

Analysis Of Research Culture And Scientific Production In A National University

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Abstract: The research culture is a fundamental pillar for scientific production, because it allows us to train future professionals contemplating the techniques, methods and the process of research to prepare short documents: such as essays, monographs, and then deepen the knowledge by performing the thesis and scientific articles, in order to contribute to science with new knowledge. In the reality studied, it was evidenced that students lack investigative competences. The general and specialty training courses do not develop such capacities, but exclusively to theoretical and practical knowledge linked to professional training. Teachers do not consider research as a profitable activity. However, the educational community is acting proactively for the creation of new research teams with a disruptive presence, where researchers and teachers share their knowledge through the practical teaching of the process of scientific investigation. The university understudy, to date, has several projects financed by CONCYTEC, FINCYT, World Bank, SENCICO, the same that not only contribute to science but the improvement of the quality of life of people with innovative jobs. Although the results are encouraging, the scientific production ratio per research professor turns out to be almost two publications, while if it is related to the student population of the 9th and 10th cycle, the unit is not reached. Consequently, through these changes in the attitude of a tiny group, the student population is encouraged to be part of the new research culture through scientific input for the benefit of the population.

Index Terms: Culture investigative, scientific production, research skills, meaningful skills, research teachers, Research culture, Higher university education.

1 INTRODUCTION

The research culture is constituted by the attitudes, values, and knowledge of the scientific method. Likewise, it is considered an essential part of the training of university students, due to the realization of research articles or works, which must transcend and contribute to scientific knowledge. The Ibero-American Ranking of Higher Education Institutions (SIR) 2019 [1] showed that in Peru, the production amounts to an average of 9154 documents, which is why it is located in a group 2, whose product range is 1000 to 10,000 publications. At the level of Ibero-America compared to 2018, the Peruvian University Cayetano Heredia descended to position 158, the National University of San Marcos - UNMSM rose to position 184. The Pontifical Catholic University of Peru - PUCP rose to position 176. The National University of Engineering - UNI ranked 412. At the Latin American level, UPCH ranked 98, UNMSM rose to 117, PUCP rose to 111 and UNI 320. At the national level, UPCH ranked first, while UNMSM descended to position 3, PUCP rose to position 2, UNI placed 8 (remains). Consequently, the results are not encouraging, but the decline in scientific production, in addition to the disparity between national universities concerning private universities.

At the national level, the National Superintendence of Higher University Education - SUNEDU [2], through the licensing process has denied said prerogative to 21 universities (20 private and 1 national), the leading cause was the shortage of scientific production (Condition 4: Research lines), and lack of agreement with university academic training (Condition 1: Existence of academic objectives, degrees, degrees and curricula). The study is based on humanistic theory, where the subjects are creative, free and conscious men; able to make and build, forged based on a habit or culture - hence the relationship with production and research culture [3]. It is also based on the contribution of Piaget - psychological and learning theory - which exposes the gradual mental development, and the experience or psychological maturation of the subject for the production of topics or daily actions, managing to merge the previous knowledge with the acquired knowledge, being the result a new knowledge [4]. The social theory, whose approach is directed to what the human group does and thinks, its social structure, norms, laws, the power relations and interrelation of the subjects [5]. Therefore, this last theory goes in parallel with the theory of education, for the emphasis on human values, necessary for the development of an ideal society, which achieves a harmonious coexistence and where anarchy, dehumanization and consumerism do not prevail [6]. The research culture is a set of good practices, proposals and values that allow the resolution of research phenomena through analysis, explanation, production, and communication of the results of a study. The teams must be made up of students, teachers and researchers [7], [8], [9], especially the latter, whose main task is to teach research in situ, so that knowledge transcends, and in time they are established the bases that will be shared by the members of a specific university community [10]. It should be noted that research competencies must be indoctrinated as part of the institutional culture of each country, to strengthen knowledge and the acquisition of experiences [11], [12]. In this sense, every study must comply with an ethical guideline (rules, norms and truthfulness) [13], [14], in order not to inform or produce a document with information not under reality. Scientific production is the assessment of knowledge that is expressed in innovative ideas, plans and proposals [15], which

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contribute to society, science [16], [17], [18], and the quality of life of people [19]. This activity is the experimental path of learning through the appropriate use of theories and concepts [20] that respond to the research lines of the institution or the journal that you want to publish [21], [22], the importance lies in analyzing, produce, exchange and diversify knowledge through open access to information and be available for new contributions [23],[24], [25]. However, conditioning factors or restrictions are identified that inhibit advances in scientific research [26], such as: (a) Personal factors: lack of commitment, psychological problems, low interest, demotivation, lack of time and lack of economic resources (b) Academic factors: the institution lacks suitable teachers for research (experience and knowledge); and (c) Institutional factors: library, laboratory, internet, among other material resources [27]. The present investigation exposes the reasons why the investigative culture in a national university of transcendence is not yet achieved, a fact that reduces scientific production and the scarce contribution to science.

2 METHOD

The study was based on the interpretative paradigm, because it was intended to understand and interpret the problem of research culture and scientific production in correspondence with the theory and previous studies [28], [29]. The approach was qualitative, according to the authors [30], [31] argue that the problem was interpreted from the assessments and perceptions of the reporting units. The base method was the case study, given that the researchers or the participating elements know and live in the context of the study, which is why they can issue information and judgments of reality [32], [33]), as well as The complementary inductive method, was used, because from the particular result it was generalized to various realities [34], [35]. Ultimately, the analytical-synthetic method that allows us to analyse and see the essence of the parts of a whole allows us to determine the relationships, characteristics, and properties, while the synthesis organizes, groups and consolidates the ideas or elements [36]. Nineteen respondents voluntarily participated in the investigation, although initially all the authorities and students were summoned, the response was not as expected. The participants were grouped into a) Authorities: Vice Chancellor for Research, Physics and Doctor of Physics of the public university understudy, has 30 years of experience and publications in Scopus since 1987. The Head of the Research Center also collaborated; on average, they have 20 years of experience. He has been qualified as a research professor at the Faculty of Sciences and has scientific publications. B) Teachers: for the study 4 collaborated, all researchers qualified as CONCYTEC researchers with publications in Scopus, belonging to the research groups assigned to the different faculties such as the Faculty of Science, Mechanics and Civil, as well as research centers, the average years of experience was between 10 to 20 years, the ages range from 39 to 65 years. C) Students, currently studying the ninth and tenth cycle of the Faculties of Science, Environmental, Mechanical and Civil, the ages are in the range of 22 and 30 years, the criterion to include them is that they currently study the subject of research and execution of thesis projects to obtain the professional degree, in total only 10 students qualified. The data collection technique applied was the interview. The dialogue with the participants was carried out based on the previously designed guide [37], [38], [39], which

was constituted by the following questions: a) In college do teachers train students to develop research papers? Why?; b) Do teachers develop significant competencies at the university (grammatical, textual, semantic, programmatic, and encyclopedic competence)? Why?; c) Are there activities related to research at the university? Why? What do you think?; d) In summary, how are the research culture and scientific production in the university? Why? In this sense, both categories were broken down into subcategories; the research culture must be related to scientific production. However, it is supported by knowledge, experience and scientific praxis, as expressed in Figure 1.

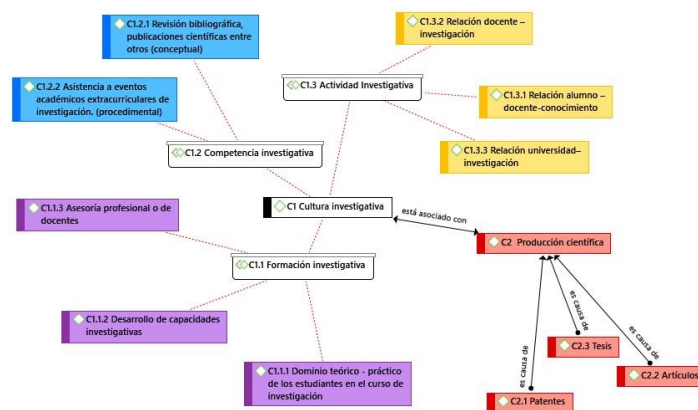


Fig. 1. The network of the research culture and scientific production in a national university.

The data obtained were processed with the triangulation technique and the Atlas.ti 8 software, the process was completed in time (at different times), space (in different contexts or places to check matches) and according to the subjects (different subject samples or units of analysis to better contrast the responses and consolidate an essence of information). The theoretical triangulation corresponded to the study, to support the theoretical bases on which the information obtained is supported [40], [41], [42].

3 RESULTS

The development of research skills turns out to be important in training and educational work, especially when conducting the thesis, articles, or research papers to obtain a professional title. It should be noted that the acquisition of research competencies turns out to be a long process; the development of courses, in general, are not focused on achieving research competencies. This situation is evidenced at the time of carrying out the thesis project; the advisors assume that these competencies possess them, and they should only execute them. However, it is not so; the student presents many difficulties in the writing, interpretation of the text, contextualization, use of Statistics, data construction and presentation of the final report. This task not only corresponds to the university level but from the Regular Basic Education, it must be taught and practiced with daily and abstract activities. Although the Science, Technology and Environment course were implemented, even the efforts do not turn out to be transcendental, despite that in some pilot educational institutions extracurricular research course has been implemented, however, the results are not encouraging, because the professionals in charge do not respond to the

profile of a research teacher. The university understudy is focused on the professional training of engineering careers, which is why students have always stood out in theoretical and technical knowledge, so they mostly do applied research. On the other hand, the carelessness in the training in the courses of letters was credited, in the curricular mesh, there is the only one writing course, and it is in the first cycles. In this sense, graduates stand out in the mechanical part such as mechanics, soil, architecture, mining, geology, information technologies, among others; but they have excessive difficulties in translating it into an official document or publishing a scientific article, as well as submit a report to the General Management. A prominent phrase expressed by an interviewee was "it is difficult to write the reasons for the problems in a few words," which demonstrates the reduced ability to write, argue, analyze, critique, summarize and consolidate the information due to the lack of practice. Teachers have incorporated students into research groups to acquire research skills; there is almost always a considerable number of students who wish to participate, the problem lies in the process, due to lack of time and financial means they decide to leave the study. This situation, unfortunately, harms the achievement of partial and institutional objectives. In this sense, the financing granted by the university turns out to be insufficient, merits resorting to private companies, external competitive funds, NGOs, among others, to overcome this difficulty. In the last five years, the State, with the implementation of University Law 30220 [43], has encouraged research. The universities of Peru had to create the Research Vice-Rectorate and is responsible for guiding, coordinating, organizing projects and activities related to it, which is why it requires a considerable budget and qualified human capital with experience, not only in the process of research but also in publication of articles and patent registration. Unfortunately, even the resources do not turn out to be enough. Alliances with foreign universities, private companies, and the State are required. Despite this situation, activities have been developed at the state university related to training projects with financing below 50,000, competitive funds with internal and external financing, participation in fairs, the formation of 50 research groups, grants for pre and post-grade research, among others, which once again motivated the synergy between teachers, students and graduates in the formation of multidisciplinary teams. Of course, not only the confirmation of them and the economic resources is enough, but it is required constancy, perseverance, proactivity, teamwork, synergy and avoiding procrastination so as not to fail in the process. The research culture in the university is still in the beginning phase, progress is observed, but more effort is still needed from the university community. It should be noted that not all (teachers and students) investigate, consider it complicated or difficult, lack the practice of critical thinking, lack significant skills, lack of motivation, assertive communication, and at the same time require investment in specialized laboratories, as well as the recognition and support of the authorities from turn. However, it is worrying that teachers do not assume responsibility for the investigative task; they consider it an activity that absorbs time and money; there is no recognition by the authority. They insist on the fact that additional training is required to investigate, of course, this situation is worrying, because if the teacher as the main actor does not possess the investigative competences, then there the response of the lack of scientific production. It should be noted that research activities are monitored by the

Vice-Rectorate for Research of the university, SUNEDU and CONCYTEC. There is a firm purpose to generate more research projects, which is why it has motivated the formation of research groups that apply for internal or external financing, in order to achieve publications in high-impact journals. In 2018, UNI managed to publish 124 articles in indexed journals, when calculating the ratio of scientific production * research teacher results 1.8 (124/68), that is to say, two articles on average per research teacher per year. If we calculate the scientific production per student of the 9th and 10th cycle = 0.06 (124/2094), which means that no item is achieved per student, even worse if we calculate the production of the university community = 0.06 (124/2094 + 68), in this sense we show that commitment, teamwork and specialized knowledge in scientific research are still needed to increase scientific production. Thirty-eight patents were also obtained, when calculating the ratio of patents achieved in the university community = 0.01 (38/2094 + 68), that is, what is achieved is not significant for the institution, these figures are similar in Peruvian reality. Similarly, during the academic year, symposia, congresses and scientific meetings are frequently held in order to present the results of the research developed by the different groups, it should be noted that the university under study is in continuous development and scientific production, in this sense has several projects financed by institutions such as CONCYTEC, FINCyT, World Bank, SENCICO, who support in technological research, scientific research and technological development, however if we calculate the impact ratios, they still prove to be insignificant, as expressed in Figure 2. Finally, scientific production is based on knowledge, experience and methodological expertise, there is a need for more significant investment in research by the State, in addition to assessing the social impact of the work carried out. Therefore, it is not enough to carry out descriptive, correlational, or causal investigations. However, these must start from an in-depth diagnosis using quantitative and qualitative tools that lead to an active (projective research) and real proposal, even more, if its viability is determined and application in the context of the study, will allow achieving a higher level of research that is the interactive type. The results address a final level that is evaluative.

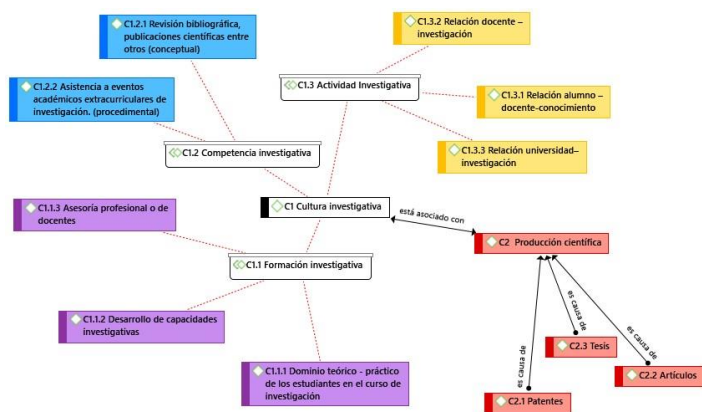


Fig. 2. The network of the research culture and scientific production in a national university.

4 CONCLUSIONS

The research culture and the scientific production is still in the initial phase at the pre and post grade level, more work is

needed from the teachers in the classrooms so that the students acquire the research skills through essays, monographic works, with the purpose of materializing it in the writing of technical reports and articles that will then be evaluated by blind peers with possible publication. Likewise, the support of the State is required for the construction and availability of resources such as laboratories, technological platforms, anti-plagiarism software licenses, among others, necessary for the development of research. The curricular plans of the university under study merit greater incorporation of courses related to human or social sciences, necessary and essential for verbal and written communication, because the human being as a social entity needs to interact with his peers and society. The responsibility for this problem lies with the professors because they agree to teach the methodology course in order to complete their teaching load, without having before received training in the scientific method. On the other hand, their participation in events, congresses, graduates and post-graduate studies related to research, as well as the publication of articles in high-impact indexed journals, is scarce. The investigation is a hierarchical process that starts from the observation, followed by the description, relation, causality, comparison and analysis of phenomena that lead to an in-depth diagnosis, for the construction of an active proposal that is applicable to reality, whose results will be evaluated under the criteria of social impact and contribution to knowledge. Based on the results obtained, a modification of the curriculum plan in line with the provisions of SUNEDU is proposed, that is, in the first year, a higher number of courses linked to social sciences and research must be included, for the promotion and development of the research culture. All this with the objective of achieving the growth of scientific publications, patents, and solutions to daily life.

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