Perceptions, challenges and motivations of scientists regarding public science communication

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Abstract

This article presents the results of empirical research, aiming to understand the involvement between scientists and society in general. The objective was to analyze the perceptions of researchers from different areas of knowledge regarding the challenges and motivations for publicly communicating scientific and technological knowledge. The starting question focused on understanding how scientists understand this type of communication and whether they take actions to improve the population's perception of science and technology. A survey was conducted between September and December 2024 among 110 researchers from research and higher education institutions, from different areas of knowledge, and in different Brazilian regions. The findings suggest that researchers' engagement in science communication is not solely driven by individual attitudes but is significantly influenced by institutional structures, incentive systems, and the legitimation of communication as a core academic activity. The rise of digital platforms and the Covid-19 pandemic have highlighted the critical need for enhanced public engagement, advocating for more active and dialogical forms of scientific participation in policymaking. Consequently, researchers assume a dual role as both educators and trust-builders within academic and research institutions.

Keywords: Public communication of Science, Scientific divulgation, Public perception of Science, Science and society.

Introduction

In recent decades, universities of reference, governmental bodies, and funding agencies across the globe have placed growing importance on the active involvement of scientists and research institutions in dialogue with society (D'Este & Robinson-García, 2023). Global literature suggests that across countries and disciplines, science communication has evolved from being considered a laudable practice to being recognized as a formal responsibility for scientists (Entradas et al., 2020; Marcinkowski et al., 2014; Laredo, 2007). Communicating science to the public means fostering engagement between scientists and society, especially those outside the walls of universities and research institutions. For this to happen, actions must be designed by funding agencies and institutional managers to encourage and create the necessary

conditions for researchers and institutions to carry out scientific dissemination (Entradas & Bauer, 2017), while ensuring that society truly understands the knowledge being shared.

Providing public access to scientific and technological information requires creating the conditions for understanding and appreciating science. To this end, communicating science to society must consider the flows, processes, and social, political, media, and cultural contexts involved (Gascoigne et al., 2020). It is particularly important to consider populations that are often excluded from traditional communication channels-those who are marginalized by society and often excluded from public science communication (Dawson, Iqani & Lock, 2024; Iqani, 2023; Dawson, 2019).

In this context, this study presents research findings that aim to analyze the perceptions of researchers from different fields of knowledge regarding the challenges and motivations for public communication of scientific and technological knowledge. This study corroborates previous research showing that communication among scientists depends on the institutional context, including resources, policies, training, and incentives, such as career promotion (Entradas & Bauer, 2019).

Communicating science to society

According to Lewenstein (2003), public communication of science and technology (PCST) defines us as human beings, is a central part of our culture, and enhances our ability to understand the natural world and use that understanding to create innovation.

Public engagement activities (Trench, 2008) include a wide range of efforts, such as giving public lectures or talks in schools; participating in interviews with journalists for newspapers, radio, or television; writing popular science books; contributing articles to newspapers or magazines; participating in public debates; volunteering as an expert at consensus conferences or "science cafés"; and working with NGOs or associations as a consultant or activist, among others (Bauer & Jensen, 2011, p. 4).

Historically, a paternalistic model known as the "deficit model" was used to address public distrust of expert data and findings. However, since the 1980s, numerous studies have challenged this approach, which assumes that citizens distrust certain techno-scientific topics (e.g., vaccines or GMOs) due to a lack of knowledge. The idea that simply increasing the amount of information would be sufficient to change attitudes has been shown to be overly simplistic and ineffective. In some cases, research has shown that the most skeptical individuals regarding certain decisions, such as the use of vaccines or GMOs, are often the most informed about the issue (Kirkland, 2012).

The deficit model has shown its shortcomings, in particular because it relies on a mechanical view of communication as a mere transfer of content, neglecting the audience's reinterpretation of that content within a framework of values, preferences, perceptions, and representations of themselves and the issues at hand. As Bucchi (2008) argues, it is inadvisable to transfer knowledge unchanged from one context to another; one cannot simply take an idea from the scientific community and deliver it directly to the public. Since the 1980s, studies in mass communication have challenged key elements of the dominant paradigm (Hilgartner, 1990), which views communication as a one-way "transfer". In recent decades, science communication studies have increasingly pointed out the limitations of this idea (Lewenstein, 1995; Turney,

1998; Bauer, Allum & Miller, 2007; Brossard & Lewenstein, 2010). Bucchi (2008) suggests that scientific communication should involve the development of both scientific and popular discourses in a dialogical and participatory manner. This approach, referred to as "public engagement in science and technology," views communication as a process that fosters interaction between stakeholders rather than starting from preconceived notions. In light of the debate about alleged public (dis)trust of science (House of Lords, 2000; Cologna et al., 2025; Askvall et al., 2021) and recent concern for misinformation (Rubin et al., 2020), several studies – with ambivalent results – have investigated whether a different science-society approach based on participation, dialogue, and co-construction of knowledge could help address public concerns and improve the quality of science communication (Wynne, 2006).

To overcome the prevalence of the deficit model, a new and more inclusive alternative has been proposed. In many countries, particularly in Europe, the term "public engagement" (PE) has become a key concept in funding programs and policy documents. PE encompasses various communication practices and inclusive tools aimed at effectively bringing science and scientists closer to citizens (Einsiedel, 2008). It also emphasizes the importance of reflecting on the context in which information is disseminated, considering the heterogeneity of audiences and how individuals process information based on their social and psychological frameworks, cultural contexts, and personal circumstances (Brossard & Lewenstein, 2010, p. 14).

For several years now, we have been witnessing what Bauer and Jensen (2011) define "the mobilization of scientists for public engagement", driven by what Wynne (2006) has called "the huge ferment of new millennium 'public engagement with science'". At the same time, a growing number of studies and research projects have investigated the factors that promote or hinder this involvement of scientists and researchers in activities aimed at engaging the non-expert public (Poliakoff & Webb, 2007; Dudo, 2012). According to Besley and colleagues (2018), the willingness to engage in public engagement activities is determined by multiple factors that are sometimes difficult to interpret. Indeed, the motivation to communicate the results of research conducted in higher education institutions and research centers arises from several factors, depending on the communication skills of researchers, institutional policies and guidelines, career status and the culture of communication (Besley, Oh & Nisbet, 2012; Stilgoe et al., 2014; Rose et al., 2020; Wilkinson et al., 2022; Vetenskap & Allmanhet, 2024). Favorable attitudes have mostly been found in relation to the availability of time, the pleasure of engaging with the public, and when researchers see a possible benefit (not necessarily personal). The fear that public engagement may take time away from research is, however, a widely explored obstacle (Ecklund et al, 2012; Bao et al., 2023). A large study conducted in the United States, for example, found that researchers consider science communication to be an important activity and that many scientists participate in various forms of dialogue with the non-specialist public. However, US scientists report that they do not feel adequately supported by institutions (Rose, Markowitz & Brossard, 2020). What these studies have found is that scientists engaged in activities with the lay public are progressively abandoning the idea that communication has the goal of public literacy, the so-called 'deficit model' (Dudo & Besley, 2016; Rose, Markowitz & Brossard, 2020). In a different socio-cultural and institutional context such as Europe, Silva and Pinto (2023) observed that engagement in science communication is related to different scientific disciplines and the level of internationalization of researchers. Compared to Spain and Portugal, Oliveira (2021) identifies several motivations for researchers to engage with the public, including legitimizing their work, personal satisfaction and rewards, securing new funding

sources, inspiring future scientists, identifying new research perspectives, and raising awareness about how science works.

Inspired by the scientific *ethos,* the idealized normative values of science discussed by R.K.Merton (1942), Oliveira (2021, p. 95) believe that motivations should stem from the social responsibility of each researcher and an understanding of the importance of promoting "scientific culture as a civic duty, legitimation, and accountability, as well as an opportunity to obtain certain benefits." However, there are also challenges, such as lack of time (given researchers' teaching and other professional responsibilities), difficulty in explaining the social relevance and complexity of certain issues in accessible terms, and lack of institutional support and recognition.

In the Latin America context, Barata (2018) emphasizes that a fundamental reason is the responsibility of scientists to be accountable to society, as it is society that finances research through taxes, especially in the Brazilian context. According to the same author, communicating science to the public is both an action and a tool for dialogue, which is essential for the transparency and legitimacy of science. From Massarani's (2022) perspective, another motivation for disseminating science is the building of a scientific culture that allows society to make informed, fact-based decisions, and provides people with the necessary tools to deal with misinformation and denialism.

Just as there are motivations, it is also necessary to reflect on the existence of barriers to carrying out public science communication, which obviously vary depending on the context. Despite the growing recognition of the importance of science communication, numerous studies indicate that scientists face multiple barriers that hinder or discourage their engagement with the lay public. These barriers can be grouped into four main categories: institutional, educational, cultural, and personal. (Pereira, Castelfranchi & Massarani, 2024; Massarani & Moreira, 2020).

One of the main obstacles is the lack of institutional recognition for outreach activities. Most universities and research centers still value academic publications in indexed journals almost exclusively as a criterion for merit, ignoring public engagement actions. This lack of institutional incentive leads many scientists to consider outreach a secondary or extracurricular activity. The constant pressure to publish, obtain funding, and meet administrative requirements leaves little time available for public engagement. Most scientists receive no training in public communication, which generates insecurity and reduces the effectiveness of their interactions with non-specialist audiences. Without adequate preparation, many scientists fear they will be unable to convey their ideas clearly or that they might end up distorting information. Another limiting factor is the fear that simplifying complex scientific concepts to make them accessible may compromise accuracy or lead to misleading interpretations. This fear is often linked to the perception that the public might misinterpret scientific data or that the media might distort the messages. Finally, there is an academic culture that has historically devalued public engagement, treating it as a less "noble" or scientific activity. This mentality still persists, despite recent changes in science and technology policies that value transparency and dialogue with society. (Pereira, Castelfranchi & Massarani, 2024; Massarani & Moreira, 2020).

Furthermore, researchers who wish to communicate scientific and technological knowledge to the public must develop communication skills and use accessible language, challenging the assumption that the public is ignorant, uninterested, or incapable of understanding science. Studies conducted in different cultural

contexts show that the public is eager to learn more about science (Wellcome Trust, 2020; Bucchi et al., 2024; European Commission, 2021).

For this reason, as Pellegrini and colleagues (2025) recently observed, universities and research centers are placing public engagement in science and science communication, as well as civil society participation, at the center of their programs and activities. Our data can help analyze the attitude of Brazilian scientists towards science communication. Based on the data collected, our study confirms other studies (Entradas et al., 2024; Entradas & Bauer, 2019) that have shown that science communication depends on the institutional context, including resources, policies, training, and cultural, institutional, and political assets. Our study examines what lessons can be learned from this case on the involvement of Brazilian scientists in public communication of science and research and proposes to verify the similarities and differences between Brazilian researchers and studies conducted in other institutional and cultural contexts.

Regarding the historical trajectory of science communication activities in Brazil, Massarani and Moreira (2020) conducted a study demonstrating that these activities have occurred with greater or lesser intensity according to different eras and initiatives, including reports in mass media, specific science communication magazines, and popular conferences. According to the authors, there was a significant impetus in science communication activities in the 1920s, led by the Brazilian Academy of Sciences to promote the basic sciences. It is also fundamental to mention that Brazil does not have a long history in this regard, as science communication was practically nonexistent in the country between the 16th and 18th centuries, due to the high illiteracy rate at the time, as well as the prohibition of the press and book publishing. Initiatives to change this situation gained momentum in the early 19th century with the arrival of the Portuguese Court, which led to the revocation of the press ban and the creation of the first scientific institutions, such as the Royal Garden (1808) and the Royal Museum (1818) (Massarani & Moreira, 2020).

Reflecting on a more recent landscape, with the end of the military dictatorship in 1985 and Brazil's redemocratization, the scientific community regained the freedom to express its views (Massarani & Moreira, 2020). However, even with this freedom of expression, a lack of investment in this area has been observed over the decades. It is also crucial to reflect that, in this perspective, "the relationship between science and society has aspects that branch out and create a complex network of relations that influence individuals' perceptions of scientific knowledge." In Brazil, even after advances in the fields of communication, outreach, and science education, this perception suffers from the consequences of social inequality, one of the factors responsible for the disproportionate access to education, culture, and scientific knowledge among people (Mendonça, Farias & Carvalho, 2025, p. 2).

Moreira, Farias, and Carvalho (2025) analyze the complex landscape of public perception of science and technology (S&T) in Brazil, identifying a central paradox. According to the authors, this scenario is marked by the existence of high popular interest and trust in science alongside a marked deficit of concrete knowledge about national scientists and research institutions. This dissonance is evidenced by the survey "Public Perception of Science and Technology in Brazil 2023" from the Ministry of Science, Technology, and Innovation (MCTI) and the Center for Management and Strategic Studies (CGEE), which indicates that the Brazilian society's view on science and technology has remained constant over the last two decades (MCTI, 2023). According to the most recent study (INCT-CPCT, 2024), there is a high level of public trust in teachers (41%), doctors (39%), and scientists (33%), with these three groups standing out at the top of the credibility ranking as sources of information for young people. Individuals holding political office, on the other hand,

are at the opposite end of the spectrum, with low credibility, as in all previous surveys. The data also show that while 67% of young people declare themselves interested in S&T, only 8% can name a Brazilian scientist (Mendonça, Farias & Carvalho, 2025).

The authors contextualize this issue within a scenario of low higher education attainment in the country, which is below the average of the Organisation for Economic Co-operation and Development (OECD, 2022) and represents a structural challenge for scientific literacy. It is understood that overcoming this gap transcends the information deficit model, as public attitude towards science is mediated by sociocultural, political, and economic factors, and not just by the level of knowledge (Mendonça, Farias & Carvalho, 2025). Although scientific literacy is an explicit objective in educational guidelines such as the National Common Curricular Base (BNCC) for the exercise of citizenship, Moreira, Farias, and Carvalho (2025) indicate that outreach initiatives and public policies need to adopt more sophisticated approaches. Such approaches must consider these multiple contextual variables to foster effective public engagement with S&T, instead of limiting themselves to the mere transmission of content.

It is observed that science communication, as well as the public perception of science and technology in Brazil, constitutes a complex landscape, as there is high interest and trust in science, yet a substantial gap in knowledge about national scientists and institutions exists simultaneously. The effectiveness of science communication, although fundamental for literacy and informed decision-making, is limited because public attitude towards S&T is mediated by social, cultural, political, and economic factors, making the mere transmission of knowledge insufficient. This scenario is aggravated by the vulnerability and discontinuity of science communication policies and initiatives, which lack robust and qualified programs that encourage the engagement of scientists in public communication. Overcoming these challenges demands the formulation of consistent public policies and collective, coordinated actions by multiple actors in the scientific-educational system (Massarani & Moreira, 2020; Mendonça, Farias & Carvalho, 2025).

Still focusing on the Brazilian landscape of public science communication and the role of scientists, it is relevant to mention a study by Pereira, Castelfranchi, and Massarani (2024), which investigated the perceptions, opinions, and attitudes of Brazilian scientists who are productivity research fellows (PQ) of the National Council for Scientific and Technological Development (CNPq), a group of high prominence in national scientific production.

The main finding of this study was the proposition of a typology of scientists, developed through Latent Class Analysis, which identified three distinct profiles based on their perceptions of science communication and the management of science policies. These profiles reveal a complex diversity of understandings and positions that coexist within the Brazilian scientific community. According to the authors, "despite awareness of the importance of science communication, the model that understands it as the mere transmission of knowledge to the public still predominates" (Pereira, Castelfranchi & Massarani, 2024, p. 249), indicating that the information deficit model is still prevalent.

The classification proposed by the authors was: a) Democratic-Engaged Class: the group most favorable to a democratic and participatory management of science and technology policy. Scientists of this profile advocate for a dialogical science communication that involves listening to and exchanging with the public, focusing on citizenship and social oversight of science; b) Democratic-Informative Class: supports public participation in science, but in a more consultative than deliberative manner, viewing it as important to inform the public and legitimize research investment while maintaining a unidirectional communication

model; c) Technocratic-Informative Class: with a more traditional view, scientists in this class believe that decisions on science and technology policies should be restricted to experts, and that science communication should be aimed at transmitting validated knowledge to a lay audience (Pereira, Castelfranchi & Massarani, 2024).

This research by the aforementioned authors shows that, although the relevance of science communication is recognized, different ideologies and models of practice persist, ranging from a technocratic and unidirectional perspective to an engaged and dialogical view. The results indicate the need for policies and programs to encourage science communication that consider this diversity of profiles and promote more participatory approaches aligned with the demands of contemporary society.

Methodology

Sampling procedure

The data for this study were collected through an online survey with the aim of examining Brazilian scientists' perceptions of public science communication. The research team collected contact information for Brazilian universities or research centers from different fields of knowledge researchers and invited them to participate in a survey on science communication. Two strategies were used for questionnaire distribution: firstly, we distributed the link of the survey through official mail address, institutional networks, and scientists who worked in Brazil. Secondly, we used researchers' social media channels and snowball sampling in order to broaden the reach of potential respondents.

The first wave of data collection took place between September and October 2023. Since the number of responses was initially lower than expected, a second wave was carried out between October and December 2023. In both phases, participation was voluntary and limited to researchers based in Brazilian universities and research centers.

Questionnaire design

The survey instrument consisted of a structured questionnaire developed on Google Forms and composed of 22 questions, both open-ended and closed-ended. The questionnaire was indexed in Figshare (Questionnaire), an open access online repository. The questionnaire addressed several dimensions of public science communication, including researchers' practices, perceptions, and challenges.

Prior to fieldwork, the instrument was pilot tested with two researchers from different disciplinary backgrounds. Feedback from this pilot stage highlighted the need to clarify certain terms and to better differentiate between "scientific communication" and "public science communication." Consequently, minor modifications were made to the wording of some items, and a short definition of public science communication was included at the beginning of the questionnaire to ensure a shared understanding among respondents.

Independent variables included in the analysis are: gender; academic qualifications; institutions, fields of knowledge and time of working. The motivations, limitations and incentives topic were explored by a battery of items.

Data collection procedure

To preserve confidentiality, anonymous invitations to complete the survey were emailed directly to the sample by the research team at the Federal University of Ceará (UFC). Reminders were sent at two subsequent points during the fieldwork period, each time after the response rate had slowed. Participation was voluntary, and informed consent was obtained electronically prior to accessing the questionnaire. Analysis was conducted using Excel and AntConc (Anthony, 2024).

Final sample

A total of 110 completed and usable responses were collected. By distributing the questionnaire in these ways, it was not possible for us to estimate a response rate. Moreover, as a consequence of our recruitment method, we were not able to make valid comparisons across different institutions and Brazilian states. So, we present observations around trends in our data rather than a detailed statistical analysis. Respondents represented a range of disciplinary areas and research institutions, providing a heterogeneous sample of Brazilian scientists engaged in research activities'. To analyze the open-ended questions, content analysis techniques were used to encode the following categories of analysis: a) Perceptions of public science communication/science dissemination, as well as the goals and projects associated with it; b) The role of researchers in disseminating the results of their studies and the motivations of scientists to communicate science to society.

Results

The distribution of respondents in the study indicated that the sample consisted of 51% males and 49% females. Regarding academic qualifications, most respondents had a Ph.D. (64.5%), followed by a Master's degree (30%) and a specialization (5.5%). Regarding age, the majority (59.1%) were between 40 and 60 years old, 25.5% were between 25 and 35 years old, 10% were between 35 and 40 years old, and 5.4% were over 60 years old.

Regarding the institutions with which the respondents were affiliated, the majority (83 researchers) were from the UFC, while the rest represented various other Brazilian universities and institutions: Universidade Federal da Paraíba (UFPB), Universidade de São Paulo (USP) and Universidade Federal do Rio de Janeiro (UFRJ) with two respondents each, and the other universities with one respondent each: Universidade Estadual de Londrina (UEL), Universidade de Fortaleza (UniFor), Universidade Federal Fluminense (UFF), Universidade Estadual Paulista (Unesp), Universidade Federal do Rio Grande do Sul (UFRGS), Universidade Estadual de Campinas (Unicamp), Instituto Brasileiro de Informação em Ciência e Tecnologia (Ibict), Universidade Federal de Rondônia (Unir), Faculdade de Tecnologia do Estado de São Paulo (Fatec), Centro

Universitário Augusto Motta (Unisuam), Universidade Federal do Amazonas (UFAM), Universidade Federal do Rio Grande do Norte (UFRN), Universidade Federal do Delta do Parnaíba (UFDPAR), Instituto de Desenvolvimento Sustentável Mamirauá, Universidade de Pernambuco (UPE), Centro Universitário Maurício de Nassau (Uninassau), Universidade Federal de Lavras (UFLA), Departamento de Ciência e Tecnologia Aeroespacial (DCTA), Centro de Tecnologias Estratégicas do Nordeste (Cetene) and Instituto de Engenharia Nuclear (IEN-CNEN).

The overwhelming presence of one institution (UFC) in the sample severely limits its representativeness in territorial terms. The fields of knowledge reported by the respondents, categorized according to the Brazilian National Council of Scientific and Technological Development (CNPq), were as follows Physical and Earth Sciences (13.6%), Health Sciences (8.2%), Agricultural Sciences (1.8%), Linguistics, Languages, and Arts (9.1%), Humanities (14.5%), Social Sciences (21.8%), Biological Sciences (25.5%), and Engineering (5.5%).

Regarding the length of time they have been working in their field, most respondents (39.1%) have been working for 10 to 20 years, 30.9% for more than 20 years, 18.2% for 5 to 10 years, and 11.8% for less than five years (Table 1).

Table 1: Demographics of interview sample

Gender	**Frequency**
Male	56
Female	54
Age	
>60 years old	06
40-60 years old	65
35-40 years old	11
25-35 years old	28
Discipline	
Physical and Earth Sciences	15
Health Sciences	09
Agricultural Sciences	02
Linguistics, Languages, and Arts	10
Humanities	16
Social Sciences	24
Biological Sciences	28
Engineering	06
Career Level	
Ph.D.	71
Master's degree	33
Specialization	06
Experience	
<5 years	13
5-10 years	20

10-20 years	43
>20 years	34
Total	110

Source: Own elaboration

The questionnaire included a question about whether the respondent was affiliated with a postgraduate program at the institution where they worked. The majority (43.1%) responded in the affirmative as permanent members, 37.6% indicated no affiliation, 16.5% indicated they were affiliated with a postgraduate program, and 2.8% indicated no interest in affiliating with such a program.

After presenting the profile of the research subjects, the analysis of the data from both open-ended and closed-ended questions is discussed below, based on a tabulation performed to avoid redundancy.

The data analysis was divided into two categories. The first category concerns respondents' perceptions of public science communication or science dissemination, and the goals and projects they associate with these activities. Respondents were coded with the letter (R) followed by a corresponding number from 1 to 110.

The analysis begins with the answers to the question of how the research subjects understand scientific dissemination: 68.8% stated that scientific dissemination is necessary as a line of research at their institution and that it should already be in practice; 22.9% replied that it might already exist but that they did not know who was doing it or who had the expertise to do it; 5.5% stressed that it was unlikely that such a line of research existed in their unit, department, institute, or faculty; and 2.8% chose the "not applicable" option for this question.

About the results concerning the understanding of public science communication or science dissemination, the responses were divided into two subcategories. The first subcategory refers to responses from researchers who understood dissemination to be limited to the academic environment, i.e., communication among peers, as shown in the following examples:

"I think it relates to open and free access to scientific publications—articles in journals, abstracts in proceedings" (R1).

"Dissemination of scientific research in scientific journals" (R17).

"Extensive dissemination of work within educational and research institutions, both in practice and results" (R24).

This understanding was observed among a minority of respondents. While some responses indicated a limited understanding of scientific dissemination, the majority associated it with bringing science closer to society through accessible and contextualized language, alongside the creation of strategies and policies to achieve this, as illustrated by the following:

"Palatable ways for non-specialized society to understand the knowledge being shared" (R2).

"The syntactic and semantic conversion of research results, published initially as scientific communication, to reach a broader audience using more palatable/accessible language" (R8).

Both R2 and R8 emphasized the term "palatable", meaning that the general population should be able to understand the language and format used for disseminating research. However, it is not merely about translating language but rather about developing specific knowledge aimed at the intended audience, as explained by one interviewee:

"Communicating science is not merely a didactic transposition or linguistic simplification, but a practice of producing new knowledge that aims to achieve broader reception beyond peer groups. Public communication concerns the scientist's or intellectual's commitment to debates held in the public sphere" (R94).

How researchers view science communication

Respondents such as R14, R36, and R45 viewed science communication as a set of actions aimed at publicizing scientific research, valuing science, helping people understand the importance of scientific knowledge for their lives, and stimulating interest in science. R51 focused on combating fake news and emphasizing the seriousness and necessity of public education and research institutions. However, these positions often reflect the deficit model, where the goal of communication is to fill gaps in public knowledge. Most respondents emphasized that public science communication involves presenting scientific knowledge in accessible language, and that it is an ethical responsibility of scientists to promote inclusive scientific development. This requires the public to understand and advocate for investment in research in all areas of knowledge. R96 expressed this as follows

"The final step of the research process, but often forgotten. Dissemination should be an obligation of researchers. The public needs to know what's new in science to make more informed decisions."

Other interesting aspects, such as university extension, were mentioned by R80, who cited two dimensions of scientific dissemination:

"One related to the historiography of science and the transmission of knowledge, and the other related to university extension, aiming to bring the latest scientific findings to the general public."

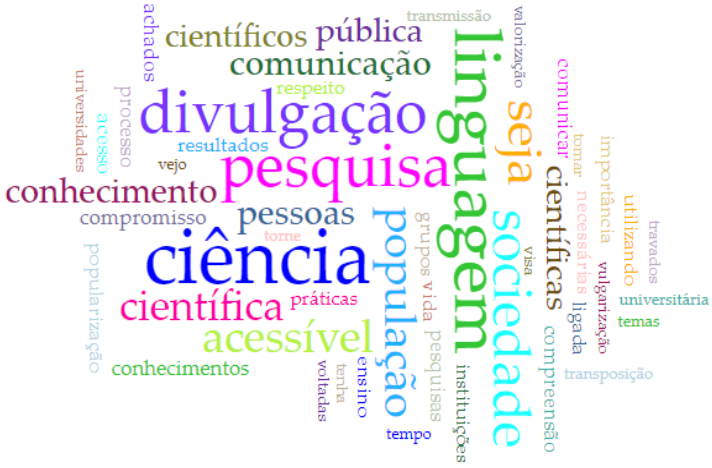
As R94 stated:

"Communicating science is not merely a didactic transposition or linguistic simplification but a practice of producing new knowledge aimed at broader reception beyond peer groups. Public communication is about the scientist's or intellectual's commitment to debates in the public sphere."

These responses highlight researchers' sensitivity and their apparent alignment with a two-way communication model ('dialogue'). Beyond the researcher's responsibility, as Oliveira (2021) points out, there must also be motivations rooted in social responsibility and a need to promote a scientific culture.

To better illustrate the research subjects' responses on scientific dissemination, a word cloud (Figure 1), word frequency list, and conceptual map were created using the responses. These responses were processed using the online and open-source text analysis application *voyant-tools.org*.

Figure 1: Word cloud on what respondents understand by public communication of science or scientific dissemination



Source: Own elaboration

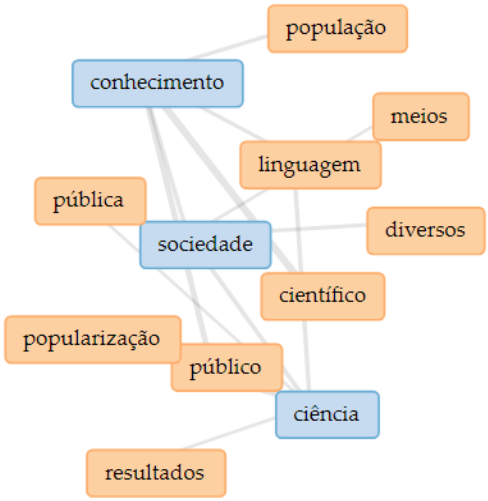
As can be observed in the word cloud, the most prominent terms *were:* language [linguagem], dissemination [disseminação], research [pesquisa], science [ciência], scientific [científico], accessible [acessível], communication [comunicação], public [público], society [sociedade], population [população], *and* knowledge [conhecimento]. *These terms reflect the responses of the research participants, emphasizing the importance of providing accessible communication to the population in a contextualized manner, using language and means tailored to each reality. In Figure 2, it is possible to see which words were mentioned most frequently, such as* knowledge [conhecimento], science [ciência], society [sociedade], public [público], *and* language [linguagem], *corroborating the word cloud findings.*

Figure 2: Word frequency list

Termo	Contagem
conhecimento	24
ciência	24
sociedade	22
público	22
linguagem	21
pesquisas	17
divulgação	17
resultados	15
pesquisa	13
científico	13
científica	13
acessível	13
comunidade	12
comunicação	12
científicos	11
população	10

Source: Own elaboration

Figures 3: Conceptual map



Source: Own elaboration

In Figure 3, which shows a conceptual map, the relationships are established with a focus on three words, knowledge [*conhecimento*], society [*sociedade*] and science [ciência], as a triad of science communication, and are interconnected with language [*linguagem*], media [*meios*], results [*resultados*], public, popularisation [*popularização*], scientific [*cientificos*] and diverse [*diversos*]. These figures dialogue with the findings of this research and with the quotes from the authors used in the theoretical framework, providing

a view that there is an understanding, albeit still basic, of what science communication means. With this triad, it's not asserted that the process of communicating science occurs in a linear fashion. According to Castelfranchi (2008), science is autonomous, and society is sometimes seen as a homogeneous, passive mass that simply receives information. However, this unidirectional model has been largely superseded by a more complex view. Latour and Woolgar (1997) argue that scientific knowledge isn't a neutral representation of reality, but rather a social construct. For this reason, the triad reflects a process where science not only informs society but is also influenced by it. The knowledge generated, in turn, impacts society, leading to technological innovations, behavioral changes, and new policies. In other words, a feedback loop occurs where both society and science benefit through accessible, transparent, and contextualized communication.

Goals of public science communication

Regarding the respondents' opinion on the objectives of science communication, they were able to tick more than one option among the three objectives presented below: 1) educational (93.6%), it aims to inform individuals about the unraveling and solution of problems related to phenomena already scientifically studied, to stimulate their scientific curiosity; 2) popular mobilization (70%), it aims to increase the possibility and quality of society's participation in the formulation and choice of public policies; 3) civic (81.8%), it aims to achieve an informed public opinion on the impact of scientific and technological development on society, especially in critical areas of the decision-making process.

The questionnaire also asked if the respondents were aware of any public communication of science (PCST) projects in the institution where they work. 51.8% said they were not, and 48.2% said they were. It can be seen that some initiatives mentioned may not be science communication, but rather science communication for scientists rather than for society in general, such as the institutional repository and the journal portal. These data show that the culture of public science communication is not as widespread among researchers as it is promoted by educational and research institutions. However, a movement to change this situation has begun with the requirements of Brazilian funding agencies that submitted projects that have a science communication plan.

Which activities are Brazilian researchers engaged in?

The second category of analysis deals with how researchers disseminate the results of their research, whether they are encouraged by the institutions where they work to engage in public communication of science, whether they usually think about how the results of their studies reach society, and whether they are willing to engage in PCST.

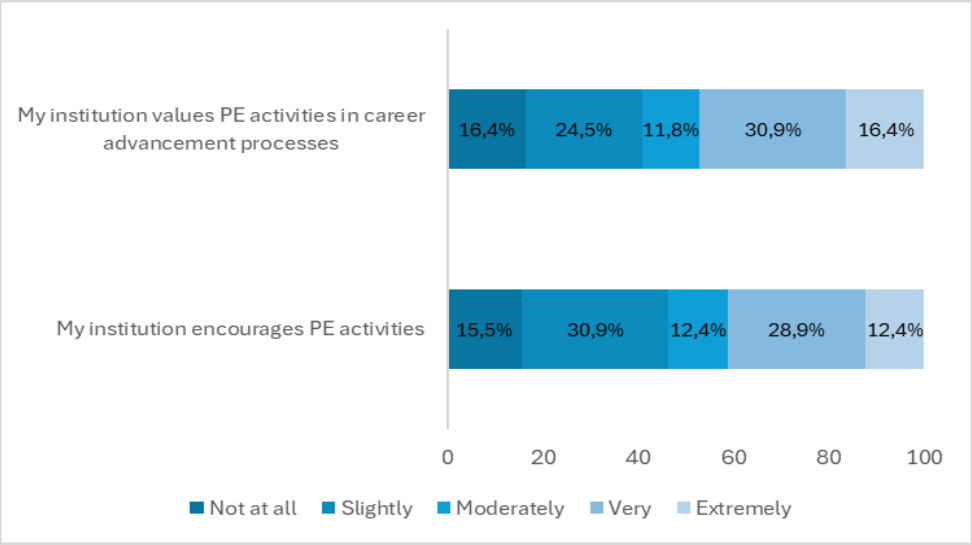
When asked if they had ever communicated the results of their research to the public, the majority of respondents (45.5%) said yes, three or more times, while 32.7% also said yes, but up to twice, and 21.8% had never done so.

Regarding institutional encouragement of PE activities, almost half of the respondents reported a low level of support:15.5% of respondents reported “not at all,” 30.9% “slightly,” 12.4% “moderately,” 28.9% “very,” and 12.4% “extremely.” Concerning the extent to which PE activities are valued in career advancement

processes, 16.4% indicated "not at all," 24.5% "slightly," 11.8% "moderately," 30.9% "very," and 16.4% "extremely." Only about 41.3% considered that their institutions encourage such activities to a "very" or "extremely" high degree (Graph 1).

A similar pattern emerges when looking at how institutions value PE activities in career advancement processes. Here, 40.9% of respondents perceived little or no recognition ("not at all" or "slightly"), while less than one third (30.9%) indicated that PE is "very" valued and only 16.4% judged it to be "extremely" valued. These results suggest that recognition and institutional support for PE activities remain limited, particularly in career progression, confirming the need for stronger institutional measures to legitimize and consolidate science communication within academic trajectories (Oliveira, 2021).

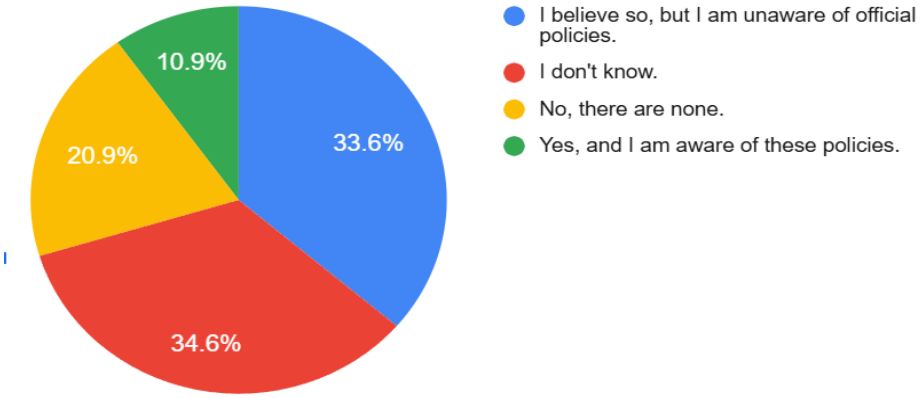
Graph 1: Valuing Encouragement of dissemination activities by institutions and dissemination activities in career promotion



Source: Own elaboration

Concerning the policies, norms, standards, or recommendations on scientific dissemination within each institution, most of the survey respondents said they did not know how to answer, as shown in the graph 2:

Graph 2: Policies, norms, standards, or recommendations on science communication



Source: Own elaboration

Researcher as communicator: obstacles to the Third Mission

When asked if they would be willing to disseminate science to society, the majority (69.1%) answered that they would like to learn how to disseminate science to society; contrary to popular belief, communicative competence is not the result of innate individual personal skills, but can be learned (Horst, 2013). While 12.7% (active) of the respondents said that they already disseminate their research results to society, 18.2% (disinterested) said yes, but they prefer to communicate through institutional communication. One of the respondents in this category, R31, emphasized the overload of those working with different teaching demands, such as research: "I think everyone should do their part, and it's not fair to overload those who are already doing research. If there are professionals who are competent, dedicated, and inspired to do it, that is up to them. For my part, I appreciate the work and pass it on whenever possible.

The respondents were also asked whether they usually think about how the knowledge generated by their research reaches the population. Fourteen respondents answered that they do not think about it - a minority - while the majority said that they do think about it. For example, R8 responded that they "try to develop strategies for scientific dissemination through social media, but it has not been an easy activity due to the accumulation of demands and scientific activities". R4 emphasized that the nature of her field (information literacy) facilitates dissemination to the public, stressing that extension activities also contribute to the implementation of scientific dissemination (SD). Meanwhile, respondent R86 discussed the difficulty of thinking about how to engage in scientific dissemination:

"I feel a lack and difficulty in establishing a more direct dialogue with the general population and with schools that are more related to my field of study. I find it difficult to think about how to bridge this information gap due to my lack of expertise".

Some research participants suggested the production of booklets with playful, accessible, and less academic language, discussion circles, the use of social media, podcasts, and alternative media channels to conduct SD to generate engagement and a wider public reach. However, they noted that this is not an easy task,

which, according to R8, is due to "the accumulation of demands and scholarly activities". Nevertheless, some researchers are already working to make their research accessible to the public, as in the case of R16:

"All my research aims to be accessible to the population, from the language used to the objectives. I think language is essential to reach the public. Scientists have to come down from their pedestals if they want scientific dissemination to go beyond the limited spaces of academic publication. We need to talk to the public to rebuild trust in science. We need to break down walls, take over public spaces, be present in schools, and work for and with people, rather than just engaging in peer discussions.

There were also respondents who stated that they were thinking about SD but did not know how to communicate their research to the public. R61, for example, emphasized that her studies take a more complex approach, dealing with objects that are not visible to the naked eye:

"I often find that I have to simplify what I am actually doing as much as possible, or resort to extensive explanations to better communicate what I am researching. I believe that if I could learn better ways to teach in a didactic and engaging way, I could improve the dissemination of my research and potentially reach new audiences".

R61's concern is valid, as Bucchi (2008) points out that scientific dissemination does not simply mean transferring research from the laboratory to the community, for example. It requires communication that focuses on dialogue and participation, fostering interaction among all stakeholders.
Some researchers have tried to engage in scientific dissemination, such as R35, who stated that

"We usually encourage the participation of the local population where the project is being implemented. We also encourage institutions at all levels to publicize the work so that the entire population is informed."

For R56, who has participated in scientific dissemination initiatives:

"The work is complicated because, as a scientist, it is difficult to give up technical terms. Despite this challenge, I believe that only an experienced scientist, supported by journalists and other communication professionals, should act as a science communicator. Unfortunately, I have seen firsthand the poor quality of initiatives led by journalists or well-intentioned colleagues who do not work in the field and do not fully understand the concepts being communicated.

In addition to the lack of preparation for scientific communication mentioned above, other issues contribute to misinformation and the discrediting of science in society. Each person processes information based on their life experiences and "social and psychological frameworks shaped by their experiences, cultural context, and personal circumstances" (Brossard & Lewenstein, 2010, p. 14). For this reason, R71 states:

"It is important to bring out both perspectives: that knowledge itself is valuable and part of the university's mission. Once this is established, we can discuss research with clearer applications and benefits to society,

while clarifying that applied science should not be an obligation (although it is always beneficial). We need to understand that applied science often grows out of basic science. Our approach has been to use social media posts with accessible language to explain our studies and their relevance."

In R106's academic context, there is an encouragement to engage with the public through outpatient care in a public hospital and to develop accessible language about the knowledge acquired at the university. This is consistent with the response of R58, who expressed a desire to see research results translated into tangible resources and services for underserved populations through the public health system (SUS). Although such initiatives are still limited, there is a growing awareness of the importance of scientific dissemination. However, resources and infrastructure supported by funding agencies are needed.
Some responses indicate that the principles of scientific dissemination are still unclear, as the focus should be on making information understandable to those outside the academia. For example, the following response refers to traditional academic communication practices aimed at those already familiar with scientific knowledge:

"Yes, through lectures, article writing, and participation in seminars and conferences" (R7).

When asked whether they usually reflect on how the knowledge produced in their research could be applied to people's daily lives, 13 respondents answered negatively. One particular negative response stood out: the respondent stated that, since they work with basic science, they do not think about how their knowledge could be used by people. This highlights the need for scientific dissemination policies across all fields of knowledge, allowing for a creative understanding of how science can and should be communicated to the public.
Other respondents stated that they do reflect on this, with R38 emphasizing concern about "how this affects people's lives and how it can reach them." R85 pointed out that their research focuses on:

"Raising people's awareness about the environment they live in."

R72 responded that they think about disease prevention and the harm it may cause future generations. R102 noted that they reflect on and apply SD by using accessible language in their research. For R16, it would be a dream

"To see people embracing my studies, developing critical thinking, and resisting misinformation through knowledge and curiosity, always encouraged."

In the specific case of R94, they described how they reflect on the applicability of their research in society:

"In Social Sciences, the knowledge produced can be applied in education, culture, health, and economics: (1) supporting academic and professional training at secondary and higher education levels; (2) producing data and educational materials with explanations and analyses of social issues and demands; (3) supporting and guiding the implementation of government policies in various sectors."

From respondents' answers, R71 reflects on the fact that not all researchers have the profile of a science communicator—something that should always be considered:

"Funding agencies have already made this clear by requiring dissemination efforts in various grant calls, which I do not think is entirely reasonable. We must recognize that not everyone is suited for science communication. Some may try, but only a few will truly be capable. Encouragement is important, and I believe scientific events can also help, alongside social media. TV and radio programs focusing on scientific dissemination would be very intriguing."

Regarding dissemination channels, R45 suggested that the most-watched programs on public television should include segments dedicated to discussing science responsibly, with guidance from scientists. Social media should also operate in the same way but should be

"Endorsed by major research centers and universities. Showing the science behind techniques and results to demystify them and highlight the importance of dedication and in-depth study in producing quality science, countering the trend that everything must be fast and fit within 15 seconds. Reading should be engaging, not just quick."

The responses from all research participants lead to a reflection on the urgency of including issues such as public communication of science, public engagement and participation, and science in society on the agendas of discussions within educational and research institutions, as well as funding agencies. This should be part of an ongoing movement to establish national policies that promote an effective dialogue with society.

Discussion

By means of survey's results, it was possible to allow a non-representative sample of Brazilian scientists and researchers to determine which factors promote or hinder their participation in science communication activities and how these influence their real and active commitment to dialogue with society.

Based on the survey results, this study provides insights into the factors that facilitate or constrain the involvement of Brazilian scientists and researchers in public communication of science, as well as into the ways such factors shape their actual engagement in dialogue with society. Consistent with previous research, our findings indicate that personal enthusiasm for communicating about science and technology remains a central motivational driver, frequently accompanied by the desire to contribute to educational goals.

Although the limited size and non-representative nature of the sample prevent us from establishing statistically robust associations with institutional context or geographic location, certain trends emerge. Motivations appear to vary only marginally across institutions and career stages, suggesting a relatively homogeneous pattern. More than half of the respondents cited educational purposes as their primary motivation, highlighting the persistence of a deficit-oriented approach among Brazilian researchers.

Nevertheless, information dissemination also continues to play a significant role in the country's science communication landscape.

In line with earlier studies, lack of time and insufficient resources were the most widely reported barriers, pointing to the predominance of contextual and structural constraints rather than individual-level deterrents. Incentives were more consistent across professional roles, with the intention to educate and to counter misinformation standing out as particularly relevant. For some respondents, communication activities were also linked to the specific requirements of their professional positions.

While motivations proved largely convergent, deterrents exhibited greater diversity. In addition to time constraints and lack of resources, respondents highlighted the absence of adequate rewards and recognition, together with limited institutional support. These findings suggest that researchers may not yet fully acknowledge external expectations regarding their communicative responsibilities, which may contribute to a perception of reluctance to engage.

To achieve this, some initial actions need to be considered to institutionalize the public communication of science. As Oliveira (2021) explains, it is necessary to: invest in and encourage the training of the scientific community and professionals working in science and technology communication; promote and take responsibility for fostering the dialogue between science, technology, and society; establish guidelines, structures, strategies, and institutional policies that encourage scientific citizenship behaviors; and facilitate public participation and engagement.

It is important to highlight the difficulty of collecting research data, given the many demands placed on researchers. As a result, the study's sample may not be highly representative in numerical terms, but it can provide valuable insights into how participants perceive public communication of science based on their lived experiences. The open-ended questions were designed to present this broader perspective and often elicited similar responses, revealing a relatively homogeneous reality - one characterized by a lack of institutional and governmental initiatives and incentives to disseminate research results to society.

For over two decades now the emphasis through PE has prompted a broad debate on the role of scientists as communicators (van Eck, 2024) and public experts (Peters, 2014), both at the individual level and at the political and social level. At the same time, the institutional processes (i.e. Third Mission) also pose challenges for science communication, researchers and institutions.

Our findings confirm the results on the engagement of Brazilian researchers in public engagement activities. In fact, in line with previous work also conducted in the Brazilian context, our research indicated an awareness of what public communication of science is and a clear interest in engaging with the lay public.

A first observation, however, concerns the interviewees' adherence to a model of science communication that aims to "translate" the language of science to a general audience. This interpretation of public science communication, understood as an activity that "translates" an unknown phenomenon or concept into a more familiar one, reflects what we might call a phenomenological approach. According to most of the interviewees, science communication operates at the intersection between the provinces of scientific meaning and common sense (Schütz, 1945).

The complexity of science therefore necessitates mediation between scientists and the general public. This idea refers to a "diffusionist conception (Bucchi, 2008), unquestionably simplistic and idealized, which holds that scientific facts need only be transported from a specialist context to a popular one" (Bucchi, 2008, p. 58).

By making their communication goals clear, Brazilian researchers confirm the persistence of the 'deficit model' (Simis et al., 2016). They see the public as mainly needing education and protection from misinformation. Also, younger Brazilian researchers say they're more open to engaging with the public.

The knowledge deficit model can easily influence attitudes toward science communication activities. Data shows that three ideal types of attitude can be identified: 1) motivated, 2) active, and the 3) disinterested. The first and second types demonstrate an understanding of the new role of researchers in the public sphere, with the second type already engaged in action and the first showing an interest in learning. The disinterested represent the group of researchers who have an outdated view of the relationship between science and society, a vision that almost assumes a separation. However, the change in the way scientists work has been so radical in recent decades that some argue it has led to a post-academic era.

In the academic era, relevant decisions about the work of scientists were essentially made within the scientific community. Interaction with the rest of society was minimal. Moreover, scientists, perhaps with limited resources, could live in an "ivory tower". In the new post-academic era, decisions relevant to scientists' work are increasingly made by the scientific community in competition with other social groups: politicians, bureaucrats, industry leaders, the military, opinion movements, non-governmental organizations, and society. In addition, scientists are being forced, perhaps reluctantly, to leave the "ivory tower."

The prevalence of the deficit model and the communication of science as "translation" is also reflected in the request by the researchers interviewed to delegate relations with society to professionals such as journalists or popularizers.

The issue of researchers' engagement is also influenced by discipline: scientists engaged in basic research say they are less interested in engaging in dialogue with citizens.According to the respondents, working in fields of knowledge closer to common sense allows for discussion and debate with the public, with the possibility of exchanging views and opinions on science. It should be noted that the questions in the questionnaire do not allow us to explain the formats with which researchers have engaged, nor their direct involvement in social media.

The second observation concerns training in the field of public communication of science and policies that promote dialogue with society within academic and research institutions. Universities and research organizations have been increasingly recognized as active agents in science communication, particularly within the framework of the so-called Third Mission (Zomer & Benneworth, 2011). As Entradas (2025) has shown, academic institutions are progressively developing a dedicated function of science communication, often distinguished from marketing and public relations. However, this function tends to remain fragmented and under-resourced, with communication units frequently decentralized at the level of departments or individual research centers, which limits their long-term sustainability. These findings resonate with earlier work that highlighted how institutional support, infrastructure, and leadership play a decisive role in enabling researchers' engagement with the public (Davies & Horst, 2016; Jensen & Gerber, 2020).

A complementary issue relates to the training of scientists in science communication. Despite a growing number of initiatives, training opportunities remain unevenly distributed and are often offered as optional, short-term workshops rather than being structurally integrated into academic curricula (Besley et al., 2016; Illingworth & Allen, 2016). Evidence suggests that such training can increase researchers' confidence, improve the accessibility and clarity of their outputs, and strengthen their intention to participate in dialogue with society (Besley et al., 2021; Silva & Bultitude, 2009). Moreover, systematic evaluation of training

outcomes, combined with the inclusion of communication competences in performance assessments and career progression, has been identified as a critical factor for consolidating engagement practices (Dudo & Besley, 2016; Davies & Horst, 2016).

Consistent with previous findings, our results indicate that researchers' communicative activities cannot be understood solely as the result of individual attitudes; rather, they are deeply shaped by institutional structures, incentive systems, and the legitimation of science communication as part of academic work. Within this context, a formative gap is evident in the training of scientists to effectively communicate their work to the public, a deficiency manifested in the respondents' own reports, who consider their research - especially in non-applied fields - difficult to disseminate to society. Overcoming this situation requires a systemic change in perception, one that recognizes that the entire scientific process is communicable. To this end, a crucial step emerges: the strengthening of institutional functions for science communication, coupled with investment in training researchers to become skilled communicators, capable of crafting narratives for diverse audiences while considering appropriate channels and formats, and the incorporation of structured training into their academic pathways. Such an approach is fundamental to transcending models oriented toward mere translation and thus fostering a genuine dialogue between science and society.

Conclusion

The role of communicators and public experts (Peters, 2014) is constantly changing and represents a significant challenge for scientists and researchers. It is therefore necessary to constantly monitor and investigate the factors that facilitate or hinder engagement in this area.

Our study sought to explore some of the dimensions that make up this multifactorial phenomenon: the perceived objectives of science communication, the role of science communication, and general attitudes toward engagement.

The study confirms that the involvement of researchers in communicating science to society depends on several factors, including the resources, contexts, and policies provided by research and education funding agencies, as well as the ability to address challenges and engage in motivational activities.

Regarding the research questions, the data identified the main challenges perceived by researchers in communicating scientific and technological knowledge to the public: the lack of recognition for those involved in science communication in terms of career development or academic promotion; the workload associated with research, teaching, and extension activities; the accumulation of scientific demands and tasks; the difficulty of establishing a direct dialogue with the public; the lack of knowledge and training on how to communicate research results effectively; the complexity of certain studies, which can hinder their dissemination; the challenge of avoiding technical and scientific jargon; and, finally, the fact that many scientists are still unclear about the principles of science communication.

With regard to the motivations that drive scientists to share their research with society, participants expressed concern about how science communication - or the lack of it - affects people's lives. They emphasized how dissemination efforts can improve public awareness of their environment, including understanding disease prevention and long-term societal impacts. Other motivating factors include scientists'

desire to see people engage with their research, develop critical thinking skills, and counter misinformation with knowledge and curiosity. In addition, many researchers see the potential for their findings to inform and support public policy in various areas that benefit society. Ultimately, those involved in or interested in science communication aim to reveal and demystify the scientific processes behind techniques and results, and to highlight the importance of dedication and in-depth study in producing high-quality science. Their work translates into tangible benefits for society, such as products, services, medicines, and improved processes.

Regarding existing science communication initiatives among researchers, the data revealed confusion between public science communication and communication within academic circles. This highlights the need for educational and research institutions to clarify this distinction. In addition, more than half of the respondents were unfamiliar with science communication projects, suggesting that much remains to be done in this area in Brazil. Although some initiatives have begun to change this landscape, progress remains slow. Based on the findings, several proposals can be formulated to encourage scientists' participation in public engagement and communication activities. Inspired by long-standing practices in other social, political, and cultural contexts, key recommendations include organizing open days and laboratory visits at universities to welcome curious citizens and students; supporting initiatives that bring researchers and the public together (such as Pint of Science or Researchers' Night in Europe); and developing recognition and award systems for scientists involved in research communication activities. The possibility of engaging the large number of researchers who have indicated their willingness to participate in training courses also leads us to consider the creation of courses dedicated to scientific communication in doctoral curricula and training activities for researchers in progress as useful.

At the institutional level, it seems appropriate to include scholarly communication in the evaluation form for teaching and research progress in academic and research institutions, as well as to fund actions for public scholarly communication and to promote awards. Stakeholders and policymakers could support science popularization initiatives by promoting science museums, science centers, or science festivals. Universities themselves would have the opportunity to create a program or institutional policy for science communication for researchers and students (Shivni, et al. 2021) in each university through the establishment of vice-chancellors for outreach and engagement with society.

This set of proposals, derived from the responses of the researchers who participated in this study, highlights the urgent need to create and implement national policies that promote effective dialogue with society, as well as the provision of structures, guidelines, and investments to make this possible. This would allow us to envision a future in which diverse segments of the population actively participate and engage in decisions that affect and concern everyone.

This study offers three main conclusions for researchers themselves, academic and research institutions, and policymakers. For future research, it is recommended to analyze the perspectives and development of scientific culture in schools, especially after the creation of the "More Science in Schools" program. This type of initiative can contribute not only to the development of technical skills related to scientific practice, but also to the enhancement of abilities and motivations aimed at disseminating scientific and technological knowledge in the environments where these young people are located.

This study has several limitations. We acknowledge that this study examined a non-representative number of Brazilian researchers. Moreover, since the research design focused primarily on institutional opportunities

and constraints that promote or hinder public engagement activities, it was not possible to identify individual factors. The biggest difficulty we encountered was the low response rate. So, since our sample consists of researchers primarily operating at UFC, it will be important to develop and articulate these findings in terms of future national representative surveys and international comparisons. Next time, to improve the rate of responses we should offer incentive options such as gift cards or donations at the institution.

Similarly, follow-up research should be dedicated to evaluating potentially predictive factors through representative surveys among the broader population of scientists. In fact, further studies are needed to deepen our understanding of these orientations and their relationships with the socio-cultural, economic, and historical factors that shape the relationship between science and society.

Nevertheless, we believe that our study can already provide results with broader implications and contribute to the debate on the public engagement of researchers in Brazil. The changing institutional configuration of universities and the evolving media ecosystem are putting pressure on researchers to engage more as experts in the public sphere (Owen, Macnaghten & Stilgoe, 2012).

The emergence of digital and social sharing platforms, as well as the pandemic experience of COVID-19, has underscored the need for greater engagement between scientists and society through the development of more active and dialogical forms of participation in policymaking. In this context, researchers have a dual role as educators and trust-builders in academic and research institutions.

In light of these considerations, we believe that in the future it will be necessary to develop studies involving a larger number of researchers that can be representative of the entire Brazilian territory. A larger dataset would allow for a more nuanced analysis that integrates cultural, social, and institutional dimensions and promotes more robust and generalizable interpretive models. Further research could examine additional variables or explore international comparisons, which could provide a solid foundation for developing communication strategies tailored to emerging public needs.

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