

Teaching Strategies for the Development of Research Skills in University Students

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A documentary review was carried out on the production and publication of research papers related to the study of the variables Teaching Strategies, Research Skills and Higher Education. The purpose of the bibliometric analysis proposed in this document was to know the main characteristics of the volume of publications registered in the Scopus database during the period 2017-2022 and to identify the current situation in public and private institutions with respect to the study of the aforementioned variables, achieving the identification of 68 publications in total at the Latin American level. The information provided by this platform was organized through graphs and figures categorizing the information by Year of Publication, Country of Origin, Area of Knowledge and Type of Publication. Once these characteristics have been described, the position of different authors regarding the proposed theme is referenced through a qualitative analysis. Among the main findings made through this research, it is found that Brazil, with 19 publications, was the country with the highest scientific production registered in the name of authors affiliated with institutions in that nation. The Area of Knowledge that made the greatest contribution to the construction of bibliographic material related to the study of Teaching Strategies, Research Skills and Higher Education was Social Sciences with 49 published documents, and the Type of Publication that was most used during the period indicated above was the Journal Article, which represents 78% of the total scientific production.

Keywords: Teaching strategies, research skills, higher education.

1. Introduction

In the volatile nature of higher education with the scope of being able to acquire adaptability over time, it is essential to cultivate university students to forge solid skills in research as a primary objective. The research benefits not only empower students to navigate the vast sea of information, but also foster critical thinking, analytical reasoning, and deep-seated intellectual curiosity. By making students aware of the importance of university research in academic and professional growth for future generations, teachers, hand in hand with innovation, have the task of being able to execute effective teaching strategies in which they seek to ensure that students not only acquire information regarding the field of research

seedbeds but also manage to implement development and skills related to diagnosis of research and discovery.

The modern environment offered by universities aims to be able to discard all traditional teaching methods and seeks to obtain an approach dedicated to innovation that can even address and execute teaching methods with different learning styles in which the needs of individual students are trained. The path to perfecting research skills is not a one-size-fits-all expedition; rather, it requires a nuanced understanding of the multifaceted dimensions of research and a strategic alignment of pedagogical techniques with the ever-evolving needs of students.

Based on the above, the epicenter in the development of research skills is born from the ability to explore infinite sources of information. This dates back to the present digital era, which has as a characteristic an avalanche of information from the network, with this it seeks to equip students with critical thinking skills to examine the various databases, academic articles and online resources. The first pillar of teaching strategies revolves around information literacy: the ability to evaluate, synthesize, and ethically use information. Information literacy instruction can take the form of workshops, online tutorials, and collaborative projects that immerse students in real-world scenarios, thereby bridging the gap between theory and practical application.

The development of research skills does not start from the need to be able to master or decode vast databases or search sites; it expands to the sowing of critical thinking. The ability to question a series of facts or assumptions, analyze evidence, and build solid arguments is intrinsic to successful research efforts. Educators should adopt pedagogies that encourage students to think critically about the world around them. Promoting dialogue in the training classrooms provides a problem-solving scenario which provides a fertile field for the cultivation of criteria skills, thus creating an intellectual space where students can express their ideas and criticisms together with others, this in order to question, challenge and perfect their perspectives.

Together with critical thinking, good communication plays an indispensable role when developing research skills. The ability to write articles in a coherent way through written and oral means of communication fulfills the paramount in academic environments. Therefore, teaching strategies should integrate intensive writing tasks, presentations, and peer reviews that not only improve students' communication skills, but also instill a sense of responsibility for the dissemination of knowledge. For this reason, this article seeks to describe the main characteristics of the compendium of publications indexed in the Scopus database related to the variables Teaching Strategies and Research Skills, as well. Such as the description of the position of certain authors affiliated with institutions, during the period between 2017 and 2022.

The justification of this scientific article should be oriented to teaching strategies, they are processes where favorable environments are created for the student to internalize knowledge and develop research skills that allow him to act independently, reflectively, creatively, so that he can choose, coordinate and get involved in procedures in a conscious and intentional way in the teaching-learning process and channel him to achieve successes in the field of academic, professional and academic research. Where they are not only researchers, but spokespersons

for new knowledge.

2. General objective

To analyze, from a bibliometric and bibliographic perspective, the production of research papers on the variables Teaching Strategies, Research Skills, Higher Education registered in Scopus during the period 2017-2022 by Latin American institutions.

3. Methodology

To avoid bias, the P.I.C.O. methodology was used and according to the author Richardson WS, this methodology consists of looking for evidence that allows us to approach the problem which proposes the following components: Participation, Indication, Comparator and Results. This strategy allowed us to construct the question: How are strategies applied for the development of research skills in the field of public and private universities?

A qualitative analysis of the information provided by Scopus is carried out under a bibliometric approach on the scientific production related to the study of the variables Teaching Strategies, Research Skills, Higher Education. Likewise, examples of some research works published in the area of study indicated above are analyzed from a qualitative perspective, from a bibliographic approach to describe the position of different authors regarding the proposed topic.

The search is carried out through the tool provided by Scopus and parameters referenced in Figure 1 are established.

3.1 Methodological design

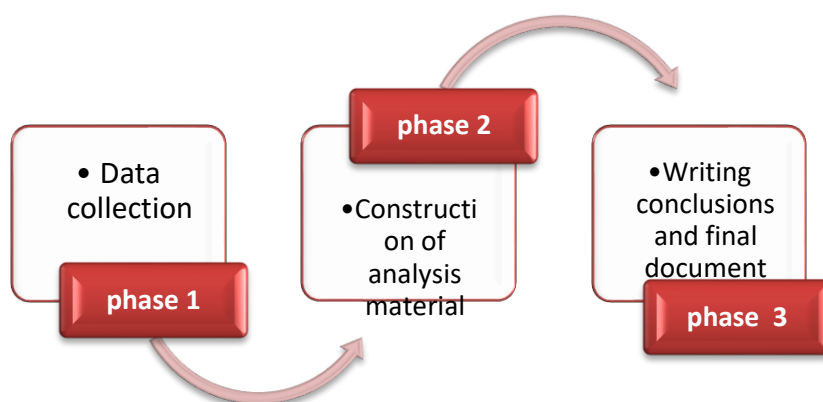


Figure 1. Methodological design

Source: Own elaboration

3.1.1 Phase 1: Data Gathering

Data collection is carried out through the Search tool on the Scopus website, through which a

total of 68 publications are identified. To this end, search filters were established that consisted of:

TITLE-ABS-KEY (teaching AND strategies, AND research AND skills, AND higher AND education) AND PUBYEAR > 2016 AND PUBYEAR < 2023 AND (LIMIT-TO (AFFILCOUNTRY , "Brazil") OR LIMIT-TO (AFFILCOUNTRY , "Mexico") OR LIMIT-TO (AFFILCOUNTRY , "Colombia") OR LIMIT-TO (AFFILCOUNTRY , "Peru") OR LIMIT-TO (AFFILCOUNTRY , "Ecuador") OR LIMIT-TO (AFFILCOUNTRY , "Chile") OR LIMIT-TO (AFFILCOUNTRY , "Argentina") OR LIMIT-TO (AFFILCOUNTRY , "Venezuela") OR LIMIT-TO (AFFILCOUNTRY , "Costa Rica") OR LIMIT-TO (AFFILCOUNTRY , "Puerto Rico") OR LIMIT-TO (AFFILCOUNTRY , "Cuba") OR LIMIT-TO (AFFILCOUNTRY , "Bolivia"))

- ✓ Published documents whose study variables are related to the study variables Teaching Strategies, Research Skills, Higher Education
- ✓ Limited to Latin American countries.
- ✓ Without distinction of area of knowledge.
- ✓ Without distinction of type of publication.

3.1.2 Phase 2: Construction of analysis material

The information identified in the previous phase is organized. The classification will be made by means of graphs, figures and tables based on data provided by Scopus.

- ✓ Co-occurrence of Words.
- ✓ Year of publication
- ✓ Country of origin of the publication.
- ✓ Area of knowledge.
- ✓ Post Type

3.1.3 Phase 3: Drafting of the conclusions and final document

After the analysis carried out in the previous phase, the conclusions are drafted and the final document is prepared.

4. Results

4.1 Word co-occurrence

Figure 2 shows the co-occurrence of keywords within the publications identified in the Scopus database.

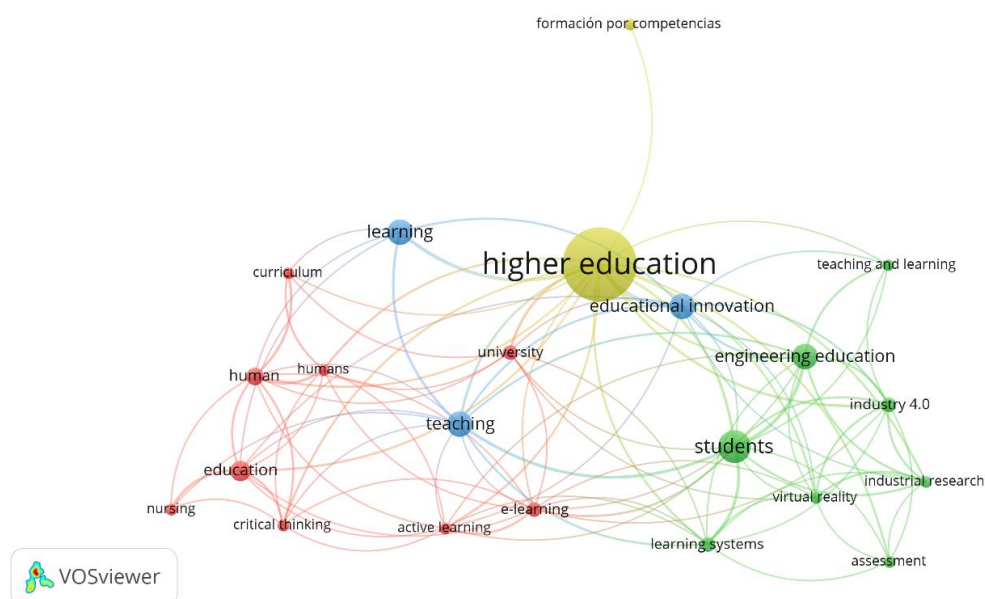


Figure 2. Word co-occurrence

Source: Own elaboration (2023); based on data provided by Scopus.

Higher education was the keyword most frequently used within the studies identified through the execution of Phase 1 of the Methodological Design proposed for the development of this article. Students is among the most frequently used variables, associated with variables such as University Studies, Learning Systems, Virtual Reality, Research, Industry 4.0, Education and Innovation. As technology continues to redefine the educational landscape, the integration of digital literacy into the development of research skills is imperative. Students must harness the power of technology not only as consumers but also as producers and disseminators of knowledge. Utilizing platforms for collaborative research, mastering data analytics tools, and understanding the ethical implications of technology are integral components of a holistic research skill set. Consequently, educators should incorporate digital literacy initiatives that bridge the gap between traditional research methodologies and the technological advances that define the contemporary research landscape. By adopting diverse teaching strategies that cater to students' diverse learning styles and preferences, universities can create a nurturing environment where the pursuit of knowledge becomes a transformative and empowering journey.

4.2 Distribution of scientific production by year of publication.

Figure 3 shows how scientific production is distributed according to the year of publication, taking into account that the period between 2017 and 2022 is taken

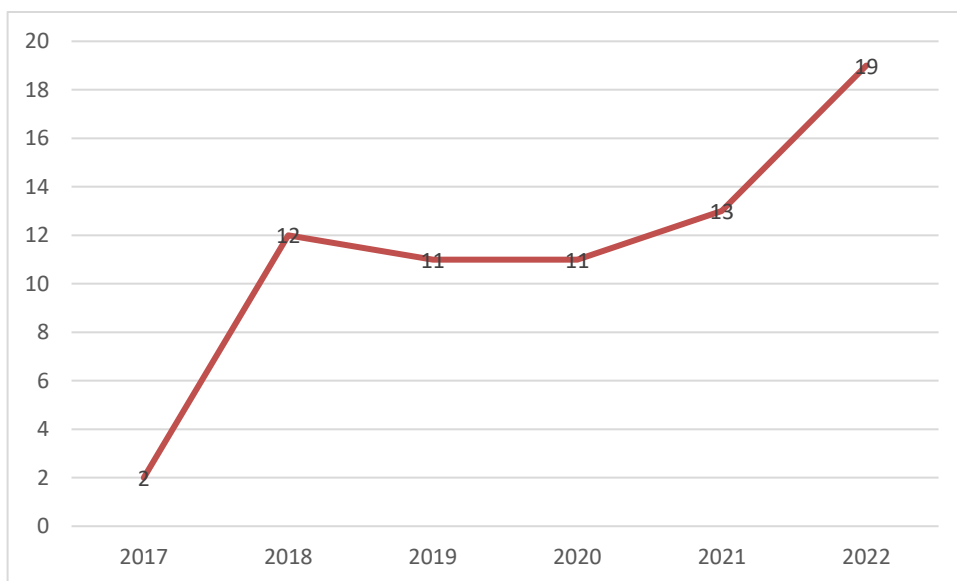


Figure 3. Distribution of scientific production by year of publication.

Source: Own elaboration (2023); based on data provided by Scopus.

Among the main characteristics evidenced by the distribution of scientific production by year of publication, a level of number of publications registered in Scopus is noted in the years 2022, reaching a total of 19 documents published in journals indexed on said platform. This can be explained thanks to articles such as the one entitled "Self-regulated learning of future teachers of Natural Sciences and Mathematics: learning strategies, self-efficacy and sociodemographic factors." This study is part of a larger investigation and aims to investigate learning and study strategies and self-awareness. Effectiveness for the learning of beliefs of 220 students enrolled in teacher training programs in Biological Sciences, Chemistry, Physics and Mathematics of a higher education institution in the state of Piauí, and to examine them in relation to age, gender, undergraduate area and semester of career. Brazilian translations of the Inventory of Learning and Study Strategies (LASSI — Third Edition) and the Self-Efficacy for Learning Form were used for data collection. The scales were administered in the classrooms both through online platforms and on paper and pencil. Nonparametric inferential statistical approaches were used to test hypotheses about group differences. Statistically significant differences were found in LASSI in relation to gender, undergraduate area, and semester of career. In general, physics students coped better with anxiety; in Mathematics he showed more favorable attitudes towards learning; in Chemistry they reported better management of their time; in Biological Sciences showed significantly lower scores on many scales than other students.(Arcoverde, 2022)

4.3 Distribution of scientific production by country of origin.

Figure 4 shows how scientific production is distributed according to the nationality of the authors.

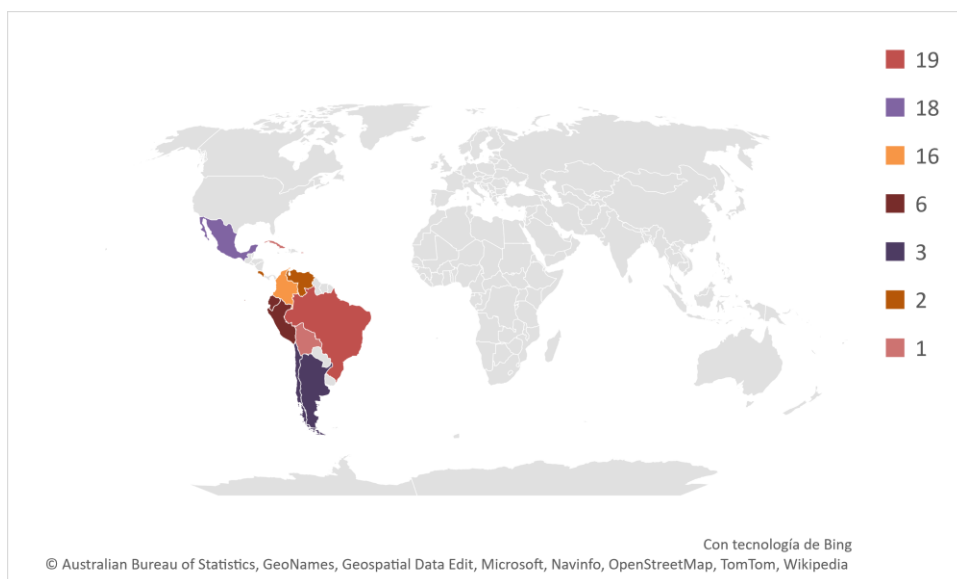


Figure 4. Distribution of scientific production by country of origin.

Source: Own elaboration (2023); based on data provided by Scopus.

Within the distribution of scientific production by country of origin, records from institutions were taken into account, establishing Brazil as the country of that community, with the highest number of publications indexed in Scopus during the period 2017-2022, with a total of 19 publications in total. In second place, Mexico with 18 scientific documents, and Colombia occupying the third place presenting to the scientific community, with a total of 16 documents, among which is the article entitled "Teaching experience and digital platforms in education." The aim of this study is to analyse these changes in the education sector from the perspective of teachers who produce content on digital platforms, such as massive open online courses (MOOCs). Design/methodology/approach: In-depth interviews were conducted with 10 Brazilian professors using MOOCs. For the content analysis, the methodology proposed by Bardin (2011) and the guidelines of the council (2013) were used. Findings: In the present study, positive aspects such as autonomy, greater financial gains, geographical coverage, quality of life, and cheaper and faster courses were identified, while the negative aspects were the dissemination and sales made by teachers, problems with technical support, demand for new skills (e.g., digital marketing), new teaching methods, and opportunities perceived by teachers. Limitations/implications of the research: The results found cannot be generalized to different audiences and contexts. Originality/value: The results contribute to a better understanding of new business models on digital platforms as they show evidence of how these techniques are contributing to the digital transformation of traditional sectors. This model can be used to connect teachers who produce content with those who want to learn, as well as to enable remote operations in public and private educational institutions. In addition, executives, CEOs and entrepreneurs in the sector can use MOOCs as a reference when formulating their strategies.(dos Santos, 2022)

4.4 Distribution of scientific production by area of knowledge

Figure 5 shows how the production of scientific publications is distributed according to the area of knowledge through which the different research methodologies are executed.

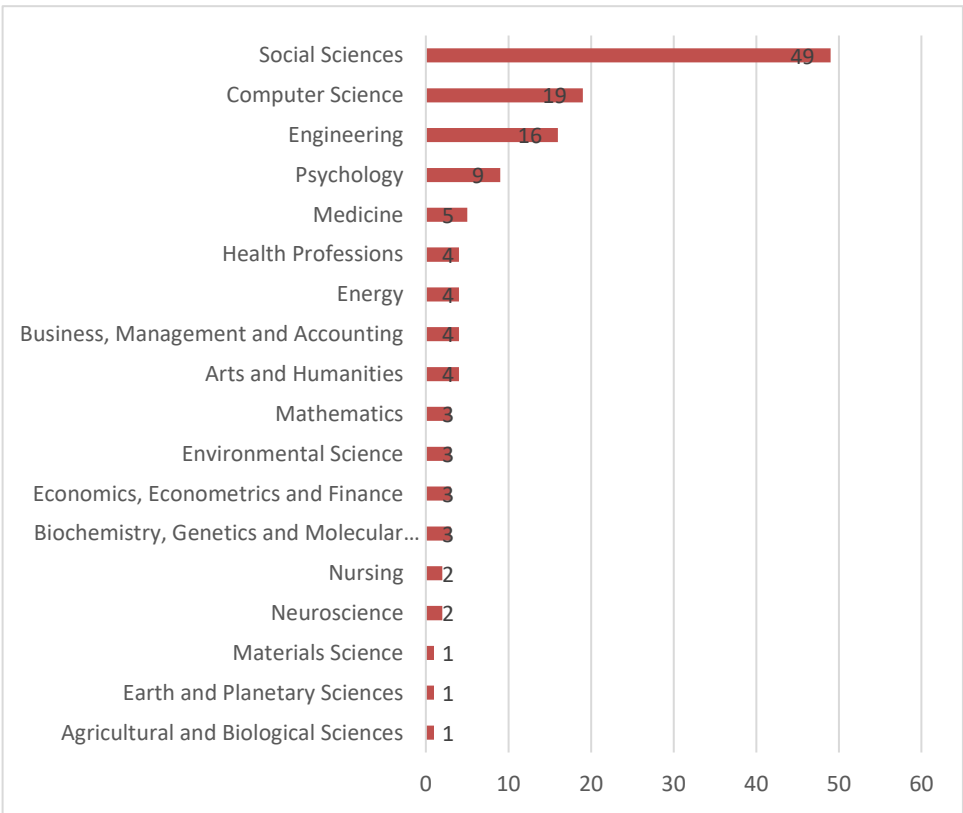


Figure 5. Distribution of scientific production by area of knowledge.

Source: Own elaboration (2023); based on data provided by Scopus.

Social Sciences was the area of knowledge with the highest number of publications registered in Scopus with a total of 49 documents that have based their methodologies on Teaching Strategies, Research Skills and Higher Education. In second place, Computer Science with 19 articles and Engineering in third place with 3. The above can be explained thanks to the contribution and study of different branches, the article with the greatest impact was registered by Social Sciences entitled "Communication in foreign languages in virtual exchanges: reflections and implications for applied linguistics" This article reports a study on the strategies used by non-specialist teachers in languages to facilitate communication in a foreign language in VE within the Brazilian Virtual Exchange (BRaVE). Data collection and analysis involved a qualitative research methodology by analyzing participants' reflections. The implications for the field of applied linguistics point to the need for a theoretical framework for VE as an interdisciplinary field. This would serve to train teachers to design and implement activities that involve communication in foreign languages.(Salomão, 2022)

4.5 Type of publication

Figure 6 shows how the bibliography production is distributed according to the type of publication chosen by the authors

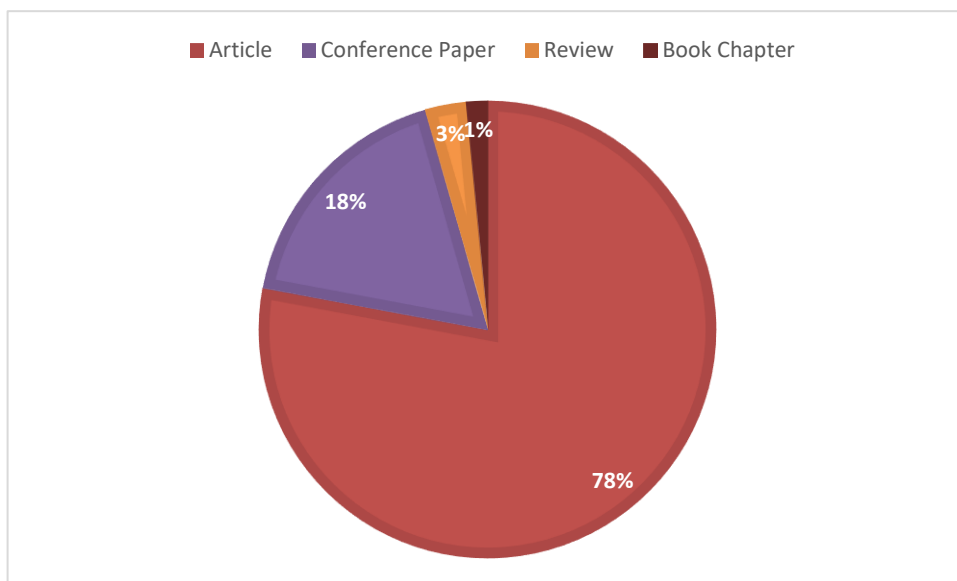


Figure 6. Post Type

Source: Own elaboration (2023); based on data provided by Scopus.

The type of publication most frequently used by the researchers referenced in the body of this document was entitled Journal Articles with 78% of the total production identified for analysis, followed by Session Paper with 18%. Journal are part of this classification, representing 3% of the research papers published during the period 2017-2022, in journals indexed in Scopus. In this last category, the one entitled "INDEX OF ATTITUDE TOWARDS SCIENTIFIC RESEARCH IN PERUVIAN PSYCHOLOGY STUDENTS" stands out. The objective of this study was to describe the attitudes towards scientific research of Peruvian students of the professional psychology program. The research approach was quantitative, non-experimental design of a basic and field type. The sample was composed of 546 undergraduate students of the professional psychology career. A sociodemographic form and the Attitude Towards Research Index were used for information collection. The results show that psychology students have an unfavorable attitude towards research. They also have a low opinion about their self-evaluation of research skills, the quality of human resources in the teaching of research and the promotion of research by the university where they study. In conclusion, it is essential to promote strategies to improve students' attitudes towards research, reinforcing the quality of research courses and selecting teachers with research knowledge and potential for scientific production.(Hernandez, 2022)

5. Conclusions

Through the bibliometric analysis carried out in this research work, it was possible to establish that Brazil was the country with the highest number of published records for the variables Teaching Strategies, Research Skills and Higher Education. With a total of 19 publications in the Scopus database. In the same way, it was possible to establish that the application of theories framed in the area of Social Sciences, were used more frequently when being able to develop the relevant skills to exercise the work of university research seedbeds, since this task requires being able to accurately execute various teaching strategies. Due to the constant evolution present by modern education, which aims for teachers and students, together with technological resources and the innovation factor, to incorporate not only methodologies dedicated to research but also to have a more holistic approach taking into account critical thinking and digital and modern literacy. A holistic strategy involves integrating traditional and technological methods. Orthodox methods, such as lectures and workshops, provide a solid theoretical foundation, while the adoption of technology facilitates access to a wide range of digital resources and encourages students to navigate the dynamic online research environment. The incorporation of practices, projects and new learning opportunities when researching motivates students and this in turn fosters a deeper understanding of the research process. Encouraging students to ask questions, explore diverse perspectives, and think critically about the information they encounter allows them to become independent researchers. Providing mentorship and guidance from experienced faculty can play a critical role in shaping students' research skills by offering knowledge, constructive feedback, and real-world experiences. Based on this premise, it is important not to overlook the constructive value of the role of good communication. As students delve deeper into the research, they should be encouraged to articulate their research and hypotheses in a coherent manner, and to express those results in written and oral form. This not only improves their ability to disseminate knowledge as researchers or columnists, but also prepares them for professional and academic tasks

To conclude, it is important to highlight the immense work that researchers currently perform, who promote a research environment in an environment as changing as education would be. By adopting these strategies, educators contribute to the well-rounded development of college students, preparing them not only for academic success but also for the complex challenges they will encounter in their future careers. As the educational landscape continues to evolve, the continuous refinement and adaptation of these strategies will be crucial to ensure that students are well-equipped for the demands of a rapidly changing world.

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