

## **Understanding Brazilian Scientists' motivation towards Public Communication of Science**

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### *Introduction*

Brazilian Science is going through a deep crisis, especially since the beginning, in January 2019, of a new federal government, whose President and Ministers systematically insult scientific evidences – as in the matters of the Amazon rainforest and climate change and, later, Covid-19. That, together with successive and ever greater cuts in the Science budget, brought the scientific community to the public arena, claiming for support and highlighting the relevance of increasing Public Communication of Science efforts.

The actions of Public Communication of Science, historically, have presented as its objectives the following: to guarantee the legitimacy of Science itself in society, the stimulus to awaken vocations for STEM careers and, more recently, the participation of people in decision-making processes that, each day more, involve the understanding of knowledge from the scientific and technological fields (Pezzo, 2018).

Another relevant issue, with regard to field actions and activities, concerns the complementary role to Science Teaching, aiming the promotion of the so-called Scientific Culture which, as proposed by Vogt (2003), groups a series of challenges presented both for the formal teaching of science and for the different Scientific Dissemination activities, directly related to the possibility of exercising citizenship. In this sense, discourses on science for the purposes of dissemination and education, aiming to promote Scientific Culture, must take place in such a way as to allow Science to occupy a social and historical place in the daily life of society.

It is also worth highlighting the important role that scientists can play in establishing channels of dialogue between Science and Society, as pointed out by Merino and Navarro (2018), when they are more engaged in the practices of Public Communication of Science. Engagement can be understood as the existence of "intentional, meaningful interactions that provide opportunities for mutual learning between scientists and members of the public.", with the goals of "civic engagement skills and empowerment, increased awareness of the cultural relevance of science, and recognition of the importance of multiple perspectives and domains of knowledge to scientific endeavors." (AAAS, 2017). Engaging certainly depends on the perceptions people have about the role of Public Communication of Science and, thus, what motivations scientists might have to engage, which were the focus of our research.

### *Objectives*

To better comprehend how this community understands the goals of such efforts and how to take this motivation to actions that can transform this increasingly dramatic scenario, we've analyzed a sample of news and opinion texts published in the first six months of 2019, in the daily newsletter *JCNotícias*, clipping from various media outlets.

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Considering the objective of the investigation, the statements of scientists about the Public Communication of Science and / or interaction between Science and Society were analyzed and categorized, aiming to unveil factors that may favor or hinder the engagement, as well as the strength of this proposal.

### *Methodology*

The research presented was supported by a descriptive and exploratory approach (Mattar, 1999), providing a description and approach to the phenomenon that presents itself as the object of interest of the work in order to allow a polishing of ideas and the formulation of hypotheses.

To carry out the investigation, we analyzed texts published in the period between January 1st and June 30th, 2019 in JCNotícias, which, as we have already noted, is a newsletter, produced by the Brazilian Society for the Progress of Science (SBPC), which aggregates related news to the Science and Technology areas of several information vehicles in Brazil. The first analysis allowed the selection of 129 texts, due to the presence of manifestations about why and how to talk about Science in the public sphere (186 events in total, from scientists - 69% -, politicians, journalists and the general public).

We analyzed and categorized the manifestations using the methodology called Discursive Textual Analysis (Moraes, 2008). This analysis, according to Moraes and Galiuzzi (2006), is located between two lines established in qualitative methodologies, Content Analysis and Discourse Analysis, and is achieved through a process of deconstruction and reconstruction of the set of linguistic materials, enabling the emergence of new meanings attributed to the investigated questions.

Using this analysis tool, we apply the categories built from our theoretical framework, in order to assess the objectives and justifications that support the efforts of Public Communication of Science: to promote Scientific Culture; to the awakening of Vocations; to promote the Legitimacy of Science; to transform Science through Dialogue with other social practices and actors; or to fulfill a Duty.

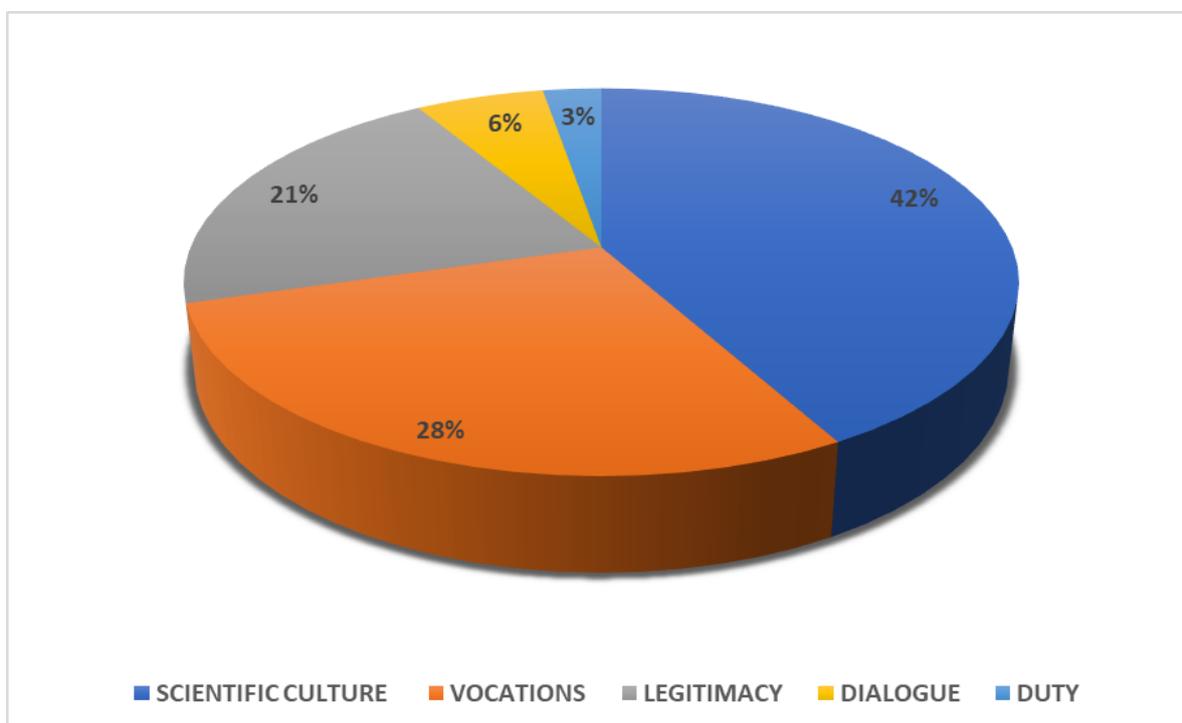
### *Results and Discussion*

The predominant category identified in the texts was “to promote scientific culture”, representing 42% of the total, followed by “Vocations” with 28% and “Legitimacy of Science” with 21%. Finally, the categories “Science through Dialogue” and “Duty” were identified respectively in 8% and 3% of the texts. The distribution of perceptions according to each of the categories can be seen in Figure 1.

The predominance of texts identified in the category “To promote scientific culture” evidenced, on the one hand, advances in the sense of looking at Public Communication of Science as an effort that does not end within scientific institutions and practices, building bridges towards other social spheres. However, the analysis carried out and our results indicated also the need for caution and detail in the category, which brings together objectives ranging from the use of Science as a motivating factor in the school context to the possibility of transformation towards a more sustainable society, passing by the promotion of public policies based on evidences and, also, by the possibility of making personal decisions based on evidences, the last two still very close to an imposing discourse or, at best, focused mainly on Science itself.

Perhaps the finding is related to the fact that the vast majority of the manifestations come from the scientific community itself (69%), with very little contribution, for example, from teachers and

students from different levels of education other than the university, public managers and political leaders and, also, the public targeted by Public Communication of Science efforts. In other words, the voice of scientists remains the main one in defending the need for Public Communication of Science.



**Fig. 1:** Distribution (%) of perceptions about Public Communication of Science identified according to the analysis categories “to promote scientific culture” (Scientific Culture); “Vocations”; “Legitimacy of Science” (Legitimacy); “Science through Dialogue” (Dialogue); and “Duty” (Duty).

In the demonstrations that advocate the need to awaken vocations, attention is drawn to the prevalence of initiatives aimed at expanding the presence of women in Science (55% of the total in this category) and, on the other hand, a single manifestation mentioning racial inequality.

Perceptions identified with this category also emerged in a work carried out with the objective of identifying the perceptions about scientific dissemination presented by a group of scientists from a research center in Brazil (Fabrício et al, 2021). In that study, however, the speeches aimed at awakening vocations were identified in only 7% of the researchers' speeches, obtained with the use of questionnaires.

With regard to the objective of ensuring legitimacy to Science, an important distinction is between discourses that exclusively advocate the allocation of resources to scientific practice, as Pezzo (2018) reminds us, representing in this research 49% of the total identified perceptions, and manifestations less frequent in the sense of a culture that values Science and specialized knowledge and, thus, favors rationality, critical thinking and, ultimately, a better life.

Finally, we highlight, on the one hand, the low presence of justifications related to the idea of fulfilling a duty associated with public funding of scientific activity and, on the other, the emergence of reflections related to dialogical communication, which transforms scientific practice itself from its relationship with other knowledge and social spheres, which we value, especially after the Covid-

19 pandemic and the polarized and disinformation scenario that emerged, as a promising path towards better STS relations.

### Conclusions

The results found in the investigation - although preliminary in relation to the theme - point to the existence of a majority of perceptions about the role of Public Communication of Science, still with conservative characteristics and very focused on the practice of Science itself, in contrast to the perceptions that consider the fundamental role of the establishment of bridges for the dialogue between Science and Society. New questions can be suggested for future work, such as the deepening and consolidation of the categories of analysis and also the influence of the corpus used in the analysis on the results.

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