

Impact of scientific research on professional training

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Abstract.- Considering the global trends in scientific publications and the boom in research topics in universities worldwide, this paper analyzes the benefits, advantages, and opportunities of using scientific research tools in university education. For this purpose, different bibliographic sources are evaluated, and surveys on a randomly selected group of students are analyzed. The main results show that many factors influence the lack of good research products in the South American region and students' lack of involvement in the research process and that students remain with largely traditional training programs.

Keywords: University training, educational methodologies, researcher profile.

Impacto de la investigación científica en la formación profesional

Resumen: Teniendo en cuenta las tendencias mundiales de las publicaciones científicas y el auge de los temas de investigación en las universidades de todo el mundo, este trabajo analiza los beneficios, las ventajas y las oportunidades de utilizar herramientas de investigación científica en la enseñanza universitaria. Para ello, se evalúan diferentes fuentes bibliográficas y se analizan encuestas realizadas a un grupo de estudiantes seleccionados al azar. Los principales resultados muestran que son muchos los factores que influyen en la falta de buenos productos de investigación en la región sudamericana y en la falta de implicación de los estudiantes en el proceso de investigación, así como en la permanencia de los estudiantes en programas de formación mayoritariamente tradicionales.

Palabras clave: formación universitaria, metodologías educativas, perfil del investigador.

I. INTRODUCTION

The present corresponds to a world in constant evolution, where technological advances, scientific discoveries, and labor demands are rapidly transformed, and vocational training acquires increasing importance. However, it is necessary to inquire about the challenge that professionals have to stay updated and prepared to face the challenges of the XXI century. [1] [2] Most likely, the answer lies in the transformative power of scientific research. Research is the engine that drives the expansion of knowledge and profoundly impacts the training of highly competent professionals [3]. [4] In this paper, we will explore the impacts of scientific research and how its findings and methodologies influence the acquisition of skills, the development of new perspectives, and the improvement of the quality of vocational training. It is expected to learn how scientific research becomes an invaluable ally for those seeking to excel in their fields and embrace continuous learning in an ever-changing environment.

II. DEVELOPMENT

Social Impact: Scientific Research

The theories that explain human development tend to specify the importance of strengthening the capacities and skills of people to contribute to the development of their communities and rebuild the planet sustainably through adequate education as a source for human beings to develop [5]. In this sense, universities are academic institutions capable of promoting scientific activity, prioritizing science and technology as an educational policy with the participation of teachers and students through multidisciplinary research teams to solve different social problems, and seeking new challenges and opportunities [6]. In addition, scientific research must generate development in the other social sectors: economic, cultural, political, educational, and technological; to achieve this purpose, universities in South America must be governed by legal guidelines, using strategies that increase scientific production to generate academic visibility at the international level [7] [8].

In this sense, the importance of generating new knowledge is based on the training of professionals with a sense of innovation and capacity for critical and analytical thinking, developing skills and competencies to solve the demands of society. It is necessary to form a good attitude toward research in both teachers and students, consolidating an academic profile that stops limiting the student to only being in the future a distant professional of research [9] [10]. However, the experiences of international academic mobility carried out by Latin American students in most cases are beneficial because the experience opens the student's mind to coping with cultural challenges, language, economy, and academia, generating greater autonomy, critical capacity, and research training, aspects that are prioritized in other universities for the opportunities offered to them. And the programs they develop for research, experiences that should be replicated in South American universities to encourage research in professional training [3] [11].

Likewise, training new researchers requires teachers with high research skills; therefore, the teacher must be trained to produce scientific with the ability to assume the commitment to transmit knowledge and strengthen students' research skills through appropriate pedagogical and didactic practices, which awaken research interest, commitment, ethics and teamwork [2], [12].

The result of research training depends on the management of the educational authority, capable of enabling the investment of the necessary resources for production, dissemination, and communication, as well as different scenarios that require the use of tools, capacities, and aptitudes to research, concluding that higher educational institutions should be the seedbeds of research with the expectation of developing societies as part of their social responsibility [5].

Therefore, to generate relevant results in the training of researchers in students, it is necessary to restructure university educational policies in research, as well as pedagogical and didactic strategies in training, strengthen academic mobility programs, manage a budget to finance projects, formalize and direct research seedbeds, selection and inclusion in multidisciplinary projects developed by teachers to students with positive attitudes towards research, promoting and improving the skills of academic actors to solve the problems of society.

Previous studies describe that university students in South America present unfavorable attitudes towards research, considering that students in health sciences have better developed their research skills due to the nature of their training. Likewise, female students develop their research skills better than male students. Age indicates that the older the student presents more interest in research [13], [12].

In South America, there is a low scientific production, with few developments of a basic level compared to other Central American countries [14], [15]. In this sense, it could be said that the crisis of academic production in vocational training is due to a set of factors that must be resolved to reverse the statistics, the most significant being: inadequate university educational policies in research, inadequate training of research teachers who are responsible for teaching research courses in academic classrooms, curricular meshes that do not respond in the training of new scientists, focused on training field professionals, classical pedagogical and didactic strategies, research institutes that are an exclusivity for some researchers, distancing in the inclusion of a representative majority of students in research projects, absence of a plan to strengthen the culture in research, low budget to finance projects, and personal and academic interest of the student for study.

Research in undergraduate student training in Peru

At present, research activities in the training of undergraduate students in Peru focus more on repetitive learning than on reflective learning [16]. As a result, students acquire limited research competencies. Although some students participate in research groups or workshops facilitated by some teachers, most of them engage in research activities only during the execution of their thesis to obtain their bachelor's degree. So far, more than 250,000 theses have been registered in the National Registry of Research Works (RENATI) since 2007. According to the National Superintendence of University Higher Education [17], less than 1% of these theses have been used for the elaboration, and publication of scientific articles, indicating that the scientific activity of university students in the country is limited. The traditional education provided in universities focuses only on the training of professionals, without considering whether students receive adequate training in scientific research or whether their participation in research groups or projects funded by these institutions is promoted [18].

In this sense, in Peru, according to the new University Law No. 30220 [19], one of the purposes of universities is to promote scientific, technological, and humanistic research, although vice-rectorships for research have been created to promote and manage this topic, it is still weakened by the number of recognized research professors working in educational institutions, with less than 5% dedicated to research.

On the other hand, according to Medina, Medina, and Merino [20], the relationship between education and research should enhance academic development and, above all, the prestige of educational institutions. Therefore, the participation of academics is essential to continue refuting or confirming theories, seeking new knowledge, or expanding existing knowledge. Hence, it is necessary to foster research attitudes within academic classrooms.

Thus, the student in the formative practice should undergo a reflective and critical process regarding the problems to be studied and must cultivate a positive attitude towards knowledge generation [21]. However, one of the primary attitudes exhibited by students is a lack of research interest [22]. They do not find research appealing because they lack motivation and, most importantly, they lack passion for scientific topics (figure 1). They do not delve into the content and are content with what is taught in the academic classrooms, displaying passivity.

Additionally, the research teacher plays a crucial role in shaping the student's necessary attitudes to achieve proper research skill development. However, students struggle to fully cultivate these skills. Undertaking a research project proves challenging, and their expectations regarding seeking necessary information are often unmet. They have minimal reading habits, are unaccustomed to writing, and their analysis of academic work lacks precision [23].

Hence, to fortify positive attitudes in aspiring researchers, they must possess a predisposition to immerse themselves in scientific work, effectively manage their emotions and feelings, actively collaborate in multidisciplinary teams, and uphold values like honesty, critical thinking, empathy, solidarity, and assistance. Above all, they should demonstrate ethical principles that reflect their true calling for research [24]. In this context, if the student's attitude generates pleasurable thoughts and feelings, they will probably cultivate a positive mindset. Conversely, if such a situation does not occur, their attitude will be negative, potentially leading to adverse or unfavorable behavior.



Figure1. Criterios de inclusión y exclusión

When examining the impact of socio-educational factors on students in professional training and their attitudes toward research, it is noteworthy that there are no significant differences based on gender. This finding emphasizes that both men and women are equally capable of demonstrating favorable or unfavorable attitudes, showing interest or disinterest, possessing or lacking vocational inclination, as well as expressing appreciation or lack of appreciation toward research [25].

Concerning the variable age and attitude towards research, significant differences were found, with university students in their last years presenting better attitudes towards research than students in their first semesters, mainly because the thesis is fundamental for their graduation, an indicator that shows the low academic productivity of the student. [26].

Regarding the field of study and attitudes towards research, students in health sciences exhibit higher interest and vocational inclination towards research compared to those in social sciences and engineering [27]. However, no differences were observed in attitudes toward research based on educational institutions. Hence, it is challenging to determine which university excels in training or fostering research among undergraduate students. This description provides insights into research development within educational institutions, the formation of attitudes, and the key factors—such as universities and teachers—that influence students' motivation to enhance scientific production.

III. METHODOLOGY

For this work, a documentary analysis of open-access sources from recent years was carried out to know the new research concerning the subject, with scientific research being the central axis.

In addition, the scale of attitudes towards research duly validated [28] and completed with socio-academic variables of the students was applied to find statistically significant differences in a sample of 2448 students. Likewise, the ethical processes for collecting data and information were carried out, considering the informed consent of the participants. Also, the confidentiality of their information was protected.

IV. RESULTS

The academic community must understand the weaknesses of scientific research in the South American region to understand the importance of scientific developments for society, health, and industry and the repercussions of this on the region's growth. Therefore, to have an adequate impact of research on the professional training of university students who produce knowledge that helps solve and improve social problems and demands, it is necessary to prioritize actions to obtain better results. Designing new educational regulations focusing on research and considering a science-based education is also essential.

Another critical factor is the investment in the education and training of teachers with a research profile to assume an adequate academic and research posture in the classroom and thus motivate and encourage the student body. In addition, research groups should be strengthened and promoted so that students can participate in teams and develop their competencies. All this should be consolidated with rethinking current pedagogical and didactic practices that motivate and awaken the student's interest in research. However, one of the primary needs in this context of transformation will be restructuring the curricula with subjects that train researchers. Innovative educational methodologies that promote the development of scientific research.

On the other hand, and perhaps one of the most critical factors, is the collaboration between academia and the professional sector, which could ensure that academic training is aligned with the needs and demands of the labor market. As technologies advance and new challenges emerge, educational programs must remain current and relevant. Therefore, collaboration with professionals enables educational institutions to adapt their curricula, include relevant skills and knowledge, and ensure that graduates are equipped to meet the world of work challenges. In addition, collaboration fosters knowledge transfer and the practical application of academic research. Academics bring research expertise, theoretical knowledge, and new perspectives to professional challenges. On the other hand, the professional sector provides practical information, real-world experience, and case studies that enrich teaching and research. This mutual collaboration allows academic research to directly impact problem-solving and the development of innovative solutions in the professional environment.

In addition, academia-professional sector collaboration fosters the employability of graduates, as companies and organizations increasingly value candidates' practical skills and work experience. This integration of academia and the professional sector allows the design of internship programs, internships, and joint projects that provide students and graduates with concrete opportunities to apply their knowledge and develop skills in a natural work environment. This strengthens the transition from education to employment and increases the chances of career success.

Finally, Peruvian undergraduate students present average attitudes towards research that tend to be unfavorable, with those in the area of health sciences presenting more favorable attitudes towards research than students in social sciences and engineering. In addition, it was observed that students in the last years of study value research more highly and show a greater inclination to become involved in research-related activities than students in the first years.

CONCLUSIONS

The impact of scientific research on vocational training is significant and beneficial in several respects, both for the professional future and for university and business environments. Developing skills in scientific research provides professionals with the necessary tools to stay updated in their respective areas, encouraging continuous learning and the acquisition of relevant skills. In addition, scientific research improves the quality of vocational training by influencing and updating curricular content, implementing best pedagogical practices, and enhancing educational programs.

A good collaboration between academia and the professional sector is vital to maximizing scientific research's impact on professional training. In addition, this integration favors the transfer of knowledge and the practical application of research, creating a bridge between theory and practice. In addition, this collaboration ensures that academic training is aligned with the needs and demands of the labor market, preparing professionals to face the world of work challenges effectively. On the other hand, it favors the industry to promote developments and improvements in business needs.

The impact of scientific research on vocational training is a powerful combination that drives excellence, innovation, and the development of relevant skills. Scientific research provides the knowledge and theoretical foundation needed to solve complex problems, adopt evidence-based approaches, and foster critical thinking in practitioners. This interaction between research and professional training strengthens the link between academia and the world of work, creating opportunities for personal growth and contributing to the advancement of society in general.

Scientific research plays a crucial role in advancing knowledge. Consequently, the training of researchers should be given greater emphasis within university classrooms. By prioritizing the development of research skills, universities can foster a culture that values and promotes scientific inquiry.

The responsibility for fostering positive attitudes towards scientific research lies with the university and its human resources, particularly the teachers. Teachers need to acquire the necessary competencies and act as role models for their students, motivating them to engage in scientific activities. Their guidance and support are instrumental in nurturing a passion for research among students.

Research is not confined to a specific field of study but encompasses all areas and disciplines. It is the responsibility of all academics to cultivate the necessary attitudes to identify and solve problems through research. A broad recognition of research's importance should be emphasized, encouraging individuals from various fields to engage in scientific inquiry.

Educational institutions should consider restructuring their curricula to prioritize science-based education and actively encourage and promote research. By integrating scientific principles and methodologies into their programs, universities can inspire students to pursue scientific exploration and equip them with the necessary skills to contribute meaningfully to their respective fields.

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