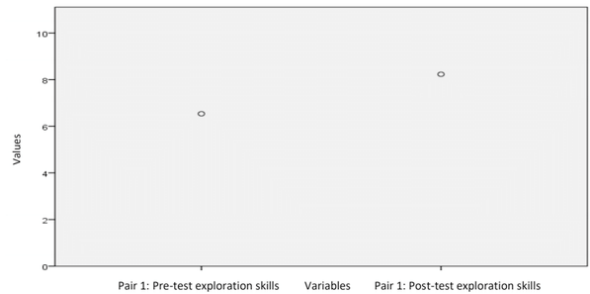


Figure 3. *Selection skills*

The section on skills in the selection of the topic of research projects, in the application of the Wilcoxon test, a significance of 0.10 <0.05 is observed, which allows us to identify that there are significant differences between both tests, verifying that the skill was obtained In addition, the selection and delimitation of the topics to be investigated by the teachers of a higher education institution is important.

**Contrast statistics**

| | Posest Selection Skills – Pretest Selection Skills |
|---|---|
| Z | -2.568b |
| Next asymptot. (bilateral) | .010 |

Table 21. *Selection skills*

**Test related samples**

| | | Related differences | | | | | T | gl | Sig. (bilateral) |
|---|---|---|---|---|---|---|---|---|---|
| | | Average | Typical deviation | Typical error of the average | 95% Confidence interval for the difference | | | | |
| | | | | | lower | Superior | | | |
| Pair 1 | Pretest Selection Skills – Posttest Selection Skills | -1.69231 | 1.84321 | .51122 | -2.80615 | -.57846 | -3,310 | 12 | .006 |

**Table 20.** *Related samples in selection*

The research processes require the search and review of the various sources of information and the identification of authors specialized in the topic. Exploration skills enable the use of indexes to locate information, Means obtained in the samples related to the skills of the exploration section comprised of three items are 9.6154 in the pretest and 12.7692 in the posttest with an upward difference of 3.1538, as seen in the table related samples in skills in exploration.

**Related Sample Statistics**

| | | Average | N | Typical deviation | Typical error of the average |
|---|---|---|---|---|---|
| Pair 1 | Pretest Exploration Skills | 9.6154 | 13 | 1.66024 | .46047 |
| | Posttest Exploration Skills | 12.7692 | 13 | 1.58923 | .44077 |

Table 22. *Related Samples on Exploration Skills*

According to the data obtained in the pretest and posttest, in the correlations of the related samples, a significance of .208 <0.05 was obtained, which indicates that there are significant differences in the tests, locating a change in the before and the results obtained after the application of change strategies, as visualized in the table correlations skills in the exploration.

Correlations of related samples

| | | N | Correlation | Next. |
|---|---|---|---|---|
| Pair 1 | Pretest Exploration Skills and Posttest Exploration Skills | 13 | .374 | .208 |

Table 23 *Exploration skill correlations*

The following figure shows the increase in skills in the exploration of the pretest and posttest for the location of the ideal information from the obsolete information that will contribute to better contributions in the research carried out by the institution's professors.
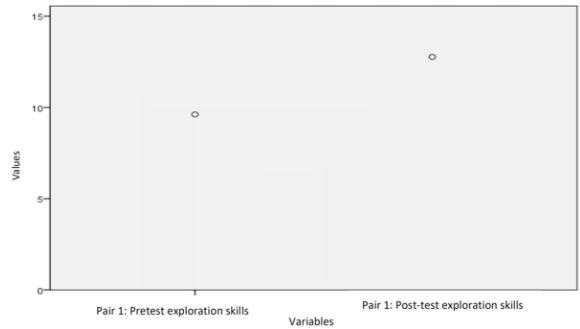


Figure 5. *Exploration skills*

In the formulation skills, the average of 13.8462 was obtained in the pretest and the posttest with 19.6154 with a difference of 5.7692, which represents that the teachers managed to obtain the learning to increase their capabilities in this area by knowing the specific terminology of their projects. of research combined with the consultation of databases as a terminological control to carry out information searches, as seen in the

following table, formulation skills.

## HYPOTHESIS TESTING

| Wilcoxon test Pretest and posttest | Significance |
|---|---|
| Knowledge | Sig.001 <.05, the null hypothesis is rejected and it is concluded that there is statistical evidence that the professors' knowledge was obtained. |
| Skills | |
| Selection skills | Sig.010 <.05, the null hypothesis is rejected and it is concluded that there is statistical evidence that the selection skills in professors were obtained. |
| Exploration skills | Sig.002 <.05, the null hypothesis is rejected and it is concluded that there is statistical evidence that the exploration skills in the professors were obtained. |
| Formulation skills | Sig.003 <.05, the null hypothesis is rejected and it is concluded that there is statistical evidence that the formulation skills in the professors were obtained. |
| Presentation skills | Sig.014 <.05, the null hypothesis is accepted and it is concluded that there is statistical evidence that the presentation skills were achieved. |
| Attitudes | Sig.003 <.05, the null hypothesis is rejected and it is concluded that there is statistical evidence in the attitudes of the professors. |

## DISCUSSION AND CONCLUSIONS

Information literacy (Alfin) provides educators with the attitudes, knowledge and attitudes with a research component, to act critically with information through the use of technology that could generate changes that herald a new educational era (Parker et al., 2019), where academic writing is no longer just about reading materials assigned by teachers but also intensively involves information literacy (Kocatepe, 2021), to empower them for the creation and dissemination of information and prepare them for more active participation in research development in the 21st century.

The application of the diagnosis made it possible to identify the weaknesses that the teachers of the institution under study

had,Erlinger (2018) states that information literacy assessment serves two important functions in addition to demonstrating value to stakeholders: giving feedback and providing feedback to instructors to help them improve their instruction by allowing the development of change strategies;teachers are lifelong learnersthat must adapt and adopt new teaching practices and tools over time (OECD, 2019).

According to the results obtained after the application of the change strategies, the hypothesis was verified:Informational competencies provide models, strategies, programs and didactic activities, in favor of the understanding and strengthening of their informational competencies and formative research in teachers of higher education institutions;allowing teachers to acquire information competencies and thus the empowerment of information that is based on learning from the experience of information, which allows people to develop "new and more complex ways of conceiving or experiencing information and use of information" (Bruce et al., 2014; Somerville & Bruce, 2017, p.2).

The vision of universities is focused on hiring human talent trained with digital and informational skills to be prepared for the digital revolution by hiring competent, well-trained employees to increase their productivity at work and anticipate future needs.

The society of the future is a competition between people, experience and wisdom (Powell, 2020; Schmidt, 2022). This implies that there is a need for high-level thinkers and lifelong learners with the ability to correlate new and old knowledge, reorganize and process information, analyze problems creatively, solve complex problems effectively, work well in teams to achieve situations in win-win and observe the world critically (Hamlin, 2022; Kroth et al., 2022).

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