

Scientific Initiation In University Training Research

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Abstract

The objective of this article is to report the experience of scientific initiation in undergraduate students as part of university training research. In this sense, the study was proposed at an exploratory-descriptive level; under the non-experimental cross-sectional design and intentional probabilistic sampling. The survey was applied to 1116 students of the scientific initiation program of the 12 campuses. Coming to group the results in three categories: participation by curricular experience, theme developed in the workshops and participation by professional career. It is evident that the curricular experiences linked to the methodology, project, development and degree by thesis stand out with greater interest among the participants. And as thematic development, technological surveillance, review article methodology, use of Zotero and guidelines for publishing review articles stand out. Likewise, regarding the professional career, there is evidence of greater interest in students of Administration, Accounting, Industrial Engineering, Civil, Law, etc. Therefore, it is concluded that a scientific initiation program arouses greater interest in participating students when the student's interest in the experience, career and/or study cycle is directly related to research and has to deliver a research product at the end. as a research paper, project or thesis.

Keywords: Scientific initiation, Formative research, University.

INTRODUCTION

It is considered "scientific research a current need in Peru" ¹⁴, in addition to a requirement established by Law No. 30220 and a requirement demanded by the National Superintendence of University Education (SUNEDU) to private and public universities to maintain their licensing, quality and accreditation; In this sense, universities must present research evidence such as theses, book publications and articles in high-impact journals registered in Scopus, Web of Science, Scielo, among others.

In this sense, various training research programs for students have been implemented in universities. It seeks to guarantee, during the process of university education, the development of investigative skills and abilities. Mastery of the scientific method and technology. Being considered, at present, essential in university and professional training because they are tools that allow searching, collecting and analyzing information in a systematic way.

Fact that the technological tools, today, make available to students information inputs on legislative, regulatory, social, economic, market aspects, among others ¹⁶. Many times, students who start in formative research do not manage to develop them with a course or program; but during a long process that lasts his university education. Although the use of technology in research has a medium and high degree of complexity, it also has a cost and helps to provide more accurate and efficient solutions, reducing costs and time ².

Digital technology, because it has a broad impact on the lives of students, implies cultural, social and economic repercussions ¹⁵; its incorporation into the scientific initiation of the student becomes necessary. Because students, when exposed to digital technology and its contents, find it difficult to formulate research problems due to the ease with which they access information in its various presentations. Relativizing the importance of a good approach to the research problem, as well as the role that the approach of the problem fulfilled in the process of scientific activity. Ceasing to be the fundamental link in the specific process of the investigation or cease to be seen as the key that opened the rest of the sections in the investigation ⁸.

In addition to the aforementioned, students, due to easy access to information, must overcome the problem of plagiarism in academic writing and ideas extracted from the Internet ^{6,19-39}; that is, today more than before, university students, when writing, incur in dishonest, unethical conduct and even violate the right to intellectual property in the writing of their work. Problem that is evident in the writing of essays, monographs, articles and theses. And in the face of this, the students, by not developing the criteria for the use of the information, specifying the authorship; have turned plagiarism into a more common dishonest practice in the various fields of undergraduate, master's and doctorate degrees ⁶.

Problems that students, in their university education process, should overcome to learn to write academically. The same one that responds in the current university a complex activity. And that, thanks to the implementation of formative research, it helps students to improve the development of their investigative skills and abilities, management of technological resources in research, mastery of the scientific method, originality in academic writing, clarity in the approach to the problem, respect for intellectual property at the time of writing and quality in the presentation of the works.

Due above all to the fact that in the formative research the student is led to think of strategies for a better coping with the challenges ¹⁸; and because scientific initiation is learning to reflect in order to build the future in university research ⁹ and "doing science is a process of building autonomy and involves the subject in the learning process" ¹⁷.

MATERIAL AND METHOD

It was an exploratory-descriptive level study to try to know and describe the process of participation of students in the scientific initiation program. And the study has been developed under the non-experimental design because there was no control or experimental sample; it was cross-sectional, because the data was collected using the Google Form in a single moment, and intentional probabilistic because it sought to organize the data reported by the participants. The study participants were 1116 students of the scientific initiation program. Of which 523 (47%) are male and 593 (53%), female. Outstanding female participation. Likewise, the participants in the scientific initiation program come from the 12 campuses of the César Vallejo University.

Table 1 Sample Of Participants By Campus According To Gender

Campus	Sex		Total	Percentage
	Male	Feminine		
tie	58	80	138	12.4
Callao	twenty	22	42	3.8
Chepen	39	16	55	4.9
Chiclayo	16	19	35	3.1
Chimbote	30	22	52	4.7
Huaraz	14	17	31	2.8
East Lima	32	48	80	7.2
North Lima	123	158	281	25.2
Moyobamba	24	31	55	4.9
Piura	38	Four. Five	83	7.4
Tarapoto	42	53	95	8.5
Trujillo	87	82	169	15.1
Total	523	593	1116	100.0

Source: Research data matrix (Google Form)

The data was obtained through a questionnaire designed through the technological tool Google Form. The same one that was shared to the participating students through a link. The times they participated in the development of the programmed topics as part of the scientific initiation. In such a way that the questionnaire was directed to collect the opinions, perceptions and criteria on scientific initiation in the process of implementing university formative research. Considering the curricular experience, thematic, study cycle, campus of origin and professional career.

Statistical analysis was performed using Excel software and Spss v.27. Organizing the data and amounts according to the criteria of participation, sex, campus, career, curricular experience, study cycle and theme in order to explore the information in a descriptive way and trying to understand the expression of the same according to the interest of study within the framework of the scientific initiation of university students.

RESULTS AND DISCUSSION

According to what was obtained in the analysis of the scientific initiation among the participants within the framework of formative research, the curricular experience that is taught in the various professional schools was considered as the basis, as shown in table 2, where the initial referent It was statistical culture for research. In general, 2.2% participated. However, in the Scientific Research Methodology (MIC) study, 21.4% of participants were found. On the other hand, those who completed a research project represented 16.2%. However, those who led the development of the research project stood out with a greater presence. Instead, 18.0% came from other curricular experiences, which indicates a special interest in participating in formative research.

On the other hand, among the participants of the degree program; that is, those students who came from non-licensed universities to obtain a baccalaureate represented 3.8%. Additionally, undergraduate teachers were included, as training in formative research, which represented 11.9%, while postgraduate teachers were 2.1%.

Table 2 Curricular Experience

curricular experience	Frequency	Percentage	Accumulated percentage
Statistical Culture for Research	25	2.2	2.2
Cientific investigation methodology	239	21.4	23.7
Investigation project	181	16.2	39.9
Research Project Development	272	24.4	64.2
Other Curriculum Experience	201	18.0	82.3
Degree Program	42	3.8	86.0
Undergraduate Teachers	133	11.9	97.9
Postgraduate Professors		2.1	100.0
Total	1116	100.0	

Source: Research data matrix (Google Form)

From the foregoing, it can be deduced that 64.2% of the participants were studying between the fifth and tenth cycle and, if we add to this the participation of those who come from other curricular experiences below the fifth cycle and the degree, a level of participation of 86.0% was achieved. While the remaining proportion corresponded to both undergraduate and postgraduate teachers who participated as trained in the research area.

Likewise, with respect to the online courses developed during the months of November and December, it was found that the one with the highest attendance was technological surveillance with 19.1%, followed by review article methodology with 17.0%. While the use of Zotero meant 16.3%. Finally, the steps to publish review articles were also found as an element of interest, in this case being 14.8%.

Instead, considering the components of the review article, 40.6% of the participants were found to be committed to this kind of developed online courses. However, this interest leaves a gap in terms of review articles, where important allies for arousing their interest and development are based on the use of the APA writing style, the systematic use of the Zotero tool, the procedures for publishing review articles and, above all, technological surveillance.

Table 3 Theme Developed In The Workshops

Developed online courses	Frequency	Percentage	Accumulated percentage
Problematic reality and problem	59	5.3	5.3
Justification and objectives	63	5.6	10.9
Review article methodology	190	17.0	28.0
Analysis of review findings	80	7.2	35.1
Discussion of the findings	47	4.2	39.3
Summary of findings	14	1.3	40.6
APA Writing Style	103	9.2	49.8
Use of Zotero	182	16.3	66.1
Steps to publish review articles	165	14.8	80.9
Technological surveillance	213	19.1	100.0
Total	1116	100.0	

Source: Research data matrix (Google Form)

On the other hand, regarding the professional careers associated with the participants, it was found that 22.8% came from Administration, while 18.8% corresponded to the Accounting career. Likewise, the Industrial Engineering career represented 12.1% among the participants. On the other hand, to a lesser extent, it is worth highlighting the participation of Civil Engineering students with 7.1% and Psychology with 5.6%. Finally, the participation of those who are part of the teacher training research program with 4.8%. While the postgraduate participation was 4.2%.

In summary, it was found that the participants in the highest degree were from business sciences, followed by engineering and closing the circle, in the undergraduate field, the Psychology career. Finally, the participation of the members of the training and teaching research program together with postgraduate studies.

Table 4 Participation According To Professional Career

	Frequency	Percentage	Accumulated percentage
Management	255	22.8	22.8
Administration in Tourism and Hospitality	30	2.7	25.5
Architecture	27	2.4	28.0

Art and Business Graphic Design	1	0.1	28.0
communication Sciences	13	1.2	29.2
sports science	3	0.3	29.5
Accounting	210	18.8	48.3
Right	46	4.1	52.4
Initial education	12	1.1	53.5
Primary education	4	0.4	53.9
Nursing	38	3.4	57.3
Agroindustrial engineering	two	0.2	57.4
Environmental engineering	19	1.7	59.1
Civil Engineering	79	7.1	66.2
Systems engineer	35	3.1	69.4
industrial engineering	135	12.1	81.5
Electric mechanic engineering	8	0.7	82.2
Marketing and Business Management	4	0.4	82.5
Medicine	9	0.8	83.3
International Business	16	1.4	84.8
Nutrition	two	0.2	84.9
Psychology	63	5.6	90.6
Translation and interpretation	4	0.4	90.9
Training and Teaching Research Program	54	4.8	95.8
Postgraduate	47	4.2	100.0
Total	1116	100.0	

Source: Research data matrix (Google Form)

Based on the evidence found, which was focused on systematizing the experience of scientific initiation in undergraduate students in university training research, the opening of participation spaces for students drew attention. This represents an achievement because it allows stimulating scientific research among students from various cycles and cities. Therefore, the opening of participation spaces for students represents an opportunity for them to assume a positive attitude in relation to the investigative processes.

The students, from the fifth cycle, begin to outline their orientation towards research through the curricular experience of statistical culture for research, then passing through the methodology of scientific research, the research project and, finally, the development of the research project. . All of them are intertwined with each other and stand as prerequisites for one another. In other words, over the course of this period, students develop investigative skills associated with university teaching focused on formative research, to which the research hotbeds, structured by professional schools and lines of research that shape a culture, greatly contribute. Research and innovation by virtue of the synergistic bond established between teachers and students ⁵.

However, the warning of this interest on the part of the students of the curricular experience of development of the research project is justified in large part because they are at the door of sustaining the thesis, so it is natural that they show interest in learning complementary. Even more so when the orientation of the vice-rectorate for research was to place a special emphasis on the development of systematic review articles as one more requirement in improving the quality of training, and to strengthen good research practices within the context of the institutional accreditation of its various programs. In short, to provide a new added value within the framework of the professional training of students, but as a requirement of SUNEDU and CONCYTEC. These converging elements led to teachers (thesis directors) also having to assimilate new learning in this kind of scientific production, which is why formative research acquires relevance and pertinence. However, this spontaneous interest must be channeled within the framework of a research culture where the contribution of teachers contributes to strengthening the research culture and enriching scientific production ³. While, from the perspective of the students, it allows the strengthening of their investigative skills, as well as that of the university community in general ¹¹.

On the other hand, in relation to the online courses developed, these were conceived as independent modules. The specific interest corresponded to the need of the moment; that is, technological surveillance. This priority focused on capturing information using both external and internal search engines about science and technology with the purpose of selecting, analyzing, disseminating and communicating information that later has to become knowledge for the research processes required by the user. ¹³.

So, in the digital age, students need to access information, filter it, treat it and convert it into knowledge. An interest that is based on research processes, which is why they necessarily require organizing the information and orienting it to the requirements set forth by the university and the training research programs. Hence, the methodology in the review articles becomes relevant to the extent that it constitutes an important aspect in the professional training of students, because it allows them to carry out the review of studies within a specific area and theme that greatly contributes to delve into the

lines of research⁷. For this reason, the students have considered it pertinent to have a greater knowledge about the use of Zotero as part of bibliographic management in research projects. In other words, with Zotero, students learn to organize and share information, but, at the same time, use it as a reference manager in the research process, evaluating and respecting the origin of the sources consulted, as well as saving time¹⁰.

However, they also require learning about the steps needed to publish review articles, an important aspect that has to do with the dissemination of findings and their communication to the university and scientific community. So that the activities of research, writing and publication are intertwined to publicize new knowledge and promote learning in theoretical, methodological, discursive and linguistic aspects among students.

For this reason, the use of APA standards in scientific writing also acquires relevance. Although there is a predominance of this standardized format. However, there are other styles of citation and reference to bibliographic sources such as Vancouver, Harvard, Chicago, among others. However, it is the APA standards that have the hegemony in academic and scientific writing. This makes it possible to standardize information and respect copyright¹⁶.

Although the online courses taught have had an adaptive learning bias, because they have allowed students, graduates, teachers and postgraduate researchers to assimilate new knowledge stimulated by the demands of the environment. However, it is pertinent that these activities be sustained and framed within generative learning with the perspective of promoting innovation in formative research. And the increasing use of technological tools for research should be socialized among students. In short, provide an organized response to the problems that students face with the use of technological tools.

Finally, regarding the participants according to their professional careers, it can be stated that the expectations were centered around Business Sciences, Engineering and Psychology. As is known, scientific research requires investigative skills that are very important in the context of higher education. However, to achieve a high impact on the purposes of the university, it is important to emphasize curricular processes, pedagogical management and evaluation. Reason why, the pedagogical perspective acquires relevance, whose purpose is to promote scientific research, the construction of knowledge, where the key aspect is formative research that, from a comprehensive look at the process of training researchers, allows theoretical preparation, methodological and technical research, in which the student learns to investigate by investigating¹.

Therefore, by influencing the development of investigative skills, the greater the development of investigative skills among students. So the interest in formative research is precisely to develop investigative skills. Hence, formative research is a pertinent teaching-learning strategy, to the extent that it solves problems using teaching methods that are currently expository and productive in nature¹⁸.

Precisely, what was evidenced in the developed online courses was the application of the expository method, since it was based on knowledge and where the student becomes a receiver of the information that is transmitted by the expository teacher, that is, you are responsible for planning and organizing the class session and delivering the content to the audience. This limitation underlies the events and becomes an obstacle for students to solve problem situations. On the other hand, the productive method focuses directly on the student by stimulating him to be a builder of knowledge, resorting to learning by discovery and the development of favorable attitudes towards research, stimulated by the facilitator teacher who guides him from beginning to end through the approach of problematic situations so that the student can use creative and innovative solutions throughout the research path¹⁷.

CONCLUSIONS

The experience of scientific initiation in undergraduate students as part of university training research responds to a joint effort of authorities, teachers, researchers and students who are committed to the development of science and technology. Making visible that the curricular experiences taught in the various professional schools of the César Vallejo University express that they not only respond to the current normative requirement; but to a commitment assumed at the institutional level. The workshops, courses, programs and events carried out, as part of the scientific initiation, represent a good strategy because they involve students from different provinces, geographical areas, cycles and professional careers. Developing scientific initiation in its diversity and plurality. Giving students the possibility of assuming positive attitudes towards scientific research.

Likewise, the curricular experience focused from the perspective of formative research should focus on promoting collaborative synergy between teachers and students, nurseries and tutors, authorities and research teachers through the search for knowledge, giving value and meaning to the activities of research carried out by students and appropriate knowledge to solve problems. On the basis of this success, promote with greater intensity the internationalization of the university based on the research results obtained based on collaboration with the private sector and society.

In the same way, the online courses developed must be based on productive methods and aimed at fostering a culture of research, investigative skills and the formation of research teams. In other words, learn to investigate and where teaching and research are in correspondence with the learning of the contents of the curriculum that contribute to the development of investigative skills.

Lastly, the events held are instructive experiences that must affirm the expectations of the students in what concerns Business Sciences, Engineering and Psychology in order to strengthen the investigative culture among teachers, students and authorities and, additionally, strengthen the link between educational research and professional practices developed by students.

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