CONTRIBUTION OF THE SCIENTIFIC PRODUCTION OF HIGHER EDUCATION TEACHERS TO THE IMPROVEMENT OF THE EDUCATIONAL QUALITY OF THE UNIVERSIDAD NACIONAL INTERCULTURAL FABIOLA SALAZAR LEGUÍA DE BAGUA, NORTHERN PERU

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ABSTRACT

Objective: The objective of this study is to analyze the scientific contribution of the regular teachers of the Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua (UNIFSLB) since their first linkage.

Method: A review of databases (Latindex 2.0, Scielo, Web of Science and Scopus), as well as relevant management documents was carried out. Likewise, the annual growth rate and the behavior of the promotion and dissemination of science through its journals hosted in OJS were evaluated. Data analysis was carried out using Minitab 19.1 and VOSviewer programs.

Results: They reveal a remarkable annual growth rate of 31.12%, with a scientific production of 115 articles. In 2022, publications in Scopus and Scielo stand out with 32 articles and 2 in Scielo, respectively. The dissemination of scientific production is mainly through the scientific and academic journals "Dékamu Agropec" with 53 publications and "Manguare" with 32. However, the presence of publications related to interculturality is limited (5 in Web of Science and 2 in Scopus).

Conclusions: The minimal number of publications could be due to insufficient economic allocation for research. Therefore, it is necessary to implement policies that promote the valuation of ancestral knowledge and that this is validated through the generation of knowledge in accordance with the lines of research. This, in turn, is associated with the low visibility of keywords related to specific topics.

Keywords: interculturalism, Bagua, scientific production, Amazonas.

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CONTRIBUIÇÃO DA PRODUÇÃO CIENTÍFICA DE PROFESSORES DE ENSINO SUPERIOR PARA A MELHORIA DA QUALIDADE EDUCACIONAL DA UNIVERSIDADE NACIONAL INTERCULTURAL FABIOLA SALAZAR LEGUÍA DE BAGUA, NORTE DO PERU

RESUMO

Objetivo: O objetivo deste estudo é analisar a contribuição científica dos professores regulares da Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua (UNIFSLB) desde seu primeiro vínculo.

Método: Foi realizada uma revisão das bases de dados (Latindex 2.0, Scielo, Web of Science e Scopus), bem como de documentos de gestão relevantes. Da mesma forma, foram avaliados a taxa de crescimento anual e o comportamento da promoção e da disseminação da ciência por meio de seus periódicos hospedados no OJS. A análise dos dados foi realizada com os programas Minitab 19.1 e VOSviewer.

Resultados: Revelam uma notável taxa de crescimento anual de 31,12%, com uma produção científica de 115 artigos. Em 2022, destacam-se as publicações na Scopus e na Scielo, com 32 artigos e 2 na Scielo, respectivamente. A divulgação da produção científica se dá principalmente por meio das revistas científicas e acadêmicas "Dékamu Agropec", com 53 publicações, e "Manguare", com 32. Entretanto, a presença de publicações relacionadas à interculturalidade é limitada (5 na Web of Science e 2 na Scopus).

Conclusões: O número mínimo de publicações pode ser devido à alocação econômica insuficiente para a pesquisa. Portanto, é necessário implementar políticas que promovam a valorização do conhecimento ancestral e que isso seja validado por meio da geração de conhecimento de acordo com as linhas de pesquisa. Isso, por sua vez, está associado à baixa visibilidade das palavras-chave relacionadas a tópicos específicos.


1 INTRODUCTION

Scientific production is fundamental to strengthen educational systems and achieve objectives such as quality improvement in universities (Aldana-Zavala et al., 2020). The university involves the development of a modern worldview and coloniality, embodies a way of thinking and a way of producing knowledge (Elizabeth et al., 2021; Mejía J, 2017), which are disseminated under a monocultural discourse founded on the Europeanist universal episteme (Mejía, 2018).

Scientific publications are associated with international community networks (Powell & Dusdal, 2017). In Peru, reforms for scientific production began in the 20th
century, with the National University of San Antonio Abad in Cuzco and the National University of San Marcos in Lima being the first to adopt reforms (Medina, 2018; Millones-Gómez et al., 2021). However, in 2016, the National Council for Science, Technology and Technological Innovation (CONCYTEC), the governing institution of Peru's National System of Science and Technology and Technological Innovation, evidenced the poor development of scientific research and technology at the national level with respect to Latin American countries that are members of the Organization for Economic Cooperation and Development (OECD) (Cervantes Liñán et al., 2020).

Scientific research should be fundamental to guarantee the continuing education and comprehensive training of undergraduate and graduate students (Mori, 2023). Thus, doing science in universities derives from four ideals: academic freedom to teach, learn and research; unity of teaching and research for deeper inquiry (Dusdal et al., 2020).

Modernity and university education in Peru must be directly connected to the process of universalization of knowledge (Bennasar & Reyes, 2022). Four intercultural universities were created in Peru at the request of indigenous organizations in order to guarantee the preservation and conservation of the culture and mother tongue of the native Andean-Amazonian peoples (Bada Laura & Wisum Petsa, 2021). In addition, universities must develop research in accordance with the concerted development plans of each regional government (Silva et al., 2022). They should also generate policies to develop research skills in their teachers (Araoz, 2023). In this regard, it is observed that scientific production (science and technology) is a function of the economic allocation that each country allocates to scientific development (Zhang, 2021). Also, the research developed has an impact on the number of publications and intellectual capital of higher institutions (Quintero-Quintero et al., 2022).

Intercultural universities are different from conventional universities in that they promote an unrestricted respect for their own culture and social dynamics (Colin, 2015; Ramírez Valverde et al., 2018). They take on the challenge of becoming tools to reduce the gaps in access to higher education faced by indigenous youth, giving importance to traditional ancestral knowledge (Augusto & Zárate, 2022). Therefore, the powers of the State have to assume a role in such a way that cultural rights are respected, mainly for those groups that are in rural and border areas; strengthening the participation of citizens in extreme poverty (Muchotrigo, 2006).
The Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua (UNIFSLB), was created by the clamor of the people of Bagua, especially by the inhabitants of the Awajún and Wampís ethnic groups living in the Amazon Region, on November 17, 2010, through Law No. 29614, with five professional careers: Agricultural Engineering, Civil Engineering, Animal Husbandry, Biotechnology and Global Business Administration.

Through Organizing Commission Resolution N°152-2017-UNIFSL-B/CO/P, dated September 18, 2017, the Organizing Commission approved to prioritize three professional careers to continue with the Institutional Licensing process: Civil Engineering, Biotechnology and Global Business Administration, due to insufficient budget to implement laboratories and workshops with adequate equipment as required by the National Superintendence of Higher University Education (SUNEDU), expressed in Official Communication N°614-2017/SUNEDU-02-12, dated August 31, two thousand seventeen. Since the licensing, a little more than 5 years of operation have passed, and only in this first semester of 2023-I, the first graduating class of UNIFSLB graduated. Therefore, for the first time we are analyzing the contribution of the scientific production of regular teachers in improving the educational quality of UNIFSLB, approached from the evolution of publications by databases, review of major management documents and the dissemination of science.

2 OBJECTIVE OF THE STUDY

- To determine the contribution of the scientific production of regular teachers in improving the quality of education at UNIFSLB.
- Determine the evolution of scientific publications by database
- Review the main management documents and the dissemination of science

3 THEORETICAL FRAMEWORK

The development of science is impossible, without solving the problem of preparation for research activity of teachers of professional careers. Likewise education and research activity of students is one of the basic factors of formation of highly qualified professionals (Askarov, 2016). The fundamental principle of the student learning process, is the effective relationship between the teacher and the student, which requires not only a high scientific knowledge of the teacher, teaching methods, but also a good reputation
as a professional (Lim & Va, 2022) and to maintain the educational quality of universities, the curriculum should be taken into account for the current challenges, as well as, put into practice environmental sustainability (Maulana, 2023; Pulido-capurro et al., 2023).

The poor quality of education received by native populations, racism and discrimination limit the options and opportunities open to indigenous populations. In this sense, intercultural universities must address integrative solutions, from the state, local governments, indigenous organizations and the academic community (Schmelkes, 2009). Higher education in emerging countries, such as Peru, should consider actions for access to inclusive education in order to achieve adequate development (Abdullahi, 2023).

4 METHODOLOGY

The study was conducted in northern Peru, Amazonas Region, Bagua Province. The province of Bagua is geographically located at 05°38'21" South latitude and 78°31'54" West longitude at an altitude of 420 masl (Fernández Jeri et al., 2022). Average annual accumulated precipitation values of 1832 mm, annual air temperature of 30 °C, characterized by a very warm climate (SENAMHI, 2020). Students in the Amazon region have the most difficulties in accessing both basic and higher education, and have the lowest levels of learning achievement (Cabrera et al., 2023). Of all the indigenous youth in the Peruvian Amazon, very few manage to enter universities despite the various aid programs and the existence of the UNIFSLB, which, unlike other intercultural universities, has the support of regional and provincial authorities, as well as the population in general (Espinosa, 2017).

Therefore, the study was based on a quantitative research approach with a comparative descriptive cross-sectional design. UNIFSLB management documents were analyzed, and the profiles of 37 regular professors (ORCID and CTI Vitae) were manually reviewed in order to verify the scientific production published in the Latindex 2.0, Scielo, Web of Science and Scopus databases, which have been visible until June 27, 2023. The search was performed from 2019 to 2023, because it is contiguous to the first publication with institutional affiliation of UNIFSLB. Publications without UNIFSLB affiliation were excluded, as well as articles that were not found with an active link. The compound annual growth rate (CAGR) was calculated following the procedures of Castillo and Powell (Castillo & Powell, 2019) and an open calculator was used because it was easy and faster to use (Calculvio, 2022; Reategui-Inga et al., 2023). A search for teachers
qualified as RENACYT researchers was carried out in order to determine the percentage of research teachers (https://servicio-renacyt.concytec.gob.pe/busqueda-de-investigadores/). On the other hand, the scientific production in Scopus with UNIFSLB affiliation was verified (publications by hired and/or dismissed personnel and students were considered), calculating the number of authors. Regarding the articles related to interculturality, it was taken based on the intercultural approach and that the scope of study was in the Amazon region (direct influence of UNIFSLB). The promotion of scientific research was verified through the financing of 2022 and 2023 projects and UNIFSLB’s scientific and academic journals.

For data analysis, the statistical software Minitab 19 Spanish version was used to generate descriptive statistics. Network maps were constructed using the complete count method of the VOSviewer v.1.6.17 software in order to explore the journals in which researchers publish and the co-occurrence of keywords in the articles (van Eck & Waltman, 2010).

5 RESULT AND DISCUSSION

The value of the compound annual rate was 31.12 % (2019-2023) indicating an increase in scientific production at UNIFSLB, which in total was 115 publications found in the three databases (Figure 1), having an R² of 0.74, which determines a normal fit and has a positive relationship between the number of years and the publications (Dominguez Dueñas et al., 2019). This is related to the diffusion of open science (Moraes, 2022), taking into account that the increase in scientific production is related to economic factors and human resources in an institution (Castillo & Powell, 2019).
Figure 1: General behavior of scientific production

Figure 2: Evolution of scientific article publications by database

Figure 2 shows the evolution of publications by database, where the highest number of publications was for Latindex 2.0 in 2021 (20 publications). The number of publications of articles in the Scielo and Scopus databases began in 2022, reaching June 2023 with 23 articles in Scopus and 2 in Scielo. This number of publications is still very low, the factors would be associated with the insufficient number of researchers, the lack of research laboratories and the limited access to academic information sources (Huamaní & Mayta-Tristán, 2010; Mayta-Tristán et al., 2013).

On the other hand, Figure 3 shows that 48 publications appear in the Latindex 2.0 database and this may be associated to the fact that UNIFSLB has the scientific journal...
Dekamu Agropec (http://revista.unibagua.edu.pe), as well as the value of knowledge dissemination and the minimum quality conditions that guarantee objectivity in the scientific contribution of researchers in training (Solórzano & Tamayo, 2022). Latindex is an extensive catalog, which contains a list of nearly 20,000 journal titles from Latin America, the Caribbean, Spain and Portugal, divided approximately equally between the "hard" and social sciences, which in turn include the arts and humanities, which implies a greater possibility of receiving articles in Spanish (Laufer, 2007). In this sense, it is also important that researchers value more the efforts made for this purpose and submit their manuscripts for publication to local journals of their own institutions (Laufer, 2007). It is expected that the university provides incentives with a larger budget to increase publications according to the region's problems and that teachers are first authors and increase scientific production, given that only 11 articles in Scopus were published by teachers as first author. Another important factor in UNIFSLB is the gender gap in the authorship of articles; women and indigenous authors are underrepresented, which suggests a multidisciplinary knowledge transfer (Silva et al., 2022; Vranas et al., 2020). The aspirations to publish in the Scopus database is because it is one of the world's leading databases (Pranckutė, 2021). With respect to the publications in Web of Science, they only appear in the Emerging Sources Citation Index (ESCI), which appeared in 2015, with the purpose of grouping the journals that in the future could be included in the main indexes (Repiso & Torres-Salinas, 2016). In Peru, the new "Regulations for the Qualification, Classification and Registration of SINACYT researchers" approved by Presidential Resolution No. 090-2021-CONCYTEC-P on August 27, 2021 considers the need to promote the generation of knowledge through publications in journals indexed in databases with national and international recognition, but does not consider publications in ESCI journals (CONCYTEC, 2021). Therefore, researchers should prefer publications in other journals of higher impact and thus increase the score to be qualified as Renacyt researchers, but should not neglect journals indexed in regional databases.
Regarding Intercultural, research is still very limited (14 publications for Latindex 2.0), understanding that this research was only limited to the results of articles that were executed within the Amazon region (Figure 4), the intercultural is developed in response to claims of indigenous peoples and their right to cultural identity; it distinguishes and promotes the coexistence between different cultural groups in the same territory (Salaverry, 2010). The number of publications that have directly addressed to solve a social problem in UNIFSLB and that appear in Scopus was 2 articles. This implies that intercultural dialogue should be increased, as a complex topic that requires a thorough analysis of the diverse realities experienced by the actors of a given territory (Reina Orosco & Quispe López, 2021). Taking into account that the Peruvian government recognizes Peruvian citizenship as an intercultural entity, cohabitating a linguistic, cultural and social diversity (Vargas, 2022).
At present, only 8 RENACYCT researchers (regular teachers) were found in levels VI and VII, respectively (a percentage of 24.32%) (Table 1). Therefore, educational institutions play a fundamental role in promoting the training of researchers, motivating and training their teachers to carry out this task and encouraging within their organizations the consolidation of a culture that tends to increase scientific publications of excellence (Ganga et al., 2016). In this sense, in a dynamic world, teacher-researchers must adopt solutions to the multiple social challenges faced by students, taking into account that Amazonas is the third poorest region in Peru (Aldana-Zavala et al., 2020; Silva et al., 2022).

<table>
<thead>
<tr>
<th>Number of Researchers</th>
<th>Registration code</th>
<th>Group *</th>
<th>Level**</th>
<th>Index H (Scopus)</th>
<th>Index H (Google Scholar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P0016436</td>
<td>..........</td>
<td>VI</td>
<td>2</td>
<td>NR</td>
</tr>
<tr>
<td>2</td>
<td>P0101794</td>
<td>..........</td>
<td>VI</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>P0048707</td>
<td>María Rostorowski (II)</td>
<td>VI</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>4</td>
<td>P0051357</td>
<td>..........</td>
<td>VII</td>
<td>1</td>
<td>NR</td>
</tr>
<tr>
<td>5</td>
<td>P0100687</td>
<td>..........</td>
<td>VII</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>P0052105</td>
<td>..........</td>
<td>VII</td>
<td>1</td>
<td>NR</td>
</tr>
<tr>
<td>7</td>
<td>P0043890</td>
<td>..........</td>
<td>VII</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>P0031699</td>
<td>..........</td>
<td>VII</td>
<td>NR</td>
<td>NR</td>
</tr>
<tr>
<td>9</td>
<td>P0066049</td>
<td>..........</td>
<td>IV***</td>
<td>2</td>
<td>4</td>
</tr>
</tbody>
</table>

* Previous regulation; ** Percentage of researchers (24.32%); *** Administrative personnel; NR= Not Reported

Source: Prepared by the author (2023)
In relation to the percentage (%) of publications by subject area in which UNIFSLB’s scientific articles are published, social sciences is the leader with 23.7% and in third and fourth place agricultural, biological and environmental sciences (11.9%) (Table 2). This relationship could be influenced by the careers offered (Global Business Administration, Biotechnology and Civil Engineering).

<table>
<thead>
<tr>
<th>Thematic area</th>
<th>Quantity</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Sciences</td>
<td>14</td>
<td>23.7</td>
</tr>
<tr>
<td>Business, Management and Accounting</td>
<td>8</td>
<td>13.6</td>
</tr>
<tr>
<td>Agricultural and Biological Sciences</td>
<td>7</td>
<td>11.9</td>
</tr>
<tr>
<td>Environmental science</td>
<td>7</td>
<td>11.9</td>
</tr>
<tr>
<td>Economics, Econometrics and Finance</td>
<td>6</td>
<td>10.2</td>
</tr>
<tr>
<td>Medicine</td>
<td>3</td>
<td>5.1</td>
</tr>
<tr>
<td>Biochemistry, Genetics and Molecular Biology</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Computer Science</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Energy</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Pharmacology and Toxicology</td>
<td>2</td>
<td>3.4</td>
</tr>
<tr>
<td>Others</td>
<td>6</td>
<td>10</td>
</tr>
</tbody>
</table>

Source: Prepared by the author (2023)

The dissemination of scientific publications at UNIFSLB, which are the result of research by teachers and students, are mostly published in the Scientific Journal Dékamu Agropec, while academic production is being promoted in the Intercultural Journal Manguaré (http://revista.unibagua.edu.pe) (Table 3). The Dékamu Agropec Journal is indexed in Latindex 2.0 and shows an editorial process of peer review. This is a good indicator to disseminate open science and strengthen collaborative networks among researchers for the advancement of knowledge in the universe of disciplines and science in general (Harbor, 2020)

<table>
<thead>
<tr>
<th>Year</th>
<th>Vol</th>
<th>Number</th>
<th>Number of articles</th>
<th>Indexing</th>
<th>H Index (Google Scholar)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2020</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>Latindex 2.0</td>
<td>2</td>
</tr>
<tr>
<td>2020</td>
<td>1</td>
<td>2</td>
<td>5</td>
<td></td>
<td></td>
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<tr>
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<td>2</td>
<td>1</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2021</td>
<td>2</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>1</td>
<td>9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2022</td>
<td>3</td>
<td>2</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>4</td>
<td>1</td>
<td>12</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>53</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Year</th>
<th>Vol</th>
<th>Number</th>
<th>Number of articles</th>
<th>Indexing</th>
<th>N.I</th>
<th>NR</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>1</td>
<td>1</td>
<td>15*</td>
<td></td>
<td>N.I</td>
<td>NR</td>
</tr>
<tr>
<td>2023</td>
<td>2</td>
<td>1</td>
<td>18*</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td></td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

N.I: Not indexed; NR: Not reportado
Source: Prepared by the author (2023)
Table 4 shows the number of teaching projects financed with UNIFSLB's ordinary resources between 2022 and 2023. Where for 2023 it increased by 19,000 soles, it is evident the efforts despite the fact that the university has a reduced canon fund (1700 soles). Researchers are trying to raise funds through PROCIENCIA projects (basic and applied) (https://prociencia.gob.pe/), however, the institution has not yet been successful due to the small number of researchers and the ratio of publications in relation to these competitions. Therefore, it is important that teachers research and publish according to the lines of research, for the articulation of research projects and they should promote research with students (Gomara et al., 2021).

Table 4. Funding of research projects

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of projects</th>
<th>Financing</th>
<th>Resolution</th>
<th>Increment</th>
</tr>
</thead>
<tbody>
<tr>
<td>2022</td>
<td>7</td>
<td>21,000</td>
<td>RVI* N° 001-2022-UNIFSLB/VPI</td>
<td></td>
</tr>
<tr>
<td>2023</td>
<td>5</td>
<td>40,000</td>
<td>RCO** N° 142-2023-UNIFSLB/CP, 24/04/23</td>
<td>19,000</td>
</tr>
</tbody>
</table>

* = Resolution of the Vice-Presidency for Research; ** Resolution of the Organizing Committee.
Source: Prepared by the author (2023)

The association of the journals published by the professors is minimal, in spite of this, it is observed that the concentration of published articles is in the "Revista Latinoamérica, International Journal of Professional Business Review" and the Universidad del Zulia, in this sense, there is a limited association between the clusters (Figure 5). Probably, this scattered situation is due to the diversity of publications made by UNIFSLB teachers and the limited human resources, since it is a young university. The human resource is important for scientific research, as well as the professional preparation and the number of hours devoted to research, given that it is approached from different edges (Barbón et al., 2018; Medina Morales, 2020), this leads to place the universities in better rankings.
Figure 5: Concentration of journals published by UNIFSLB professors

Figure 6 shows the coupling of keywords, showing that the largest nodes are for the words "metal", "numerical methods", "integrated training", "socioeconomic aspects", "environmental and bamboo". All the clusters formed by the software show the undisputed predominance of the keywords with the lines of research and the professional careers offered. Therefore, it is of utmost importance to allocate a larger budget to research, especially to increase the publication of impact articles. An increase in investment will allow UNIFSLB to maintain its growth in research and strengthen its commitment to the sustainable development of the region and the recognition of the cultural and knowledge diversity of its indigenous peoples.
6 CONCLUSION

The Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua (UNIFSLB) shows a remarkable growth in research, reflected in an annual growth rate of 31.12% and a total scientific production of 115 articles. It is evident that the diversity of research is having a significant impact on the teaching of students, which will be reflected in their graduates. However, there is a limited presence of research related to interculturality and the application of technologies to solve emerging problems in indigenous peoples.

To promote and strengthen intercultural research, it is essential to implement policies that promote ancestral knowledge, validating it through the generation of knowledge in accordance with the lines of research of UNIFSLB, and taking into account the concerted development plan of the regional government.

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