REVISTA INVECOM
ISSN en línea: 2739-0063

Situated teaching as a strategy for strengthening research skills in teacher training

La enseñanza situada como estrategia para el fortalecimiento de capacidades investigativas en la formación docente

Received: 26/08/2025 - **Accepted:** 22/11/2025

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Abstract

The objective of this research was to determine the influence of situated teaching on the development of research skills, specifically in problem statement, theoretical framework, and methodological framework, in pre-service teacher education students at a pedagogical school in Celendín, Cajamarca, Peru. The study, conducted under a positivist paradigm with a quantitative approach and a pre-experimental static-group comparison design, involved 63 students. The experimental group (n=34, from the initial education program) received an intervention based on situated teaching, while the control group (n=29, from the primary education program) continued with their regular instruction. An analytical product evaluation scale was used to measure research skills. The results of the Mann-Whitney U test (p = .000) revealed a statistically significant difference between the groups, leading to the conclusion that the situated teaching strategy positively influenced the development of students' research skills.

Keywords: situated teaching, research skills, teacher education

Resumen

El objetivo de esta investigación fue determinar la influencia de la enseñanza situada en el desarrollo de las capacidades investigativas, específicamente en el planteamiento del problema, la elaboración del marco teórico y del marco metodológico, en estudiantes de formación inicial docente de una escuela pedagógica en Celendín, Cajamarca, Perú. El estudio, desarrollado bajo un paradigma positivista con enfoque cuantitativo y un diseño preexperimental de comparación estática con un grupo intacto, contó con la participación de 63 estudiantes. El grupo experimental (n = 34, del programa de educación inicial) recibió una intervención basada en la enseñanza situada, mientras que el grupo control (n = 29, del programa de educación primaria) continuó con su instrucción regular. Se utilizó una escala valorativa de evaluación analítica del producto para medir las capacidades investigativas. Los resultados de la prueba U de Mann-Whitney (p = 0,000) revelaron una diferencia estadísticamente significativa entre los grupos, lo que permitió concluir que la estrategia de enseñanza situada influyó positivamente en el desarrollo de las capacidades investigativas de los estudiantes.

Palabras clave: enseñanza situada, capacidades investigativas, formación docente

Introduction

The production of scientific knowledge has been described as an indispensable engine for the social, economic, and cultural development of nations. Indeed, promoting research across all educational levels, particularly in higher education, is a key condition for any society aspiring to transform and project itself into the future. Engaging in research involves not only generating new knowledge but also fostering critical thinking, resolving complex problems, and continuously improving professional practices. In the educational context, this need becomes even more pronounced, as research enables educators to better understand the processes of teaching and learning, identify the real needs of their students, and design more relevant and context-specific pedagogical strategies.

However, as Lloyd (2018) warns, in much of Latin America, the conditions for conducting research remain insufficient or uneven. While countries like Mexico have established robust public policies that integrate universities, businesses, researchers, and citizens around the strengthening of the scientific system, others, such as Peru, continue to operate in a fragmented manner without a long-term strategic vision that would allow for the integration of different stakeholders' efforts. This structural gap is reflected in teacher training, where the development of research competencies still faces institutional, curricular, and academic support limitations.

In this context, situated teaching emerges as a particularly valuable pedagogical perspective. According to García and Murillo (2023), learning is not an isolated or decontextualized act; rather, it is a process deeply connected to the concrete experiences of students. Under this framework, situated teaching requires future educators to develop solid research competencies that enable them to formulate questions, problematize their surroundings, and address their own concerns through rigorous inquiry processes. Therefore, strengthening these competencies is not an ancillary component of initial training; it is a critical axis for cultivating professionals equipped to think and act based on evidence.

The institutional approach guiding this study is based on the proposal "Situated Teaching and the Development of Research Competencies in Teacher Training," which posits the development of such competencies as a central variable in the initial education of teachers. From this perspective, opportunities for research should be present in all formative spaces, and learning environments must promote authentic experiences that connect theory to educational reality.

As Nuñez (2024) explains, situated teaching views learning as an active, contextualized, and meaningful process in which students participate reflectively, understanding the purpose of what they learn and evaluate. This methodology diverges from traditional approaches, advocating for experiences that involve solving real problems in authentic contexts, guided by three essential principles: learning in a meaningful environment, active participation, and recognizing the utility of the acquired knowledge.

Building on these foundations, Alva-Gómez (2025) indicates that the design of situated teaching proposals aimed at developing research competencies typically focuses on managing and executing real educational projects, supported by experiential learning models and technological tools for collecting, analyzing, and presenting data. In this way, situated experiences not only help students acquire technical competencies but also enable them to generate knowledge that enriches their teaching practices and strengthens their professional identity.

In the initial training of educators specializing in Early Childhood Education and Primary Education, these approaches have been progressively incorporated. As noted by García and Murillo (2023), the combination of situated teaching and experiential learning fosters students' ability to formulate relevant questions, construct evidence-based arguments, and recognize how research contributes to understanding and transforming their environment. This process is realized through research activities inspired by the genuine concerns of students or the needs of the educational community.

Complementarily, the dynamics of formative research, as described by Asis et al. (2022), integrate spaces for reflection, collaborative work, and small projects developed in authentic contexts. These activities help to reframe beliefs, make informed decisions, and build learning communities. Additionally, Romero et al. (2024) suggest that formative research allows future educators to "learn to research by researching," a pedagogical process that moves away from traditional scientific inquiry and has been shown to be effective in strengthening research competencies, as evidenced by the work of Campos-Ugaz et al. (2022).

Situated teaching, as a strategy derived from situated learning theory, thus presents itself as a suitable methodology for developing research competencies. By proposing authentic, contextualized, and challenging activities, it allows future educators to learn through practice and reflect on their teaching. From this perspective, educational research projects transform from theoretical exercises into meaningful experiences that connect school realities with the formative process.

This study is framed within this conceptual context and seeks to analyze the impact of a pedagogical intervention based on situated teaching on the development of research competencies in students from a teacher education institution in Celendín, Cajamarca. The research focuses on three key dimensions for developing an academic project: the problem statement, the theoretical framework, and the methodological framework. These areas were selected because, in addition to being the backbone of any research, they often represent the greatest challenges for students in teacher training.

The guiding question of this work was: To what extent does situated teaching enhance the research competencies of teacher training students in a pedagogical school in Celendín during the year 2022? This question led to three specific inquiries focused on analyzing the impact of the intervention on the problem statement, the construction of the theoretical framework, and the development of the methodological framework. Through this, the study aims to provide empirical evidence regarding a pedagogical strategy that, according to the reviewed literature, has significant potential to strengthen the research profile of future educators.

Methodology

To begin with, the research was framed within the positivist paradigm, employing a quantitative approach and classified as applied research. This orientation enabled an empirical and objective examination of the

phenomenon, focused on assessing the effectiveness of a specific pedagogical strategy in a real context. The practical problem addressed was the low level of research competency development among teacher training students, with the proposed solution being the implementation of a situated teaching strategy, conceived as an innovative methodological alternative to enhance these competencies.

A pre-experimental static comparison design with intact groups, also known as a post-test only comparison group design, was utilized. This design was deemed appropriate given the actual conditions of the educational context, where random assignment of participants was not feasible due to students being previously organized into natural class groups. In this structure, the experimental group received the intervention based on situated teaching, while the control group continued with the traditional methodology. Although this design does not allow for total control over extraneous variables, it represents a methodologically valid and ethically sound alternative in real educational settings.

Regarding participants, the population consisted of all students from a pedagogical higher education institution located in Celendín, Cajamarca. A non-probabilistic convenience sample was selected, comprising a total of 63 students. Of these, 34 formed the experimental group from the Early Childhood Education program, while 29 comprised the control group from the Primary Education program. Both groups were enrolled in the same academic semester and participated in the Educational Research course. The selection of these groups was based on institutional availability and the ability to implement the intervention without disrupting the curricular development of the control group, thus ensuring comparable conditions for analysis.

Concerning the variables, situated teaching was operationally defined as a pedagogical methodology that promotes learning through participation in authentic and contextualized activities, where students address real problems related to their future professional field. The intervention lasted 16 weeks and was conducted through a structured program that combined various learning strategies. First, Problem-Based Learning (PBL) was employed, enabling students to identify real educational issues from their surroundings and use these as the foundation for their research projects.

Second, case analyses and literature reviews were conducted, fostering reflection on their strengths, weaknesses, and potential adaptations. Third, collaborative work in research teams was promoted, stimulating co-responsibility and peer interaction. Additionally, constant reflection on the research practice was encouraged through journals, group feedback sessions, and individual tutoring. Finally, it was ensured that all activities were contextualized to the local educational reality, thereby strengthening the connection between theory, practice, and social transformation.

The dependent variable corresponded to research competencies, understood as the set of knowledge, skills, and attitudes necessary to plan and execute a scientific research project. These competencies were operationalized into three complementary dimensions. The first dimension was the problem statement, which involved the ability to identify, contextualize, justify, and clearly formulate a research problem with precision and coherence. The second dimension was the development of the theoretical framework, which assessed the competency to seek, analyze, and articulate relevant academic sources. Finally, the third dimension focused on the construction of the methodological framework, which encompassed the design of the research process, the definition of the population and sample, the selection of instruments, and data analysis techniques.

For data collection, the technique of document analysis was utilized, based on the research plans formulated by students. The instrument employed was an analytical evaluation scale designed specifically for this study. This scale included detailed descriptors for each of the three aforementioned dimensions, organized into four performance levels that differentiated the degree of competency development: initial, process, achieved, and outstanding. Its design aimed not only to measure the attained competency but also to provide formative feedback regarding progress and areas for improvement in each component.

Regarding the validity and reliability of the instrument, it underwent a rigorous validation process through expert judgment. Three PhD holders in education, with extensive experience in research and teacher training, evaluated the relevance, clarity, and coherence of the items. The Aiken's V coefficient obtained was 0.95, indicating a high level of agreement among judges and excellent content validity. Subsequently, a pilot test was conducted with 20 research plans from students of a similar institution, achieving a Cronbach's alpha of 0.89, reflecting a high internal consistency of the instrument.

Finally, the research procedure was developed in a sequential and carefully planned manner. Firstly, the pedagogical intervention was designed, planning the 16 sessions, selecting the didactic strategies, and defining the assessment criteria. The measurement instrument was then validated and the pilot test executed. Following this, the intervention was implemented over an academic semester: while the experimental group actively participated in situated teaching activities, the control group received the usual instruction, focused on lectures

and theoretical readings. At the end of the semester, research plans from both groups were collected, independently evaluated by two specialists, and any discrepancies resolved through a third consensus evaluation.

Lastly, statistical analysis was conducted using SPSS version 25. Initially, frequency tables and percentages were created to characterize the descriptive results; subsequently, the Shapiro-Wilk normality test was applied, yielding p-values lower than 0.05, confirming the absence of normality in the data. Therefore, the non-parametric Mann-Whitney U test was used to compare median ranks between groups and to test the research hypothesis at a significance level of $\alpha = 0.05$.

Results

The analysis of the data was conducted based on the scores obtained from the evaluative scale applied to the research plans of the 63 participating students. The following sections present both descriptive and inferential results, covering overall findings as well as specific insights for each dimension of the variable research competencies.

The descriptive results (see Table 1) demonstrate a clear performance difference between the experimental group and the control group. In the experimental group, which received the intervention based on situated teaching, 79.4% of the students reached the "Achieved" level, and 11.8% attained the "Outstanding" level, indicating that 91.2% of the students in the experimental group achieved a satisfactory or superior performance. In contrast, the majority of students in the control group were situated at the "Initial" (41.4%) and "Process" (55.2%) levels, with only 3.4% reaching the "Achieved" level. No students in the control group reached the "Outstanding" level.

Table 1

Performance levels in research competencies (General)

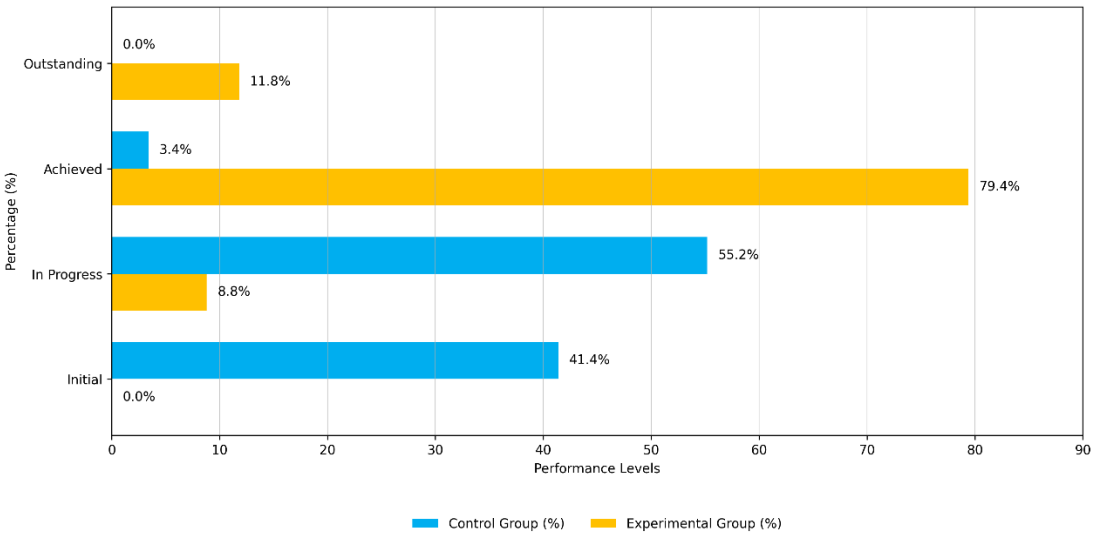
Performance Level	Experimental Group (n=34)		Control Group (n=29)	
	Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
Initial (1)	0	0.0	12	41.4
Process (2)	3	8.8	16	55.2
Achieved (3)	27	79.4	1	3.4
Outstanding (4)	4	11.8	0	0.0
Total	**34**	**100.0**	**29**	**100.0**

Note. Data obtained from the evaluation of research plans.

Figure 1 visually illustrates this substantial difference between the two groups. It is evident that the experimental group shows a concentration of scores in the higher performance levels, whereas the control group is concentrated at the lower levels.

Figure 1

Comparison of research competency performance levels between the experimental group and the control group.



To test the general hypothesis, the Mann-Whitney U test was employed, which is suitable for comparing two independent groups when the data do not follow a normal distribution. The results obtained (see Table 2) indicate a clear difference between the groups: the experimental group achieved an average rank of 49.03, well above the 12.21 recorded by the control group. The U statistic value was 0.500, and the associated p-value (two-tailed asymptotic significance) was 0.000.

Since this p-value is less than 0.05, the null hypothesis, which assumed a lack of differences, is rejected, supporting the research hypothesis. Thus, it can be concluded that the implementation of situated teaching had a significant and positive impact on the development of research competencies among teacher training students.

Table 2

Mann-Whitney U Test for research competencies (General)

Group	N	Average Rank	Sum of Ranks
Experimental Group	34	49.03	1667.00
Control Group	29	12.21	354.00
Total	**63**		
Statistic	**Value**		
Mann-Whitney U	0.500		
Asymptotic Significance (two-tailed)	.000		

Note. Significance level α = 0.05.

The effect size, calculated using Rosenthal's r, was found to be 0.82, which, according to classification of Cohen (1988), represents a large effect. This indicates that the observed difference is not only statistically significant but also of practical relevance.

The analysis extended to the three dimensions of research competencies to identify the specific areas where situated teaching had the greatest impact.

Dimension 1: problem statement

In the experimental group, 91.2% of the students reached the "Achieved" and "Outstanding" levels in this dimension, demonstrating their ability to identify relevant educational issues, contextualize them appropriately, justify their importance, and formulate clear and pertinent research questions. Conversely, in the control group,

96.5% remained at the "Initial" and "Process" levels, indicating challenges in defining the problem, a lack of contextualization, or imprecise formulation of research questions. The Mann-Whitney U test yielded a p-value of 0.000, confirming a statistically significant difference between the two groups.

Dimension 2: theoretical framework development

In the experimental group, 85.3% located themselves at the "Achieved" and "Outstanding" levels in developing the theoretical framework, demonstrating an ability to search for and select relevant academic sources, critically analyze theories and concepts, establish relationships between different authors, and construct a coherent and well-founded theoretical framework. In contrast, 100% of the control group students were at the "Initial" and "Process" levels, presenting theoretical frameworks with insufficient sources, a lack of critical analysis, minimal articulation between concepts, or an absence of clear relevance to the research problem. Again, the Mann-Whitney U test proved significant ($p = 0.000$).

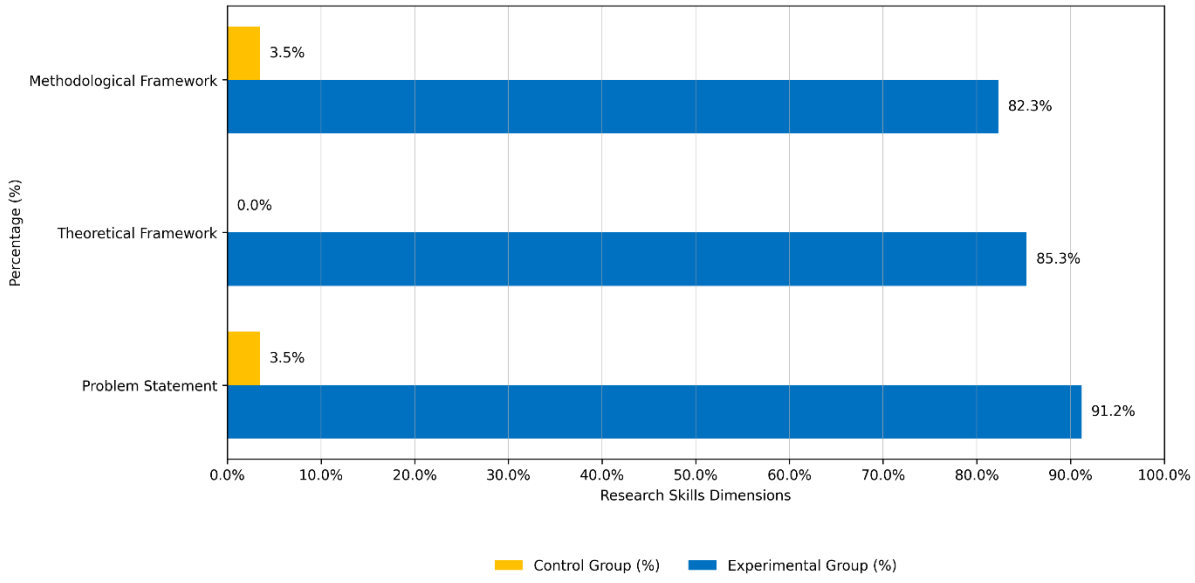
Dimension 3: methodological framework development

In the experimental group, 82.3% achieved the higher levels ("Achieved" and "Outstanding") in developing the methodological framework, demonstrating competency in selecting appropriate research approaches and designs, accurately defining the population and sample, choosing relevant techniques and instruments, and clearly describing the data collection and analysis procedures. In comparison, only 3.5% of the control group reached this level of performance, while 96.5% remained at the "Initial" and "Process" levels, indicating methodological confusion, incoherence among design elements, or lack of clarity in procedures. Once again, the difference was statistically significant according to the Mann-Whitney U test ($p = 0.000$).

Figure 2 presents a visual comparison of the performance of both groups across each of the three dimensions, focusing solely on students who reached the "Achieved" and "Outstanding" levels.

Figure 2

Comparison of performance by dimensions of research capacities (percentage of students at Achieved + Outstanding levels).

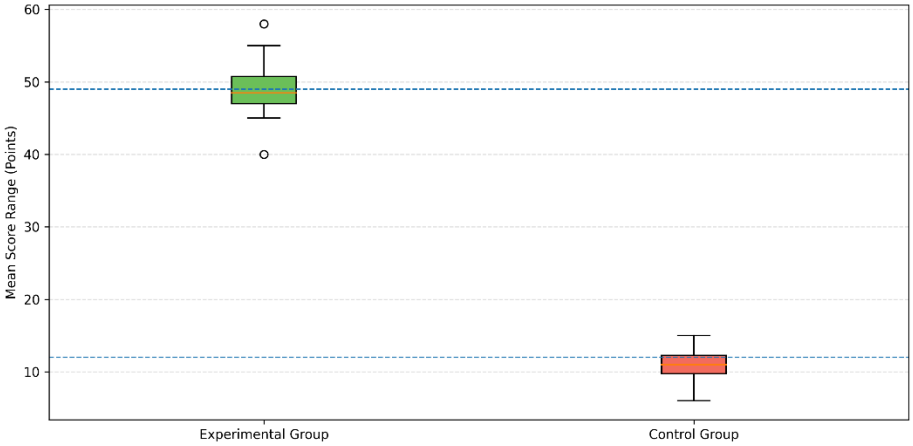


These results, consistent overall and by dimension, provide strong evidence of the positive impact of the pedagogical intervention based on situated teaching.

To complement the analysis, a boxplot diagram was created to show the distribution of the ranks of scores for both groups (Figure 3). This graph not only visualizes differences in medians but also displays the dispersion and presence of outliers.

Figure 3

Distribution of research competency ranks by study group



As illustrated in Figure 3, the experimental group exhibits a significantly higher median and lower dispersion compared to the control group, indicating not only improved average performance but also greater homogeneity in the development of research competencies.

Discussion

The results of this research confirm that situated teaching yields substantial improvements in the development of research competencies among teacher training students, a finding that directly aligns with reports from other international and regional studies. In this study, the experimental group achieved significantly higher performance levels across the three evaluated dimensions, problem statement, theoretical framework, and methodological framework, with achievement percentages exceeding 80% in all cases. This trend correlates with the assertions of Díaz-Cruz et al. (2024), who argue that strengthening research competencies requires a balanced combination of methodological mastery, systematic reflection, and evidence-based project management. The findings of the current study corroborate this premise: when students engage in real situations, reflect on their practice, and structure purpose-driven projects, their performance improves significantly.

Similarly, the findings resonate with Nuñez (2024), who points out that situated teaching realizes its true potential when institutional conditions exist to connect formative projects with authentic contexts. In this investigation, the intervention was conducted in real classrooms and closely tied to local educational needs. This explains the experimental group's 91.2% achievement rate in problem formulation compared to just 3.5% in the control group. This contrast highlights that, as Nuñez asserts, experiential learning and situated work are not mere complements but essential conditions for making research practice meaningful for future educators. This relationship between context, experience, and learning was central to the original conceptual framework provided by the foundational document.

Furthermore, the results align with the views of Montalvo and Zuñiga (2025) on the pedagogical value of low-complexity research. These authors argue that the goal of research in teacher training is not theoretical innovation but rather the generation of meaningful learning experiences. The analysis of the research plans developed by the experimental group demonstrates that, although their projects were limited in scope, students managed to understand and apply scientific research principles with greater clarity. The improvement in the theoretical framework, with 85.3% achieving higher performance levels, indicates that researching topics relevant to their practice allows students to select and articulate bibliographic sources more critically and contextually.

Regarding institutional support, the data also support the views of Barrientos (2023), who contends that the development of research competencies requires coherent institutional planning and minimum conditions for rigorous work. In the experimental group, where a formal research structure existed, students achieved homogeneous and high performance; in contrast, the control group, lacking these conditions, demonstrated a wide dispersion and predominance of the "Initial" and "Process" levels. The difference was statistically significant across all dimensions ($p = .000$), emphasizing that the quality of institutional mediation directly influences outcomes.

Finally, the results closely engage with Limo et al.'s (2023) proposal regarding the relevance of formative research, action research, and experiential learning in teacher training. The intervention developed in this study incorporated elements from all these approaches, which explains why 82.3% of students in the experimental group attained satisfactory or outstanding levels in the methodological framework. Situated teaching facilitates the

transition from theoretical learning to reflective practice, allowing future educators to develop comprehensive research competencies. This assertion aligns with the observations made in the original study document, highlighting that situated teaching promotes authentic learning experiences that connect theory and practice within an educational transformation framework.

In conclusion, the comparison between the results of this investigation and previous studies allows us to conclude that situated teaching constitutes a robust and coherent approach for developing research competencies in teacher education. Not only does it enhance technical performance in project development, but it also fosters a deeper understanding of research as a tool for interpreting, questioning, and transforming educational realities.

Conclusions

The implementation of a situated teaching approach in initial teacher training creates a favorable environment for future educators to develop research competencies and effectively integrate them into enhancing the quality of education. Including these competencies in teacher training not only strengthens the use of research as a pedagogical tool but also expands opportunities for meaningful learning for students.

Moreover, articulating research from a situated perspective, focused on the development and management of research or teaching innovation projects, enables students to connect with diverse educational realities. Through areas such as education in vulnerable contexts, science teaching, and the use of ICT, a repository of collaboratively developed projects is established. This framework allows both students and graduates to engage in reflective practices in real and enriching environments.

Similarly, research within teacher training is strengthened when integrated with educational projects and innovation initiatives. Collaborative efforts with institutions across various levels and socioeconomic contexts enable future educators to actively participate in situated pedagogical processes, contributing to student learning and the quality of innovative proposals generated in these spaces.

Ultimately, the incorporation of research competencies in initial training not only drives improvements in educational quality but also promotes more equitable access to learning opportunities. The strategies developed are part of a sustained long-term process aimed at consolidating a research culture within the teacher training unit and strengthening its role within the educational ecosystem of the country.

References

Alva-Gomez, M. (2025). Aprendizaje Basado en Proyectos en el desarrollo de habilidades investigativas en estudiantes. Revisión narrativa. *Maestro y Sociedad*, *22*(2), 993-1009. https://maestroysociedad.uo.edu.cu/index.php/MyS/article/view/6889

Asis López, M. E., Monzón Briceño, E., & Hernández Medina, E. (2022). Investigación formativa para la enseñanza y aprendizaje en las universidades. *Mendive. Revista de educación*, *20*(2), 675-691. https://mendive.upr.edu.cu/index.php/MendiveUPR/article/view/2676

Barrientos, M. U. (2023). Protocolo de investigación para el abordaje de la problemática de la mejora de la calidad del proceso enseñanza-aprendizaje de los estudiantes de nuevo ingreso del Programa Educativo de Ingeniería en Gestión Empresarial del TecNM, Campus Chilpancingo, Estado de Guerrero. *Dilemas contemporáneos: Educación, Política y Valores*. https://dilemascontemporaneoseducacionpoliticayvalores.com/index.php/dilemas/article/view/3491

Birgin, A., & Marco, L. D. (2021). Los saberes en la formación docente inicial bajo la lupa: disputas en la Argentina del siglo XXI. *Revista Práxis Educacional*, *17*(46), 177-201. https://doi.org/10.22481/praxisedu.v17i46.8922

Campos-Ugaz, O., Campos-Ugaz, W. A., Hernández, R. M., Aguinaga-Doig, S. G., Falla-Ortiz, J. B., Saavedra-López, M. A., & Garay-Argandoña, R. (2022). Formative Research to Strengthen Enquiry Competence in University Students. *International Journal of Learning, Teaching and Educational Research, 21*(11), 452-471. https://doi.org/10.26803/ijlter.21.11.25

Cohen, J. (1988). *Statistical power analysis for the behavioral sciences* (2nd ed.). Lawrence Erlbaum Associates. https://www.taylorfrancis.com/books/mono/10.4324/9780203771587/statistical-power-analysis-behavioral-sciences-jacob-cohen

Consejo Nacional de Ciencia, Tecnología e Innovación Tecnológica (CONCYTEC). (2017). *Censo Nacional de Investigación y Desarrollo a Centros de Investigación 2016*. CONCYTEC. https://www.gob.pe/institucion/concytec/informes-publicaciones/1326766-i-censo-nacional-de-investigacion-y-desarrollo-a-centros-de-investigacion-2016

Díaz-Cruz, V., Saavedra-Carrion, N. P., & Zevallos-Delgado, K. D. P. (2024). Competencia Investigativa y Desarrollo Profesional Docente. *Revista Tecnológica-Educativa Docentes 2.0*, *17*(1), 261-270. https://doi.org/10.37843/rted.v17i1.471

García, M. C., & Murillo, D. M. (2023). El aprendizaje situado: Una oportunidad para la práctica pedagógica innovadora, crítica y reflexiva. *Revista Científica Hallazgos21*, *8*(3), 316-329. https://doi.org/10.69890/hallazgos21.v8i3.639

Limo, F. A. F., Limo, J. F. F., Dávila, J. E. C., & Trujillo, L. V. A. (2023). La investigación formativa en el proceso de enseñanza-aprendizaje en la educación superior: Una revisión sistemática. *Ciencia Latina Revista Científica Multidisciplinar*, *7*(2), 8648-8663. https://doi.org/10.37811/cl_rcm.v7i2.5981

Lloyd, M. (2018). Políticas públicas para fortalecer el espacio científico en México. *Revista de la Educación Superior,* *47*(187), 1-22. https://www.ses.unam.mx/integrantes/uploadfile/mlloyd/Lloyd2018_ElSectorDeLaInvestigacionEnMexico.pdf

Montalvo, J. V. L., & Zuñiga, E. D. B. (2025). Gestión de la formación por competencias metodológicas de los docentes. *Alpha International Journal*, *3*(1), 128-151. https://doi.org/10.63380/aij.v3n1.2025.110

Nuñez, C. E. B. (2024). Aprendizaje situado: Sinergia pedagógica efectiva en la praxis pedagógica universitaria. *Cuestiones Pedagógicas. Revista De Ciencias De La Educación*, *1*(33), 111-130. https://doi.org/10.12795/CP.2024.i33.v1.06

Romero, D. I., Torres, J., & Otero, L. (2024). Formative research in teacher training: A case study carried out in Uruguay. *International Journal of Educational Research,* *125*, 102345. https://doi.org/10.1016/j.ijer.2024.102345