

CHARTING THE PATH TO EXCELLENCE: A REVIEW OF RESEARCH
COMPETENCIES IN UNIVERSITY STUDENTS

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Received February 2024

Accepted March 2025

Abstract

The objective of the study was to systematize research on research competencies in scientific literature among university students. The methodological design used was a theoretical and systematic review. The search explored four databases following the PRISMA statement (Scopus, Web of Science, PubMed, and SciELO), and 2999 articles were found, of which, after the eligibility criteria, 25 were systematized. The results indicate that we worked with a sample of 6002 students, mostly women, who belonged 56% undergraduate and 24% postgraduate. Similarly, it was observed that about 47% of the students demonstrated a high level of research competencies, while about 50% showed a moderately developed level. It has also been revealed that there are variables related to research skills, such as social factors, digital skills, attitude toward research, motivational factors, and teaching strategies. Based on these findings, three dimensions (cognitive, attitudinal, and technological) were established with their respective indicators for the measurement of these competencies. In this sense, valuable information is provided to improve research training and practice in higher education, highlighting the importance of addressing specific aspects to promote a better development of research skills in students.

Keywords – Research competencies, Research skills, Student, Systematic review.

To cite this article:

Tapullima-Mori, C., Pizzan-Tomanguillo, S.L., Pizzan-Tomanguillo, N. de P., Vásquez-Sánchez, M., & Soria-Quijaite, J.J. (2025). Charting the path to excellence: A review of research competencies in university students. *Journal of Technology and Science Education*, 15(2), 364-379. <https://doi.org/10.3926/jotse.2729>

1. Introduction

Research competencies (RC) are skills and abilities that are developed to carry out research effectively and successfully; these competencies involve the ability to formulate relevant research questions, collect and analyze information, apply appropriate methods and techniques, interpret results, clearly communicate findings, and make decisions based on the evidence obtained (Jeréz, Laza, Martorell & Hernández, 2022). Epistemologically, it has been more valued in higher education because it allows for the effective promotion of learning (Walker, Brownlee, Lennox, Exley, Howells & Cocker, 2009). RC also includes critical thinking, problem-solving, teamwork, and research ethics (Sánchez & Rodríguez, 2023). For this reason, they are considered to be the set of skills and knowledge necessary to carry out rigorous research and contribute to the advancement of understanding in a given field.

RC is necessary for academic-professional practice because it represents an advantage for solving problems that arise in the workplace and should be developed from regular basic education and reinforced in higher education (Jeréz et al., 2022). Currently, the university law poses the challenge of developing research competencies to guarantee educational quality and train highly trained professionals (Leyva, Estupiñán, Coles & Bajaña, 2021). Under this reality, the present study seeks to synthesize scientific literature on RC developed by university students. These will benefit the educational community because, from the data obtained, it will be possible to establish strategies, strengthen development programs, and improve curricular plans linked to these competencies.

A growing need for the development of RC has been driven by universities' sense of urgency to fulfill their primary purpose of generating knowledge within a face-to-face and virtual context (Dáher, Panunzio & Hernández, 2018; Martínez & Castellanos, 2018; Sánchez & Rodríguez, 2023). In this sense, universities contribute to an efficient educational model (Fernández, Gómez & Ricardo, 2021) and allow social development in all areas (Nessi, Mora & Ysea, 2019).

Currently, RCs are being explored in various fields of university education. However, the results that have been found are not conclusive, which is why it is intended to make use of the systematic review (SR) methodology, as it allows an exhaustive registration and evaluation of a topic for the systematized summary in order to make decisions (Poklepović & Tanveer, 2019; South & Lorenc, 2020). In addition, 100% of the journals (5) in Q1 belonging to Ibero-America, according to Scimago, have proposed developing systematic reviews, reinforcing the need to synthesize information on RC in university students.

RCs have been explored for a long time to develop policies in higher education (Laws, 1997; Mathers, Abel & Chesson, 2004) and promote the quality of teaching (Cejas, Mendoza, Navarro, Rogel & Ortega, 2019). These are considered elements integrated into the scientific literature (Vieno, Rogers & Campbell, 2022) because they are the set of knowledge that individuals possess about critical evaluation, information synthesis, decision-making, problem-solving, collection, analysis, and communication of data in the development of scientific research, which contribute to academic training and can then be applied in various contexts (Castro-Rodríguez, 2021a). Recently, RCs have been evaluated from the prevalence in undergraduate or graduate university students in virtual and face-to-face education (Barbachán, Casimiro, Casimiro, Pacovilca, Pacovilca, Barbachán-Ruales et al., 2021; Jeréz et al., 2022; Nolzco-Labajos, Guerrero, Carhuancho-Mendoza & Saravia, 2022), the development of the researcher's profile (Ocaña-Fernández, Fuster-Guillén, Uribe-Hernández & Castro, 2022), the strategies linked to it to obtain better learning outcomes (Hernández, Lay, Herrera & Rodríguez, 2021), guarantee formative research (Corona, 2023) and strengthen the capacity for analysis and scientific writing (Barceló-Hidalgo, Gómez-Paz & Cartaya, 2022).

Current SR studies have addressed that the primary research competencies are analysis, search process, information selection, review, and writing, which are linked to collaborative work strategies, tutor accompaniment, and feedback (Valderrama, Pérez, Llaque & Matute, 2022). Likewise, in Latin America, more studies are presented in Ecuador and Peru (Torres & Manchego, 2023). It is stated that RCs have been evaluated more in higher education than in basic education for their contribution to labor

development (Valdiviezo-Villegas & Leyva-Aguilar, 2023). On the other hand, the development of education 4.0 has no interference with the presence of research competencies, for which both the level of competencies they achieve, the competencies they develop, the instruments, or other factors have not been presented in the scientific literature, thus considering that the results evidenced have not been conclusive despite being an SR; which represents a gap in knowledge for the intervention or development of programs in higher education (George-Reyes, López-Caudana, Ramírez-Montoya & Vargas-Olivares, 2022). In this sense, the objective was to systematize research on research competencies in scientific literature among university students. At the specific level, it was considered to characterize the scientific literature, identify the measurement instruments, know the prevalence, and identify the main related variables.

2. Methodology

2.1. Type of Research

The type of research was SR theoretical (Ranganathan & Aggarwal, 2020) because large volumes of information were synthesized and evaluated to make decisions regarding the topic of study (Newman & Gough, 2020; Owens, 2021), these were sufficiently complex for the generalization of the results.

2.2. Search Strategies

For the development of the study, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement (Page, McKenzie, Bossuyt, Boutron, Hoffmann, Mulrow et al., 2021) was considered, and four central databases were selected: Scopus, Web of Science, PubMed, and SciELO. The search process was then carried out using the terms “research skills, investigative skills, scientific research skills, student*”; these, together with the Boolean operators AND and OR, were entered into the Title-Abst-Key search criteria. The search equations for Scopus [TITLE-ABS-KEY (“research skills” OR “investigative skills” OR “scientific research skills” AND student*)], for Web of Science [TI=(“investigative skills” OR “research skills” OR “scientific research skills” AND student*)], for PubMed [(((“research skills”[Title/Abstract]) OR (“investigative skills”[Title/Abstract])) OR (scientific research skills[Title/Abstract])) AND (student*[Title/Abstract])] and for SciELO [(ti: (research skills)) OR (ti:(Research skills)) OR (ti:(research skills)) AND (ti:(student*)) OR (ti:(Research skills))]. For the selection of the articles, inclusion criteria were applied, and only empirical articles were selected between 2019 and 2023. The criterion of temporality is mainly driven by the fact that scientific production and research skills are increasingly valued in higher education. In this sense, temporal segregation allowed for temporal bias and ensured that the conclusions were appropriate for practice and that current trends were recorded (Higgins, Thomas, Chandler, Cumpston, Li, Page et al., 2019; Liberati, Altman, Tetzlaff, Mulrow, Gøtzsche, Ioannidis et al., 2009). Regarding the exclusion criteria, those studies of grey literature and those documents that could not be accessed as full text at the end of the review were not considered. In addition, to guarantee the documents’ eligibility, the quality criteria set forth by the PRISMA declaration were considered.

2.3. Data Collection Techniques

For the collection of information, documentary analysis was considered (Bracho, Fernández & Díaz, 2021) through the design of an information matrix; a Microsoft Excel ® format was used where the information of the author, year of publication, objective, design, sample, instruments, and results were contemplated. After systematizing the articles, they were reviewed by three independent researchers to identify if they correspond to the topic in question, thus avoiding biases.

2.4. Information Processing

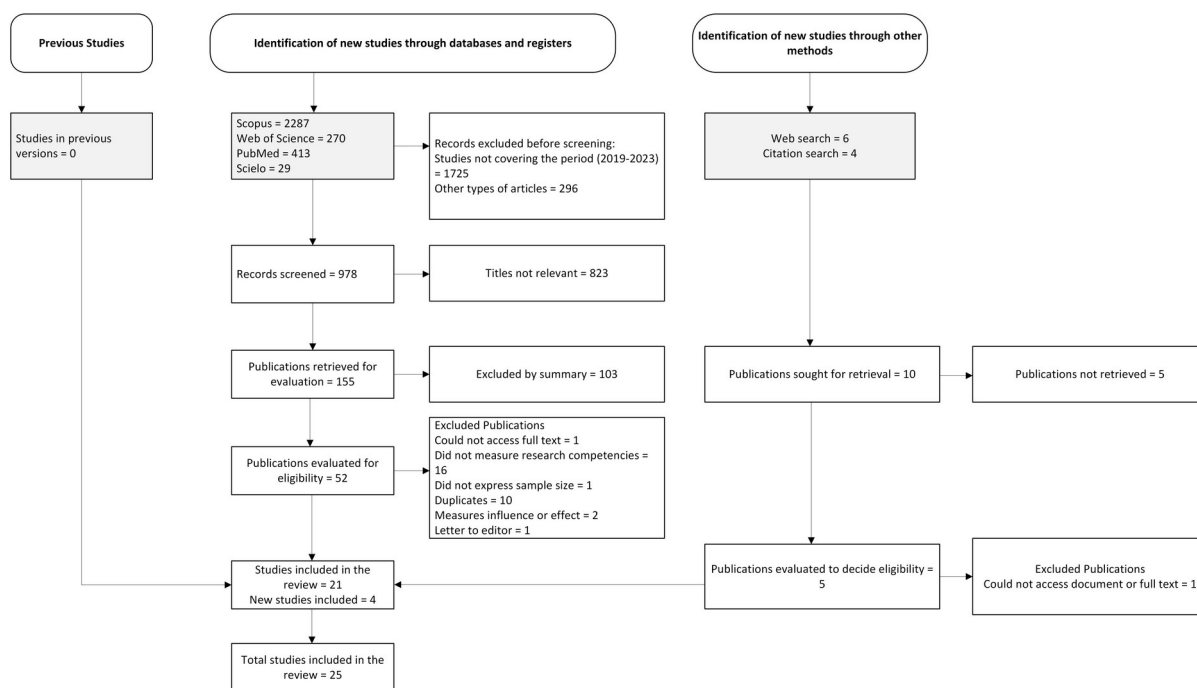
Descriptive statistics were applied by measuring averages achieved on the level of research competencies evidenced in the articles; as for the process of characterization of the participants, the free software jamovi 2.2.5 ® was used to show the mean, standard deviation, and even the countries with the highest production, this allowed the results to be generalizable, contributing to the formulation of research

perspectives and knowing the main results within the scientific literature. The double-entry table was used to characterize the articles, in which the main data of author and year, country of origin, type of research, instruments, and participants were recorded. Next, the results were detailed concerning each element found to analyze how they correspond to the research competencies. In addition, the percentage values of the development of research competencies in higher education students were measured.

3. Results

3.1. Study Selection

According to Figure 1, 2999 articles were identified in the four databases, and after the first elimination for study concepts between 2019 and 2023, only 978 were screened; after the review of the titles, only 155 documents were registered. After the review of the abstracts, 52 documents were recovered for eligibility, where they were excluded due to the lack of access to full text, not having measured the competencies, not defining the sample, duplicates, the objective differs from the requirements of the study as well as having been a letter to the editor, including only 21 documents. In addition, four articles were added to the web search and citation process; in total, 25 articles were systematized to meet the selection criteria established by the authors and following the PRISMA systematization matrix.



Note: Review analysis of selected articles

Figure 1. PRISMA Selection Diagram

3.2. Characteristics of the Studies and Instruments Applied (n = 25)

According to Figure 2, 14 of 25 articles (56%) are from Peru, three are from Ecuador, two are from Cuba, one is from Australia, Spain, Mexico, Russia, and Ukraine, and one could not be identified.

Table 1 shows that the selected articles registered 6002 participants ($M = 240$, $SD = 309$), 57.76% of whom were women. In addition, 56% registered undergraduate studies and 24% postgraduate studies. 80% of the documents (20 articles) applied instruments of their own elaboration; of these, 11 corresponded to instruments with more than 20 items (Ayala, 2020; Duche-Pérez & Paredes, 2022; Kaur, Hakim, Jeremy, Coorey, Kalman, Jenkin et al., 2023; Mendioroz, Napal & Peñalva, 2022; Nolazco-Labajos et al., 2022; Núñez, Yangaly, Huaita, Vásquez & Rivera, 2020; Núñez, 2019; Rojas-Hernández,

Saborit-Carvajal, Castillo-Mateu, Martínez-Brito, Cid-Rodríguez & Pérez-Quñones, 2021; Romero, Alfonso, Álvarez & Latorre, 2022; Rueda, Torres & Córdova, 2022; Veytia, Gómez & Morales, 2019) and two short instruments, the first with nine items (Vera-Rivero, Chirino-Sánchez, Ferrer-Orozco, Blanco-Barbeito, Amechazurra-Oliva, Machado-Caraballo et al., 2021) and the second with six (Guerra, Reynosa, Durand, Acero, Florez, Callata et al., 2023). Similarly, five out of 25 studies (20%) registered existing instruments, Díaz and Cardoza (2021) used the Research Skills Self-Assessment Scale (EAHI), Ocaña-Fernández et al. (2022) applied the Investigative Skills Scale, Vitor, Zavaleta, Bryson and Córdova (2023) applied the Research Competence Assessment Scale, Ipanaqué-Zapata, Figueroa-Quñones, Bazalar-Palacios, Arhuis-Inca, Quiñones-Negrete and Villarreal-Zegarra (2023) applied the research skills self-perception instrument, and Torres, Cosi and Peña (2019) applied the Skills Questionnaire Research. Six studies did not record any psychometric characteristic assessment (Alfonso, Romero, Latorre & Sánchez, 2021; Ilyashenko, 2019; Nolazco-Labajos et al., 2022; Rojas-Hernández et al., 2021; Romaniuk, Karpenko & Kichuk, 2023; Vera-Rivero et al., 2021). While 16 articles registered adequate levels of reliability using Cronbach’s alpha between .74 and .99; likewise, it was made reliable by McDonald’s alpha ordinal and omega. 10 of 25 articles used criterion validity, which used between 5 and 15 judges, and EFA and CFA validated the content.

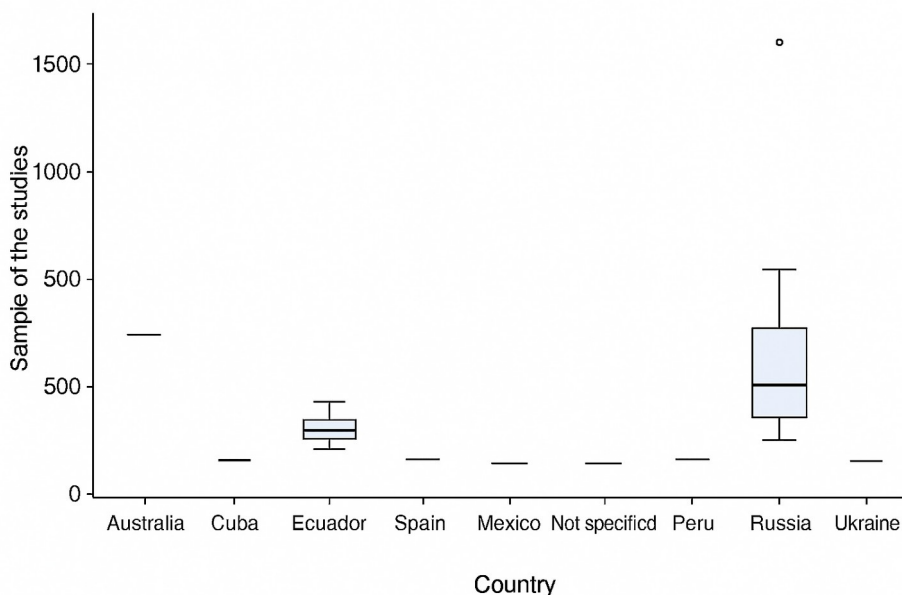


Figure 2. Countries with the highest production of research skills

Authors	Sample	Instruments
Nolazco-Labajos et al. (2022)	134 graduate students, 64.9% male.	Questionnaire of 35 items [identification and organization of information; generation of knowledge; dissemination of knowledge].
Riveros, Cayllahua, Sangama, Choquetico & Quispe (2022)	131 undergraduate students, 59.5% women.	Questionnaire
Díaz & Cardoza (2021)	269 graduate students, 59% male.	Research skills self-assessment scale (EAHI) of 51 items [cognitive, technological, information search, theoretical framework, methodological framework, results, bibliographic references, research experience].
Rojas-Hernández et al. (2021)	68 undergraduate students.	26-item questionnaire [design of a project profile, information collection, and analysis and interpretation of information].
Vera-Rivero et al. (2021)	148 undergraduate students, 52.1% male.	9-item questionnaire.

Authors	Sample	Instruments
Guerra et al. (2023)	289 undergraduate students, 67.5% women.	Questionnaire, 6 items, factors [formulation, academic writing, validation, sampling, statistical analysis, reference styles].
Romaniuk et al. (2023)	84 undergraduate students.	Questionnaire.
Romero et al. (2022)	103 undergraduate students.	Questionnaire of 23 items [basic, technical, specialized].
Duche-Pérez & Paredes (2022)	53 undergraduate students, 66% women.	A questionnaire of 26 items was used [technical-instrumental competence CTI, scientific-intellectual competence CCI, HT work habits, personal qualities CP].
Ocaña-Fernández et al. (2022)	303 students.	Investigative Skills Scale [capacidad investigativa de indagación reflexiva CIIR, capacidad investigativa de conceptualización genérica CICG, capacidades cognitivas investigativas concretas CICC, capacidades de investigación de construcción cognitiva activa CICCA].
Kaur et al. (2023)	236 undergraduate students.	Questionnaire of 52 items.
Vitor et al. (2023)	236 undergraduate students.	Research Competence Assessment Scale of 47 items [methodological competencies, generic competencies].
Ipanaqué-Zapata et al. (2023)	1598 students, 70.53% women.	Instrument for self-perception of research skills of 8 items.
Núñez et al. (2020)	384 graduate students.	Questionnaire of 26 items [search for information, technological mastery in software, methodological mastery, attitudinal mastery].
Veytia et al. (2019)	218 graduate students, 50% women.	Questionnaire of 26 items [inquiring, organizational, analytical, collaborative, communicative, critical-reflective].
Ilyashenko (2019)	Not specified	Questionnaire [knowledge of the components of scientific research, knowledge of the types of scientific research, ability to develop a scientific research proposal, ability to conduct and report on scientific research].
Cardoso & Cerecedo (2019)	124 graduate students.	Questionnaire [research design, instrumental, personal, management for dissemination].
Alfonso et al. (2021)	78 undergraduate students.	Questionnaire.
Oседа, Lavado, Chang & Carhuachuco (2021)	155 undergraduate students.	Questionnaire.
Mendioroz et al. (2022)	208 graduate students.	Questionnaire of 22 items [Comprehensive, critical, creative, metacognitive].
Rueda et al. (2022)	88 undergraduate students, 56.82% women.	27-item questionnaire [knowledge of the scientific research process, research skills, attitudes, and values].
Alvarez-Ochoa, Cabrera-Berrezueta & Mena-Clerque (2022)	296 students. Undergraduate, Medicine	Questionnaire [cognitive, attitudinal, procedural, communicative, professional competencies].
Núñez (2019)	50 undergraduate students, 79% women.	Questionnaire of 36 items [statement of the problem and theoretical bases, materials and methods, tools and means, skills necessary for research, evidence or results of study].
Ayala (2020)	88 undergraduate students.	Questionnaire of 27 items.
Torres et al. (2019)	384 students.	Research skills questionnaire.

Table 1. Characteristics of systematized articles

3.3. Level of Research Competencies in University Students

According to Table 2, it was found that research competencies registered an average of 46.91% of high level, which implies that students have developed skills to search, select, and describe information. Similarly, on average, 50.12% have developed research competencies moderately, and 33.54%, on average, have a low level of competencies for the development of projects, insufficient knowledge for the dissemination of results, research design, and the application of instruments (Cardoso & Cerecedo, 2019). In addition, on many occasions, the student is not aware of the lack of development of research skills for their training (Mendioroz et al., 2022).

At the specific level, it was found that cognitive competencies have been moderately developed, where research processes, the formulation of problems, objectives, and hypotheses were the ones that have had the highest participation. Similarly, the technological mastery over the use of software, ICTs, and other technologies registered a moderately developed level, which is similar to the ability to search for information, where students reported that they developed their skills in the use of catalogs, books, and bibliographic records in an adequate and moderately adequate way. However, a greater number of deficiencies have been witnessed in the level of methodological mastery, mainly in the process of selecting samples, instruments, and/or tools for obtaining data, which, added to the process of processing for the realization of results, 69% register a limited capacity to carry out and report scientific research (Ilyashenko, 2019). Similar to these results, bibliographic management continues to be a barrier to developing research competencies because students do not know the citation of styles, despite its growing dissemination or application of bibliographic managers, which is recorded above 50%. In this way, a greater doubt arises about its capacity for disseminating and employing ethical criteria and values for distributing information.

3.4 Variables Correlated to Research Competencies

Research competencies are mainly related to social factors such as age, sex, type, degree of study, and academic training (Nolazco-Labajos et al., 2022; Ocaña-Fernández et al., 2022; Romaniuk et al., 2023). Another variable is digital skills, which provide various names, such as the use of technological tools or technological literacy (Oseda et al., 2021; Torres et al., 2019; Veytia et al., 2019). Likewise, the attitude towards research (Díaz & Cardoza, 2021; Duche-Pérez & Paredes, 2022), motivational factors (Vitor et al., 2023), didactic strategies, informational skills, work habits, and systematization with professional practice.

Authors	Research skills	Related variables
Nolazco-Labajos et al. (2022)	52% have not developed it.	Sex, age, and type of master's degree [$\chi^2 = 5.85, 14.83, 14.01; p < .05$].
Riveros, Cayllahua, Sangama, Choquetico & Quispe (2022)	43.5% high level, 42.3% basic, .8% low, and 13% superior.	-
Díaz & Cardoza (2021)	Master's degree students have deficiencies in their research skills.	Investigative attitudes at the cognitive, affective, and behavioral levels [$p < .50; r = .61, .73, .82$].
Rojas-Hernández et al. (2021)	Adequate mastery of research skills.	-
Vera-Rivero et al. (2021)	Increasing adequate and moderately adequate levels.	-
Guerra et al. (2023)	42% have not developed research skills, 42% are in process, and 16% have developed them.	Systematization of professional practices [$p = .000, rho = .41$].
Romaniuk et al. (2023)	In the first year, research skills were 52.8% low, 45.9% medium, and 1.3% high; in the second year, they were 62.9% medium, and in the third year, they were 45% medium.	Year of study.

Authors	Research skills	Related variables
Romero et al. (2022)	58% of medium level, 36.5% low and 5.50% high.	-
Duche-Pérez & Paredes (2022)	There is no homogeneous level of competencies, skills, or knowledge related to research, and the use of ICTs for research is markedly deficient.	ICTs and CCI are related to HT and PC in university students and contribute to developing research competencies.
Ocaña-Fernández et al. (2022)	Research skills are not homogeneous. 32.3% identify to a greater extent with reflective inquiry.	Academic training processes.
Kaur et al. (2023)	37% felt that they had the necessary research skills.	-
Vitor et al. (2023)	87.5% high level.	Motivational factors were high [$p = .00$; $\rho = .85$].
Ipanaqué-Zapata et al. (2023)	34.2% of low level, 35% medium and 30.7% high.	-
Núñez et al. (2020)	62% were adequate, and 38% were inadequate.	Social Competencies and Cooperative Work [$p < .05$].
Veytia et al. (2019)	The frequency of using technological tools and the search and selection of information through digital channels has been highlighted.	-
Ilyashenko (2019)	About 60% acceptable level and 30% advanced level.	-
Cardoso & Cerecedo (2019)	There has been insufficient development in dissemination, research design, and instruments.	-
Alfonso et al. (2021)	The level was 78.2% high, 19.2% medium, and 2.6% low.	-
Oseda et al. (2021).	The level was 63.01% good, 28.8% medium and 15.07% very good.	Digital competencies [$p = .00$; $r = .89$].
Mendioroz et al. (2022)	The student is unaware of the lack of training in research skills.	-
Rueda et al. (2022)	It was 55.30% low, 36.05% medium, and 8.64% high.	-
Alvarez-Ochoa et al. (2022)	The most favorable research competencies are selecting the methodological design, sample design, information collection techniques, data analysis, and dissemination of results.	-
Núñez (2019)	The level was intermediate.	Strategies that teachers apply.
Ayala (2020)	77.3% of the regular level was registered.	Information competencies [$p = .004$; $\rho = .30$].
Torres et al. (2019)	56.9% were at medium level, 20.4% low and 22.7% high.	Technological literacy, access to and use information, communication and collaboration, digital citizenship, creativity, and innovation [$p < .05$].

Table 2. Results found from the systematization

3.5. Dimensionality of Research Competencies

After analyzing the results of the 25 systematized articles, Figure 3 shows the structuring of research competence, which is defined as the set of skills, knowledge, and abilities that range from the effective application of technological tools and the management of databases and *software* to the internalization of ethical values in the context of research. They are not only limited to the mastery of technical tools but also encompass a broad and conscious approach toward searching for and applying scientific knowledge to solve problems. Three dimensions have been proposed; the first is the **cognitive dimension**, which refers to the entire set of knowledge, skills, and abilities available to the student to search for information, theoretically analyze the contents, discern the methodology to be used, the presentation of the results, the mastery of the bibliography (APA, ISO, Vancouver, etc.), together with the dissemination process.

In the same way, the technological dimension is described, where the mastery of the various statistical packages or *software* to process information (descriptive and inferential) is proposed, having skills for the design of presentations to organize the information that is sought to be explained, as well as the mastery of the various bibliographic managers (*EndNote*, *Mendeley*, *Zotero*, etc.). The **attitudinal dimension** was considered, which is understood as the degree of interest that the individual has in developing a research project, the practice of values, and ethics so that the information is reliable.



Figure 3. Design of the Dimensions of Research Competencies

4. Discussion

The SR on RCs in university students reveals significant findings that contribute to understanding the level of development of these skills. These competencies are fundamental in professional practice, problem-solving, and the development of science in combination with practice and theory (Arzuaga, Cabrera & Alvarez, 2023), representing a significant challenge in higher education (López & García, 2022).

Twenty-five studies in this SR reflect a wide variety of approaches and contexts, with a predominance of research in Latin American countries such as Peru and Ecuador. This is in line with what was proposed by Torres and Manchego (2023), who identified a greater number of studies on RC in Ibero-America in response to the regulatory framework of higher education. In this sense, students are required to acquire theoretical knowledge and master research activities such as searching, selecting, organizing, and analyzing information. This allows them to be more competitive (Garro-Aburto, Romero-Vela, Majo-Marrufo, Alcas-Zapata & Guerra-Reyes, 2022), develop the ability to solve problems, research, and generate new productive knowledge (Nancy, Héctor, Ulises, Rosa & Milagros, 2023).

Most of the RCs have been measured in undergraduate students, as they are in the training stage, unlike postgraduate students, who have a greater mastery of scientific competencies due to the frequency of research practice and the rigor of their academic work (Emelyanova & Teplyakova, 2022; Zambrano-Sandoval & Chacón, 2021). However, some studies contradict this statement, indicating that graduate students have deficiencies in their research skills and, in many cases, are not aware of it (Cardoso & Cerecedo, 2019; Díaz & Cardoza, 2021; Mendioroz et al., 2022; Nolazco-Labajos et al., 2022).

One of the most questioned aspects in measuring research competencies is using instruments since 80% of the studies reviewed used tools designed within their research. Although this represents a valuable contribution, these instruments lack sufficient psychometric robustness to be applied in other contexts. It is crucial to emphasize the validation of these instruments through exploratory and confirmatory factor analyses (EFA, CFA) to improve their reliability and validity (Stanick, Halko, Mettert, Dorsey, Moullin, Weiner et al., 2021). This is especially relevant considering that the data obtained from these studies are key to the development of educational programs aimed at improving the quality of higher education.

The proportion of students with a high level of research competencies reaches an average of 47%, which is consistent with previous research that indicates that a significant part of university students develop advanced research skills (Alfonso et al., 2021; Ilyashenko, 2019; Kaur et al., 2023; Núñez et al., 2020; Oseda et al., 2021; Vera-Rivero et al., 2021; Vitor et al., 2023). However, about 50% have a medium level, and approximately a third show deficiencies, which underscores the need for improvement strategies based not only on theoretical knowledge but also on applied research (Confraria & Vargas, 2019; Falavigna, Filho, Avila, Guyot, Gonzáles & Riew, 2015; Vicente, Triana & Vasquez, 2021).

The analysis of the social factors associated with research competencies indicates that age, sex, type of institution, degree of study, and academic training influence students' willingness and ability to engage in research. For example, age differences may be related to maturity levels and commitment to research, while gender differences may influence participation in specific fields of study. In addition, the type of institution and academic background can determine the opportunities and resources available to develop these competencies (Madhubhashini, 2022).

The impact of digital skills on research is becoming increasingly evident. Students with advanced technological skills have an advantage in data search, collection, and analysis (Oseda et al., 2021; Torres et al., 2019; Veytia et al., 2019). Likewise, a positive attitude toward research and intrinsic motivation is crucial for developing research competencies. Students with genuine research interests tend to devote more time and effort to strengthening their skills (Díaz & Cardoza, 2021; Duche-Pérez & Paredes, 2022; Vitor et al., 2023).

Using didactic strategies aligned with professional practice highlights the importance of a holistic approach in research training. Pedagogical approaches that encourage application in real contexts and interaction with the professional world can significantly improve the transfer of research skills. In this sense, the need to develop specific tools to measure these competencies has been identified, structuring them into three main dimensions: cognitive, technological, and attitudinal (Castro-Rodríguez, 2021b; Chen, Huang, Castro & Tang, 2021).

Despite its contributions, this SR presents methodological limitations, such as the temporal restriction of the study (2019-2023) and the search for literature only in English and Spanish. However, this risk was mitigated by appropriate search equations. The results obtained reinforce the need to continue strengthening research competencies in university students. While progress has been made in their formation, areas for improvement still need to be addressed to ensure robust and rigorous research. As a future implication, it is recommended that universities integrate research into their academic programs not only as a subject but as part of a comprehensive approach to professional development. In addition, it is suggested that future research longitudinally assess the impact of research competencies on professional performance and develop more robust and psychometrically validated measurement instruments to improve the understanding of their progress in different regions.

5. Conclusions

In summary, 2999 documents were identified in four databases. After several stages of review (titles, abstracts, and access to full text), the sample was reduced to 52 eligible documents, of which only 25 were systematized. Most of the articles come from Latin American countries, mainly Peru and Ecuador, and the sample included 6002 participants, mostly women (56.76%), distributed in undergraduate (56%) and

graduate (24%) academic levels. 80% of the researchers assessed research competencies using their own instruments, which showed adequate levels of reliability, using measures such as Cronbach's alpha, ordinal alpha, and McDonald's omega, validated through expert judgment and exploratory analyses.

The results indicated that about 47% of the students had high research skills. In comparison, approximately 50% showed an intermediate development and 34% a low level, which suggests areas for improvement in the search, selection, and description of information, as well as in the dissemination of results and research design. Cognitive competencies, such as problem and goal formulation and technological skills, showed moderate development. However, deficiencies were evident in methodological skills, such as sample selection, data processing, bibliography management, and knowledge of citation rules.

Finally, several factors related to research competencies were identified, including social variables such as age, gender, type, level of study, digital competencies, attitude toward research, motivational factors, and didactic strategies. This study provides a comprehensive view of the research competencies of students from different countries and academic levels, highlighting both strengths and weaknesses in developing these skills, which offers key information for improving research training and practice in academic environments.

Declaration of Conflicting Interests

The authors stated that they had no potential conflicts of interest regarding the research, authorship, and/or publication of this article.

Funding

The authors did not receive financial support for the research.

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Journal of Technology and Science Education, 2025 (www.jotse.org)



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