

Original article

Building competencies for scientific publishing among university stakeholders

La formación de competencias para la publicación científica en actores universitarios

A formação de competências para a publicação científica em autores universitários

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Abstract

The 2030 Agenda for Sustainable Development demands the conception of a university committed to the cultural transformation of the societies to which it serves. Substantive processes contribute to change management through initiatives that are localized in all fields of knowledge. However, the culture of scientific communication among university stakeholders remains

insufficient in several Latin American countries. This study aimed to design and implement a postgraduate course aimed at building competencies for scientific publishing among faculty and researchers at the Instituto Especializado de Profesionales de la Salud [*Specialized Institute of Health Professionals*] and to disseminate its results, with the goal of promoting its systematization in similar contexts as an effective training alternative. The research was of a descriptive cross-sectional nature and was conducted at the Instituto Especializado de Profesionales de la Salud in El Salvador in 2022, as part of the enhancement of their substantive processes in favor of quality and inclusive higher education. Within the significant results, 45 scientific articles were achieved, of which 30 were accepted in scientific journals indexed in reputable regional databases. It is concluded that the postgraduate course is feasible and can be systematized in specific contexts as an alternative for building communicative competencies for publishing purposes among university stakeholders.

Keywords: scientific communication, sustainable development, teaching-learning, scientific writing.

Resumen

La Agenda 2030 para el Desarrollo Sostenible demanda la concepción de una universidad comprometida con la transformación cultural de las sociedades a las cuales tributa. Los procesos sustantivos contribuyen a la gestión de ese cambio mediante iniciativas que se concretan desde lo local en todas las áreas del conocimiento. Sin embargo, la cultura de la comunicación científica en los actores universitarios es aún insuficiente y limita la visibilidad de estos aportes en varios países de Latinoamérica. El presente estudio tuvo por objetivos diseñar e implementar un curso de postgrado dirigido a la formación de competencias para la publicación científica en actores del Instituto Especializado de Profesionales de la Salud de El Salvador; y socializar sus resultados. La investigación fue de tipo descriptiva transversal, y se desarrolló en dicha institución durante el 2022. Como resultados relevantes se lograron 45 artículos científicos, de los cuales 30 fueron aceptados en revistas científicas indexadas en bases de datos de prestigio regional. Se concluye que, el curso de postgrado es viable, y permite su sistematización en contextos específicos como

alternativa para la formación de competencias comunicativas con fines de publicación en los actores universitarios.

Palabras clave: comunicación científica, desarrollo sostenible, enseñanza-aprendizaje, escritura científica.

Resumo

A Agenda 2030 para o Desenvolvimento Sustentável exige a concepção de uma universidade comprometida com a transformação cultural das sociedades às quais tributa. Os processos substantivos contribuem para a gestão de mudanças por meio de iniciativas que se concretizam a partir do local em todas as áreas do conhecimento. No entanto, a cultura da comunicação científica nos autores universitários ainda é insuficiente em vários países latino-americanos. O presente estudo teve como objetivos: projetar e implementar um curso de pós-graduação voltado para a formação de competências para publicação científica em professores e pesquisadores do IEPROES e socializar seus resultados, em virtude de favorecer a sua sistematização em contextos semelhantes como alternativa de treinamento eficaz. A pesquisa foi descritiva transversal, e foi desenvolvida no Instituto Especializado de Profissionais de Saúde de El Salvador, durante 2022, como parte da melhoria de seus processos substantivos em favor de um ensino superior de qualidade e inclusivo. Como resultados relevantes: alcançou 45 artigos científicos, dos quais 30 foram aceitos em periódicos indexados em bancos de dados de prestígio regional. Conclui-se que o curso de pós-graduação é viável e permite sua sistematização em contextos específicos como alternativa para a formação de habilidades de comunicação para fins de publicação em autores universitários.

Palavras-chave: comunicação científica, desenvolvimento sustentável, ensino-aprendizagem, redação científica.

Introduction

The 2030 Agenda for Sustainable Development (United Nations, 2015) has placed significant issues on the agenda of higher education, making it an ally for driving the social, cultural,

environmental, and economic transformation that its goals encompass. Thus, professional training, science and innovation, and university extension lead several regional and national initiatives that promote change in the ways current generations operate, in order to protect biodiversity, address climate change, eradicate poverty, achieve gender equality and empower vulnerable communities, and safeguard the very existence of humankind and the planet as a legacy for future generations.

Internationally, these criteria have been endorsed by prominent researchers such as Castellar (2020), who emphasizes that universities still have to continue working and contributing to improving social realities through the production of knowledge, invention, innovation, and technologies that help generate sustainable development at a global level. Also, Caballero (2020), who summarizes the contributions of higher education institutions (HEIs) to the fulfillment of the 2030 Agenda in Colombia, and Ramos (2021), who discusses the contribution of Spanish higher education to sustainable development through teaching.

In Cuba, it is noteworthy to mention the studies by Díaz-Canel and Fernández-González (2020), who demonstrate how higher education has become a key ally of governments in the strategic management of local development. Also, the work by Alonso-Becerra *et al.* (2021), where they discuss the efforts made by the Ministry of Higher Education to impact strategic sectors and contribute to the fulfillment of the Sustainable Development Goals.

As can be seen, there is a demand for universities that are committed to the cultural transformation of the societies they serve, where substantive processes significantly contribute to managing that change through initiatives that are implemented at the local level across all fields of knowledge. On the other hand, the culture of scientific communication is still insufficient in several countries and Higher Education Institutions (HEIs) in Latin America, despite the fact that in the region, both opportunities for publishing in scientific journals and access to their content have been strengthened through the *open science* movement.

According to Babini (2019), in recent decades, SciELO, Latindex, and Redalyc, along with other institutional repositories, have facilitated scientific communication in Latin America and the

Caribbean as "collaborative non-profit initiatives" (p. 1). This has made it possible for the scientific production in this region to experience sustained growth, thanks to government policies aimed at increasing investment in science and innovation. However, "it lacks comprehensive and territorialized research on scientific production and communication and inequalities in regional science" (Santin & Caregnato, 2020, p. 5).

While universities in the region have gained greater prominence in the science and innovation systems of their countries, their contributions to national or international scientific production often go unrecognized or fail to establish a strong position. This is because of the disparity in communication skills among university stakeholders when it comes to drafting and writing scientific texts, which hinders their ability to enter, sustain, or excel on the rigorous path of publishing on an equal footing.

Given this reality, the development of specific communication competencies through postgraduate education is essential to achieve visibility for institutional contributions to sustainable development. Competencies can be understood as the qualities that enable individuals to act effectively in a specific work situation (López, 2019; Corral, 2021). They can be classified, according to Salas and Salas (2017), as *basic, generic, and specific*.

Aware of the above, the general management of the Instituto Especializado de Profesionales de la Salud (IEPROES) of El Salvador, as part of its strategy for institutional growth and enhancement of its substantive processes in favor of quality higher education, took the initiative to organize, upon the proposal of the General Coordination of Research and Social Outreach, the postgraduate course "Drafting, Writing, and Publishing Scientific Articles for University Stakeholders." This decision was made after recognizing that, despite the institution's efforts to contribute to the development of Salvadoran society through health sciences, the visibility of its impacts did not meet the desired status.

Consequently, the objective of this study was to design and introduce a postgraduate course aimed at developing competencies for scientific publishing in IEPROES faculty and researchers

and to share its results, in order to promote its systematization in similar contexts as an effective training alternative.

Methodology

The research followed a descriptive cross-sectional methodology (Hernández-Sampieri & Mendoza-Torres, 2018) and included faculty and researchers at IEPROES, El Salvador, during the period from February to December 2022.

The sample consisted of 45 faculty and researchers from this institution, encompassing its two regional centers in Santa Ana and San Miguel, as well as the headquarters in San Salvador. They met the following inclusion criteria:

- Willingness to participate in the course.
- Involvement as a member in a research project.
- Research or promotion of topics related to the Agenda 2030.

Exclusion criteria were as follows:

- Lack of willingness to participate in the course.
- Inadequate mastery of the scientific method.
- No systematic research work conducted in the past two years.
- No promotion of 2030 Agenda -related topics.

The course design began with the identification of the learning needs of the participants in the study. A questionnaire was used as a technique, developed based on core areas related to scientific and cultural communication. The survey was anonymous and consisted of a total of 15 questions. It was administered through Google Forms.

Using this instrument, along with the literature and document review conducted to complement the diagnosis of the visibility of the institution's scientific results, the course program was developed. The course focused on four fundamental topics: science communication, scientific text drafting, effective writing techniques and standards, and the selection of journals based on the impact of the results to be communicated.

The course was implemented during the months of June and July, with a total of 32 hours of in-person sessions and 32 hours of online activities. These hours were distributed across eight lectures, eight practical classes, and two scientific writing workshops. The course was conducted in two locations: San Miguel for the participants from that regional center of IEPROES, and San Salvador for participants from the regional center of Santa Ana and the main campus in San Salvador. There were 15 participants in the first location and 30 participants in the second location, totaling the entire sample of 45 participants. Out of the total, 40 participants had higher education degrees, while 5 had advanced technical degrees.

Before starting the course and after its completion, a second on-site survey was completed in order to know/check the participants' mastery of the specific contents included in the program and their competencies for scientific and cultural communication, which was applied as a paper and pencil instrument. Likewise, group techniques and a third satisfaction survey were used, the latter through Google Forms. Empirical, statistical, and theoretical methods were used throughout the research to process the data.

In broad terms, the following variables were considered to assess the relevance of the postgraduate course as an alternative for professional competency development with the purpose of publishing in university stakeholders:

- Achievement of objectives.
- Evaluation of course content.
- Relevance of course content.
- Assessment of teaching methods.
- Positive, negative, and interesting aspects of the course.

The final assessment took place in August and September 2022, during which time the manuscripts that would be submitted to different scientific journals, identified during the in-person classes, were submitted and assessed.

The partial assessment of the research was conducted in January 2023, once the minimum waiting period for the publishing of a scientific article had passed, according to international

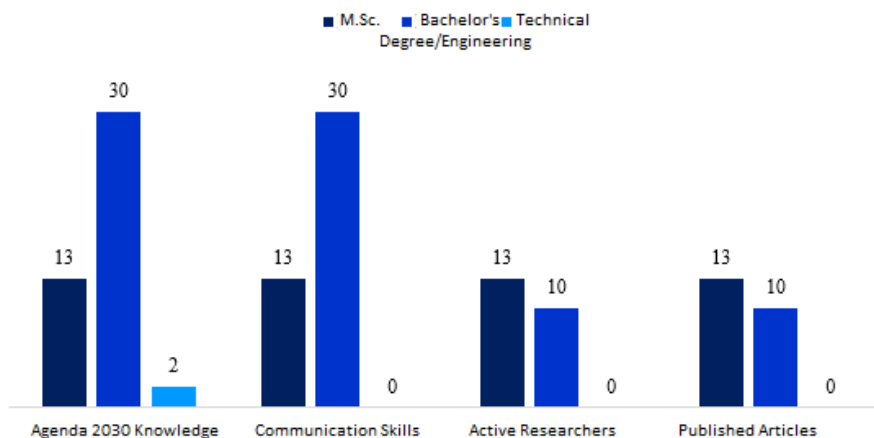
statistics for editorial management of indexed journals, operationalized through the *Open Journal System*.

Results and discussion

The diagnosis conducted to assess the communicative competences of the faculty and researchers at IEPROES in El Salvador allowed us to determine the results shown in Figure 1.

Figure 1

Results of initial diagnosis



As can be seen in Figure 1, all participants hold higher education degrees and are involved in all substantive processes. However, only 23 of them have managed to publish some type of scientific text in the last 2 years. Among them, only 13 have achieved more than one publishing beyond their institution's journal. All published contributions were related to a prioritized research area in the process of science and innovation.

In this regard, a total of 27 scientific texts were identified in international databases validating the data of the instrument applied. The main typologies found were original research articles, literature review articles, and research reports summarizing the theses to obtain an academic degree in different specialties of the health sciences.

The initial diagnosis highlighted the need to train these professionals in the development of communication competencies, as "writing scientific texts is a fundamental cross-cutting skill in the repertoire of competencies of healthcare professionals, whether they are in healthcare, research, or teaching" (Serés *et al.*, 2022, p. 188). This is further reinforced by Pérez de Valdivia *et al.* (2016), who state that "every professional needs to have developed the skills that allow them to produce scientific texts, as these constitute the channel for transmitting the results and advances obtained in scientific research" (p. 508). However, the dissemination of the results of the research carried out by these professionals, and consequently the results of IPROES, has not managed to gain a position among Salvadoran or regional journals for various reasons, as expressed by the participants in the course (Table 1).

Table 1

Recurring criteria supporting the low rate of publishing

Criteria	Percentage
Achieving acceptance by a journal is difficult	100 %
I lack the necessary communication competencies	90 %
The evaluation process is humiliating	85 %
Online courses are not effective in this field	73 %
I don't know how to write a scientific article	51 %
I don't have time to publish	51 %
I'm not interested in publishing	30 %

It is significant to highlight that 90% of the participants stated that they did not possess the necessary communication competencies, and specifically, 51% expressed that they did not know how to write a scientific article. These criteria are extremely important because, in agreement with Serrano Guzmán *et al.* (2018) and Branch and Villarreal (2008), the process of publishing a scientific article demands the development of specific competencies, not only in terms of article writing but also in the selection of the journal to which the manuscript will be submitted and the rigorous refereeing process.

As a result, a postgraduate course was designed to train competencies in scientific publishing for faculty and researchers at IEPROES with the objective of developing communication

competencies and skills for drafting, writing, and publishing scientific texts. This course used tools and procedures that allowed for the organization, selection, and usage of language levels (lexical, morphological, syntactic, and textual) to enhance the quality, accuracy, conciseness, and clarity of written communication. To achieve this, various contents were structured into four topics (Table 2).

Table 2

Postgraduate Course Analytical Program

Topics	Contents	Class hours
Topic 1. Science communication. Its competences	<ul style="list-style-type: none"> • Science Communication Channels. • Stakeholders in science communication: visibility and positioning. • Scientific language and text. Its characteristics. 	10 h
Topic 2. The drafting of the scientific text according to its typologies	<ul style="list-style-type: none"> • The scientific text. • The scientific article and its textual typologies. • Strategies and procedures for its drafting and self-assessment. 	16 h
Topic 3. Drafting and style of scientific texts	<ul style="list-style-type: none"> • Conciseness, clarity and accuracy as composition principles of scientific writing. • APA Standards 7th edition 	16 h
Topic 4. The publishing process in indexed journals	<ul style="list-style-type: none"> • Journal selection strategies. • Editorial standards and peer review guidelines • Acceptance, assessment, and proofreading of texts during the publishing process. 	16 h
Final workshop. Lessons learned		6 h

The first topic aimed to explain the specifics of scientific communication for knowledge generation and dissemination. The second aimed to identify the structural and semantic differences among different types of scientific texts, and the drafting procedures. The third, to expose the principles of composition, the role of the research subject and the morphological, lexical and syntactic relationships established in the scientific enunciation and statement. Finally, the fourth topic aimed to illustrate the interim peculiarities of the publishing process in an indexed scientific journal, and the importance of its correct selection.

The course content, in general, aligns with other proposals for courses on scientific writing documented in the scientific literature, as stated by Serés *et al.* in 2022.

The implementation of the designed course had, as an articulating element, the use of participatory methods, taking into account Batista's proposal (2012) and aligning with Viñas' criteria (2015). Therefore, the methods were selected based on their ability to: work on the content to achieve the objectives; ensure that tasks were performed based on the skills that participants already had and those they needed to develop (thus promoting working within the zone of proximal development); encourage reflection, interaction, and criticism among students and teachers; and generate interest in task execution due to its connection to professional activities. All of this led to the use of participatory methods that fostered the active and participatory assimilation of knowledge (Sandí Delgado & Cruz Alvarado, 2016), such as pair and plenary discussions based on critical writing workshops, supported by document consultation, exchange with participating faculty, use of classic and up-to-date bibliographic sources, publication-related periodization, and other complementary tools for contextual-theoretical analysis.

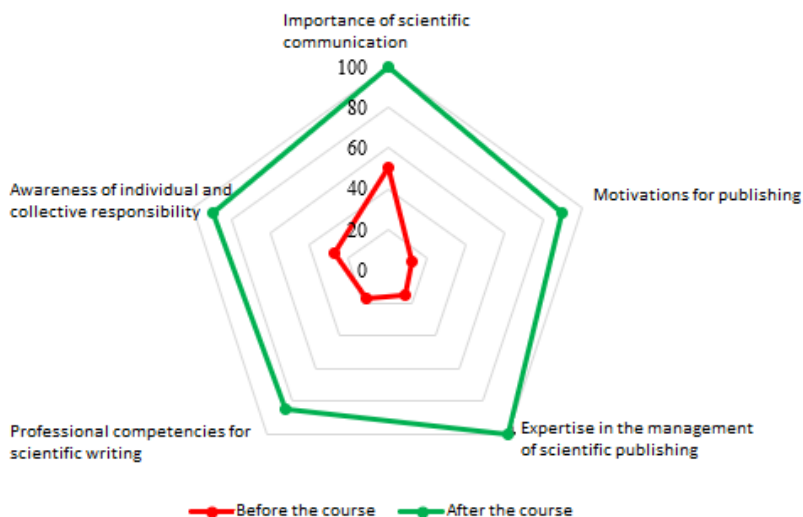
The instruments applied before starting the course and once it was completed demonstrated a substantial change in the participants' knowledge, attitudes, and skills regarding the importance of scientific communication, the role of the researcher in promoting their results, and the peculiarities of writing for these purposes. Figure 2 summarizes this based on conceptual nuclei. It is noteworthy that the three conceptual nuclei that showed the greatest increase were: motivations for publishing, professional skills for scientific writing, and knowledge about the management of scientific publishing. This demonstrates that the course went beyond the skills of writing an article.

Regarding the perception of the quality of the designed and implemented postgraduate course, whose data was collected through the PNI technique (positive, negative, and interesting); it can be said that it was favorable, as participants appreciated the opportunity to further their professional development in these topics. They also expressed satisfaction with the teaching methods, the expertise and the skills taught by faculty members who conducted the course. They recognized the need to continue with specialized courses in each of the topics covered to improve their role as communicators of science for sustainable development and potential authors from their institution. Additionally, when applying the course satisfaction survey, some of the

participants' criteria issued during the application of the PNI technique were confirmed, as shown in Figure 3.

Figure 2

Approach to the cultural transformation of the participants

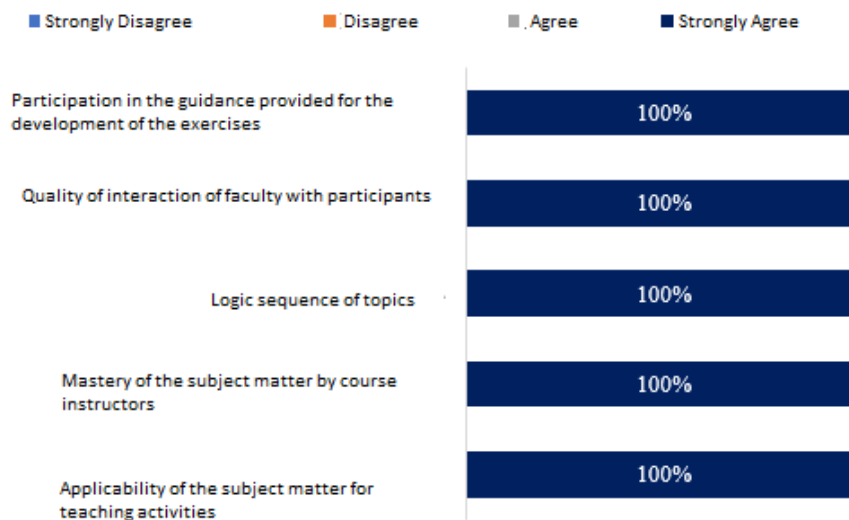


Here are some of the comments made by participants of the course in the satisfaction survey conducted at the end of the in-person sessions:

- "The topics taught are very interesting, as we were explained the steps, we need to follow for scientific article writing" (comment 1).
- "The training was developed according to the presented topics, the speakers have a mastery of the subject, and the methodology used was suitable" (comment 6).
- "Quite comprehensive [referring to the course] in terms of information and explanation about the covered content. These will facilitate not only the creation of articles but also their applicability in teaching practice, especially in research courses" (comment 10).
- "I appreciate the opportunity to acquire and expand knowledge about research, which is essential in our teaching work. It was very beneficial, and I hope to have the chance to continue in this learning process" (comment 15).

Figure 3

Course evaluation by the trainees



As a result of this first experience, it is significant to highlight:

- The empathy achieved between course participants and faculty through collaborative work and meaningful learning.
- The acquisition of the transmitted knowledge, as there was an increase from 23% of correct answers in the initial diagnosis to 88% of correct answers in the final diagnosis.
- The development of 45 scientific articles, of which 26 were submitted to the "Salud y Desarrollo" Journal of IEPROES, and four to other indexed journals.
- The approval and publishing of the four articles submitted to prestigious journals in the Central American region.
- A greater presence of IEPROES faculty and researchers on social and academic networks to contribute to the visibility and positioning of IEPROES as an institution that advocates for sustainable development and promotes the principles of the 2030 Agenda.
- The relevance of the postgraduate course as a key tool for fostering professional competencies in any field of science.
- The confirmation of the need for ongoing professional development for university professionals in the field of scientific and cultural communication.

Figure 4 shows some of the documented evidence of course delivery at the chosen sites.

Figure 4

Photos taken during group activities of the course



Conclusions

The postgraduate course designed to strengthen the training of specific competencies for publishing purposes in stakeholders of IEPROES, El Salvador, allowed for raising awareness about the importance of the visibility of scientific production as a means to gain social recognition for its impact on achieving the 2030 Agenda. It also led to the creation of 45 articles to disseminate concrete experiences related to the Sustainable Development Goals.

As a result, the systematization of this course contributes to enhancing the positioning of higher education institutions within the international academic community. It enables the diversification of scientific communication of their results by publishing high-quality and rigorously reviewed articles in high-impact journals.

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Conflict of interest

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