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Formative Research as a Resource for Teaching Scientific Logic in Higher Education

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Abstract

This study analyzes formative research as a pedagogical resource for teaching scientific logic in higher education from a constructivist perspective. The purpose of the article is to examine how formative research contributes to the development of scientific reasoning, critical thinking, and analytical skills among university students through active, reflective, and contextually grounded learning processes. The study is an exploratory narrative/documentary literature review. The initial bibliographic search identified 105 scientific documents published between 2000 and 2025 in indexed databases such as Scopus, Web of Science, SciELO, Taylor & Francis, MDPI, ResearchGate, Redalyc, and RENATI. After duplicates were removed and inclusion and exclusion criteria were applied, 54 studies were selected for the final analysis. A two-way documentary analysis matrix was used to identify conceptual relationships among constructivism, reflection-in-action, mental representations, induction and deduction, and their contributions to scientific logic. The findings show that formative research strengthens scientific logic by promoting active knowledge construction, critical reflection, problem-solving, and argumentative reasoning. The contributions of Piaget, Vygotsky, Bruner, Schön, and Fosnot demonstrate that scientific thinking develops through interaction, inquiry, contextualized learning, and reflective practice. Inductive and deductive reasoning were also identified as complementary mechanisms for developing analytical and interpretive competencies in university education. The study proposes that formative research should be considered a central pedagogical strategy in higher education because it facilitates the integration of scientific reasoning, reflective learning, and research-based teaching. Finally, an operational formative research program based on a holistic student development approach is proposed to foster scientific reasoning, intellectual autonomy, and the formation of more critical, reflective, and scientifically competent university students.

Keywords: formative research; scientific logic; constructivism; higher education; critical thinking; scientific reasoning; reflection-in-action; university learning

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1. Introduction

The article argues that formative research significantly contributes to the development of scientific reasoning among university students through reflection, analysis, and active knowledge construction. The theoretical foundation of the study is organized into five categories: constructivism, reflection-in-action, mental representations, inductive and deductive reasoning, and formative research.

Constructivism conceives learning as an active process of knowledge construction based on experience, interaction, and critical reflection [1–4]. Reflection-in-action is consid-

ered an essential element of research practice, as it enables students to critically analyze their decisions, readjust procedures, and strengthen their reasoning during and after the research process [5]. From this perspective, university students do not merely receive information; rather, they develop capacities for analysis, interpretation, and the production of scientific knowledge.

The model of mental representations explains how students organize, interpret, and cognitively reconstruct scientific information, thereby promoting a deeper understanding of concepts, relationships, and research phenomena [6,7]. On the other hand, inductive and deductive reasoning modalities are essential processes in scientific research. Induction allows general explanations to be constructed from the observation and analysis of particular facts, whereas deduction facilitates the application of general theories and principles to the study of specific situations. Both modalities strengthen scientific reasoning, argumentative capacity, and students' ability to relate theory, evidence, and academic practice.

This study considers the aforementioned theoretical contributions and proposes that formative research, through its pedagogical strategy, develops scientific logic in students. Although this concept does not always appear explicitly in the literature, it may be understood as a research competence that strengthens cognitive and methodological skills in logical reasoning, argumentation, problem-solving, and the construction of scientific knowledge. Likewise, Guerrero [8], Parra Moreno [9], and Restrepo Gómez [10] emphasize these cognitive aspects that enable the construction of scientific knowledge, noting that formative research, as a pedagogical strategy, is oriented toward the development of critical thinking, scientific reflection, and active knowledge construction in interaction with other participants in the educational process in higher education.

Consequently, the purpose of this study is to analyze the contribution of formative research to the development of scientific logic in students, understood as an essential research competence with a pedagogical function that fosters a research-oriented mindset. Likewise, as a practical contribution, the study proposes two modalities of formative research: the first derives from deductive reasoning, moving from general principles to concrete aspects, and is referred to as formative research with an emphasis on teaching didactics; the second is based on inductive reasoning, moving from empirical reality toward general explanations, and is referred to as formative research with an emphasis on scientific research. Finally, the conceptual/theoretical framework examines the constructivist approach and the contributions of Piaget [1], Vygotsky [2], Bruner [3], Fosnot [4], reflection-in-action [5], mental representations [6,7], and inductive and deductive reasoning. It also analyzes the pedagogical aspects involved in implementing formative research, including the relationship between teaching and research, the teacher as an academic and administrative manager, and the two proposed modalities of formative research.

2. Materials and Methods

To develop the study, the interpretative paradigm and qualitative approach were applied, based on documentary research and an exploratory, narrative review of theoretical and empirical articles on formative research. The bibliographic search initially identified 105 scientific documents in indexed databases such as Scopus, Web of Science, SciELO, Taylor & Francis, MDPI, ResearchGate, Redalyc, and RENATI. The search strategy combined keywords using the Boolean operators AND and OR. The main keywords were formative research, scientific reasoning, scientific logic, research-based learning, university education, constructivism, reflection-in-action, mental representations, and inductive and deductive reasoning. After removing duplicate records and applying inclusion and exclusion criteria, 54 studies were selected for the final analysis. The inclusion criteria included peer-reviewed articles published between 2000 and 2025, studies related to formative research, scientific

logic, scientific reasoning, and higher education, in English and Spanish. Incomplete documents, non-peer-reviewed studies, and publications without a direct thematic relationship with the object of study were excluded. For information processing, a documentary analysis matrix (Table 1 was used, based on previously defined analytical dimensions: a double-entry documentary analysis matrix was applied to identify conceptual relationships among the main categories of the study, linked to pedagogical trends and methodological contributions from the theories of Piaget, Vygotsky, Bruner, Schön, Fosnot, and studies on formative research present in the selected literature. These dimensions functioned as qualitative coding categories to interpret theoretical trends, conceptual relationships, and pedagogical contributions found in the reviewed scientific literature.

Table 1. Documentary Analysis Matrix.

Author/Year	Theoretical and Formative Research Focus	Contribution to Scientific Logic and Main Conclusion
Jean Piaget [1]	Objective: Explain cognitive development Theoretical basis: Cognitive constructivism Concept of formative research: Learning based on active knowledge construction Contribution to constructivism: Assimilation and accommodation	Reflection-in-action: Reflection on cognitive structures Mental representations: Cognitive schemas Induction/Deduction: Predominantly inductive Contribution to scientific logic: Development of logical reasoning Main conclusion: Learning transforms mental structures
Lev Vygotsky [2]	Objective: Analyze social learning Theoretical basis: Socioconstructivism Concept of formative research: Socially mediated learning Contribution to constructivism: Interaction and pedagogical mediation	Reflection-in-action: Reflection through interaction Mental representations: Social construction of knowledge Induction/Deduction: Contextual induction and deduction Contribution to scientific logic: Strengthens critical thinking Main conclusion: Social context influences learning
Jerome Bruner [3]	Objective: Explain discovery learning Theoretical basis: Constructivism Concept of formative research: Learning through exploration Contribution to constructivism: Guided discovery	Reflection-in-action: Reflection during problem-solving Mental representations: Cognitive organization of knowledge Induction/Deduction: Predominantly deductive Contribution to scientific logic: Development of scientific reasoning Main conclusion: Students learn through inquiry
Donald Schön [5]	Objective: Analyze reflective practice Theoretical basis: Reflective learning Concept of formative research: Research as reflective practice Contribution to constructivism: Critical knowledge construction	Reflection-in-action: Reflection-in-action Mental representations: Cognitive restructuring Induction/Deduction: Inductive and deductive analysis Contribution to scientific logic: Improves analytical capacity Main conclusion: Reflection strengthens professional competencies

Table 1. *Cont.*

Author/Year	Theoretical and Formative Research Focus	Contribution to Scientific Logic and Main Conclusion
Catherine Twomey Fosnot [4]	Objective: Apply constructivism to teaching Theoretical basis: Pedagogical constructivism Concept of formative research: Research as active learning Contribution to constructivism: Meaningful knowledge construction	Reflection-in-action: Critical reflection on learning Mental representations: Active interpretation of concepts Induction/Deduction: Integration of logical reasoning Contribution to scientific logic: Development of scientific thinking Main conclusion: Knowledge is built through experiences
Studies on formative research	Objective: Analyze research strategies in higher education Theoretical basis: Research pedagogy Concept of formative research: Learning through inquiry Contribution to constructivism: Active student participation	Reflection-in-action: Permanent critical evaluation Mental representations: Contextual scientific understanding Induction/Deduction: Combined use of induction and deduction Contribution to scientific logic: Strengthens research logic Main conclusion: Formative research develops scientific competencies

Source: Author's elaboration based on documentary analysis.

3. Results and Discussion

Although there is an indivisible link between teaching and research in the production of quality higher education, this relationship is not always harmonious or productive. It is often marked by tension and may become biased toward one component: either weak classroom teaching or research performance negatively affected by teaching obligations. The aim is to develop both teaching and research in a balanced and productive manner. This article argues that formative research can occupy this space if its objectives are flexible, if financial investment and technological resources are strengthened, and if scientific-logical reasoning, grounded in inductive and deductive approaches, is considered essential within the scope of formative research.

The following sections present the relationship between constructivism and formative research, the role of reflection-in-action, the construction of mental representations through a reflective classroom, and inductive and deductive approaches in scientific research. These elements constitute the conceptual and theoretical framework. The article also analyzes pedagogical aspects of implementing formative research, including its concept and modalities, the relationship between teaching and research, the teacher as an academic and administrative manager, and the evolution of formative research in Peru as a Latin American case.

3.1. Constructivism and Formative Research

Formative research can be understood from a constructivist perspective because it promotes active learning processes, critical reflection, and the construction of scientific knowledge in university students [1–4]. Constructivism states that knowledge is not mechanically transmitted; rather, it is actively constructed by learners through experiences, interactions, and reflective processes. From this perspective, learning involves reorganizing prior ideas and developing new cognitive structures, or schemas, through problem-solving and critical analysis.

Piaget [1] argues that learning occurs through assimilation and accommodation, through which individuals modify their cognitive schemas to adapt to new experiences. In the university context, this implies that students develop scientific thinking when they actively engage with research problems and build logical explanations supported by empirical evidence, guided by a teacher who promotes reflection in the classroom.

Vygotsky [2] emphasizes the importance of social context and interaction in the formation of knowledge. His sociocultural theory states that learning develops through pedagogical mediation and the exchange of experiences. Formative research therefore favors collaborative spaces where students, under teachers' guidance, construct scientific knowledge through dialogue, reflection, argumentation, and shared academic work.

Bruner [3] considers that learning should be oriented toward discovery and active participation. From this perspective, formative research constitutes a pedagogical strategy that strengthens students' capacity to explore, interpret, and generate knowledge in real learning contexts. In contemporary education, Fosnot [4] highlights the practical application of constructivism by emphasizing that learning occurs when students actively participate in inquiry, analysis, and reflection. The teacher must act as a mediator who promotes problem situations that allow students to develop critical thinking and construct their own meanings.

Recent contributions also reinforce the value of constructivist learning. Kugele [11] emphasizes that individuals actively construct their understanding of the world through interaction with the environment. Learning is dynamic because mental models change and improve through the connection between prior and new knowledge. Le and Nguyen [12] show that constructivist learning can overcome teacher-centered methods by strengthening analytical and critical thinking, deep learning, and student–teacher interactions.

Dialogical pedagogy, as a methodological strategy within constructivist pedagogy, counters passive learning and strengthens learning through experience, higher-order cognitive skills, logical reasoning, self-criticism, and reflective thinking [13]. Applied to the classroom from a systemic perspective, constructivism allows students to be understood as open systems that interact with cultural and social agents and as closed systems that relate new learning to personal experience. The production of meaning through the scientific method is cross-cutting across both systems, as students inquire, conduct research, and reflect through rigorous methodologies and evidence collection.

Accordingly, formative research is not limited to the teaching of research methods. It is a holistic strategy for developing higher-order cognitive skills, scientific reasoning, and research logic in university education. The constructivist approach provides the theoretical foundation for formative research by promoting knowledge construction, critical reflection, and scientific reasoning [1–4]. Indeed, research-based learning is an educational approach that fosters students' curiosity and critical thinking by engaging them in formulating and exploring questions, thereby promoting deeper, more meaningful learning. The relationship between theory and practice, linked to the critical analysis of students' experiences and mediated by the teacher's guiding role, is central to the research process. In this way, the modality of reflection-in-action emerges. This modality, developed in the 1980s, provides an operational basis for teachers who apply formative research. The following section analyzes the pedagogical contribution of this modality to formative research.

3.2. Reflection-in-Action and Formative Research

Schön [5] introduced the concept of reflection-in-action in the 1980s. According to Tardif and Gauthier, this involves reasoning about the course of action and is therefore a form of practical reasoning rather than merely theoretical rationality [14]. It is an immediate form of reflection that attempts to modify physical or social reality during action. After the

action has ended, reflection-on-action allows the subject to distance himself or herself from what occurred and to evaluate the activity as a whole, stimulating metacognition and deep, meaningful learning [14].

Education has the essential function of developing students' reflective and critical capacities according to their level of development. This implies transforming classrooms into analytical, innovative, and entrepreneurial spaces for decision-making in relation to real problems and existing theory. Research and education can be linked when subjects adopt a reflective and critical attitude toward practice or existing theoretical knowledge [15].

Reflection-in-action has important pedagogical implications because teaching is conceived as the application of didactic resources to help students think systematically and rigorously, enabling them to solve practical problems in their environment. Reflection is therefore a central concept: it refers to the thought process that seeks to give coherence to an initially confusing situation [16], integrating theory and practice, reflection and logical thinking, and stimulating professional competencies [17].

Through formative research, students develop capacities for problem identification, structured action planning, implementation, and reflective review. These processes strengthen critical thinking, problem-solving, data management, scientific experimentation, and communication skills [18]. Reflection-in-action therefore produces awareness of what is being done and helps create and refine increasingly rigorous cognitive schemas about reality.

What is learned and taught through formative research consists, to a large extent, of mental representations. Students learn mental models and optimize cognitive schemas through reflective practice during and after learning events, guided by an expert, tutor, or professor [5,7]. Mental representations and models are learned meaningfully when the scientific method provides order and rigorous logic for investigating facts and events in physical and social reality.

3.3. Building Mental Representations Through a Reflective Classroom

Through theoretical reflection on practice and the creation of an analytical classroom, students learn to construct their own mental representations. Learning is not limited to the assimilation of content or skills; rather, students construct mental models to solve problems and develop innovative solutions.

Vosniadou [6] argues that mental representations may mediate the interpretation of counterintuitive scientific information and the understanding of cultural artifacts. Through formative research, students reflect on the validity of spontaneous knowledge by applying systematic logic oriented toward empirical verification, which challenges mere belief. The concept of mental representation is central to the cognitive approach to learning. According to Johnson-Laird, mental models unify the representation of objects, states of affairs, sequences of events, and social and psychological actions, allowing individuals to infer, understand phenomena, decide courses of action, control execution, and experience events [7].

Science learning is especially important in university education because science enables rigorous thinking that combines empirical knowledge of the object of study with its mental representations and models [6,7]. This process allows the identification of problem characteristics, the analysis of variables, the review of the research background, hypothesis formulation, methodological design, the presentation of results, discussion, analysis, and conclusions. Scientific reasoning differs from mere belief or speculation precisely because of the empirical and evidentiary character of the scientific method.

Formative research in higher education promotes the development and optimization of cognitive schemas applied to practice through original and innovative mental representa-

tions. This process is mediated by a teacher who stimulates a reflective classroom through critical and creative thinking [5,7]. In addition to these psychosocial factors and classroom ecology, it is necessary to link formative research with the generation of knowledge through scientific inquiry. This theoretical basis supports the proposal of two modalities of formative research: one emphasizing scientific research and another emphasizing didactic classroom work.

3.4. Inductive and Deductive Approaches in Scientific Research

Scientific research is based on reasoning processes that enable the interpretation, explanation, and systematic construction of knowledge. Among the most relevant approaches to scientific thinking are induction and deduction, which constitute essential foundations of scientific logic and research processes in higher education. Both are complementary forms of reasoning that guide the formulation of ideas, the interpretation of evidence, and the construction of conclusions in academic and scientific practice.

The inductive approach begins with particular observations in order to establish generalizations, categories, or theoretical principles. Through this process, the researcher analyzes specific facts, identifies patterns, and constructs interpretations that allow phenomena to be understood progressively. In the context of formative research, induction favors the development of observation, critical analysis, and discovery skills, allowing students to construct scientific knowledge from experience and contextualized exploration.

The deductive approach, by contrast, is based on the application of general principles, theories, or previously established concepts to explain specific situations. This form of reasoning enables contrasting ideas, formulating hypotheses, and developing logical explanations grounded in theoretical foundations. In university education, deduction strengthens argumentative capacity, rational analysis, and methodological coherence, all of which are indispensable for scientific thinking.

Systematic inquiry studies that emphasize theorization and logical analysis highlight the intellectual activity involved in research and open up a field of documentary research with deductive and inferential characteristics. Empirical research, grounded in practical experience with surrounding reality, produces exploratory, qualitative, descriptive, correlational, and experimental studies. According to Lewthwaite and Nind [19], under the leadership of the classroom teacher, mastery of quantitative, qualitative, and mixed-methods research connects students with research by offering direct, immersive experiences of research practice and encouraging reflection on empirical experience.

From a constructivist perspective, inductive and deductive processes do not operate in isolation. They are integrated within active learning experiences, critical reflection, and problem-solving. The contributions of Piaget, Vygotsky, and Bruner [1–3] show that scientific knowledge develops through interaction, cognitive reorganization, and progressive discovery. Similarly, Schön's [5] reflection-in-action strengthens students' capacity to analyze research decisions and to adjust their reasoning processes continuously and critically.

Knowledge of these methods and approaches opens the possibility of applying formative research in university classrooms without expecting high-impact or highly innovative research outcomes. The first task is to teach students, through didactic strategies, to think scientifically. This occurs through a deductive research approach, using academic and research documents as bibliographic foundations for a course and generating theoretical categories through teacher mediation and reflective classroom analysis. A second modality emphasizes scientific research through an inductive approach that collects field data using instruments and techniques under teacher guidance and later analyzes the results in a reflective classroom.

The emphasis on inductive and deductive approaches therefore supports the proposal of two modalities of formative research: the first emphasizing didactics and aligned with the deductive approach, and the second emphasizing the scientific research process and linked to the inductive approach. This development is presented in subsequent sections. The next section analyzes the pedagogical aspects involved in implementing formative research.

3.5. Teaching and Research in the University

Teaching and research are two basic functions of the university. Society expects universities to train competent professionals capable of solving practical problems in their areas of specialization, while also expecting universities to develop high-level research that contributes to science and social development. According to Arroyo [20], scientific research at undergraduate and postgraduate levels is essential not only for academic growth but also for sustainability, innovation, and evidence-based decision-making in response to current problems [21].

The relationship between teaching and research is multiple and diverse. Some authors consider both functions to be reciprocal, indivisible, and mutually enriching [22]. Others argue that university teachers can advise on research while effectively fulfilling teaching tasks [23]. However, other studies show that university professors may experience conflicts between teaching and research due to limited time and resources [22]. Such conflict may negatively affect research performance, although stress, when properly managed, can also become a challenge that improves research efficiency [22].

Cenamor [24] distinguishes three types of relationships between teaching and research. The first is conflictual, when teaching and research are viewed as opposing tasks. The second is complementary, in which both activities share skills such as disseminating new knowledge, creativity, and critical analysis. The third is unrelated, when both are considered separate and the teaching load is viewed as an obstacle to research success.

Conducting research involves exploring, documenting, analyzing, reviewing background, collecting empirical evidence, experimenting, discussing, drawing conclusions, and disseminating results. To meet this function at a high level, universities must train specialized human resources, allocate financial resources, and integrate interdisciplinary and transdisciplinary teams with appropriate technical means [25].

Universities should commit to producing impactful and meaningful research. They may form groups of specialists and student research seedbeds according to competencies and potential. Teaching and research can be combined if institutions reduce pressure on teachers and adopt incentives and support mechanisms. Relevant lines of action include teaching as part of the research activity and using research when planning classes [23].

For classroom teachers whose priority is teaching rather than high-level research production, the expectation should be to optimize their teaching function through research, whether inductive or deductive. They can analyze the state of the art of their discipline, categorize, process, interpret, and select relevant aspects associated with professional experience and contextual needs. The objective that should not be neglected is teaching students how to think.

The teacher therefore becomes an intermediary agent who stimulates critical analysis and encourages students to conduct documentary research with a deductive approach or empirical research with an inductive approach at a basic level [26]. Even if this form of teaching is not equivalent to high-impact scientific research, teaching students to think scientifically is a complex cognitive task that develops higher-order cognitive skills, logical mental representations, and rigorous schemas capable of generating new knowledge in formative contexts.

3.6. The Teacher as Academic and Administrative Manager

The academic and administrative management role of the university teacher involves lesson planning, didactic implementation, formative and summative assessment, tutorial work, university social responsibility activities, participation in curriculum design, and the preparation of learning syllabi. The teaching–learning process is dialogical and circular: teaching and learning overlap, and educational agents exchange positions [27]. To teach, the teacher must first learn curricular topics, didactics, learner psychology, group sociology, the educational community, and institutional dynamics. The teacher then becomes a designer, classroom manager, evaluator, and researcher.

Universities must carry out complex and important activities responsibly without neglecting any of them. Nevertheless, teaching and research must be developed effectively, in both documentary and empirical modalities, especially at the undergraduate level. In many Latin American universities, functional conflict between teaching and research is aggravated by precarious working conditions, which affect academic quality, research quality, and researchers' mental health [28]. Institutions must therefore adopt proactive approaches to create work environments that foster collaboration, creativity, and well-being.

Various ways of linking scientific research with pedagogical training have emerged. These share a common core: teachers seek to clarify the research process, provide practical experience, and facilitate critical reflection [29]. A coherent approach should address academic experience as a whole and recognize the disciplinary epistemologies that structure knowledge production, methodology, field of study, and teaching methods [30,31].

This article proposes the creation of a system called formative research that links teaching and research to promote holistic student development. This system develops research capacities that allow students to act reflectively and practically in their social environment through scientific logic in the classroom. It should also respect disciplinary particularities while maintaining the common core of formative research: analysis, critical thinking, social connection, decision-making, and reflective practice.

Research should be understood as a continuum in university education, extending from undergraduate to postgraduate studies [32]. Postgraduate education aspires to higher-impact research, while undergraduate education requires formative research as a preparatory and developmental pathway. From this perspective, two modalities are proposed: formative research as a didactic resource, or pedagogical research, applied by the teacher in the classroom; and formative research emphasizing scientific research, technology, and innovation. In both modalities, the common goal is to teach students to think with the orderly and rigorous logic characteristic of scientific inquiry.

3.7. Formative Research: Conception and Modalities

Formative research activities aim to promote the acquisition and development of knowledge, skills, and attitudes so that teachers and students can engage in activities related to scientific research, technological development, and innovation in academic or productive sectors [9]. Formative research may also be understood as teaching through research or teaching using the research method [9]. In any course, the teacher applies strategies and activities that promote scientific and logical reasoning and problem-solving, tailored to students' levels of development.

According to Parra Moreno [9], formative research has two fundamental characteristics: it is directed and guided by a professor as part of the teaching function, and the research agents are not professional researchers but learners in training. This article therefore distinguishes two modalities: formative research as a didactic resource and formative research emphasizing scientific research.

3.7.1. Formative Research as a Didactic Resource

This modality emphasizes teaching and is embedded in the formative process as part of the teacher's work to promote new cognitive competencies in students. The promotion of new cognitive competencies implies the development of thinking skills that can be taught and practiced regularly. In the university setting, it is essential to teach students to think by promoting cognitive transformation and logical–conceptual innovation through technology, active strategies, and practical field experiences that strengthen professional performance.

Research as a didactic strategy is natural to university work because it is directly related to the teaching–learning process and the curricular activities of the teaching function. Didactic research helps professors improve teaching quality and helps students optimize learning processes [9]. Research training is especially meaningful when undergraduate students actively participate in inquiry-based learning, which deepens understanding [33].

Formative research is a pedagogical and didactic challenge because it seeks to give scientific relevance to the content taught, familiarize students with the logic of research, and initiate them into its practice. Discovery learning and construction strategies are particularly relevant [10]. From the perspective of the social construction of reality, teaching implies sharing a representation of reality, a narrative, and a set of discourses constructed from evidence in a specific time and context [34]. Teachers and students jointly construct representations in the form of concepts, images, skills, and problem-solving strategies.

As a didactic strategy, formative research guides the teacher in encouraging, stimulating, and accompanying students through scaffolding, in line with Vygotsky's sociocultural approach [2]. The teacher acts as an intermediary between cultural knowledge and students' experiences. Contemporary teachers must encourage original and logical thinking that is tested against reality according to each specialty, while being aware of the cognitive representations they seek to promote and the strategic means they use as didactic resources. Tomasello [35] distinguishes imitative, instructed, and collaborative learning as forms of cultural learning mediated by intersubjectivity.

From a didactic perspective, formative research must be grounded in teaching students to think scientifically. During practical activity, cognitive and social representations are built in students' minds and shared with teachers. Practical activity is important, but it should not be an end in itself; it must be supported by theory, reflection on results, and rigorous analysis. Active methodologies such as problem-based learning, the case method, projects, the flipped classroom, essays, gamification, collaborative learning, cooperative learning, design thinking, and thinking-based learning can be useful when oriented toward reflective classroom work [36,37].

Teaching students to think implies creating a space for reflection in and on practice, where teachers and students learn through reflection on experience [5]. Formative research as a didactic resource should be understood as teaching through research or teaching using the scientific method. It requires the teacher to create reflective classrooms, analyze theories, design activities, formulate strategies, ask questions, and promote experiences. It also requires empirical discoveries, whether incipient or advanced, to be narrated and guided by the teacher so that students develop innovative mental representations transferable to other contexts.

From this perspective, formative research emphasizing didactics is a curricular strategy with didactic purposes. It involves the teacher–student relationship, fosters scientific curiosity, and promotes problem-solving based on scientific logic in relation to course content and teaching methods. It should be intentional, connected to professional problems, adapted to students' development, supported by guidance and motivation, based on creative methods, contextualized, participatory, and collaborative [37].

This modality has value in itself because it promotes higher-order cognitive skills, intellectual curiosity, creativity, critical thinking, decision-making, problem-solving, and basic knowledge management strategies [9]. It does not focus primarily on final research products but on the foundations of human behavior: thinking, mental representations, and cognitive schemas optimized by scientific logic within teaching and learning.

The teacher is the main actor in research as a didactic or teaching strategy. The central objective is not to generate transcendent knowledge, but rather to operate within the more concrete space of grounding and solving problems specific to the profession by applying reflective teaching strategies that facilitate learning. Under these considerations, formative research has value in itself, as it promotes higher-order cognitive skills and supports a holistic approach to academic preparation in research, intellectual curiosity, creativity, critical thinking, decision-making, problem-solving, and basic knowledge management strategies. This modality of formative research, with an emphasis on didactics, focuses not on the final product but on the foundations of human behavior: thinking, mental representations, and cognitive schemas optimized through the application of scientific logic within the teaching-learning process.

Emphasizing the importance of "didactic research" or "pedagogical research" as a modality of "formative research," we agree with Parra Moreno, C., who states that this type of research carried out by the classroom teacher is also rigorous, like high-level scientific research. Although its purpose is not to produce "new knowledge" for the scientific community, it is new for the teacher; it allows the teacher to "perfect what he or she already possesses," and such knowledge is "truthful, valid, and reliable, by virtue of the methodological rigor and systematicity with which it has been acquired" [9].

This type of research, which may be questioned by scholars who conduct "high-level" productive research, is carried out by the classroom teacher, who, without greater pretensions, stimulates critical thinking and decision-making by creating a "reflective classroom" within a creative and stimulating environment. Its purpose is to "teach students to think with scientific logic." From our perspective, this is valid and justified, and it has invaluable worth when students later conduct high-level research. In the present moment, students question and debate ideas and research findings while also becoming familiar with the application of the scientific method. They apply the knowledge they have gained to solve problems in their specialty and to analyze new constructs and categories of knowledge. Thus, the work of the classroom teacher serves a strategic, often invisible function that has become essential in recent times. On the one hand, it enables professionals to train in problem-solving specific to their field within a professionalizing approach; on the other hand, it enables students to develop academic and research competencies. Similarly, at the institutional level, professional programs benefit from national and international accreditation and university licensing, which are regulatory requirements intended to ensure the quality of higher education.

3.7.2. Formative Research with Emphasis on Scientific Research

This modality emphasizes scientific knowledge and is probably the best-known application of formative research. Its purpose is to prepare students to conduct high-level scientific research later. It can strategically promote research seedbeds and incubation spaces for future researchers. In this process, learning research methods is essential for producing results and disseminating them to the scientific community under the guidance and supervision of a research professor.

Formative research emphasizing scientific research identifies categories of research skills: basic research skills such as observation and logical processes; conceptual construction skills; skills specific to research methodology; skills for knowledge production and dissemination; and digital skills [38].

Observation is not simply a sensory-perceptual skill. It is useful for identifying research problems by drawing on prior cognitive schemas that guide what to observe, how to classify phenomena, and how to compare them with similar or different phenomena. At a higher cognitive level, analysis, synthesis, and evaluation are applied, strengthening observational acuity, description, and analysis [38].

Conceptual construction skills are applied in information searches, hypothesis formulation, interpretation of results, identification of conclusions, and management of possible applications through development projects and university social responsibility. Methodological research skills involve planning how to collect information using methods and resources adapted to the phenomenon under study, and identifying the research problem, objectives, theoretical framework, hypotheses, strategy, procedure, and methods.

The research process also requires determining the study type, selecting instruments, identifying the population, planning activities, and establishing a timetable. Reflection and analysis are essential throughout the process. Students must be familiarized with the academic style of their specialty, whether APA, Vancouver, or another style. After presenting and describing the results, students should synthesize the findings, contrast them with previous studies, discuss them, identify limitations, propose future lines of inquiry, and identify specific and general contributions.

Dissemination is also fundamental. An unpublished study effectively does not exist and will have no future value. This is the culmination of skills for the production and dissemination of knowledge. Academic units should design institutional channels for dissemination, clarify research lines, and inform students about other relevant academic spaces. Digital skills are also essential for specialized information search, data processing, and scientific dissemination.

This modality should make the research process visible, actively involve students in methodological aspects, facilitate learning through the experience of doing research, and foster critical reflection on research practice [29]. The benefits are twofold: students develop research skills, and teachers improve their own research and methodological teaching capacities [39]. We conclude our analysis with a reflection on how formative research has evolved in Peru, as in other Latin American countries that face challenges and difficulties in implementing research as an essential dimension of human development.

3.8. Evolution of Formative Research in Peru

For decades, Peru, like other Latin American countries, has recognized that research is a fundamental function of the university. University research is essential for two reasons: it contributes to national development through links with society, and it promotes the learning of scientific mechanisms for generating new knowledge [40]. Since the emergence of international rankings measuring university research activity, Peru enacted University Law No. 30220 in 2014 and established SUNEDU as the regulatory body responsible for supervising the quality of higher education. This process encouraged research, the formulation of research lines, and the involvement of teachers and students in innovation and knowledge transfer [41].

Since then, Peruvian universities have intensified their research efforts and created spaces for interaction between teachers and students in which teaching through research or teaching using the scientific method is systematically included in professional study plans. However, some universities still conceive undergraduate research narrowly, assuming

that it must always be high-impact research. This view ignores the gradual learning required for students to apply the scientific method and understand the complexity of high-impact studies.

Productive research is usually defined as rigorous research that seeks tangible results and incorporates new and innovative elements into scientific production [42]. The problem is that an excessive emphasis on productive research can undervalue formative research and render it invisible. Both productive and formative research should coexist in Peruvian universities. Not all students will become researchers as their main professional activity, but all students need research capacities to apply them in their work [40].

Research seedbeds and scientific student societies have historically served as limited and isolated spaces for research training in Peru. The need to link research training or formative research with productive research has become increasingly evident [40]. Formative research does not necessarily seek novelty or originality as a primary objective; rather, it develops capacities related to scientific logic, knowledge updating, and professional skills [9,40].

Miyahira [40] specifically states that, approximately two decades before the publication of his work, there were research groups and scientific student societies in Peru, in some cases linked to universities such as Universidad Peruana Cayetano Heredia. These groups acted as "research seedbeds" and provided research training, generally in a limited and isolated manner, with the expectation of carrying out this activity in the future with a higher level of impact. Since that time, particularly since the 1990s, the need to link research training, or "formative research," with "productive research" became evident across the academic education provided by Peruvian universities, as Miyahira [40] had already suggested. According to the author, the purpose of formative research should be to disseminate existing information and help students incorporate it as knowledge. It does not primarily seek novelty or originality; rather, it develops capacities related to scientific logic that enable knowledge updating and the development of professional skills. In a certain sense, Miyahira anticipated the coexistence between a "productive approach to research" and a "holistic development approach" for university students, generating a paradigm shift that is currently being cultivated in Peru.

Recent studies show that the concept of formative research in Peruvian universities has evolved from an initial perspective focused on research skills toward a more holistic vision connected to society and professional practice [43]. This evolution transforms formative methodologies and promotes evidence-based knowledge. Unlike basic and applied scientific research, formative research focuses on enriching students' holistic development and improving professional skills [43].

Empirical studies with undergraduate students in Lima show diverse perceptions of formative research: training to conduct scientific research, curricular or extracurricular activities related to research, preparation for graduation research, development of professional research competencies, instructional strategy, and strengthening of research culture [44]. These perceptions reveal that formative research is often seen as transitional or utilitarian rather than valuable in itself. Many students also perceive that formative research has been neglected, which represents a challenge for improving professional education through qualified instructors, relevant methods, updated curricula, and guaranteed resources.

Documentary studies of Peruvian universities show that formative research has increased and is more common in public universities than in private ones. It is mainly included in institutional educational models and strategic plans [45]. Nevertheless, important challenges remain, including insufficient integration of formative research into university curricula and the need to foster a research culture that transcends classrooms.

Some universities have begun to implement clearer policies for research training, offering workshops, seminars, and spaces for scientific project development [45].

At the Latin American level, scientific production on formative research has increased, especially in indexed journals and regional academic networks [46]. This reveals that research, innovation, and technology are feasible pathways toward development, provided that human resources are prepared through university research skills. From our perspective, the development of formative research in Peru, which is similar to that of other Latin American countries, requires addressing the following challenges: (a) discussing the theoretical foundations, as an essential dimension, of theories and concepts that emphasize the importance of stimulating reflection and scientific logic in students by constructing more rigorous schemas and mental representations; and (b) as an operational framework, designing formative research programs aimed at developing higher-order cognitive skills and applying strategies and techniques specific to the scientific method, according to the academic and administrative level of the university institution. Based on the preceding analysis, we present below a program proposal derived from implementation experience at a privately managed Peruvian university. The proposal has been reformulated and adapted by the author.

4. Proposal for a Formative Research Program from a Holistic Student-Development Approach

The formative research activities proposed in this program account for students' differences and academic development, reflecting their progress in the study plan. They may also serve as a basis for diagnosing and evaluating projects implemented as university social responsibility, outreach, and extension activities. A fundamental criterion is that a formative research program is strictly formative and does not seek to present finished products normally expected from specialized educational agents.

The proposal is the result of previous implementation experience in a privately managed Peruvian university and has been reformulated and adapted by the author. It is organized around objectives, a general implementation strategy, specialized committees, stages of activity, and two complementary sets of actions: activities emphasizing scientific research and active didactic methodologies.

4.1. Objectives

The first objective is to optimize learning by implementing a reflective classroom that stimulates scientific-logical thinking, guided by the teacher through the scientific method and active, participatory didactic strategies. This should increase motivation and the use of basic tools for documentary analysis and empirical exploration among teachers and students.

The second objective is to foster a research culture within the educational organization and to influence the learning process through planning of study programs, didactic methodology, and formative assessment.

4.2. General Implementation Strategy

Considering differences in academic development by semester, formative research activities should be planned, implemented, and evaluated in the syllabi and formative programs of all courses across professional schools.

The modality of formative research as a didactic resource should be applied across all courses to foster reflective classrooms and scientific–logical thinking among teachers and students.

The modality of formative research emphasizing scientific research should be determined according to course content. It is advisable to identify one transversal course per semester that focuses on empirical research skills, study design, instrument application, and conceptualization of results.

The general methodology may apply the following principles: integrating knowledge, skills, and attitudes; emphasizing contextualized learning; emphasizing learning processes, strategies, and methods oriented toward inquiry and lifelong self-learning; emphasizing practice and performance to facilitate transfer to real life [17]; and requesting reflective reports in which students interpret texts, argue, write original products, present, and narrate [47].

4.3. Functions of Formative Research and University Social Responsibility Committees

To implement the program, it is important to create or activate specialized committees in each professional field. These committees should assume management functions in rational and equitable planning, teacher training, evaluation, and dissemination.

These committees should train teachers in formative research as a didactic resource and in formative research emphasizing scientific research, creating reflective classrooms that apply deductive approaches through theoretical and research background analysis and inductive approaches through empirical exploration instruments.

They should also formulate lines of research work linked to outreach and university extension. In the modality emphasizing scientific research, committees should select the courses in which activities will be implemented in order to avoid excessive student workload.

They should support planning and implementation through advising, group meetings, monitoring, recording results, and disseminating the experience.

They should guide, supervise, and evaluate the program's implementation in three phases: planning; implementation; and reporting, registration, and dissemination of activities.

4.4. Activities

In the planning phase, specialized committees, together with teachers, identify the course that will develop the research activity, preferably one course per semester. Selection should consider the teacher's experience in the topic, motivation, and training in scientific research. Committees should also plan training sessions and identify didactic formative experiences for all teachers in the specialty.

In the implementation phase, committees monitor and support teachers in courses that apply formative research emphasizing scientific research, as well as teachers who apply formative research for didactic purposes.

In the reporting, registration, and dissemination phase, formats should be designed to record activities related to formative research, scientific research, social responsibility, outreach, and extension. Teachers should report experiences that had a significant impact on students. The best activities may be disseminated in the educational community to encourage exchange and motivation.

A form for formative research activities emphasizing scientific research, outreach, and university extension may include the following: name of the activity; purpose expressed in terms of student competencies; assessment indicators; responsible parties, including students and teachers; beneficiaries; and a schedule specifying the beginning and end of the activity during the semester.

At the end of the academic semester, the teacher responsible for the course should submit a results report, along with evidence, to the specialized committee of the professional

school. The report may include the name of the activity, execution dates, responsible persons, participants, beneficiary population, products and relevant incidents, material and financial resources used, final results, and annexes such as forms, surveys, videos, and photographs.

Next, we propose formative research activities emphasizing scientific research (Table 2), as well as the corresponding active didactic methodologies (Table 3), the latter related to formative research emphasizing didactics. The contents have been reworked based on the author's previous experience.

Table 2. Formative Research Activities with Emphasis on Scientific Research and University Social Responsibility Activities.

Levels	Academic Semester	Formative Activities	Academic Weight (%)
Level 1: Thinking with scientific logic	Semesters I–III	Participate in and organize solidarity campaigns for awareness purposes while identifying basic problems affecting the population.	50
		Become familiar with specialized digital search engines and analyze the structure of research articles.	20
		Analyze quantitative and qualitative components of selected scientific articles.	10
		Produce intellectual products respecting academic standards; participate in reflective classroom activities.	20
Level 2: Preparation of research projects and social development profiles	Semesters IV–VII	Develop information-gathering strategies and intellectual products according to the style of the specialty.	10
		Participate in panels analyzing social problems.	25
		Participate in solidarity campaigns while also identifying the basic problems faced by the population.	10
		Develop scientific research projects.	25
		Develop social and technological development profiles, suggesting remedial actions.	30
Level 3: Implementation and execution of research and social development projects	Semesters VIII–X	Participate in campaigns providing technical support to the community.	15
		Collect information and discuss results for research and social development.	15
		Implement research and social or technological development projects.	25
		Execute projects.	25
		Disseminate intellectual products and identify appropriate academic media for dissemination.	20

Source: Adapted from Construction of the University Curriculum [48].

Table 3. Active Didactic Methodologies Related to Formative Research with Emphasis on Didactics.

Didactic Methodology	Conceptualization	Application
Teacher exposition and dialogue	An active methodology that moves away from traditional lectures and transforms the classroom into a dynamic, shared space for explanation, dialogue, participation, reflection, and collective knowledge construction.	Structured explanation by the teacher; dialogue with students; questions, exchange of ideas, reflection on consequences and applications; connection between previous experience and new learning; contextualization.
Problem-based learning (PBL)	An active, student-centered methodology in which real or simulated problems are presented before theoretical explanation. Students seek solutions through group work and reflection.	Presentation of an open and complex problem; teamwork; formulation of hypotheses and questions; identification of what is known and what needs to be learned; information search; reasoned solutions and discussion.
Case method	A methodology similar to PBL but based on a concrete, narrative, and structured case with specific data. The teacher acts as a moderator of discussion.	Presentation of a real or simulated case; individual or group analysis; identification of specific problems; decision-making; debate and moderated discussion.
Project method	A didactic strategy in which students plan, investigate, collect information, intervene, organize, and present a practical and meaningful final product.	Organization around a real problem or need; collaborative planning, research, execution, organization, and final report; interdisciplinary cooperation and shared responsibility.
Flipped classroom	A pedagogical model that reverses the traditional sequence: theoretical content is studied at home through videos, readings, or digital resources, and class time is devoted to application and discussion.	Autonomous study at home; classroom problem-solving, discussion, practical exercises, collaborative projects, and teacher guidance.
Monographs and essays	These become active methodologies when approached as processes of inquiry and critical reflection aimed at developing search, analysis, synthesis, and argumentation skills.	Topic selection; information search and consolidation; connection with practice; logical and critical writing; oral defense and feedback.
Gamification	The use of game elements in formative situations to increase motivation, teamwork, and classroom social climate through challenges.	Definition of a learning objective; creation of a challenge; selection of digital resources; rewards; feedback and reflection.
Collaborative learning	A flexible methodology in which students work together in small groups with shared roles and functions, developing academic and social skills.	Formation of groups; role assignment; meaningful tasks; group rules; teacher guidance; individual and group evaluation.
Cooperative learning	A more structured form of group learning in which the teacher actively organizes groups, roles, tasks, and expected products.	Define outcomes; design tasks and subtasks; form heterogeneous groups; assign responsibilities; monitor and evaluate.
Design thinking	A teamwork approach to creative problem-solving focused on people's needs through empathy, definition, ideation, prototyping, and testing.	Empathize; define the problem; generate ideas; select and prototype solutions; test and improve.

Table 3. *Cont.*

Didactic Methodology	Conceptualization	Application
Thinking-based learning (TBL)	A methodology that helps students make thinking processes explicit and become aware of how they think when solving a problem.	Use thinking routines; compare information; infer; identify causes and consequences; decompose complex information; evaluate alternatives; transfer knowledge and argue.

Source: Author's elaboration based on documentary analysis.

Regarding formative research activities emphasizing didactics, these activities are regularly applied in the classroom and aim to develop a research-oriented mindset in students through the following actions: (a) reflection on the problem; (b) observation of the phenomenon; (c) information gathering; (d) formulation of possible hypotheses by proposing viable solutions; (e) use of strategies and procedures that allow implementation and application; and (f) verification of hypotheses through action.

The application of active methodologies in the classroom is highly recommended because it restores students' leading roles as active learners. In a pre-experimental study conducted by Epiquién [49] in Amazonas, Peru, the authors found that formative research through problem-based learning and the debate seminar influences the development of basic research competencies, as shown in the post-test: 43.3% of participants reached the achieved level and 6.7% reached a moderate achievement level. The following table compiles and synthesizes essential aspects of the main didactic methodologies derived from the deductive approach applied to formative research, as developed above.

5. Conclusions

Formative research is a fundamental pedagogical strategy for developing scientific logic in higher education, as it transforms students into active agents of learning, capable of analyzing, interpreting, questioning, arguing, and constructing knowledge through rational and reflective processes, thereby increasing the complexity of their thinking. Its importance does not lie solely in teaching research methodologies, but in promoting the integral development of higher-order logical thinking oriented toward a critical understanding of reality.

The study shows that scientific logic is not developed exclusively through the theoretical teaching of methods or content, but primarily through contextualized research experiences that enable students to face real problems, formulate questions, contrast information, and develop well-founded explanations. This implies the need for reflective pedagogical environments oriented toward inquiry, academic discussion, the interpretation of evidence, and problem-solving. In this sense, formative research acts as a bridge between theory, reflection, and academic practice.

From the constructivist approach, formative research promotes processes of cognitive reorganization and meaningful knowledge construction. The contributions of Jean Piaget, Lev Vygotsky, Jerome Bruner, and others make it possible to understand that scientific learning emerges through the interaction among experience, pedagogical mediation, discovery, and students' active participation, thereby overcoming traditional models based on memorization and the passive transmission of information.

Constructivist and cognitive approaches, including reflection-in-action and mental representations, as well as the practice of inductive and deductive reasoning, contribute to the integral development of university students' thinking. Students learn not only by conducting research but also by continuously reflecting on their methodological decisions, interpretations, and scientific reasoning. This contributes to the development of profes-

sionals with stronger competencies to critically analyze reality, generate knowledge, and respond rationally to complex problems within social and academic contexts.

Formative research also represents an epistemological transformation of the university educational process, shifting the emphasis from the simple reproduction of content to the reflective production of knowledge. This implies conceiving higher education as a space for problematization, critical interpretation, and permanent intellectual construction.

Consequently, formative research should not be regarded as a complementary component of the university curriculum; rather, it should constitute an essential articulating axis of scientific learning and the development of highly complex thinking, linked to students' future as professionals and scientific researchers capable of generating knowledge and solving problems specific to their environment.

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References

1. Piaget, J. *The Origins of Intelligence in Children*; International Universities Press: Madison, CT, USA, 1952. [CrossRef]
2. Vygotsky, L.S. *Mind in Society: The Development of Higher Psychological Processes*; Harvard University Press: Cambridge, MA, USA, 1978.
3. Bruner, J.S. *The Process of Education*; Harvard University Press: Cambridge, MA, USA, 1960.
4. Fosnot, C.T. *Constructivism: Theory, Perspectives, and Practice*; Teachers College Press: New York, NY, USA, 2013.
5. Schön, D.A. *La Formación de Profesionales Reflexivos: Hacia un Nuevo Diseño de la Enseñanza y el Aprendizaje en las Profesiones*; Paidós: Barcelona, Spain, 1992.
6. Vosniadou, S. Model-Based Reasoning and the Learning of Counter-Intuitive Science Concepts. *J. Study Educ. Dev.* **2013**, *36*, 5–33. [CrossRef]
7. Otero, M.R. Psicología cognitiva, representaciones mentales e investigación en enseñanza de las ciencias. *Investig. Ensino Ciências* **1999**, *4*, 93–119.
8. Guerrero Useda, M.E. Formación de habilidades para la investigación desde el pregrado. *Acta Colomb. Psicol.* **2007**, *10*, 190–192.
9. Parra Moreno, C. Apuntes sobre la investigación formativa. *Educ. Educ.* **2004**, *7*, 57–77.
10. Restrepo Gómez, B. Investigación formativa e investigación productiva de conocimiento en la universidad. *Nómadas* **2003**, *18*, 195–202.
11. Kugele, S. Constructivist procedural learning for grounded cognitive agents. *Cogn. Syst. Res.* **2025**, *90*, 101321. [CrossRef]
12. Le, H.V.; Nguyen, L.Q. Promoting L2 Learners' Critical Thinking Skills: The Role of Social Constructivism in Reading Class. *Front. Educ.* **2024**, *9*, 1241973. [CrossRef]
13. Infante-Miranda, M.E.; Isea-Argüelles, J.J.; Méndez-Cabrita, C.M. Building Critical Thinking from Dialogical Praxis in the University Classroom. *Rev. Conrado* **2025**, *21*, e4697.
14. Castellanos Galindo, S.H.; Yaya Escobar, R.E. La reflexión docente y la construcción de conocimiento: Una experiencia desde la práctica. *Rev. Electrón. Sinéctica* **2013**, *41*, 1–18.
15. Arenas, Q.B.; Toro Díaz, J.; Vidarte Claros, J.A. Concepto de investigación. *Ánfora* **2000**, *8*, 87–90. [CrossRef]
16. Clarà, M. What Is Reflection? Looking for Clarity in an Ambiguous Notion. *J. Teach. Educ.* **2015**, *66*, 261–271. [CrossRef]
17. Lin, T.C.; Lee, Y.S.; Ye, J.H. A Study on Taiwan's Vocational Senior High School Teachers' Teaching Identity and Teaching Transformation When Facing a New Competency-Based Curriculum. *Front. Psychol.* **2024**, *15*, 1290551. [CrossRef] [PubMed]
18. Santiago, C.M.; Santos, J.P.E.; Mangawang, J.B. Transforming research capacity: An effective and efficient action learning development framework for young scientists. *Action Learn. Res. Pract.* **2025**, *22*, 305–318. [CrossRef]

19. Lewthwaite, S.; Nind, M. Teaching Research Methods in the Social Sciences: Expert Perspectives on Pedagogy and Practice. *Br. J. Educ. Stud.* **2016**, *64*, 413–430. [CrossRef]
20. Vernaza Arroyo, G.; Medina Sánchez, E.P.; Chamorro Quiñonez, J. Innovación, emprendimiento e investigación científica. *Rev. Cienc. Soc.* **2020**, *26*, 163–174. [CrossRef]
21. Comas, R. La investigación científica universitaria y su impacto en la sociedad. *Uniandes Episteme. Rev. Digit. Cienc. Tecnol. Innovación* **2024**, *11*, 1–2. [CrossRef]
22. Feng, R.; Wu, J.; Xie, Y. Does teaching-research conflict affect research performance? The role of research stress, engagement and job insecurity. *Cogent Educ.* **2025**, *12*, 2457907. [CrossRef]
23. Douglas, A.S. Advice from the professors in a university Social Sciences department on the teaching-research nexus. *Teach. High. Educ.* **2012**, *18*, 377–388. [CrossRef]
24. Cenamor, J. ¿Enseñar o no enseñar? Académicos jóvenes y la relación entre docencia e investigación. *High. Educ. Res. Dev.* **2021**, *41*, 1417–1435. [CrossRef]
25. Tight, M. Examining the research/teaching nexus. *Eur. J. High. Educ.* **2016**, *6*, 293–311. [CrossRef]
26. Benavides, C.; Ruíz, A. El pensamiento crítico en el ámbito educativo: Una revisión sistemática. *Rev. Innova Educ.* **2022**, *4*, 62–79. [CrossRef]
27. Monereo, C.; Hermans, H. Education and Dialogical Self: State of Art (Educación y yo dialógico: Estado de la cuestión). *J. Study Educ. Dev.* **2023**, *46*, 445–491. [CrossRef]
28. Pruna Silva, D.A.; Guzmán Campaña, J.L.; Gallegos Paredes, B.A.; Pérez Villalba, L.D. Investigación y redacción científica desde la docencia. *Rev. Conrado* **2025**, *21*, e4700.
29. Kilburn, D.; Nind, M.; Wiles, R. Learning as Researchers and Teachers: The Development of a Pedagogical Culture for Social Science Research Methods? *Br. J. Educ. Stud.* **2014**, *62*, 191–207. [CrossRef]
30. Griffiths, R. Producción de conocimiento y el nexo entre investigación y docencia: El caso de las disciplinas del entorno construido. *Stud. High. Educ.* **2004**, *29*, 709–726. [CrossRef]
31. Robertson, J. Beyond the research/teaching nexus: Exploring the complexity of academic experience. *Stud. High. Educ.* **2007**, *32*, 541–556. [CrossRef]
32. Venegas Mejía, V.; Esquivel Grados, J.; Turpo-Gebera, O. Reflexiones sobre la investigación educativa y la investigación formativa en la universidad peruana. *Rev. Conrado* **2019**, *15*, 444–454.
33. Healey, M. Linking Research and Teaching to Benefit Student Learning. *J. Geogr. High. Educ.* **2005**, *29*, 183–201. [CrossRef]
34. Berger, P.; Luckmann, T. *La Construcción Social de la Realidad*; Amorrortu: Buenos Aires, Argentina, 1967.
35. Tomasello, M.; Kruger, A.C.; Ratner, H.H. Cultural learning. *Behav. Brain Sci.* **1993**, *16*, 495–511. [CrossRef]
36. Wiyono, B.B.; Imron, A.; Sumarsono, R.B.; Musa, K.; Binti Mohd. Saat, R. The effect of constructivist learning and project-based learning model on students' entrepreneurial competence in higher education. *Cogent Educ.* **2025**, *12*. [CrossRef]
37. Zambrano Martínez, N.R. La formación en investigación de los estudiantes universitarios: Las concepciones teóricas, metodológicas y prácticas de los profesores. *Rev. Conrado* **2025**, *21*, e4562.
38. Pontificia Universidad Católica del Perú Facultad de Educación. *La Observación Como Habilidad Investigativa: Una Aproximación Desde la Investigación Formativa en Educación*; Pontificia Universidad Católica del Perú: Lima, Peru, 2025. Available online: https://facultad-educacion.pucp.edu.pe/wp-content/uploads/2025/04/LA-OBSERVACION-COMO-HABILIDAD-INVESTIGATIVA-2025-1.pdf (accessed on 12 January 2026).
39. Deem, R.; Lucas, L. Learning about research: Exploring the learning and teaching/research relationship amongst educational practitioners studying in higher education. *Teach. High. Educ.* **2006**, *11*, 1–18. [CrossRef]
40. Miyahira, J. La investigación formativa y la formación para la investigación en el pregrado. *Rev. Médica Hered.* **2009**, *20*, 119–122. [CrossRef]
41. Lavalle, C.; de Nicolas, V.L. Peru and its New Challenge in Higher Education: Towards a Research University. *PLoS ONE* **2017**, *12*, e0182631. [CrossRef] [PubMed]
42. Colán-Hernández, B. La investigación formativa en el contexto de la universidad peruana. *Rev. Interdiscip. Humanidades Educ. Cienc. Tecnol.* **2020**, *6*, 183–192. [CrossRef]
43. Turpo-Gebera, O.; Diaz-Zavala, R. Cartografía conceptual de la investigación formativa en la universidad peruana. *Hum. Rev.* **2023**, *21*, 437–450. [CrossRef]
44. Esquivel-Grados, J.; Venegas-Mejía, V.; Venegas-Mejía, C.; Gonzáles-Benitas, M.; Valdivia-Huaranga, H.; Bacón Salazar, N. Investigación formativa: Percepciones de estudiantes de Ciencias de la Comunicación de una universidad peruana. *J. Technol. Sci. Educ.* **2023**, *13*, 565–582. [CrossRef]
45. Mercado Mamani, S.L.; Barrutia Barreto, I.; Mercado Portal, J.L.; Mamani Cahuta, L.D.; Rolin Diaz, C.D. La investigación formativa en las universidades peruanas: Análisis de tendencias y desafíos en documentos institucionales. *Rev. Lusófona Educ.* **2024**, *64*, 85–102. [CrossRef]

46. Mamani-Benito, O.J.; Carranza Esteban, R.F.; Hernández-Vásquez, R.; Tito-Betancur, M.; Turpo Chaparro, J.; Torres-Miranda, J. Producción latinoamericana sobre investigación formativa en Scopus. *Educ. Médica Super.* **2022**, *36*, e3135.
47. Trimasse, N. The use of reflective reports in higher education. *Reflective Pract.* **2024**, *26*, 154–171. [CrossRef]
48. Martínez Carpio, H.; Guzmán Gamero, R.; Benavente Morales, A.; Cateriano Chávez, T.; Vargas Olivera, G.; Meza Gómez, P.; Delgado del Carpio, P.; Alemán Achata, Y. *Construcción del Currículo Universitario: Diseño y Gestión del Currículo Universitario*; Universidad Católica de Santa María: Arequipa, Peru, 2019.
49. Epiquién, M.; Oc Carrasco, O.J.; Farje, J.D.; Silva, Y.A. Investigación formativa en el desarrollo de competencias investigativas en estudiantes universitarios. *Rev. Cienc. Soc.* **2023**, *29*, 402–414. [CrossRef]

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