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ENVIRONMENTS AND COMMUNICATORS IN SCIENCE COMMUNICATION

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Abstract

As it has happened in all fields of research, the study of language has adjusted and is still adjusting to the development of the world, which has led to the corresponding changes in the linguistic area. One cannot develop on this topic without referring to the digital environment and the means it has generated, which are made use of in sharing information of any kind, including scientific. The technologies available today in the domain of digital communication represent the revolutionary bridge between scientists and unspecialized people. The sharing of the scientific content takes place in the virtual environment, in a wide variety of forms and at a fast speed, both within each of the separate categories, specialists and non-specialists, on one hand, and between the two categories, on the other hand.

One of the main factors that have been proven to have significant influence on science communication is the communicator of scientific knowledge, whose perspective is inevitably, and sometimes intentionally, imprinted on the material to be disseminated to the public. In this research article an attempt will be made to discover whether and how the institution of the communicator and the environment impact the scientific material to be transmitted and the way it is perceived.

Keywords: science communication; communicator; environment; audience; lay public.

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Introduction

Nowadays one major preoccupation for scholars is the forms and methods in which science is expressed and transmitted to people, as this phenomenon of opening science to masses has known significant growth in the past decades. This increased interest in communicating science has been assisted by the continuous evolution of technology, especially as regards forms of communication, establishing connections, sharing information and dissemination, all this being possible regardless of matters such as space or time. The benefits of an ever-evolving technological world are, among many, the major advances in the communication process worldwide, leading to forms of spreading information that break the physical barriers of the past. However, all this development in the technological area has also brought about challenges that specialists have been dealing with more and more in their studies. Some of these challenges are about how the communication of scientific content should be done, in what kind of contexts, the forms it should or can take and who should do it, as well as the rate at which all these factors influence the whole process. In this research article an attempt

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will be made to discover whether and how the institution of the communicator and the environment impact the scientific material to be transmitted and the way it is perceived.

As it has happened in all fields of research, the study of language has adjusted and is still adjusting to the development of the world, which has led to the corresponding changes in the linguistic area. From this point of view, the communication of science can be discussed according to two main directions: the linguistic frame of knowledge elaborated by specialists and addressed to specialists and the shape science takes when it is presented to the lay public. In the former case, it is about an “intra-scientific communication” between scientists, “internal to science,” involving knowledge production, while in the latter case it is about “popular or public communication,” which is directed at lay people, disseminates and popularizes (Felt & Davies, 2020, p. 13-17). This second case means that the language used is tailored according to the target public in such a way as to succeed in making science understandable and accessible for people who do not have specialized training. The two directions complete each other in achieving the final result of taking science to people. At an international level, there are joint efforts on behalf of scholars to build in a practical way on the concept of sci comm, i.e. science communication, which refers to “scientific communication for non-specialist audiences” (McCarty, 2021, p. 144), and open science, especially under the umbrella of the process of digitalization.

One cannot develop on this topic without referring to the digital environment and the means it has generated, which are made use of in sharing information of any kind, including scientific. The technologies available today in the domain of digital communication represent the revolutionary bridge between scientists and unspecialized people. The sharing of the scientific content takes place in the virtual environment, in a wide variety of forms and at a fast speed, both within each of the separate categories, specialists and non-specialists, on one hand, and between the two categories, on the other hand. It is a process that is easily followed and monitored by those initiating it, which happens in an efficient way and allows the possibility of giving and receiving feedback.

Once the process of making science accessible to lay people has intensified and has found more modern, innovative media to develop, the issues attached to this phenomenon, such as linguistic, ethical, contextual, environmental, socio-political, have started to become visible. One of the main factors that have been proven to have significant influence on all these aspects is the communicator of scientific knowledge, whose perspective is inevitably, and sometimes intentionally, imprinted on the material to be disseminated to the public. This is why the aspect of the person, group or institution that constructs the message to be made public and deals with the communication with the lay people has become of great interest to scholars in various fields, such as linguistic, social, psychological, and many others.

When reading from the specialized literature on science communication about the entity of the communicator, one discovers that a growing number of theories and perspectives belonging to professionals have already been released on the subject. Some of these renowned authors and their works will be referred to in this piece of writing and their views will be presented further in the text in order to have as broad a picture as possible of the interpretations given so far. The main concepts used throughout the text and which will be in the focus of attention are science, communication, (the two concepts put together in the phrase) science communication, communicator, scientist, public, audience, lay people, more exactly a number of terms whose meanings, according to specialists’ explanations, will intersect, overlap or complete each other in drafting a presentation of the subject under discussion.

The environments of science communication

To start developing on types of environments in which science communication takes place and how it is affected by the kind of communication adopted, as well as on the types of communicators and their outlines, Alain Létourneau (2018) is one of the specialists that should be mentioned, as he has made significant contribution to the topic. The author speaks of various “organizational settings” for this

task of taking knowledge to non-specialists: a traditional setting including newspapers, radio, television, magazines, and a more modern one, including online media such as blogs, Facebook, Twitter. These different environments mean differences in the type of task to carry out, the limits and the opportunities they offer, the measures needed for ensuring protection, and in the type of communicative relationship that is built (Létourneau, 2018, p. 259).

No dimension of society is strictly independent of others, as the social network comprises a multitude of interconnected spheres whose synergy and combination make the world move as one. Therefore, one field involving and including people, values, knowledge, automatically entails another one or leads to a new direction. From this perspective, Scheufele, Hall Jamieson and Kahan (2017) underline the interdependences existing between the development of science communication and the involvement of the public, on the one hand, and the polarized political environments, on the other. They put forward the idea of significant power of the public space over decisions regarding scientific conclusions (Scheufele et al., 2017). The authors stress the fact that, since debates are not private any more, decisions are televised or made available online at any time. The open character of scientific debates allows groups of interest or the public to engage in supporting one side or another of the issue.

Speaking of different environments in which science communication occurs, under the influence of certain cultural, political or social backgrounds or according to them, the growing importance of the online space has been stressed by a considerable number of researchers in the field, in addition to the ones already quoted or that will be quoted in this essay. Sara K. Yeo and Dominique Brossard (2017) exemplify how the media interaction and the possibility to have works peer-reviewed have led to decisions of retraction of scientific articles which contained inaccurate information (p. 268). This is an essential role that online media, with all its facilities, has demonstrated to play in the validation process of the data published. Such actions stand as evidence that the environment of the scientific world is changing with times and adapting to new requirements and conditions. One authority stating an academic theory is no longer enough for it to be accepted and validated. The online environment has gained a position from which it can influence major decisions concerning what is counted as scientific knowledge. The efficacy of such public debates relies on the accessibility of the respective platforms on which they are carried out, the speed at which the action can be initiated and performed and all this is nowadays ensured by the technological affordances of the online space.

The capacity of technology to provide users' tools which allow the selection of what people want to read or see and whom they want to interact with leads to a highly polarized society as regards perception, interpretation and mainly choice of scientific knowledge. It is the case of social platforms such as Twitter or Facebook. What is obtained is a group of people having very different views from another group of people on the same topic or matter, according to the ideas they adhere to (Scheufele et al., 2017). This social phenomenon can be seen as a segregation of the public depending on their beliefs and, as the authors put it, "the credibility and relevance" of the scientific outcomes depend on the understanding and acceptance of the receiver-group (Scheufele et al., 2017, p. 463). This is how society can influence whether academic research and results become recognized and find a place in the national or world heritage or not.

The idea of polarization of the society according to the perspective people take is also to be found in Hodges, Lieber, and Denning's (2021) theory. The authors link the idea of audiences' perspective to rhetoric when speaking of the impact which is desired when ideas become public. Rhetoric means "considering how one's communication will be perceived by one's audience," which further leads to the concept of taking perspective, which is explained as "the process of one person taking another specific person's perspective" (Hodges, Lieber & Denning, 2021, p. 17). Besides the good effects related to perspective taking, such as improved behaviour, sympathy and better understanding of other people, it has been admitted that it can also lead to negative social consequences. One of them is the above-mentioned highly politically polarized society caused by the development of social media communities (Hodges et al., 2021, p. 32). The authors believe that the interference of science in the "crossfire of this polarization" is a recent phenomenon (pp. 32-33). Once separate from politics,

science has started to be assimilated in debates whose nature has made it leave the neutral space it used to occupy.

In her writings, Carmen Pérez-Llantada (2016) highlights the significant impact that technologies have had on academic communication regarding the forms of accessing and disseminating information. According to her opinion, there is “a need for stimulating scholarly conversation on issues of genre innovation and change so as to better understand the new forms of research communication in today's academic settings” (Pérez-Llantada, 2016, p. 24). To illustrate the intensity with which scholars resort to the online environment, I have selected the following tweet by Pérez-Llantada (2022): “More thoughts on genres and digital science, this time with a focus on wider audiences and science dissemination practices on the Internet” (Pérez-Llantada, 2022).

The pace at which technology is developing and providing virtual spaces to manifest professionally, to communicate and present science, to form professional groups and gather audience around them, together with the flexibility with which people turn to technological novelty and use it, opens a territory of research that seems unlimited and always subject to progress. The challenging task of analysing online communication and the digital genres that appear as a result of the diversification of this process provide us with opportunities to discover linguistic and rhetorical innovations.

The role of communicators

As concerns the “groups of actors”, as they are called by Létourneau (2018, p. 268), meaning the communicators who take the responsibility of engaging with the public, these are journalists, “professional communicators” belonging to companies, government agencies or other public organizations, groups of researchers with certain social or professional status in domains that are connected to science, technology, methods and approaches (Létourneau, 2018, p. 260). Another group of communicators comprises scientists themselves who can set up networks for the purpose of making known aspects of their work and the outcomes they achieve (Létourneau, 2018). Scientists as communicators have raised the most questions and discussions among analysts in this area of inquiry. Their public activity, meaning the engagement with the masses of people, especially non-specialists, with the purpose of sharing scientific findings with them, has been analysed and conclusions have been drawn. This activity has been scrutinized from the professional angle, of the content delivered, but also from the interpersonal angle, concerning the type of relationship scientists have managed to build with the parties involved in all this process.

Similarly to Létourneau (2018), Sara K. Yeo and Dominique Brossard (2017) emphasise the “linear” evolution of the act of communicating scientific outcomes to non-specialists. This line started from the journalists dealing with the science section. These obtained information from scientists and released it in “mainstream media”. They are the communicators of the more traditional way in which scientific results were brought to lay people. The latest media advances such as social networking technology and multimedia, search engines, make possible the more direct communication between “scientists and citizens” who can get involved in a dialogue in environments which are mediated (Yeo & Brossard, 2017, p. 262). Mike S. Schäfer (2017), however, mentions that the shift from traditional media to online and social media for science news is especially manifest among young age groups.

From Yeo and Brossard's (2017) research conclusions, it is clear that for the period 1999 – 2004 one cannot speak of a high frequency of such initiatives of scholars interacting with the media in order to make scientific findings known to broader audiences. As regards the type of communication journalists, for example, managed to have with scientists, it is described as tense until mid-2000, with the journalists' complaints regarding the scholars' attitude (Yeo & Brossard, 2017). The authors also refer to the view of the past (early 20th century) regarding the visibility members of the academia used to have through the media. The more appearances they had, the more rejected they became within the respective professional community. This mentality could be related to the corresponding era in which the boundaries of a social or professional category were strict and no outside people were allowed to cross them. It can be understood that keeping themselves away from the public eye helped

with the aura surrounding them. The distance between scientists and the rest of the society marked and heightened their importance and even superiority.

After 2004, the relationship between the media and the scientific world has become more amiable and this has been seen as a sign that “the culture of science” had started to change (Yeo & Brossard, 2017, p. 264). They refer to a “cultural shift” that has been taking place ever since, and which is still under the influence of various factors (Yeo & Brossard, 2017, p. 264). Among these factors there is the scientists’ increasing awareness of the fact that they need communication training programmes with the purpose of boosting their confidence when making their research findings public. This requirement of undertaking communication training might be seen as one vector of change for what was earlier called “the culture of science” (Yeo & Brossard, *idem*). The meaning of science here is the people doing science, the ones who are trying to work on their mentality and attitude in relation to the media and to the wider world. More openness is desired of them with a benefit for the broad public, who would gain more access to scientific content.

There are even higher expectations of scientists as regards their contact with the public at large. For example, it is believed that it would be useful if people knew about the insights of research work and what it implies. People should be allowed to see what is behind the final result in a statement of recognition towards science. This is thought to generate more awareness of the importance of science, more interest and attention on behalf of masses, and at the same time to boost the general level of knowledge, all of which can shape the public attitude regarding scientific issues (Létourneau, 2018, p. 258). Ryan McCarty (2021) is another author that stresses the importance of “demystifying the process of research” to “help non-scientists understand the work of the discipline more broadly”, in such a way that scientific information is not lost (p. 151).

Another feature that is to be expected of the “producer” of knowledge or of science communication is that of “care” (Felt & Davies, 2020, p. 23). It is the authors’ opinion that emotional involvement in what they create in this area of inquiry is important and contributes to opening the field and stimulating questions about it. The exact “act of care” that is understood here is one for “specific matters for (public) concern” (Felt & Davies, *idem*), “an intervention that opens up particular topics to wider debate, allowing us to question what has seemed unquestionable” (Felt & Davies, *idem*). This is the essentially human nature that is attached to the interpretation of the science communicator and given significance to. Just like in all fields, the degree of personal involvement in professional matters is an issue of measure. It has to be allowed according to the benefits it brings and the boost it triggers to the quality of the work done. It is, nevertheless, an important factor to consider, especially since the final result of the activity of science communication is to inform people, and thus allow their lives to improve accordingly. Therefore, it is about a sphere in which people take action for people, so a complete separation of the personal level from the professional one is virtually impossible.

After these considerations and the selection of opinions from specialists, one could still ask themselves whether the institution of the communicator has a significant impact on the way science information is presented and on people’s perception of scientific findings. The print of the voice which designs the shape of science news cannot be denied. It is recognizable in the form of expression, the choice of pieces to focus on, the side taken, and the attitude towards what is being said. However, the voice is the end point where several important factors in the respective context have already exerted their role. The voice is the reflection of all contextual aspects that interfere with the process and purpose of science communication. It is the “heterogeneity” that Felt and Davies (2020) speak about, meaning the “voices or positions” that are comprised in the particular context in which the communication takes place (p. 14).

The two authors provide an example to illustrate how the communicator’s perspective dictates the form of the science content presented to people and the thread by which it is built. The case exemplified is that of obesity (Penkler et al. *qtd.* in Felt and Davies, 2020, p. 19), seen in a negative way and outlined as a weak point to be dealt with by obese individuals themselves. Pushed forward as “a threat to society”, with the invitation for the sufferers to join the fight for the “collective good”

(Felt & Davies, 2020, p. 19), the medical problem is approached moralistically and accounted for by incorrect lifestyles. In the authors' eyes, this position means that much remains unsaid about this condition and the public is directed towards considering it "illegitimate" (idem, p. 22). It is a matter of responsibility taken by the sender of the message in shaping public views on health issues.

The case presented above might be an example of attitudes dictated by various reasons for which science becomes an instrument of achieving objectives parallel to its nature and aims. This is the reason why other researchers, such as Hodges et al. (2021), Schäfer (2017), Létourneau (2018), to mention just a few, pose the problem of academic findings that are ethically or less ethically used, appropriately or inappropriately made public, positively or negatively manipulated in educating society. The impact of science communication at the societal level goes hand in hand with the intentions of the entity that is communicating, more exactly the former becomes the result of the latter. All this justifies scientists' frequent reactions to and worry about the accuracy of science reporting when it is done by other institutions, organizations or individuals, separate from the scientists' community or the academic environment.

A more diverse combination of actors is seen as recommendable by Felt and Davies (2020) among other authors. The suggestion of hybrid forums might be one solution to obtaining a more realistic, multiple-sided report, especially when essential issues are being debated, issues that address a large number of people and can have a major impact on the quality of life in general. Once they have reached the public space through articles or conferences, scientific results that are part of the message transmitted are often referred to as "scientific facts" (Felt & Davies, 2020, p. 10). This phenomenon reflects the reliability of scientists, their perceived status as authorities establishing what can become an element of the scientific patrimony and what cannot. This supports the idea that care and responsibility are absolutely necessary when deciding what and how to release to the public sphere. It could also come to the aid of the suggestion Scheufele et al. (2017) made about scientists being the ones to explain scientific matters to the broad public, relying on their popularity and expertise.

Bringing to attention the movement of open science, i.e. science made more accessible to non-specialists, especially when this action is performed by specialists themselves, Yeo and Brossard (2017) identify a new scientist profile that adapts to the current trends and accepts that the separation lines between the scientific environment and ordinary people's lives are melting. What can be added is that the culture of science, like all other aspects of study, education and any other social dimension, is subject to the same historical evolution and alteration process according to the development of technology and society, adjusting its perspectives to new realities and demands of people. In line with the above-mentioned authors, Schäfer (2017) also stresses the idea that scientists have started becoming aware of the importance of making themselves available to the public and of building an image that people can associate with the content of scientific knowledge.

The world of science represents a whole if it is analysed in its entirety, meaning scientists in all fields, research work, achieved results and outcomes, research spaces and many more, but it can also be broken into separate pieces, according to areas of study taken individually. From this point of view, it could be understood that there are micro-environments within the larger boundaries of all of them taken together under a single umbrella. Each field of research can adjust the general norms of conduct, morality, attitude to the specificity of the respective piece. Therefore, within the broad lines of academia, distinct micro-worlds can exist. With regard to this aspect, Yeo and Brossard (2017) write that "there are different outlooks and cultural dispositions toward science within various scientific disciplines that influence how and why these scientists participate in communication activities" (Salmon et al. qtd. in Yeo & Brossard, 2017, p. 267).

With such conclusions, the authors are making an obvious connection between the type of environment scientists develop and perform in and the activity of communicating scientific findings to the lay public, bringing one more proof that it is definitely possible to talk about influences between these two factors, the environment and the communicator. The environment of each discipline encompasses the attitude, behaviour and approach of the group of specialists who belong to a

particular field of research. In other words, one can speak of a professional sub-community whose members distinguish themselves from other similar communities by the way they view the contact with the world outside their field and the action of revealing the results of their work by becoming themselves the communicators.

Conclusions

It is the obvious reality that the world has turned digital in the past decades and the more obvious assumption that it will continue to do so in the future. The specific elements of the scientific environment will inevitably take part in constructing any new shape of the world of the future by adjusting to it. As a result of the impressive diversification of approaches in the domains of research and communication, theories have become interdependent, creating a space of multidimensional understanding and knowledge. This is true especially in this era of globalization and uniformity, when barriers and distinctions are increasingly fading away, no matter if it is about people and their attitudes, science and technology and their impact on society or other such matters or fields. One cannot speak of communicators and environments of science communication as two parallel lines which only sometimes come across each other for then to find their separate ways again. On the contrary, they shape each other and their symbiosis leads to a coordinated structure of the phenomenon of making scientific outcomes known to people. The final result of an instance of science communication brings together the voice that gives it a written or spoken form, the cultural heritage of those contributing to and performing the act of communicating science, the contextual element and the larger environment that frames it all.

References and bibliography

Felt, U. & Davies, S. R. (Eds.). (2020). *Exploring Science Communication: A Science and Technology Studies Approach*. (pp. 3-25). Sage Publications.

Hodges, S. D., Lieber, S., & Denning, K. R. (2021). Where Perspective Taking Can and Cannot Take Us. In: Kramer, O. & Gottschling, M. (Eds.). *Recontextualized Knowledge: Rhetoric - Situation - Science Communication*. (pp. 17-37). De Gruyter.

Létourneau, A. (2018). Science Communication Ethics: A Reflexive View. In: Priest, S., Goodwin, J., & Dahlstrom, M. F. (Eds.). *Ethics and Practice in Science Communication*. (pp.1-15). University of Chicago Press.

Luzón, M. J. & Pérez-Llantada, C. (2022). Wider Audiences and New Practices in Academic Communication in the 21st Century. *Channel View Publications and Multilingual Matters Blog*, 16 August 2022. <https://channelviewpublications.wordpress.com/2022/03/17/wider-audiences-and-new-practices-in-academic-communication-in-the-21st-century/>

McCarty, R. (2021). “Where Does the Science Go?” An Ethnographic Study of Chemistry PhD Students Learning Science Communication Genres. In: Muresan, L.-M. & Orna-Montesinos, C. (Eds.), *Academic Literacy Development: Perspectives on Multilingual Scholars’ Approaches to Writing*. (pp. 143-161). Palgrave Macmillan.

Pérez-Llantada, C. (2016). How is the digital medium shaping research genres? Some cross-disciplinary trends. *ESP Today. Journal of English for Specific Purposes at Tertiary Level*, vol. 4 (1). 22-42.

Schäfer, M. S. (2017). How Changing Media Structures Are Affecting Science News Coverage. In: Jamieson, K. H. et al. (Eds.). *The Oxford Handbook of the Science of Science Communication*. (pp. 50-59). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190497620.013.5>. Accessed 23 November 2022.

Scheufele, D. A., Jamieson, K. H., & Kahan, D. M. (2017). Conclusion - On the horizon: The Changing Science Communication Environment. In: Jamieson, K. H. et al. *The Oxford Handbook of*

the Science of Science Communication. (pp. 461-468). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190497620.013.49>. Accessed 23 November 2022.

Yeo, S. K. & Brossard, D. The (Changing) Nature of Scientist – Media Interactions: A Cross-National Analysis. In: Jamieson, K. H. et al. (Eds.). *The Oxford Handbook of the Science of Science Communication*. (pp. 260-272). Oxford University Press. <https://doi.org/10.1093/oxfordhb/9780190497620.013.29>. Accessed 23 November 2022.

Pérez-Llantada, C. [@carmenpll2016]. (2022, June 22). *More thoughts on genres and digital science, this time with a focus on wider audiences and science dissemination practices on the Internet.* [Tweet]. Twitter. <https://twitter.com/carmenpll2016/status/1541020872869388289>.

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