

A communication of science model for institutes of scientific research

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Abstract

In a democratic society, citizens must be informed of the latest scientific advances so that they can participate in the debates about the trends science will follow, its applications, its benefits and its risks. Science communication benefits not only individuals who have no direct contact with scientific research, but also scientists themselves. It is important that the latter communicate their projects and discoveries. However, most scientists find communicating their results to the general public to be complicated and frustrating. Because of this in the last few years, Mexican institutes of scientific research have started opening communication of science offices. This is very important for a country like Mexico, where scientific research is often funded with citizens' taxes. This is the case in the National Autonomous University of Mexico (UNAM).

The problem of how to carry out communication of science actions within these offices in a multicultural country can be very complicated. Hence, in this paper I am proposing a communication of science model for Mexican science institutes that I am implementing in the Communication of Science Unit of the Nuclear Sciences Institute of the National Autonomous University of Mexico.

Introduction

In a democratic society, citizens must be informed of the latest scientific advances so that they can participate in the debates about the trends science will follow, its applications, its benefits and its risks. However, the journey taken by scientific information, which travels from within the institutes where it is generated to the members of general audiences, can be tortuous.

Science communication benefits not only individuals who have no direct contact with scientific research, but also scientists themselves. It is important that the latter communicate their projects and discoveries. However, most scientists find communicating their results to the general public to be complicated and frustrating. Because of this, many institutes and research centres around the world have created communication of science offices, which are in charge of informing society about the main accomplishments of their institutions.

In the last few years Mexican centres and institutes of scientific research have started opening communication of science offices. This is very important for a country like Mexico, where scientific research is mostly funded with citizens' taxes.

After studying the models used by some of these offices around the world and in Mexico, I am proposing a communication of science model that promotes dialogues between members of scientific communities and individuals who belong to different cultural groups.

Communication of Science Offices

Communication of science offices are not something new for research institutes in Europe or in the United States of America. Most of these offices are created to inform the citizens about the recent accomplishments of their institutions and to persuade people of the value of science. Hence, their activities usually are modelled within the deficit model. This is not surprising

since communication of science offices are created within scientific communities, who are concerned about the lack of public support for science.

An example of this offices is the Public Information Office which was created when The National Aeronautics and Space Administration (NASA) was formed in 1958. It was led by Walter T. Boney, and followed the traditional objectives of a press office:

Bonney saw his mission in traditional public information terms —producing speeches, news releases and special reports, answering incoming queries, preparing Congressional budget presentations and internal publications. Although he foresaw a growing need for service to the educational community, he limited his efforts to explanations of NASA's activities without much attention to providing background material on space science (Lewenstein, 1993: 251).

From the beginning of the Public Information Office, NASA followed a propagandist approach to communicate the activities of the agency, exemplified by the broad media coverage of the first man to walk on the moon in 1969. In this case, public understanding of space science was equivalent to public appreciation of NASA's work. Currently, NASA has several programs to communicate science in different media: web pages, blogs, social networks, and exhibitions among others, which follow different communication of science models.

Another interesting example is the Communications Office of the European Organization for Nuclear Research (CERN), which was created in 1954. According to CERN Communications Group, the main objectives of the office are the following:

The communications group works to increase awareness and to foster support for CERN activities; to promote the interaction of science with society. Their mandate is working with a number of key target audiences to generate public

engagement in science, to produce and distribute information, to foster community building and to build support for CERN and its missions.

As in NASA's case, the objectives of this office correspond to the deficit model. Creating awareness of the relevance of experiments carried out in CERN among the stakeholders and the members of the European Union is extremely important to the laboratory to obtain resources to maintain expensive experiments such as the Large Hadron Collider (LHC). Hence, most of the Office's actions are directed towards publicizing the laboratory's accomplishments rather than promoting a deeper understanding of science. An example of this is the press release published on the 4th of July 2012, which announced the discovery of the Higgs boson with the following headline: "CERN experiments observe particle consistent with long-sought Higgs boson". This press release contained several technical terms, incomprehensible for general audiences: "We observe in our data clear signs of a new particle, at the level of 5 sigma, in the mass region around 126 GeV. [...] The results are preliminary but the 5 sigma signal at around 125 GeV we're seeing is dramatic. This is indeed a new particle. We know it is the heaviest boson ever found".

In the former example is clear that the deficit model was used to communicate the Higgs particle discovery: the press release is not concerned with the public understanding of the subject but with spreading the news of the discovery.

In Mexico, most science communication offices in research institutes and centres have also carry out actions that use the deficit model as a framework. In the National Autonomus University of Mexico, the largest in Latin America, the first communication of science office within a scientific institute, was opened in Institute for Biomedical Research in 1995, which had as main objective "informing the members of the Institute and of the University, as well as the general public, about the actions, advances, accomplishments and challenges of the Institute in the fields of biomedical

research and experimental biology” (Frías, 2014: 1). In 2004, a communication of science office was created in the Astronomy Institute, with a persuasion strategy with the objective of “socially inducing positive beliefs and conducts towards scientific culture, with all the media and resources available” (Frías, 2014: 1). In 2008 a Communication of Science Unit was opened in the Nuclear Sciences institute of which I am the head. Its main goal is to communicate the results of research carried out in the Institute to different cultural groups. As most projects of this kind the office was born with the deficit model as a framework. However, nowadays the practical actions of the office are based on theoretical research – from the philosophical, anthropological and sociological point of view – that is carried out in this Unit. This research also includes ethnological studies of the communication of science offices that belong to institutes of scientific research around the world, such as NASA, Gran Sasso Laboratory, Perimeter Institute and CERN among others. These studies showed the need of proposing a communication of science model to promote meetings in which scientific communities can engage in dialogues about science with members of different cultural groups.

Communicating science: from the institute to society

The first actors that meet in the communication of science processes are scientists and professional communicators of science. Usually, scientists are sure that experts in communication are not going to understand the complexity or importance of their work. On the other hand, some communicators of science find scientists to be arrogant, or difficult to approach. The next encounter that takes place is that of scientists and/or communicators of science with different audiences. Usually, those scientists who are willing to communicate their work during fairs or public lectures are convinced that people will not understand them, even when they prepare their presentations according to the audience they think they will address. Even more worrying is the fact that the members of those audiences believe

themselves to be incapable of understanding what scientists or communicators of science will present, even before the event begins.

A Dialogue Model

The objective of the model proposed in this work is to promote dialogical processes between scientific communities and social actors that belong to different cultural groups.

This process begins when the members of the communication of science office of an institute create conditions that are conducive to a dialogue between members of a scientific community and members of different cultural groups, who are not scientists.

In order to have a common ground for the conversation, there has to be a stage where actors who do not belong to the scientific communities learn the basic definitions of the subject that will be discussed. This stage is crucial since usually there is an epistemic asymmetry between scientists and non-scientists. This asymmetry can cause a feeling of vulnerability among the latter, as Carina Cortassa comments:

A normal recurrent worry of the members of the general public is derived from the correct perception they have of a high degree of vulnerability of the place he or she occupies, and of being aware that he or she occupies a vulnerable position, and realizing his or her incapability of judging, in an autonomous way, the epistemic value of a scientific proposition or of the reasons presented on his behalf. In such circumstances, the asymmetry would reduce its options to believing or not believing the things that experts assert (Cortassa, 2010: 161).

Hence, at the beginning of the process the members of the communication of science office act as mediators between the actors that participate in the process of dialogue, helping to reduce the linguistic and conceptual incommensurability among them by making scientific information accessible

to all participants. Usually, during this stage, either scientists or communicators of science have to carry out a one-way transmission of information problem. This activity corresponds to the Deficit Model. Even if this stage seems to contradict the idea of a Dialogue Model, the two models can be complementary. According to Brian Trench, “when we consider the deficit-dialogue relationship carefully, we can see circumstances in which the “old” way can have a legitimate place, after it has been weighed up with due care” (Trench, 2008: 128).

It is important to point out that the model acknowledges multiculturalism, both in the scientific community and in society. In his book *Multiculturalism and Pluralism*, the Mexican philosopher of science León Olivé comments that “it is possible that the world - views of different cultures are incompatible and that the members of those cultures live in different worlds. However, they can still act in a rational way and reach agreement” (Olivé 2000, p. 77). In this context, the dialogue model of communication of science does not only focus on the scientific topic, but on shared concerns between the communities involved in the communication of science processes.

Once the participants on the communication of science process share common definitions and information about the subject that will be discussed – which can be proposed by members of the scientific community or by non-scientists– the goal is to reach an understanding, in the terms proposed by Jürgen Habermas in his book *The Theory of Communicative Action*:

Processes of reaching understanding aim at an agreement that meets the conditions of rationally motivated assent to the content of an utterance. A communicatively achieved agreement has a rational basis; it cannot be imposed by either party, whether instrumentally through intervention in the situation directly or strategically through influencing the decisions of opponents. Agreement can indeed be objectively obtained by force; but what

comes to pass manifestly through outside influence or the use of violence cannot count subjectively as an agreement. Agreement rests on common convictions. The speech act on one person succeeds only if the other accepts the offer contained in it by taking (however implicitly) a “yes” or “no” position on a validity claim that is in the principle criticisable. Both ego, who rises a validity claim with his utterance, an alter, who recognizes or rejects it, base their decisions on potential grounds or reasons (Habermas, 2010: 332).

Hence, the actors who do not belong to scientific communities, will only appropriate scientific knowledge if they are part of a cooperative process of interpretation which aim is obtaining a number of definitions of the situation that can be recognized in an intersubjective way.

It is important to point out that when using this model, all the participants go through epistemic, axiological and linguistical transformations. The process of appropriation of science involves critical thinking from those who do not belong to scientific communities. This model promotes a transformation in the practices that are related to science and technology of the individuals, which participate in the dialogue process.

In the Unit of Communication of Science of the Nuclear Sciences Institute of UNAM we have started creating practical communication of science actions using this model as a framework, with positive results.

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