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Formative Research to Strengthen Enquiry Competence in University Students

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Abstract. The purpose of the study was to demonstrate the effectiveness of formative research in strengthening enquiry competence in university students. In this sense, a single-group design with pre-test and post-test was used, with a purposive sample of 102 subjects. The instrument used was a rubric, characterised by very high valuations, in terms of validity criteria (0.917) and reliability (0.869). The results obtained exceeded expectations, which were corroborated by the Wilcoxon statistical test; since the theoretical significance $\alpha = 0.05$ is superlative, when compared to the observed significance, Sig.=000; consequently, the null hypothesis was categorically rejected. In short, the proposal, consisting of five stages: sensitisation, adoption, interaction, evaluation and confrontation, proved its effectiveness in the enhancement of investigative knowledge, such as the problematisation-theorisation-checking of reality. Undoubtedly, great advances in initial training that have an impact not only in raising the quality of scientific production, but also in making

sustainable the development of research skills for subsequent performance in the professional field and for improving quality in universities.

Keywords: formative research; research knowledge; problematisation; theorisation; verification

1. Introduction

One of the pillars of progress in societies is under the responsibility of universities, promoters of enquiry skills as integrated knowledge, also aligned to the production of new knowledge to solve contextual demands. In our country, universities consider the research component as fundamental and unavoidable, whose purpose is to train competent professionals, suitable to solve problems with scientific rigidity. In this perspective, the competence investigates on a real level; and it is understood as the ability of an individual to use scientific knowledge and to be able to distinguish problems of reality, to study them, to understand them and to explain them through specialised techniques, such as the use of the scientific method, to obtain conclusions based on objectively relevant data (Chávez et al., 2022, Vargas & Sito, 2021, Rubio et al., 2018).

It has as a fundamental pillar, the development of intellectual capacity, through specialised techniques and of the procedures of a scientific nature (Rojas, 2020); allowing a researcher to perform effectively (Fernández & Villavicencio, 2017). Likewise, Alfaro and Estrada (2019) mention that for the development of this competence, the cognitive aspect and the abilities to put acquired knowledge into practice are necessary. In sum, attitudes, knowledge and enquiry skills allow performing research tasks efficiently and effectively, contributing to the quality of the study (Casanova et al., 2020).

The subject in question is very important in professional training; however, its development continues to grow in training institutions in the region and at the national level, with values far below those of countries, such as Brazil, Chile, Uruguay, Mexico and Colombia. From this analysis, initial training programs in Latin American universities, to date, have not produced sustainable changes in innovation, development and research (IDI). Specifically in Peru, despite its considerable progress in regulatory matters, public policies, it is worth mentioning the University Law in its articles 7-48-51 (Law No. 30220), the quality models under standards 22, 23, 24 (SINEACE, 2018) and the basic conditions IV-V contemplated by the National Superintendence of University Higher Education (SUNEDU, 2019); there is still no noticeable increase in the number of scientific publications, for example. In view of all this, there is a great expectation that academic action will achieve the goals of continuous improvement and the incorporation of new knowledge useful for the progress of societies.

Meanwhile, there is a good predisposition for scientific enquiry on the part of Peruvian university students; however, there are deficiencies in the formative aspect of this process. A study that agrees with this statement corresponds to that of Hernández et al. (2021), who point out in a descriptive comparative study, carried out with Peruvian (n: 468) and Spanish (n: 485) undergraduate students,

that more than 50% of the Peruvian university students evaluated have a positive attitude towards research, compared to only 23.5% of Spanish students. However, the quality of research training is at a lower level compared to the European countries. The latter constitute the starting point and lend suitability to the characterisation promoted in the study, from a theoretical-pragmatic perspective.

With reference to the above, it is evident that Latin American universities do not manage to consolidate scientific research, as a social policy, articulated with regional, national and international problems. A study showed that the number of scientists in Peru is very low, with a total of 0.01% of the population, compared to that of other countries. Moreover, one out of ten research-projects is developed by private institutions (De la Cruz - Vargas & Rodriguez-Chavez, 2019). This could be due to the fact that higher levels training is mainly formative-assistenial and the curriculum in most cases provides little relevance to research subjects, i.e., subjects are considered in the curriculum, but writing and publishing scientific articles is not taught (Hernández et al., 2022). This preliminary evidence shows the need to promote scientific activity, due to the limited number of researchers and scarce scientific production by teachers, students and graduates, which affects the quality of research work and the time required to obtain a degree.

According to Scimago Institutions Rankings [SIR] (2021), Peru ranks sixty-fifth (234) worldwide and sixth (48) in Latin America, with 6104 documents. This is probably due to the slow progress of IDI management in training institutions. In this reality, a high percentage of undergraduate and postgraduate students of various Peruvian training institutions are located in this situation; a worrying situation that needs the intervention of professionals with concrete, viable and relevant proposals. Based on these premises, a diagnosis was made in undergraduate students, the puppose of which purpose was to know their present enquiry competence. As a result, multiple difficulties that interfere in the development of their academic activities were experienced. One of the most outstanding characteristics in the research is reflected at the moment of identifying the research problem, explaining with precision the causes and the consequences of the identified need, and the limitations in carrying out the general description and discernment of the existing state, referring to the specific area of research, among others linked to the scientific formulation of the problem (problematisation).

On the other hand, students show deficiencies to elaborate, select and understand theories that allow them to propose innovative solutions, with scientific rigour and ethical criteria, leading to concrete improvement actions (theorisation). It was also evidenced in the participants, with notorious difficulties in the fieldwork phase: the use of a methodology that is not very pertinent for the collection, processing and analysis of qualitative-quantitative data. Another limitation noted is the lack of ability to effectively communicate the most important findings and to discuss the data collected, based on previous studies and the various theories cited (reality check).

In congruence with the problem, it is affirmed that the enquiry competence of the students in the study sample, referring to the problematisation, theorisation and verification of reality, needs to be strengthened; since these are necessary to

promote scientific production from the classroom. Along these lines, the study by Gómez-Escorcha et al. (2020) agrees, stating that the research component in the initial training provided by Peruvian universities is scarce, formative exploration is not prioritised, consequently, there are great deficiencies in the research skills of university students, evidenced at the time of formulating the study problem, the hypothesis, analysing statistical and qualitative data; they also show difficulties in drawing conclusions, recommendations, disseminating results, among other basic research categories.

In the described context and in order to reduce the existing knowledge gap, the scientific question is formulated: how to strengthen the enquiry competence in university students? In response to this, it was proposed to demonstrate the effectiveness of formative research (Sensitisation, Adoption, Interaction, Assessment and Confrontation: SAIVC) in strengthening enquiry competence in university students. The following was also stated as an a priori conjecture: SAIVC formative research will strengthen enquiry competence in university students. Under this logic, it was pointed out that formative research, seen as a classroom learning process, stimulates the development of an enquiry culture in students, thereby enabling them to discover scientific findings, enhancing their skills and interests in relation to research and strengthening their other learning capabilities (Álvarez et al., 2021 and Espinoza, 2020).

Therefore, the present study questions how useful it can be to train early in research, and whether this raises the quality standards in universities? Therefore, it is intended to demonstrate the effectiveness of formative research in strengthening enquiry competence in university students, since this competence is an essential and mandatory function of the university, which promotes and executes it, responding through the production of knowledge and development of technology applied to the needs of society (University Law No. 30220). Thus, the impact of the study can materialise in advances in university management; as inferred from the analysis of Dáher et al. (2018); Vergara et al. (2018) and Turpo et al. (2020) when they linked the progress of research with the policies adopted by training institutions, as a quality assurance system.

1.1 The Theoretical Foundation

1.1.1. Formative research

Esparza and Morales (2021) suggest that formative research can become an active teaching-learning process, a methodological strategy or a useful tool in the acquisition of knowledge. Espinoza (2020) and Escobar (2020) characterise it as a type of enquiry directed by a teacher, in which the tasks are shared with the students; by the way in which it makes it possible to discover and build knowledge. This variable also means instructing, accompanying and supporting in, and for exploratory activities, with the purpose of involving the students in the active construction of their learning, through the search for information, reflection and analysis through an instruction oriented to the solution of problematic realities in the different professional fields (Mejía and Velásquez, 2021). In short, it is intended that students should learn the benefits of enquiring through their own enquiry practices.

Additionally, the purpose of formative research is to provide comprehensive teaching, from and, for university classrooms (Patiño et al., 2018; Campos, 2020; Asis et al., 2022; Esteban et al., 2021; Escobar, 2020). This type of enquiry allows students to foster their creativity, autonomy, criticality, collaborative learning and to broaden their interdisciplinary knowledge; ensuring thereby the formation of professionals with communication and research skills that respond to the current needs (García et. al, 2018). Similarly, formative research plays an essential role in undergraduate education; since it focuses on imparting new knowledge, and the training of professionals capable of identifying problems and proposing alternative solutions, because, at present, professionals with the necessary skills to develop and disseminate scientific research are required. Based on the aforementioned authors, formative research can be defined as an integral didactic strategy, through which university students can acquire enquiry competences through learning by doing. In summary, for the purposes of the study, formative research (SAIVC) was materialised through a set of specific activities that deliberately enhanced the skills chosen for the intervention.

1.1.2 Enquiry competence

Scientific competence, from a general view, is an integrated knowledge; it includes thinking, doing and being. From this perspective, Vigo (2018) stipulates that competence is not taught, it is not learned, it is only acquired by activating potentialities, according to their multiple interests and needs. In this regard, it is relevant to generate learning situations throughout the training of future professionals, thereby enabling them to have the knowledge, skills and attitudes necessary to solve the problems of their professional work with autonomy and flexibility.

Fernández and Villavicencio (2017) argued that enquiry competence is composed of skills, such as enquiry, assimilation, explanation and contrast; and those skills, among which enquiry, analysis and channelling stand out. The aforementioned help to achieve creativity and critical thinking in a university students; and, therefore, to comply with the graduate profile. In this same line, there are nine operations that every researcher must perform before initiating the enquiry process and thereby facilitating the development of a scientific study: analyse information, synthesise content, operationalise variables, pose hypotheses, select theories linked to the study, make inferences, establish methodology and conclusions, and synthesise the study, in order to make it known to the scientific community. Therefore, it is essential that higher education should promote the strategy of formative research, so that students might strengthen their research potential, in order to contribute to solving problems in their environment (Fernández and Villavicencio, 2017; Carlín et al., 2020).

Taking into account the preceding authors, enquiry competence can be conceptualised as the combined application of knowledge, skills and attitudes, conducive to the effective development of research work. Among the skills that integrate other potentialities and that have a greater impact in the formative field are the following: problematisation, theorisation, and reality-testing. It should be noted that these skills transcend the educational context; since they are connected to the field of research and function as mediators for the collection of information,

enquiry, hypothesis-formulation, obtaining results, among other activities of an investigative nature.

2. Methods and Materials

The study was of applicative modality, based on the quantitative approach (Hernández-Sampieri & Mendoza, 2018; Sánchez, 2019) and limited to the administration of formative research (SAIVC). Its purpose was intended to contribute to the strengthening of enquiry competence (problematisation, theorisation and reality-testing), in a group of university students. In correspondence with the general purpose, the data obtained in the research were the object of description, analysis and interpretation, in order to focus on the objectives and to finalise with a clear communication of the study. The research design used was related to the plan established by the researcher and the objectives set. In accordance with recent research, which assumes experimental designs to evaluate the efficacy and the effectiveness of an intervention, relating cause and effect in behavioural phenomena and educational sciences (Zurita-Cruz et al., 2018; Chávez et al., 2020), it was decided to use a single-group design with pre-test and post-test, as shown in the following schematisation: G: O1 X O2, where G stands for research subjects; O1, pre-test; X, stimulus; and O2, post-test.

The sample was purposive, composed of 102 students, whose ages ranged between 21 and 22 years. The intervened subjects belonged to a finite set, characterised by being an accessible, homogeneous and problem-bearing sample; which made it possible, in this way, to obtain the conclusions, based on an objective measurement. In other words, as Otzen and Manterola (2017) state, it is important to make use of representative samples, selected with the inclusion and exclusion criteria that allow generalising the results and extrapolating the benefit to target populations. A rubric was used in Its pre-test and post-test versions, which was adapted from the author Aliaga et al. (2021). In the validation process, five experts on the subject participated and the quantifications were tabulated through Aike''s V, reaching a result of 0.917 (very high level in the criteria of coherence, clarity, relevance; per item and in general, see Table 1). Similarly, the reliability of the rubric is declared through the Cronbach's Alpha coefficient, achieving *very high* merit (0.869) according to scale (See Table 2).

Table 1. Expert appraisal, measuring instrument

Indicators/Items	Clarity	Consistency	Relevance	Average
1	0.778	0.944	1.000	0.907
	0.833	0.778	0.722	0.778
	0.722	0.833	0.889	0.815
	0.889	0.889	0.833	0.870
5	1.000	0.944	1.000	0.981
	1.000	1.000	1.000	1.000
	0.944	0.889	1.000	0.944
	0.944	1.000	1.000	0.981
	1.000	1.000	1.000	1.000
	0.778	0.944	0.944	0.889
Overall average	0.889	0.922	0.934	0.917

Note: The table shows the average scores calculated with Aike's V coefficient, according to the ratings of the five judges for the 10 items of the rubric.

Table 2. Reliability of the instrument. Statistics

No Items	No Subjects	*Value*
10	102	*0.869*

Note. The result comes from the Cronbach''s Alpha formula, a reliability method calculated with the results of the pilot test.

According to **Muriel** (2018), for an in-depth analysis of the study cat egories, processes of triangulation of data, methods and theories are important. Then, it was decided to analyse, systematically and simultaneously, the creditable products presented by the students in the thesis report. In this way, the debugging-ordering, coding, tabulation and interpretation were followed based on the idea of Sanchez (2019), also qualitative inductive-deductive methods for the processing of the information collected through the rubric and the final reports. Certainly, the valid combination of techniques was achieved in the research, as promoted by Forni and De Grande (2020) and Samaja (2018), when it comes to the contemporary social sciences.

The data collected were statistically calculated in the SPSS version 25 software. Therefore, the relevant information is presented in tables and figures, duly interpreted, in accordance with the models suggested by de la Torre and Miguel (2020).

3. The Results

In coherence with the objective of the research, the data showing significant changes in the enquiry competence of university students and the essential components of the proposal are presented sequentially.

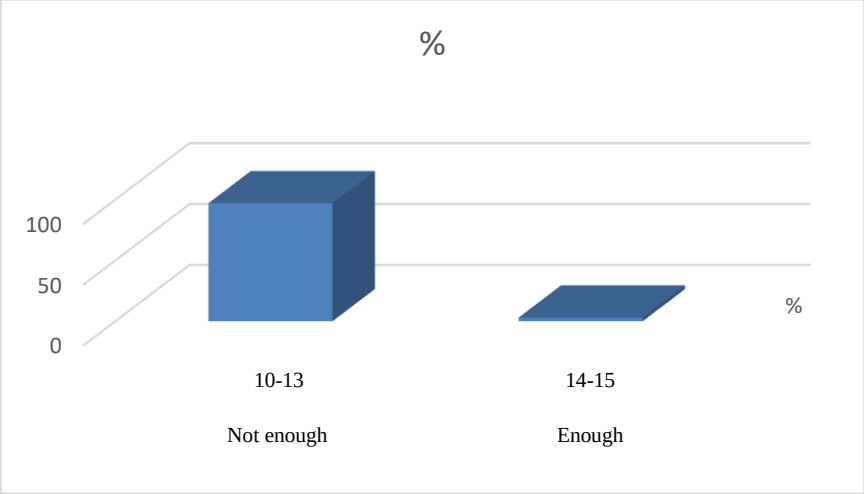

Figure 1. The level of enquiry skills in thesis courses, before the application of the tests.

Note: The figure shows the lowest levels of the enquiry competence for the entire group evaluated.

In general, the diagnostic evaluation determined that no student in the sample was placed in the *notable* and *outstanding* levels. In the specific calculation, using statisticians, it stands out that the group is homogeneous with a CV=7.14 %. Also,

the value of the arithmetic mean is equivalent to 12.11 points, with 11 being the most frequently repeated score. It was found at the same time that 50 % of those evaluated have scores below the declared mean. This indicates that the subjects presented difficulties in the development of their research skills, when referred to the statement of the scientific problem, the theorisation of the object of study, the methodological approach, field work (collection, processing and analysis of qualitative-quantitative data) and scientific writing.

The data also show basic skills in the field of theorising the object of study: the subjects are at the sufficient level in two competences assessed (see Table 3). In sum, almost 100% of the subjects investigated constructed their theoretical framework by integrating the essential concepts of the work variables with some background information and linking them with general constructs moderately related to the central theme. Likewise, they weakly explain the methodological, practical and theoretical implications of the enquiry, this being the most contentious and priority aspect to be addressed.

Table 3. Specific assessment of enquiry competence

Indicators evaluated	Media
D1. Problematisation	
Problematising of the object of study-approach for objective solutions.	11
Data organisation for the substantiation of the identified problem.	12
Formulation of coherent questions, objectives and hypotheses.	12
D2. Theorising	
Construction of the theoretical framework integrating different fields of knowledge.	14
Argumentation of the theoretical, methodological and practical relevance of the study.	14
D3. Reality check	
Methodological selection consistent with the purpose of the study.	10
Systematisition of the data obtained in the field work.	12
Data analysis to structure the answer to the research question.	12
Interpretation of transcendental data.	12
Writing the thesis report with academic, scientific and technical precision.	10

Note: The table shows the average scores of the group for each competence assessed at the beginning of the research.

This is followed by the analysis and interpretation of the subsequent procedure that determines the effectiveness of the SAIVC program.

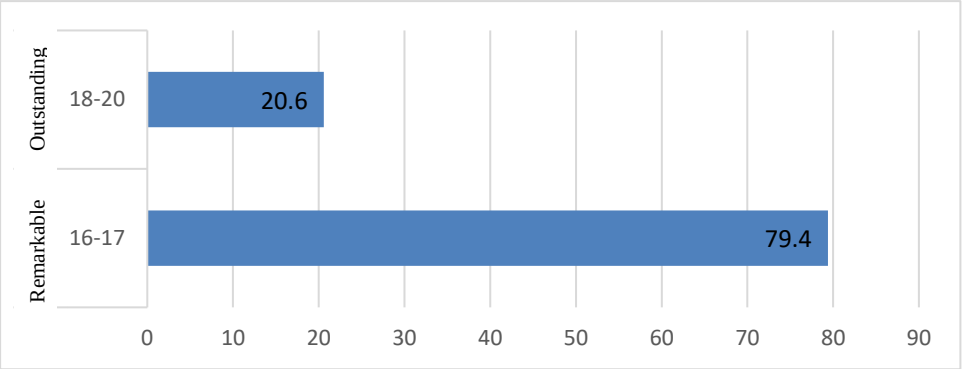

Figure 2. Level of enquiry skills in thesis courses, after the application of the stimulus.
Note: The figure shows the highest levels on the scale used to measure enquiry competence after applying the SAIVC academic program. Statistical processing shows that at the end of the experiment, all the students were at the highest levels. In addition, performance was uniformly maintained among those evaluated, declaring once again the homogeneity of the group (CV=3.88 %) and the arithmetic mean, which was increased with respect to the pre-test (from 12.11 to 16.71). In addition, the mode 16 score was recorded, with minimum scores of 15.37 and maximum scores of 18.22. It is worth mentioning that in correspondence wotj the identified problem, the academic program acted on the dimension that promotes methodological management in thesis courses in university students, thereby noting the progress with six points of difference in the average scores (See Figure 3).

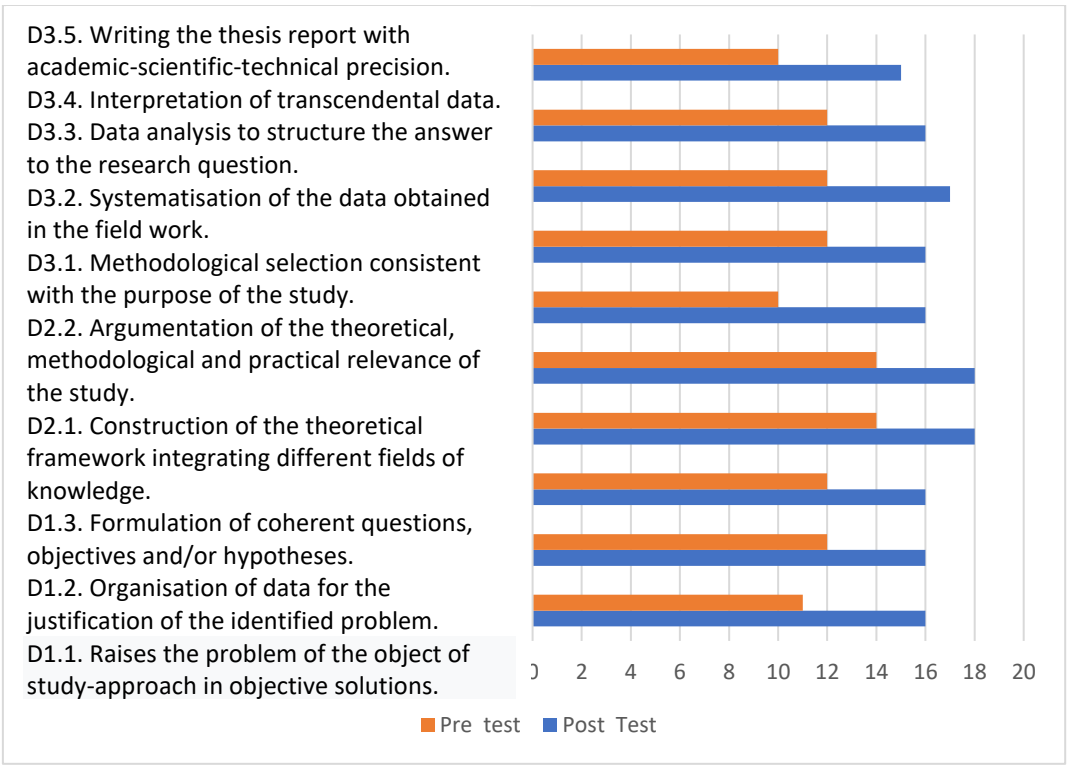

Figure 3. ***Comparison of results by skill, after the application of the stimulus.***

In this way, the effectiveness of formative research in strengthening enquiry competence and with the rigour of the Wilconxon method is demonstrated. The corresponding hypothesis test was performed. Certainly, relevant differences were found between the pre-test (12.11) and the post-test results (16.7124), where the theoretical significance α = 0.05 is superlative, compared to the observed significance, Sig =000. Therefore, the Ho (null hypothesis) is refuted and the H1 (alternate hypothesis) is accepted, there being sufficient scientific evidence to conclude that the formative research had a direct and proven result in the empowerment of skills in initial teacher training (see Tables 4 and 5).

Table 4. Specific assessment of enquiry competence

Indicators evaluated	Media
D1. Problematisation	
Problematisation of the object of study-approach of objective solutions.	16
Data organisation for the substantiation of the identified problem.	16
Formulation of coherent questions, objectives and hypotheses.	16
D2. Theorising	
Construction of the theoretical framework integrating different fields of knowledge.	18
Argumentation of the theoretical, methodological and practical items relevance of the study.	18
D3. Reality check	
Methodological selection consistent with the purpose of the study.	16
Systematisation of the data obtained in the field work.	16
Data analysis to structure the answer to the research question.	17
Interpretation of transcendental data.	16
Writing the thesis report with academic-scientific-technical precision.	15

***Note: The* table shows the average scores of the group for each competence evaluated after applying the proposal.**

Table 5. Wilcoxon method calculation

Measurements	Media	*N*	Deviation standard
Pre-test	12,1152	102	0,86562
Post-test	16,7176	102	0,64789
Pre- and post-test 4.6024			
Theoretical significance α = 0.05		Significance observed Sig =0.000	

In the meantime, the findings linked to a proposal make its presentation relevant, the same that explains its organisation and the foundation, from which

experimentation was favoured. In this environment, the following paragraphs describe the modelling of the formative research developed as a contribution to the improvement of the research competence.

In general, formative research stands out as a primary alternative strategy in the university context; since it is there where the development of scientific production is required. Cabrales (2021), in his scientific study, recommends teachers of research subjects to carry out experimental work, as well as the integration of formative research, as a pedagogical-didactic and curricular strategy, in order to promote and strengthen research competences and performance. Under this logic, the proposal is conceived as an integral strategy, whose purpose is to promote the development of enquiry competence in accordance with the competences of the graduate profile of the university rank. It is characterised for being holistic, systemic, objective and sustainable, the latter, for possessing the qualities of theoretical validity and empirical validation. Undoubtedly, the contribution constitutes an active methodology, as pointed out by Esparza-Reyes and Morales-Trapp (2021), and a pedagogical strategy, according to Arenas et al. (2020); standing out as a primary alternative in the university context, a scenario demanding scientific production.

Now, the modelling of the academic program implied the integration of terminology that the authors assume from the theoretical contribution. One, inquiry competence, as investigative knowledge that encompasses a set of practices to produce knowledge, enhance skills, attitudes and abilities, which -in essence- favour meaningful learning (George and Salado, 2019 and Figueroa et al., 2019). Two, problematisation, a process that consists of approaching reality from a holistic view to know, analyse and understand the problems that affect it and, based on this, formulate the research questions, objectives and hypotheses (Álvarez-Ochoa, et al., 2020; Rojas & Tasayco, 2020). Three, theorising, is a type of work that involves owning, constructing, exposing, explaining, claiming, applying, questioning, knowing and putting into practice diverse theories (Juncosa & Garcés, 2020). Four, reality check, assumed as the determination of the viability and consistency of the alternatives applied, in order to solve the problematic situation by evaluating its achievements and difficulties in a scientific manner, as stated by Rojas & Tasayco (2020). Likewise, it has to do with the precision of the methodology, data collection and presentation of the results in contrast with the scientific theory, qualities in accordance with the approach of Álvarez-Ochoa et al. (2020).

Three theories are also considered an essential part of SAIVC. Firstly, the classic curricular model, in which the student plays a fundamental role in learning, while the teacher guides, accompanies and directs the acquisition of new knowledge. The latter should be based on concrete situations and organised knowledge from a curricular viewpoint. It includes in turn: expected learning, content, methodology and evaluation, elements proposed by Biggs and Tang (2011). Secondly, the theory of connectivism. From it, ideas are taken about the critical capacity that each individual has to select what to learn and how to do it; and it is of the utmost importance in the academic field, much more so when making use of technological resources. This is consistent with the principles described: there

is no standardised knowledge and way of learning; one learns more by researching; knowledge resides in technologies; information changes continuously; the learner, in this case the researcher, must be ready to modify his previous knowledge about a particular field of study because one learns constantly, since information tends to be updated (Siemens, 2004 and Sobrino, 2014). And, the research theory, to affirm that research proposals are framed in a concrete reality; they include endogenous and exogenous components, and are based on current scientific theories that seek to contribute to the objective solution of problems inherent to the national and international community. In this direction, for research to determine a series of approaches to complex solutions, it must be scientific, as exposed by Padrón (2018); therefore, it must comply with three properties; socialisation, systematisation and have a theoretical foundation.

Finally, the graduation profile is defined as the set of characteristics, skills or competences that a student is able to demonstrate at the end of the training process. It responds to the social demands of the educational level in which they are configured, assertions that coincide with those of Huamán et al. (2021), García and Treviño (2020), which serve as support throughout the approach to the development of formative research in university students.

In order to materialise the proposal, several postulates were taken into consideration. Regarding the approach, students are faced with a concrete, relevant, but limited problem situation, for which a real solution is required within the predefined terms of the project. Thus, its design conforms to five propositions. One, in terms of learning, the students obtain new skills through discovery, considering a pertinent sequence: sensitisation, adoption, interaction, valuation and confrontation. Two, related to the process, the university student works in all stages of the project, so that its approach always generates significant learning. Three, the evaluation is comprehensive, including the relevant objective and subjective dimensions. Four, regarding the teaching role, the teacher is the designer, guide, instructor and has prior knowledge of the solution. In other words, the teacher is in charge of preparing and fostering a welcoming environment, with students participating in an active, orderly and voluntary manner.

Finally, the didactic resources required to execute this proposal depend on each selected case and the purpose of the activity. The most significant is sufficient information to learn and illustrate the issue or situation under discussion. In this context, bibliographic and audiovisual material, documents, among others, are used, especially those framed in virtuality.

Continuing with the description, one of the fundamental elements that also constitute the didactic and methodological contribution of SAIVC, are the cyclical phases, complementary to each other, for the development of the sessions in thesis subjects (See Table 6). Within the framework of the study and experimentation, they turn out to be the explanation of the students' achievements observed in the post-test, being able to affirm that, in these components, there is enough support for the development of pedagogical proposals that include not only formative

research as a strategy, but that could be adapted as pedagogical processes aligned with diverse areas and educational competences.

Table 6. Stages of formative research (SAIVC)

Phases	Description
Awareness	The students have a first approach to the situation posed. From this, they retrieve previous information and learn about it (previous knowledge-purpose-organisation).
Adoption	An in-depth study of the case is carried out. First, the different variables involved are analyzed individually. We observe whether the information we have is sufficient or whether further research and support from the teacher is required (general explanation - theorisation - feedback).
Interaction	Knowledge about the case is shared and discussed. The solution alternatives are presented, the pros and cons of each one of them. Finally, decisions are proposed (exchange of knowledge).
Valuation	Evaluation phase: corresponds to the sharing and analysis. Each student has an answer for the case, which is presented individually or in small groups. In the plenary, comments and observations are made on each of the alternatives presented. Students develop their expository and argumentative capacity; they are also receptive and tolerant of divergent positions (application of knowledge-feedback).
Confrontation	At this stage, after supporting each of the solutions to the case, these are compared with the solution in the real situation (triangulation of knowledge-deepening-articulation).

The proposal was reflected in each of the programmed activities. First, the thematic unit entitled "Academic Aspects" containing two sessions with a total of 8 teaching hours and an emphasis on the practical work. Topics on philosophical and epistemological foundations were addressed, with the primary purpose of consolidating learning on the basic elements of the research.

In relation to philosophical foundations, the purpose of the session was for students to master basic knowledge about the role of philosophy and its branches throughout history (aesthetics, ethics, ontology, metaphysics, philosophy of language, political philosophy, gnoseology, anthropology and epistemology). This, by virtue of the fact that philosophy is the key to understanding research; and therefore, it makes possible the production and the creation of scientific knowledge.

Regarding epistemological foundations: It is essential that students, before conceiving the scientific problem, master the basic knowledge about epistemology. In view of this, the importance of the paradigms of science (positivism-hermeneutic-phenomenological-socio-critical) and the most transcendent epistemic theories throughout history, in terms of the production of knowledge in the search for truth, was developed.

Next, the thematic unit related to the techno-didactic component, had an extension of 8 sessions with 32 teaching hours, in which the practical aspect was developed -mostly- with activities, such as the following: approaching the scientific problem, review of the study of the art, elaboration of a contextual framework, design and validity of data collection instruments, construction and ratification of models, mastery of techniques, such as data analysis, hypothesis testing and the corresponding scientific writing. The following is a summary of the achievements and products of the sessions.

Regarding the scientific problem statement, students in this session were able to identify the emerging problem, the starting point of the current study, in order to obtain original information and, based on this, to propose alternative solutions. They were also able to obtain and systematise exclusive information that allowed for the prioritisation of the problem.

Finally, they enunciated the basic categories (problem, objectives and hypotheses), in order to continue with the scientific process. Then, for the review of the study of the art, in order to carry out a sustainable and well-founded work, they were familiar with the existing literature, the findings and the previous models.

In the elaboration of a contextual framework, each participant consolidated the problem statement. In this line, they approached the analysis of the problematic situation, describing, by the way, the frame of reference on the object of study at the local, national and international levels. Then, in order to collect reliable information on the object of study, they took on the challenge of constructing or adapting instruments.

Next, they determined, through experts, the content validity; and finally, they conducted a pilot test, from which the key data were obtained to establish the reliability of the measurement tools. This was materialised through the Kr20 (Kuder Richardson)-Alpha Cronbach methods (see complete session in the attached table).

Table 7. Classroom Design Using Formative Inquiry (SAIVC)

Session title: "Creating and validating instruments."	
Skill: Reality check	
Phases	Didactic process
Awareness	Previous knowledge: Resolve the question: What are the processes and resources to be used to design and validate measurement instruments?
	Statement of purpose: At the end of the session, they are able to determine whether the selected tools to be used are reliable and valid.
	Organisation: They work individually/teams.
Adoption	General explanation: presentation of the subject.

	Theorization: They individually analyse diverse information on the subject.
	Feedback: Reinforce specific ideas in the presence of a cognitive conflict.
Interaction	Exchange of knowledge: They present individually, or in teams, the information or the case analysed.
Valuation	Application of knowledge in new situations: They participate in teams or individually, and are evaluated according to an estimation scale. Based on the results, feedback is provided on the topic or case studied.
Confrontation	Triangulation of knowledge: They actively participate in the systematisation of the topic or case being dealt with.
	Deepening - articulation: They deepen and investigate the topic or case that will be developed in the following class, according to the program (strategy, inverted classroom).

Other topics implemented were those corresponding to model construction and validation. The purpose of the activity was to build a proposal and, at the same time, to certify it by means of the expert judgment method. In this line, the principles of systemic approach and simplicity were considered. For the mastery of techniques and the data analysis, the students were able to process and analyse the qualitative and the quantitative data. The information was materialised in the "results and discussion" section of the executive report. Hypothesis testing was also established; in this activity, the basic tests most commonly used in pedagogical research were addressed.

Finally, scientific writing was addressed, the purpose of which was for students to master three important aspects: research work protocols (thesis project-report), scientific citation techniques, and writing style. Regarding the methodological and evaluative process of the proposal, the first was determinant, in order to promote the development of enquiry skills, being among the most significant the inverted classroom, workshops, problem-based learning (PBL), case method, intercalated questions, exposition-dialogue, autonomous learning, team-work, among other resources within the virtual framework. Regarding the second process, it was developed in three modalities: diagnostic (rubric), formative (estimation scale) and summative (rubric). For this purpose, the instrument proposed by the authors Aliaga et al. (2021) was used, which was adapted to initial training (the main format was applied to postgraduate studies), and whose purpose was to evaluate, specifically, the students' enquiry skills in thesis courses, considering the research report as a medium. In this scheme, a vigesimal scale is used: 1 (not achieved <10), 2 (insufficient 10-13), 3 (sufficient 14-15), 4 (remarkable 16-17) and 5 (outstanding 18-20).

4. Discussion

In the analysis of the enquiry competence, it was found that 50% of those evaluated obtained scores lower than 12.11, and the entire group reached insufficient and sufficient levels on the scale used. Consequently, it is asserted that undergraduate students weakly achieve the development of competences related to research. This is due to the curricular distribution that places these competences in specific research subjects, towards the last cycles, resulting in a dissociation in the training without any emphasis on scientific knowledge and methodologies to do science. In the environment of the indicated problematic, Hernández et al. (2020) and García et al. (2018) concluded in their work that the initial training provided by Peruvian universities is deficient; since formative research is not prioritised; consequently, there are great deficiencies in their enquiry competences, evidenced at the moment of formulating the scientific problem and hypothesis, analysing the statistical data, elaborating conclusions, recommendations, disseminating results, among other basic inquiry categories. The above reaffirm the concern and one of the most immediate measures would be to incorporate new and sustainable didactic proposals that manage to add formative research as a strategy and in a transversal way in undergraduate situations.

Other research has expressed similar opinions. Thus, they state that higher level institutions present as a challenge to raise the academic quality of students with a training based on research competences; and they should seek to incorporate them in their daily life, social and labour development (Velandia-Mesa et al. , 2017; Cruz, 2019). Along these lines, formative research orients students towards the production and communication of academic studies, awakening their first notions of research and socialisation with their peers, which leads to the improvement of scientific research and to a contribution of new knowledge to the knowledge society (Asis et al., 2022; Peláez & Montoya, 2019).

Therefore, it should be considered from the first cycles of the university; since it facilitates autonomous learning, interdisciplinary training and the promotion of good enquiry practices. Undoubtedly, the evolution of research is essential to achieve quality training in higher education, an aspect connected with the impact and advances in the field to respond to current challenges, such as changes in globalisation and technology, in accordance with the assertions of Stankovska et al. (2019).

In addition, from the comparative evaluation in the study, relevant differences were found between the pre-test and the post-test (4.6 points), demonstrating by the Wilconxon method for hypothesis testing that formative research strengthens enquiry competences in university students. A work that largely agrees with the results of this study is that of García et al. (2018). The authors concluded that formative research has a positive impact on the development of communicative and investigative skills, as the ratings of their sample increased by 4.12 points.

In the first criterion considered, they placed speaking and listening; likewise, in the second, interpretation, synthesis and analysis. However, the study in question limits the evaluations and actions to two of the dimensions assessed in the present

enquiry, which comprehensively reports aspects of the procedure involving skills ranging from elaborating a project, executing it and reporting the results in a scientific manner; issues that have allowed alerting, above all, the need for knowledge in the scientific method.

Being the learning of research methodology the most complex for undergraduate students, and the curricular plans designed considering the progressive teaching of these competences, a viable alternative is constituted by research seedbeds. This is stated by Alfaro and Estrada (2019), Villalba and González (2017), Numa-Sanjuan and Márquez (2019), who promote as a formative strategy with impact on the development of research skills, language management, cognitive operations, observation, argumentation, social construction of knowledge and the apprehension of new knowledge. In relation to this, Jojoa (2021) stipulates that formative research awakens in students motivation, confidence, security and passion for research, thereby improving skills; among them, assertive communication, problem-solving, critical thinking and metacognition. Even at the graduate level, the difficulties to materialise degree and graduation processes have an impact on the satisfaction of graduates, where well-conducted research allows closing this gap (Perales, 2020).

From the perspective of training and the development of professionals for the exercise in the field of action, there are works that support this type of proposal so that, according to Aparicio and Rodriguez (2020), the transversalisation of formative research should be achieved; since it is an integrating strategy that in turn generates impact on the students in charge of future professionals in Education. In fact, more works consider that the intervened students show great capacity to participate in a relevant way in the planning processes, field work and communication of results (Díaz et al., 2017; Carlín et al., 2020; Gamboa-Suárez et al., 2017); therefore, by enhancing different scientific skills from the implementation of pedagogical strategies, the beneficiaries may even have access to job opportunities (Hernández et al., 2021).

With regard to the explanations of the findings, it is also important to describe the systematised limitations and recommendations of the study; firstly, with respect to the design, and, secondly, related to the scope of the object of study. Consistent with the design, there was no comparative group, as was initially thought. The selection of the sample was not based on probabilistic methods; only on the criteria of homogeneity, accessibility, and the bearer of the problem studied (non-probabilistic sampling) were considered. In this context, it is suggested that in future research, quasi-experimental designs or pure experiments should be taken into consideration, as long as they are materially feasible, since they should strengthen the proposal.

In relation to the second aspect, it should be noted that the work focused on diagnosing and promoting the development of certain enquiry skills, leaving some gaps concerning the characterisation of the dynamics of formative research with respect to the description of the contexts and the strategies used to promote the variable in question, and on the learning methodology used by students to

benefit the development of research knowledge during their training, not only in thesis courses, but also in related subjects.

In short, the data obtained in this academic experience are effective for the acquisition of different enquiry competences in the university context, such as problematisation, theorisation and verification of reality. On the other hand, it promotes a better benefit and use of the acquired knowledge, teamwork, interpersonal relationships, also it motivates the learning process and allows the achievement of successful academic results. In this sense, it is recommended that this proposal be applied not only to students in Education careers, but also in all other careers, both undergraduate and graduate. At the same time, it is suggested to determine the correlation between the enquiry competences of the teaching staff and the skills and attitudes of the students; associating, at the same time, variables linked to the learning of the different curricular areas.

5. Conclusions

The findings of the study showed that formative research, from and for university classrooms, becomes a fundamental strategy in response to the problems and needs of today's society. In this line, it promotes learning in real situations and by discovery, where the teacher is directly responsible for promoting it, after planning diverse didactic resources.

Thus, it is categorically stated about the benefits of formative research (SAIVC), accepting the hypothesis of the study by fulfilling the strengthening of the enquiry competence in students of the Education career, through the developed program. With this, the bases are also laid in contribution to the improvement of quality in universities, thereby expanding the methodology to other professional careers. Likewise, scientific production is guaranteed as a genuine practice, with benefits in the school-professional, academic-labour, social-economic environment.

6. References

Alfaro-Mendives, K. L., & Estrada-Cuzcano, A. (2019). "Semilleros en aula" program in the development of research skills of library science students at Universidad Nacional Mayor de San Marcos. *Revista Interamericana De Bibliotecología, 42*(3), 235-250. https://doi.org/10.17533/udea.rib.v42n3a04

Aliaga Pacora, A. A., Juárez Hernández, L. G., & Herrera Meza, R. (2021). Design and content validity of a socio-formative analytical rubric to assess graduate research competencies. *Apuntes Universitarios, 11*(2), 62-82. https://doi.org/10.17162/au.v11i2.632.

Álvarez Gómez, G. A., Álvarez Gómez, S. D., & Ramos Sánchez, R. E. (2021). Influence of mentor teacher training on students' formative research. *Universidad y Sociedad*, 13(S3), 416-423.

Álvarez-Ochoa, R., Román-Collazo, C., Conchado-Martínez, J., & Cordero-Cordero, G. (2020). Research skills in higher education teachers: an approach to reality. *Revista ciencias pedagógicas e innovación, 8*(1), 70-77. https://incyt.upse.edu.ec/pedagogia/revistas/index.php/rcpi/article/view/370.

Aparicio, J., & Rodríguez, C. (2020). Environmental curriculum mainstreaming in higher education through curriculum design committees. *RIDE. Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 10*(19), e018 https://doi.org/10.23913/ride.v10i19.524

Arenas, I. D. R., Marín, J. A. D., & Vera, J. A. R. (2020). Formative research as a pedagogical strategy: Industrial engineering case study of the I. U pascual bravo. *Estudios Pedagógicos, 46*(1), 319-338. http://dx.doi.org/10.4067/S0718-07052020000100319

Asis, M., Monzón, E., & Hernández, E. (2022). Formative research for teaching and learning in universities. *Revista Mendive, Pinar del Río, 20*(2), 675-691, http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1815-76962022000200675&lng=es&nrm=iso>

Biggs, J., & Tang, C. (2011). Teaching for Quality Learning at University. Open University Press - McGraw-Hill Education.

Cabrales Lara, G. F. (2021). Formative research in initial teacher education. *Apuntes Universitarios, 11*(4), 1-16. https://doi.org/10.17162/au.v11i4.757

Campos Olazábal, P. J. (2020). The importance of formative research as a learning strategy. *EDUCARE ET COMUNICARE: Research Journal of the Faculty of Humanities*, 8(1), 88-94. https://doi.org/10.35383/educare.v8i1.397

Carlín Chávez, C., Carballosa González, A., & Herrera Rivas, K. K. (2020). Formation of research competencies of students at the university of Guayaquil. *Universidad y Sociedad, 12*(2), 8-16.

Casanova Zamora, T. A., Navas Bonilla, C. R., Piñas Morales, M. B., & Vásquez Cáceres, M. G. (2020). Ecuadorian higher education in the research field. Skills and society. *Revista Boletín Redipe, 9*(9), 65-75.

Chávez Vera, K. J., Ayasta Llontop, L., Kong Nunton, I., and Gonzales Dávila,J. S. (2022). Formation of research competencies in students of the Universidad Señor de Sipan in Peru. *Revista de Ciencias Sociales*, XXVIII(1), 250-260. https://produccioncientificaluz.org/index.php/rcs/index

Chávez, S., Esparza, O., & Riosvelasco, L. (2020). Pre-experimental and quasi-experimental designs applied to social sciences and education. *Teaching and Research in Psychology, 2*(2), 167-178. https://www.revistacneip.org/index.php/cneip/article/view/104

Cruz, Y. (2019). The inquiry investigative competence in the students of the primary career of the university branch Baraguá. *Universidad & Ciencia, 8*(3), 28-45.

Dáher, J., Panunzio, A., & Hernández, M. (2018). Scientific research: a university function to consider in the Ecuadorian context. *EDUMECENTRO, 10*(4), 166-179. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2077-28742018000400011&lng=es&tlng=es

de la Torre, E. H., & Miguel, S. G. (2020). Analysis of qualitative data through the system of tables and matrices in educational research. *Revista Electronica Interuniversitaria De Formacion Del Profesorado*, *23*(3), 115-132. https://doi.org/10.6018/REIFOP.435021

Díaz, O., Montes, M., & Cangahuala, O. (2017). Formative research in undergraduate: a proposal from the curriculum of the faculty of accounting sciences of the PUCP. *Revista Científica Hermes,* (19), 409-431.

Escobar, J. (2020). Formative research at the National University Altiplano of Puno. *Revista de Derecho de la Universidad Nacional del Altiplano de Puno, 5*(1), 238-247.

Esparza-Reyes, E., & Morales-Trapp, S. (2021). Formative research as a methodological strategy of human rights: From theory to practical experience. *Revista Pedagogia Universitaria y Didactica Del Derecho, 8*(1), 241-261. https://doi.org/10.5354/0719-5885.2021.57078

Espinoza, E. (2020). Formative research. A theoretical reflection. Conrado, 16(74), 45-53. http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1990-86442020000300045&lng=es&tlng=es

Esteban, E., Piñero, M., Rojas, A., & Callupe S. (2021). Formative research in university program accreditation models in Peru. *Revista Conrado, 17*(83), 469-476.

http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1990-86442021000600469&lng=es&tlng=es

Figueroa Rodríguez, S., Granados Ramos, D., & López Sánchez, J. (2019). Acquisition and Development of Research Competences in undergraduate Psychology students: intramural formative experience. *Enseñanza & Teaching: Revista Interuniversitaria De Didáctica, 37*(2), 135-145. https://doi.org/10.14201/et2019372135145

Forni, P., & De Grande, P. (2020). Triangulation and mixed methods in contemporary social sciences. *Revista Mexicana De Sociologia, 82(*1), 159-189.

Gamboa-Suárez, A., Vargas-Toloza, R., & Hernández-Suárez C. (2017). Formative research: curricular pretensions and social representations of educational actors in the Nursing program at Universidad Francisco de Paula Santander - Cúcuta, Colombia. *Revista Universidad y Salud, 19*(1), 6066. http://dx.doi.org/10.22267/rus.171901.69

García Bedoya, N. M., Paca Vallejo, N. K., Bonifaz Valdez, B., Gómez Arteta, I. I., & Arista Santisteban, S. M. (2018). Formative research in the development of communicative and investigative skills. *Revista De Investigaciones Altoandinas, 20*(1), 125-136. https://doi.org/10.18271/ria.2018.336

García, C. (2020). University competences and the graduate profile. Estudios del Desarrollo Social, 8(1), e014.

García, N., Paca, N., Arista, S., Valdez, B., & Gómez, I. (2018). Formative research in the development of communicative and investigative skills. *Revista de Investigaciones Altoandinas, 20*(1), 125-136. https://dx.doi.org/10.18271/ria.2018.336

George Reyes, C. E., & Salado Rodríguez, L. I. (2019). Research competencies with the use of ICT in doctoral students. *Apertura (Guadalajara, Jal.), 11*(1), 40-55. https://doi.org/10.32870/ap.v11n1.1387

Hernández, R., Marino-Jiménez, M., Rivero Forton, Y., & Sánchez, N. (2020). Research in University Students: Real Needs for the Implementation of a Formative Research Program. *Academia,* (20-21), 154-176. https://doi.org/10.26220/aca.3445

Hernández, R., Montes-Valer, E., Mamani-Benito, O., Ortega-Pauta, B., Saavedra-López, M., & Calle-Ramírez (2022). Index of attitude towards scientific research in Peruvian psychology students. *International Journal of Education and Practice, 10*(2), 204-2013. https://doi.org/10.18488/61.v10i2.3046.

Hernández, R., Saavedra-López, M., Calle-Ramirez, X., & Rodríguez-Fuentes, A. (2021). Index of Undergraduate Students' Attitude towards Scientific Research: A Study in Peru and Spain. *Jurnal Pendidikan IPA Indonesia*, 10(3), 416-427. https://doi.org/10.15294/jpii.v10i3.30480

Hernández-Sampieri, R., & Mendoza, C. (2018). Research methodology. Quantitative, qualitative and mixed routes. McGRAW-HILL Interamericana Editores.

Hernández Sánchez, I. B., Lay, N., Herrera, H., & Rodríguez Borbarán, M. (2021). Pedagogical strategies for learning and development of research competencies in university students. *Revista De Ciencias Sociales, 27*(2), 242-255. https://doi.org/10.31876/rcs.v27i2.35911

Huamán, L., Pucuhuaranga, T., & Hilario, N. (2021) Evaluation of the achievement of the graduate profile in university degrees: trends and challenges. *RIDE. Revista Iberoamericana para la Investigación y el Desarrollo Educativo, 11*(21), e09. https://doi.org/10.23913/ride.v11i21.691

Jhony, A., De La Cruz -Vargas, J., & Rodríguez-Chávez, E. (2019). Research: Beyond the ranking of universities. Revista de la Facultad de Medicina Human, 19(1), 7-12. https://doi.org/10.25176/RFMH.v19.n1.1786

Jojoa, H. (2021). Semilleros de investigación: una mirada general desde lo individual y colectivo. *Runin. Informatics, Education and Pedagogy*, (12), 84-104. https://revistas.udenar.edu.co/index.php/runin/article/view/7112

Juncosa. E., & Garcés, F. (2020). What is theory? Approaches, uses and debates around theoretical thinking. Editorial Abya-Yala. http://doi.org/10.7476/9789978105788

Law 30220, University Law. Peru Available at http://www4.congreso.gob.pe/pvp/leyes/ley30220.pdf

Mejía Ospina, P., & Velásquez López, P. (2021). Changes generated by COVID-19 in formative and research practice in Social Work: opportunities, dilemmas and challenges for social research. *Alternativas. Cuadernos de Trabajo Social, 28*(2), 325-349.

Muriel, F. A. Z. (2018). Analysis of some Lasallan school manuals. *Revista Lasallista De Investigacion, 15(*1), 29-49. https://doi.org/10.22507/rli.v15n1a3

Numa-Sanjuan, N., & Márquez, R. (2019). Semilleros as research spaces for the novice researcher. *Propósitos y Representaciones, 7*(1), 230-239. http://dx.doi.org/10.20511/pyr2019.v7n1.289

Otzen, T., & Manterola, C. (2017). Sampling Techniques on a Study Population. *International Journal of Morphology, 35(*1), 227-232. https://dx.doi.org/10.4067/S0717-95022017000100037

Patiño Jacinto, R. A., Melgarejo Molina, Z. A., & Valero Zapata, G. M. (2018). Perception of accounting graduates vis-à-vis formative research. *Revista Activos, 16*(30). http://portal.amelica.org/ameli/jatsRepo/292/2921265005/2921265005.pdf

Padrón, J. (2018). A theory of enquiry: the variability model of scientific investigations. https://padron.entretemas.com.ve/INICC2018-2/lecturas/u1/padron-teoria.pdf

Peláez, L., & Montoya, J. (2019). Formative Research and Research in the Strict Sense: A Reflection to Differentiate its Application in Higher Education Institutions. *Entre Ciencia E Ingeniería, 7*(13), 20 - 25. https://revistas.ucp.edu.co/index.php/entrecienciaeingenieria/article/view/644

Perales, F. (2020). Study of graduates in a graduate program in education. Alteridad, 15(2). https://doi.org/10.17163/alt.v15n2.2020.9

Restrepo, B. (2003). Formative research and productive research of knowledge in the university. Nómadas (Col), 18, 195-202.

Rojas, W., & Tasayco, A. (2020). Characterisation of research skills in the production of academic papers. *Studium Veritatis, 18(*24), 153-169. https://studium.ucss.edu.pe/index.php/SV/article/view/321

Rubio, M. J., Torrado, M., Quirós, C., & Valls, R. (2018). Self-perception of research skills in final year Pedagogy students at the University of Barcelona to develop their Final Degree Project. *Revista Complutense de Educación, 29* (2), 335-354.

Samaja, J. (2018). Methodological triangulation (for a dialectic understanding of the approaches combination). *Revista Cubana De Salud Pública, 44*(2), 431-443.

Sánchez, F. (2019). Epistemic foundations of qualitative and quantitative research: consensus and dissent. *Revista Digital de Investigación en Docencia Universitaria, 13*(1), 102-122. https://dx.doi.org/10.19083/ridu.2019.644

Sánchez, F. G. (2019). Thesis: Methodological development of research. Lima: Ediciones Normas Jurídicas S.A.C.

Scimago Institutions Rankings. (2021). 14 ranked institutions. https://www.scimagoir.com/rankings.php?country=PER

Siemens, G. (2004). Connectivism: A theory of teaching for the digital age. https://skat.ihmc.us/rid=1J134XMRS-1ZNMYT4-13CN/George%20Siemens%20-%20Conectivismo-una%20teor%C3%ADa%20de%20aprendizaje%20para%20la%20era%20digital.pdf

National System of Evaluation, Accreditation and Certification of Educational Quality-SINEACE (2018). Modelo de acreditación para programas de estudios de educación superior universitaria. Lima: SINEACE.

Sobrino, A. (2014). Contributions of connectivism as a post-constructivist pedagogical model. *Propuesta Educativa, 42,* 39-48. https://www.redalyc.org/pdf/4030/403041713005.pdf

Stankovska, G., Dimitrovski, D., Memedi. I., & Ibraimi, Z. (2019). Ethical Sensitivity and Global Competence among University Students. *BCES Conference Books, 17*(4), 132-138.

National Superintendence of Higher Education - SUNEDU (2019). II Biennial report on the university reality in Peru. SUNEDU. https://www.gob.pe/institucion/sunedu/informes-publicaciones/1093280-ii-informe-bienal-sobre-la-realidad-universitaria-en-el-peru

Turpo-Gebera, O., Mango, P., Cuadros, L., & Gonzales-Miñán, M. (2020). Formative research at the university: senses assigned by the faculty of a Faculty of Education. *Educação e Pesquisa, 46,* 1-19. http://dx.doi.org/10.1590/S1678-4634202046215876

Vargas, G., & Sito, L. (2021). Assessment of research competencies of teachers in higher education. *Revista Conrado, 17*(81), 236-242.

Velandia-Mesa, C., Serrano-Pastor, F., & Martínez-Segura, M. (2017). Formative Research in Ubiquitous and Virtual Environments in Higher Education. *Comunicar, 51*(25), 9-18. https://doi.org/10.3916/C51-2017-01

Vergara Fregoso, M., Gamboa Suárez, A. A., & Hernández Suárez, C. A. (2018). Research policies in higher education: Instituted imaginaries of a public university in norte de santander, Colombia. *Espacios, 39*(43). www.scopus.com

Vigo, O. L. (2018). Scientific definition of competence: interdisciplinary vision. Lambayeque: APM "Asesoramiento en publicidad y mercadotecnia".

Villalba, J., & Gonzáles, A. (2017). The importance of research seedbeds. *Revista Prolegómenos - Derechos y Valores, 20*(39), 9-10.

Zurita-Cruz, J., Márquez-González, H., Miranda-Novales, G., & Villasís-Keever, M. (2018). Experimental studies: research designs for the evaluation of interventions in the clinic. *Revista alergia México, 65*(2), 178-186. https://doi.org/10.29262/ram.v65i2.376