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Scientific production in Scopus on research skills in university students. A systematic review

Producción científica en Scopus sobre competencias investigativas en estudiantes universitarios. Una revisión sistemática

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Abstract

Interest in the research skills of university students has experienced a notable increase, reflected in the growth of scientific publications, which have great methodological diversity and are developed in various training contexts, which is why a panoramic view of these publications becomes imperative. Therefore, this study aims to characterize the scientific production in Scopus on research competencies in university students. For these purposes, the PRISMA Declaration was followed. Using Boolean descriptors and operators, a literature search was carried out that allowed 690 documents to be identified and after applying inclusion and exclusion criteria, 25 scientific articles were chosen for the study. As results of the review, it is highlighted that 72% of the articles correspond to the quantitative approach, 56% were written in English, 44% were carried out in Peru and the majority of the studies, the research competencies are addressed from the self-perception of the student. In conclusion, the works studied show various levels of achievement of investigative skills and constitute valuable inputs for carrying out new and necessary research.

Keywords: Higher education, research competencies, research skills, university students, systematic literature review

Resumen

El interés en las competencias investigativas del estudiantado universitario ha experimentado un notorio aumento, reflejado en el crecimiento de publicaciones científicas, las cuales tienen una gran diversidad metodológica y se desarrollan en variados contextos formativos; por esta razón, se vuelve imperativo una mirada panorámica de estas publicaciones. Este estudio tuvo como finalidad caracterizar la producción científica en Scopus sobre competencias investigativas en estudiantes universitarios. Para estos fines, se siguió la Declaración PRISMA. A partir de descriptores y operadores booleanos se realizó una búsqueda de literatura que permitió identificar 690 documentos y luego de la aplicación de criterios de inclusión y exclusión se eligieron 25 artículos científicos para el estudio. Como resultados de la revisión se destacó que el 72% de los artículos corresponden al enfoque cuantitativo, un 56% fueron escritos en inglés, el 44% se realizaron en el Perú y en la mayoría de los estudios las competencias investigativas se abordaron desde la autopercepción del estudiante. En conclusión, los trabajos estudiados mostraron diversos niveles de logro de las competencias investigativas y constituyeron valiosos insumos para la realización de nuevas y necesarias investigaciones.

Palabras clave : educación superior, competencias investigativas, habilidades investigativas, estudiantes universitarios, revisión sistemática de literatura

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Introduction

Currently, the research competencies of university students are fundamental to their academic and professional development. These competencies allow students to develop critical, creative, and reflective skills necessary to address complex problems and generate new knowledge. In a knowledge-based society, universities play a crucial role in training professionals capable of researching and applying innovative solutions in their fields. Therefore, the development of research competencies is essential not only for students' academic success but also for their ability to contribute significantly to society and the global labor market.

The research competencies of university students have been the subject of study and debate worldwide because, in a knowledge society, science and technology play a special role in the development of nations and in the productivity of organizations. From this perspective, universities are expected to generate scientific and technological knowledge through scientific research while also training professionals prepared to act with scientific judgment in their respective fields (Guerra et al., 2023; Gussen et al., 2023; Campos et al., 2022). In this context, society demands professionals who perform creatively, critically, reflectively, and systematically to positively impact and transform reality from its complexity and dynamism. To achieve this, universities must strengthen the development of so-called research competencies in their academic programs.

In this sense, the term competency is polysemous. In the educational field, it refers to the individual capacity that enables a subject to act with the necessary skill and expertise to meet a specific demand. Research competency refers to a set of essential knowledge, attitudes, and behaviors required to carry out successful research (García and Aznar, 2019; Knyazyan and Mushynska, 2019; Wessels et al., 2018). There are various classifications of research competencies. For example, Zarraga and Cerpa (2023) distinguish between basic research competencies related to the systematization of data and information generated from the formulation of a research project, and advanced research competencies, which involve processes of linking theory with practice from a holistic and ethical perspective, with commitment and social responsibility. Sánchez and Rodríguez (2023) refer to competencies for problematizing reality through the observation of events or phenomena and their subsequent study; competencies for theorizing reality, aimed at testing existing theories or constructing new theories based on reliable sources; and competencies for verifying reality, by contrasting the problematic reality with previously existing theories.

Research competencies have cognitive, metacognitive, motivational, and personal components that make it possible to carry out each stage of the scientific research process, including skills such as teamwork, the use of technologies in research, and good interpersonal relationships (Rubio et al., 2018). These competencies involve a set of intellectual processes where perception, comprehension, and interpretation are particularly important, without neglecting practice, which is inevitably connected to theory (Infante, 2021). Research competencies energize the scientist's mindset as they are expressed in capabilities such as the efficient and optimal management of scientific literature, identifying and addressing research problems, designing the methodology, selecting techniques and instruments, testing hypotheses, and communicating research results.

Indeed, research competencies are implicit in the generic competencies agreed upon in the Tuning Project and are highly valued in higher education today. However, weaknesses have been identified in universities regarding the development of these competencies in both undergraduate and graduate education (Zarraga and Cerpa, 2023). As an attempt to address the issue, teaching initiatives such as formative research, research seedbeds, methodological coaching, and teaching-learning of research through interactive technological tools, gamification, and even the use of social networks have emerged. These initiatives for teaching and learning research competencies are carried out from various paradigms, theories, approaches, and models of educational thinking, in synergy with the worldviews of the context.

This growing interest in research competencies is reflected in the increase of scientific publications on this topic in the university setting, written from multiple methodological perspectives and various training contexts. Therefore, it is useful and necessary to have a panoramic view of the main publications in Scopus, a platform that is the largest database with a vast number of journals, and whose relevance is indisputable in the academic field. For this reason, the study aimed to characterize the scientific production in Scopus on research competencies in university students.

Methodology

This study started with the research question: What are the most significant characteristics of the scientific production published in Scopus regarding research competences in university students between 2023 and 2019?

To answer this question, a systematic literature review was carried out, following the protocol outlined in the PRISMA Declaration [The Preferred Reporting Items for Systematic Reviews and Meta-Analysis] (Moher et al., 2015), which constitutes a strategy for the collection, review, and systematic analysis of scientific literature used when there is a need to study and organize the findings of research on a specific topic in a synthetic manner to ensure its systematicity, quality, and replicability. Additionally, a four-phase framework for systematic literature review was used, which for the purposes of this study is presented below in *Figure 1*.

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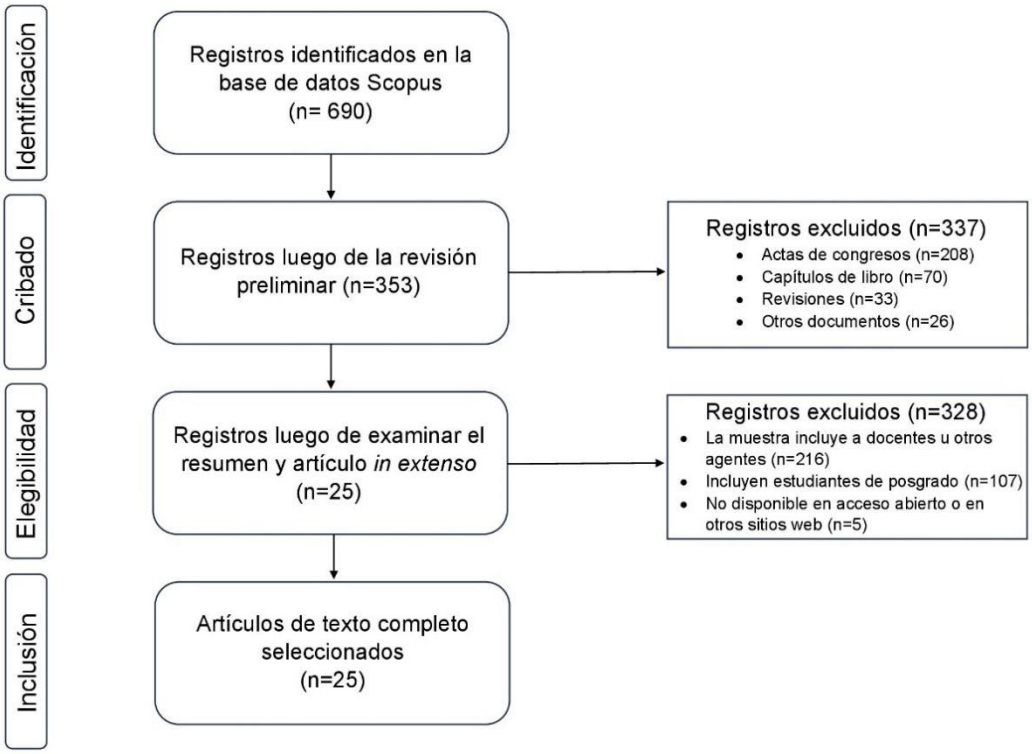
Figure 1

Phases of the Systematic Literature Review.



Regarding the Identification stage, the literature search in the Scopus database was carried out in January 2024. The descriptors or terms used were: “Research competences,” “Competence for research,” “Competence towards research,” “Investigative capacities,” “Capacities for research,” “Investigative skills,” “Research skills.” These terms were combined with Boolean operators (OR, AND) and terms that directed the search toward studies conducted on university students: “University Student,” “College Student,” “University,” “College.” Following successive searches by each author separately, and after eliminating duplicate works, a total of 690 documents were obtained.

During the Screening stage, the title and summary of the 690 identified records were examined, excluding documents that were not articles published in journals, such as book chapters, reviews, conference proceedings, and others. In this stage, 337 records were excluded, leaving 353 eligible articles. The selection of articles in this study was made based on pre-established inclusion and exclusion criteria, which are detailed in *Table 1*.

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Table 1

Inclusion and Exclusion Criteria.

Criterion	Inclusion	Exclusion
Educational Level	Studies conducted in the context of higher education	Estudios realizados en el contexto de la educación inicial, primaria, secundaria o técnica
Article Focus	That includes research competences in university students as one of its variables or study categories	That does not include research competences in university students as one of its variables or study categories
Type of Publication	Original research articles	Capítulos de libro, revisiones, actas de congresos, notas
Study Units	University students	University teachers and researchers, other agents.

In the Eligibility stage, the abstract and full text of the 353 records were reviewed preliminarily to verify that the studies were conducted in the context of higher education, that they included research competences as one of their variables or study categories, and that the study unit or subjects were university students. Five of the works were not available in full text, nor could they be obtained from other websites, so they had to be discarded. In this stage, 328 records were excluded, and 25 articles were selected, which were independently reviewed by each author to minimize the potential for bias.

For the Inclusion stage, the full text of the 25 articles was reviewed and then consolidated into a database created in Excel, considering the following attributes: manuscript title, author(s), journal name, quartile, country of publication, country of the study, publication language, research focus and design, sample size, educational setting, and findings regarding research competences.

Results

The results and discussion of this systematic literature review were presented in two sections. The first section focused on the bibliometric and methodological traits of the scientific production in Scopus regarding research competencies in university education. In the second section, the findings of the reviewed articles were analyzed.

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3.1. Bibliometric and Methodological Traits of the Scientific Production Published in Scopus

The list of the 25 articles included in the systematic literature review, containing the code, citation, country where the study was conducted, research approach, and article language, is presented in *Table 2*.

Table 2

List of Articles Included in the Systematic Literature Review.

Code	Citation	Country of Study	Language	Approach
1	Zarraga-Barreno et al. (2023)	Chile	Spanish	Qualitative
2	Ipanaqué-Zapata et al. (2023)	Peru	English	Quantitative
3	Guerra et al. (2023)	Peru	English	Quantitative
4	Gussen et al. (2023)	Germany	English	Quantitative
5	Enriquez et al. (2023)	Peru	English	Quantitative
6	Romaniuk et al. (2023)	Ukraine	English	Quantitative
7	Sánchez and Rodríguez (2023)	Peru	Spanish	Qualitative
8	Campos-Ugaz et al. (2022)	Peru	English	Quantitative
9	Ciraso-Calí et al. (2022)	Spain	English	Quantitative
10	Estrada et al. (2022)	Cuba	Spanish	Qualitative
11	Zapata (2022)	Peru	Spanish	Quantitative
12	Chávez et al. (2022)	Peru	Spanish	Qualitative
13	Díaz and Cardoza (2021)	Peru	Spanish	Quantitative
14	Garay-Argandona et al. (2021)	Peru	English	Quantitative
15	Vera-Rivero et al. (2021)	Cuba	Spanish	Quantitative
16	Rodríguez-Vargas et al. (2020)	Peru	English	Quantitative
17	Prosekov et al. (2020)	Russia	English	Mixed
18	Galustyan et al. (2020)	Russia	English	Quantitative
19	Sokolova and Gilmutdinova (2019)	Russia	English	Quantitative
20	García-Gutiérrez and Aznar-Díaz (2019)	Colombia	Spanish	Mixed
21	Bucheli et al. (2019)	Argentina and others	Spanish	Quantitative
22	Cardoso and Cerecedo (2019)	Mexico	Spanish	Quantitative
23	Knyazyan and Mushynska (2019)	Ukraine	English	Mixed
24	Alfaro-Mendives and Estrada-Cuzcano (2019)	Peru	Spanish	Quantitative
25	Poh and Kanesan (2019)	Malaysia	English	Quantitative

Regarding the publication dates of the included studies, seven were published in 2023 (28%), five in 2022 (20%), three in 2021 (12%), three in 2020 (12%), and seven in 2019 (28%). There is a clear increase in publications in 2023 and a decline during the COVID-19 pandemic, a period when university academic activities were forced to transition to virtual formats due to health regulations.

Eleven of the studies that met the inclusion and exclusion criteria were conducted in Peru (44%), three in Russia (12%), two in Ukraine (8%), two in Cuba (8%), one in Spain, Chile, Germany, Colombia, Mexico, and Malaysia. Notably, the work by Bucheli et al. (2019) was carried out in Argentina, Colombia, Cuba, Spain, Mexico, Peru, Puerto Rico, Uruguay, Venezuela, Chile, Nicaragua, Panama, El Salvador, Ecuador, Costa Rica, Bolivia, and Paraguay.

It is important to mention the significant number of studies conducted in Peru on research competencies in university students. This can be attributed to the accreditation and licensing processes promoted by the Ministry of Education of Peru, which has fostered growing interest among universities and academic staff to consolidate a research system that meets international standards. It is also notable that many studies have been carried out in developing countries, which could be seen as an indicator of the importance being placed on research as a driver of science and technology in these nations.

Regarding the original language of the reviewed articles, fourteen were published in English (56%), while eleven were in Spanish (44%), which is a significant percentage, considering that the majority of mainstream literature is published in English. Seventy-two percent of the studies included in this review were published in journals ranked in Q2 and Q3 quartiles, two studies were published in Q4 journals (8%), one study in a Q1 source, and four studies, while indexed in Scopus, were published in journals without an assigned quartile.

The studies included in this systematic literature review on research competencies in university students were predominantly quantitative (72%), with only four studies adopting a qualitative approach (16%) and three employing a mixed research approach (12%). This shows a preference for quantitative studies aimed at exploring the relationship or degree of association between two or more variables or phenomena in a given context (Hernández and Torres, 2018).

Among the studies using a quantitative approach, there was diversity in the research designs. Ipanaqué et al. (2023), Romaniuk et al. (2023), Campos et al. (2022), and Galustyan et al. (2020) used experimental designs, particularly excelling in the controlled evaluation of variables. Gussen et al. (2023) and Rodríguez et al. (2020) opted for quasi-experimental designs, with the latter being longitudinal and prospective, offering a more dynamic understanding over time. Zapata (2022) and Alfaro and Estrada (2019) used pre-experimental designs focused on the preliminary evaluation of effects. In the non-experimental domain, Enriquez et al. (2023) and Poh and Kanesan (2019) conducted correlational studies to explore associations between variables. Other studies, such as those by Mamytbayeva et al. (2022), Ciraso et al. (2022), Prosekov et al. (2020), and Knyazyan and Mushynska (2019), employed descriptive approaches, while Bucheli et al. (2019) conducted a cross-sectional, descriptive study, and Cardoso and Cerecedo (2019) used an exploratory-descriptive approach. Díaz and Cardoza (2021) and Vera et al. (2021) used descriptive observational designs, providing detailed data on the studied variables.

For the collection of quantitative data, the most commonly used instrument was the questionnaire (48%), followed by scales (20%), and less commonly checklists and rubrics. Some examples of the measurement instruments used include: Investigative Skills Scale (Ipanaqué et al., 2023), Research Skills Assessment Questionnaire (Guerra et al., 2023), Socio-formative Rubric for Assessing

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Research Competencies (Campos et al., 2022), Böttcher and Thiel's Questionnaire (Ciraso et al., 2022), Self-assessment of Research Skills Scale (Díaz and Cardoza, 2021), Research Competency Questionnaire (Garay et al., 2021), and Research Skills Measurement Questionnaire (Rodríguez et al., 2020).

These quantitative studies incorporated a wide variety of data analysis procedures, with the common denominator being the use of tests to determine the reliability of the instruments. One or more statistical tests were used, including descriptive statistics, exploratory factor analysis, and, to a lesser extent, other inferential tests such as Pearson's Chi-square, ANOVA, Student's t-test, Wilcoxon test, among others.

On the other hand, although less numerous, the qualitative studies provided deep and contextual approaches. Zarraga and Cerpa (2023) used a phenomenological design to explore the lived experiences of participants, allowing for a rich and detailed understanding of the perceptions and meanings attributed. Likewise, Sánchez and Rodríguez (2023) and Chávez et al. (2022) adopted the action-research methodology, a strategy that allows researchers and participants to collaborate actively in the research process to address practical issues and improve practices. Furthermore, Estrada et al. (2022) implemented a case study, providing a comprehensive understanding of a specific phenomenon within its real context, which is invaluable for deepening knowledge in particular situations.

Regarding the studies with a mixed approach, these combined qualitative and quantitative methodologies to provide a more comprehensive view of the research competencies in university students. Guerra et al. (2023) integrated a qualitative descriptive analysis with a quasi-experimental design, allowing both detailed description of relationships between variables and controlled experimentation to validate the findings. Similarly, García and Aznar (2019) employed a design that integrates qualitative and quantitative data, providing a holistic perspective and a triangulation of data that strengthens the validity and reliability of the results obtained. This combination of methodological approaches allows research competencies to be addressed from multiple perspectives, enriching the understanding and providing a more robust and complete analysis.

Regarding the sample sizes considered in each study on research competencies in university students, whether qualitative, quantitative, or mixed, ten studies have configured samples ranging between 50 and 149 students (40%), seven studies have samples between 150 and 999 students, five studies have samples of fewer than 49 students (20%), and three studies were conducted with samples of more than 1,000 students. This indicates that, in the majority, researchers sought results that were more generalizable and credible.

3.2. Findings in the Scientific Production Published in Scopus

The analysis of findings from the scientific productions indexed in Scopus in this systematic review had as its starting point the necessary clarification of the terminology underlying each work regarding research competencies, since some used the term "research competencies" and other groups of authors used "research skills."

Regarding the term "research competencies," it is used by Zarraga and Cerpa (2023), Gussen et al. (2023), Enriquez et al. (2023), Sánchez and Rodríguez (2023), Campos et al. (2022), Zapata (2022), Chávez et al. (2022), Garay et al. (2021), Prosekov et al. (2020), Galustyan et al. (2020), García and Aznar (2019), Bucheli et al. (2019), Cardoso and Cerecedo (2019), Knyazyan and Mushynska (2019). The term "competence" comes from the Latin competens, which means "to be capable of," and in the educational field, it refers to complex abilities that allow students to think and act in various areas. Research competencies, then, are comprehensive actions that enable the identification, interpretation, argumentation, and resolution of problems within a given context in an appropriate and ethical manner, considering the "know-how, know-do, and know-know" (Tobón et al., 2010). In studies that used the term "research competencies," this conception is essentially underlying.

Considering the reviewed studies, research competencies are capabilities that enable an individual to employ scientific knowledge to identify problems, acquire new knowledge, explain scientific phenomena, and draw conclusions (Chávez et al., 2022). They are oriented to identify, formulate, question, plan, develop, lead, execute, and report the results of a research project (Garay et al., 2021). They include analytical, forecasting, reflective, and communicative skills for the development of research (Campos et al., 2022; Knyazyan and Mushynska, 2019), involving cognitive components, metacognitive elements, motivation, and social and professional experience of the individual (Cardoso and Cerecedo, 2019), as well as processes like critical thinking and ethical reasoning (Gussen et al., 2023; Galustyan et al., 2020), and personal qualities (Prosekov et al., 2020; Cardoso and Cerecedo, 2019).

Research competencies involve the mobilization of conceptual, procedural, and attitudinal knowledge to address the challenges they encounter (Bucheli et al., 2019), based on ethical principles, social commitment, and scientific responsibility (Zarraga and Cerpa et al., 2023). They are a transversal component of any career (García and Aznar, 2019), crucial for successful professional performance (Enriquez et al., 2023), and essential for contributing effectively to the development of society (Sánchez and Rodríguez, 2023). Furthermore, the use of digital tools to efficiently and swiftly manage research processes is important (Zapata, 2022).

Regarding the term "research skills," it is used by Ipanaqué et al. (2023), Guerra et al. (2023), Romaniuk et al. (2023), Ciraso et al. (2022), Estrada et al. (2022), Díaz and Cardoza (2021), Vera et al. (2021), Rodríguez et al. (2020), Sokolova and Gilmutdinova (2019), Alfaro and Estrada (2019), and Poh and Kanesan (2019). The terms "research competencies" and "research skills" are being used as synonyms, although the term "skill" comes from the Latin *habilis*, meaning "capable of holding, moving, or handling with ease." Skills are structures of thought that allow for the assimilation, conservation, recall, application, and extrapolation of knowledge, transforming into actions that meet theoretical or practical requirements.

In the works included in this systematic review, research skills constitute a set of abilities to use theoretical knowledge in order to introduce innovations that solve practical problems (Romaniuk et al., 2023) through the research process (Ipanaqué et al., 2023). Research skills make it possible to use the scientific method and apply it in various professional or academic contexts (Estrada et al., 2022; Ciraso et al., 2022; Díaz & Cardoza, 2021) through research projects (Vera et al., 2021; Alfaro

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& Estrada, 2019) with proficiency and ethics (Rodríguez et al., 2020). They involve analysis and reflection by students (Guerra et al., 2023), as well as the ability to learn and adapt, the capacity to formulate a research problem, the ability to analyze and master sophisticated computer tools, and the ability to work in an interdisciplinary environment (Sokolova & Gilmutdinova, 2019). Research skills are closely linked to self-efficacy in research, which is a perception of one's ability to conduct research, ranging from methodological design to the execution of the study and its subsequent publication (Poh & Kanesan, 2019).

Research competencies, sometimes referred to as research skills, can be categorized into generic ones, related to interpersonal or human qualities, and technical ones, associated with specific capabilities to carry out research. Each study has broken down these research competencies into dimensions, providing detailed information on how the specificity of these constructs is understood in each study. *Table 3* outlines the dimensions considered in each article reviewed.

Table 3

Dimensions of Research Competencies and Research Skills

Research Competencies		Research Skills	
Artículo	**Dimensiones**	**Artículo**	**Dimensiones**
Zarraga-Barreno et al. (2023)	Conception of competencies and research training Research competencies acquired in the training process Perception of the teacher's role in teaching-research competencies Difficulties in developing research competencies Educational demands for the development of research competencies	Ipanaqué-Zapata et al. (2023)	Use of catalogs Formulation of a scientific problem Selection of the population and sample Development and application of methods Analysis and processing of information Interpretation and discussion of results Preparation of conclusions and recommendations Writing the final thesis report
Gussen et al. (2023)	Affective-motivational domain Joy in conducting research Interest related to the value of research Perceived benefits of research for practice. Cognitive domain Ability to review the state of research Methodological competencies Ability to reflect on research results	Guerra et al. (2023)	Discourse management for constructing an academic text Formulation of the problem, objectives, and hypothesis Use of statistical methods for instrument validity Statistical data analysis APA style management
Enriquez et al. (2023)	General aspects and approach to the problem Theoretical framework and hypothesis Methodology Results, conclusions, recommendations, and bibliography	Romaniuk et al. (2023)	Formulation of objectives, hypotheses, choice of methods Building theoretical foundations, systematization of scientific information, and data collection Consultation with experts Argumentation Generalization of results Presentation of new research results Self-evaluation of results

Sánchez y Rodríguez (2023)	Basic competencies Skills in information searching and processing Methodological competencies Attitudinal competencies
Campos-Ugaz et al. (2022)	Problematization Theorization Verification of reality
Zapata (2022)	Research training in education Information search and registration Virtual communication and interaction Data/information collection and analysis Organization and systematization of information Dissemination and visibility of results
Chávez et al. (2022)	Cognitive competency Questioning competency Observational competency Reflective competency
Garay-Argandona et al. (2021)	Cognitive competencies Technological competencies Methodological competencies Project management competencies Teamwork competencies
Prosekov et al. (2020)	Motivational component Gnoseological component Operational component Personality component
Galustyan et al. (2020)	Motivational component Communicative component Reflective component Personal component
García-Gutiérrez y Aznar-Díaz (2019)	Ability to use observational methodology in the field Ability to analyze obtained data Relation of theory and practice Promotion of research and innovation Management of personal and professional development Reading scientific articles and literature
Bucheli et al. (2019)	Investigative competence Organizational competence Collaborative analytical competence Critical communicative competence
Cardoso y Cerecedo (2019)	Research design competencies Instrumental competencies Personal competencies Management competencies for dissemination
Ciraso-Calí et al. (2022)	Skills in reviewing the state of the art Methodological skills Reflective skills Communicative skills Knowledge of content
Estrada et al. (2022)	Correct formulation of the research question, general and specific objectives Convenient selection of theoretical foundations Creation of a glossary of terms and their interrelationship Search, process, and analyze information from various bibliographic sources
Díaz y Cardoza (2021)	Cognitive skills Technological skills Information search Building the theoretical framework Building the methodological framework Generating results Preparing references Evaluating the research experience
Vera-Rivero et al. (2021)	Use of catalogs, descriptor books, and preparation of bibliographic cards Formulation of a scientific problem, research objectives, and hypotheses Selection of the population, sample, and sampling method to use Selection, preparation, and application of methods, techniques, and instruments
Rodríguez-Vargas et al. (2020)	Cognitive dimension Procedural dimension Attitudinal dimension
Sokolova y Gilmutdinova (2019)	Ability to search for information Ability to analyze information Ability to write a scientific thesis Ability to present the thesis and engage in discussions about the topic

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Knyazyan y Mushynska (2019)	Development of the initial research base Study of theoretical information Data collection Data processing Development of the pedagogical experiment Argumentation of personal position Generalization of experimental data Forecasting research perspectives Presentation of results Publication of research results Self-evaluation
Alfaro-Mendives y Estrada-Cuzcano (2019)	Dimensions of language mastery Basic cognitive operations: knowing, observing, and questioning Social construction of knowledge Social construction of new knowledge
Poh y Kanesan (2019)	Research Self-Efficacy Research design skills Practical research skills Quantitative and computational skills Writing skills

On the other hand, it is important to note that there are studies where the approach to research competencies is done from the students' self-perception. In other studies, it is done through an external evaluation by experts, and some studies adopt both approaches. The studies that examined research competencies from self-perception are those by Zarraga and Cepar (2023), Ipanaqué et al. (2023), Guerra et al. (2023), Gussen et al. (2023), Ciraso et al. (2022), Díaz and Cardoza (2021), Garay et al. (2021), Vera et al. (2021), Rodríguez et al. (2020), Prosekov et al. (2020), Galustyan et al. (2020), García and Aznar (2019), Bucheli et al. (2019), Cardoso and Cerecedo (2019), and Poh and Kanesan (2019). Similarly, the studies that approached research competencies through evaluation by experts are those by Enriquez et al. (2023), Romaniuk et al. (2023), Campos et al. (2022), Estrada et al. (2022), Zapata (2022), Chávez et al. (2022), Sokolova and Gilmutdinova (2019), and Alfaro and Estrada (2019). The studies that consider both the students' self-perception and evaluation by experts are those by Sánchez and Rodríguez (2023) and Knyazyan and Mushynska (2019).

In the studies where the approach was from the students' self-perception regarding their research competencies, the most significant weaknesses or deficiencies identified by the authors correspond to the following aspects: perceived self-efficacy in research (Zarraga and Cerpa, 2023); use of academic databases, addressing the research topic, and statistical processing (Ipanaqué et al., 2023); limited research ability in the systematization of pre-professional practice (Guerra et al., 2023); lack of interest and low motivation to conduct research (Gussen et al., 2023); ability to review the state of the art (Ciraso et al., 2022); handling of statistical packages (Díaz and Cardoza, 2021); low methodological competencies (Garay et al., 2021); formulation of a scientific problem, objectives, and research hypotheses (Vera et al., 2021); attitude toward research (Rodríguez et al., 2020); conceptual limitations regarding the research process (Prosekov et al., 2020); self-organization, independence, self-education, self-regulation, self-determination, and self-development skills (Galustyan et al., 2020); reading skills (García and Aznar, 2019); data analysis using technological programs (Bucheli et al., 2019); preparation and publication of academic products (Cardoso and Cerecedo, 2019); and low levels of knowledge in research (Poh and Kanesan, 2019).

Regarding studies based on an external evaluation by experts, their authors identified weaknesses or deficiencies in students in the following aspects: the evaluated theses did not achieve favorable levels (Enriquez et al., 2023); low level of research skills (Romaniuk et al., 2023); insufficient understanding of the methodological, practical, and theoretical implications of research (Campos

et al., 2022); searching, processing, and analyzing information from different bibliographic sources (Estrada et al., 2022); quite incipient level of technological research competency (Zapata, 2022); students do not analyze or relate theoretical aspects to proposed situations (Chávez et al., 2022); writing of a scientific thesis (Sokolova and Gilmutdinova, 2019); and social construction of knowledge (Alfaro and Estrada, 2019). Regarding studies that approached research competencies from both the students' self-perception and an external evaluation by experts, their authors identified weaknesses in the search and processing of information (Sánchez and Rodríguez, 2023) and the development of models in the stage of pedagogical experiment formation (Knyazyan and Mushynska, 2019).

Regarding the results obtained in the reviewed articles, approached from the students' self-perception of their research competencies, Zarraga and Cepar (2023) studied the self-perception of university students on research training competencies and found that they perceive themselves as having competencies to collect and organize information, build theoretical systems, pose questions, and apply data collection techniques. Ipanaqué et al. (2023) evaluated the psychometric properties of a scale on research skills, and their results showed low ability to use databases such as Scopus or Web of Science, with the lowest research skills being problem formulation, objectives, and hypotheses. Regarding the work of Guerra et al. (2023), they studied the influence of systematizing pre-professional practice on research skills and determined that a low percentage of students considered themselves to have developed their research skills. Gussen et al. (2023) investigated the influence of a postgraduate module on the development of research competencies and found a decrease in the affective-motivational domain and an increase in the cognitive domain. Ciraso et al. (2022) studied the acquisition and development of research competencies in undergraduate education students and found a low valuation of competencies for content knowledge and review of the state of the art.

In this context, Díaz and Cardoza (2021) in their work investigated the relationship between skills and attitudes towards research in master's students and determined that there is a deficient level in the students' research skills, who assume a low and indifferent attitude towards research. Garay et al. (2021) described research competencies in postgraduate students in virtual learning environments and found that cognitive skills and teamwork abilities are the most predominant, while the weakest areas are related to technological competencies, methodological competencies, and project management. Vera et al. (2021) studied the self-assessment of research skills in teaching assistants in the Medicine program and found that third-year students mostly rated themselves at a moderately adequate level, while fourth and fifth-year students mostly rated themselves at an adequate level. Rodríguez et al. (2020) investigated the effects of applying the "researcher seedbed" pedagogical strategy on the development of research skills and found that the pedagogical strategy had a positive effect on the development of research skills. Prosekov et al. (2020) studied the level of development of research competencies and their structural components in university students, and their results show positive changes in the parameters of the components that together form the research competency, as well as an increased level of motivation.

Similarly, Galustyan et al. (2020) conducted a study on the formation of research competencies in students through mobile education, and the results showed a significant dynamic in the

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development of research competencies in the experimental group. García and Aznar (2019) studied the development of research competencies in the training of professionals in early childhood education and found a favorable evaluation from the students regarding the processes developed by the academic program to enable the development of research competencies. Bucheli et al. (2019) in their work on research competencies and technological mediation in doctoral students in Ibero-America obtained higher percentages concerning inquiry competency, mainly in relation to searching and selecting information. Cardoso and Cerecedo (2019) studied the research competencies of postgraduate students in management and found that students have an insufficient level of development in their instrumental research competencies and knowledge dissemination. Similarly, Poh and Kanesan (2019) in their research on factors influencing research self-efficacy in postgraduate students found a moderate correlation between research self-efficacy and the research training environment.

Regarding the results obtained in the reviewed articles, which addressed research competencies of university students through expert evaluations, Enriquez et al. (2023) studied the relationship between formative research and achieving skills based on undergraduate thesis in education; as a result, they found that most of the evaluated students had achieved research competencies, with a smaller proportion still in the process of achieving them. Romaniuk et al. (2023) determined the research capabilities of future family doctors using test methods and expert evaluation, and they found that the number of students with high research skills in the third year of the medical career increased significantly. Campos et al. (2022) aimed to verify the effectiveness of formative research in strengthening research competency in university students and found that the subjects faced difficulties in developing their research skills.

Similarly, Estrada et al. (2022) studied the formation of research skills in engineering students in computer science and their results show that all students had limitations in mastering research skills. Zapata (2022) aimed to determine whether the implementation of an e-research proposal strengthens the technological research competency in master's students, and found that technological research competency was indeed strengthened through formative experiences in e-research. Chávez et al. (2022) in their work on the development of research competencies in students at the Universidad Señor de Sipán found that the development of research competencies in students was a result of the intervention.

Similarly, Sokolova and Gilmutdinova (2019) researched the influence of English lessons and student scientific conferences on the development of research skills in university students and determined that English lessons, together with participation in student conferences, effectively influenced the development of research skills. Alfaro and Estrada (2019) studied the effect of the "Seedbeds in the Classroom" program on the development of research skills in Library Science students, finding that the program had a significant effect on the development of research skills in students.

Regarding the results obtained in the reviewed articles that addressed students' self-perception of their research competencies, but also included an external evaluation or expert judgment, the study by Sánchez and Rodríguez (2023) was reviewed. They aimed to implement strategies to improve research competencies in university students in virtual education and found that after

the action-research conducted, the majority of students were at a medium or low level of the research competencies investigated. The work of Knyazyan and Mushynska (2019) related to the development of research competencies of translators in Ukrainian universities was also studied. Their results determined that students generally achieved research skills in all areas, but the highest results were obtained in the aspect of studying theoretical information and data collection in the field of didactic research.

When expanding the analysis to include the international perspective, significant differences were observed in the approaches and results of studies conducted in various countries and cultural contexts. In Peru, where 44% of the studies were conducted, quantitative approaches predominated, with a strong focus on identifying weaknesses in specific competencies such as the use of academic databases, the ability to systematize pre-professional practice, and the handling of statistical software (Ipanaqué et al., 2023; Guerra et al., 2023; Díaz and Cardoza, 2021). Peruvian studies also stood out for implementing experimental and quasi-experimental designs to evaluate educational interventions, as observed in the work of Campos et al. (2022) and Rodríguez et al. (2020). In contrast, other Latin American countries like Chile, Argentina, and Colombia have addressed research competencies from more qualitative and descriptive approaches, focusing on perceived self-efficacy and the analysis of acquiring competencies through phenomenological and descriptive studies (Zarraga and Cepar, 2023; Bucheli et al., 2019).

In Europe, the studies also showed notable methodological diversity and an emphasis on the external evaluation of competencies. In Germany, for example, Gussen et al. (2023) used a quasi-experimental design to study the influence of a postgraduate module on research competencies, highlighting a decrease in the affective-motivational domain. In Ukraine, both Romaniuk et al. (2023) and Knyazyan and Mushynska (2019) used test methods and expert evaluation to determine students' research capabilities, finding significant improvements in research skills over the course of academic training. In Russia, Prosekov et al. (2020) and Galustyan et al. (2020) focused on evaluating the structural components of research competencies, observing positive changes in students' motivation and methodological skills. These European studies were notable for their systematic and rigorous approach to evaluating competencies, often using experimental and explanatory designs.

In other international contexts, such as Malaysia and Kazakhstan, the studies also reveal interesting particularities. Poh and Kanesan (2019) in Malaysia found a moderate correlation between research self-efficacy and the research training environment, emphasizing the importance of the educational context in the development of competencies. In Kazakhstan, Mamytbayeva et al. (2022) conducted a descriptive study to analyze research competencies in students, highlighting significant deficiencies in the ability to search for, process, and analyze bibliographic information. These findings suggest that research competencies are influenced not only by the pedagogical methods applied but also by the specific cultural and educational context of each country, requiring approaches that consider contextual aspects for the effective development of these competencies.

The findings obtained from scientific productions indexed in Scopus regarding research competencies in university students reflect the existing interest in the subject, which has mainly been addressed from a quantitative approach, with a focus on the self-perception of students

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regarding their research competencies. Comparatively, there are fewer studies where research competencies are examined through external judgment or evaluation.

This systematic review provides a panoramic view of the characteristics and trends of mainstream empirical research published in the Scopus database concerning research competencies in university students. This may be useful for researchers interested in the state of the art, as well as for university authorities and academic managers responsible for formulating institutional policies, curriculum designs, and planning educational processes.

Conclusions

Based on the results of this systematic review of the scientific production published in Scopus regarding research competencies in university students, the following conclusions have been drawn.

The scientific production in Scopus that has been studied is characterized by peaks in publication in the years 2023 and 2019, with a significantly high number of works produced in Peru, predominantly published in journals ranked in the Q1 and Q2 quartiles. Nearly half of the publications are in Spanish, with a predominance of a quantitative approach, as well as a preference for experimental, quasi-experimental, and pre-experimental designs.

Regarding the findings from the articles reviewed, the analysis began with a conceptual precision regarding the terms “research competencies” and “research skills,” finding that both are used synonymously and reflect a strong influence of the competency-based approach. There is a variety of ways to break down these research competencies, but they always include competencies related to interpersonal (generic) abilities and specific skills for conducting research (technical). Moreover, in most studies, research competencies are assessed from the student’s self-perception. The results obtained from the studies show various levels of achievement of research competencies, with the methodological designs providing valuable support for conducting new and necessary research.

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