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RESPONSIBLE SCIENCE COMMUNICATION
ACROSS THE GLOBE

Responsible science communication in Latin America: reflections on challenges

Claudia Aguirre Rios and Sergio de Regules

Abstract

Practitioners of responsible science communication in Latin American countries face context-dependent challenges ranging from high poverty and inequality to a public from an extremely varied palette of cultural backgrounds. Effort has been done in the region to foster a coherent community of science communicators. This article reflects on the history of science communication in Latin America and how these challenges are being faced.

Keywords

Science communication in the developing world; Science communication: theory and models

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Introduction

In 1681, Carlos de Sigüenza y Góngora, a scholar born in New Spain (present-day Mexico), published a book titled *Manifiesto filosófico contra los cometas despojados del imperio que tenían sobre los tímidos* («A philosophical manifest against comets deprived of their power over the timid»). A comet had recently appeared and Sigüenza wanted to reassure his readers, arguing that comets posed no threat. Neither he nor anyone at the time knew what comets actually were, but Sigüenza was an early advocate for the separation of the developing field of scientific astronomy from astrology, the unsubstantiated claim that heavenly events have a mystical influence on earthly affairs. Sigüenza quoted such figures as Copernicus, Galileo, and Kepler to make the point that comets are not harbingers of calamity [Sigüenza y Góngora, 1681].

In their article in this issue of *JCOM*, Gary Kerr and Lindsay Keith establish a parallel between science communication and sports-for-development programs (S4D). They argue that, just as the goal of S4D is not to benefit the sporting world but the public (by promoting health), so science communication ought to focus on benefits to the individual, not to science. Carlos de Sigüenza y Góngora was one of the first science communicators in the Americas, and it is interesting to note that

his work at this early period was already an example of science communication as a service to the public.

Today, allaying fears caused by natural phenomena such as comets, earthquakes, and volcanic eruptions continues to be part of the job of science communicators in Latin America (and indeed everywhere else). But the purview of science communicators has extended considerably since the time of Sigüenza to include helping the public keep up with scientific advances, reporting on scientific activities to promote accountability and public participation in decision-making, brokering scientific information related to public health, promoting critical thinking, and showing how science meshes with the rest of culture.

Responsible science communication in Latin America puts the practitioner up against context-specific challenges, such as high poverty indices, unequally distributed access to high-quality education, high crime and insecurity, the continued influence of religion on health issues such as birth control and abortion, and official opposition to science, to say nothing of more global problems, such as the proliferation of fake news.

The Latin American practitioner faces additional challenges. In a region with typically deficient state education systems, science communication is often required to serve as a complement, or even at times a substitute, to formal education in science, a role for which it is ill-suited [see, for example, Baram-Tsabari and Osborne, 2015] Furthermore, there is the question of catering to publics from a variety of cultural backgrounds, often speaking languages other than Spanish or Portuguese, the dominant languages in the region. Even before the practitioner encounters this problem, there is the difficulty of communicating research that was originally published in English, even when it was locally produced.

Rallying efforts

There are records of science communication activities in Latin America for at least 250 years [see Massarani et al., 2015] other than the efforts of Carlos de Sigüenza y Góngora. In particular, the independence movements in the 1800s and 1900s attracted well-known naturalists (such as Alexander von Humboldt), who helped spread the scientific work that was being done in this part of the world.

During the 20th century, even as some countries in Latin America were under dictatorships (Argentina, from 1966 to 1973; Brazil, from 1964 to 1985; Chile, from 1973 to 1990; Uruguay, from 1973 to 1985) with broad negative repercussions on their social, economic, educational and scientific life, a strong educational movement attempted to keep critical thinking alive, as well as to guarantee inclusiveness in the Latin American population to face the socio political context.

One important milestone in rallying disperse efforts towards science education and communication in Latin America was the creation of RedPop, the Network for the Popularization of Science and Technology in Latin America and the Caribbean, in November 1990, by UNESCO's regional bureau initiative during a meeting in Sao Paulo (Brazil). The aim was to give visibility, relevance and continuity to an innovative educational movement which arose in several countries in Latin America during the 1960s [Massarani et al., 2015]. The idea was not only to improve science education in schools, but also to increase scientific literacy in the population by using tools such as science centers, as well as printed and broadcast

media. Science communication activities were called in to play the role of a complement to the educational system. In many countries, however, the impetus of science communication fell short of what was needed to face the science and technology challenges of the 20th century.

As several papers presented in this issue of *JCOM* suggest, representativeness and inclusion are key elements in science communication. As in other parts of the world, Latin American science communicators have tried to achieve these goals in the past 60 or 70 years through the development of science centers, publications, activities and projects in different contexts, including science communication in indigenous languages. Challenges remain. Responsible science communication in Latin America requires that we address the many socio economic issues that plague the region, and come to terms with the cultural diversity that characterizes our public.

The spirit of the times

RedPOP has promoted several initiatives. From universities to science centers; from citizen initiatives to governmental decisions, many measures are being developed that demonstrate the efforts to foster scientific literacy in Latin American populations. The level of citizen engagement and participation is very variable. Nevertheless, very successful participatory methods have been developed in Latin America and they have resulted in improving the quality of life of a number of communities.[1]

Governmental and scholarly institutions have participated in the proliferation of those initiatives: UNESCO for all Latin America, UNAM in México, the Science and Technology Ministry in Argentina, Colciencias in Colombia (which afterwards became also a Ministry of Science and Technology), the CNPQ in Brasil, the CONICYT in Chile (that also became a ministry), among others.

Following the spirit of the times, museums and science centers of all sizes and budgets appeared throughout the region between the 1980s and the 2000s, frequently supported by governments, but also as local initiatives. These museums and science centers are often located within low-income communities, where, in addition to science-based entertainment and informal education, they may provide shelter and time away from hazardous environments.

When worldviews collide

Latin America is a melting pot (or even a melting pot of melting pots). The many indigenous pre-columbian peoples of the Americas merged with African and European cultures to create a new world of colliding visions. This diversity of worldviews poses particular challenges for science communication. How to bring about the meeting of perspectives? Are these perspectives complementary, or contradictory? How to deal tactfully and respectfully with ancient practices that can be deleterious to health or safety?

[1] See, for instance, "Voces de mujeres" https://vimeo.com/170799097 a documentary about a research group that worked with a group of women in a poor community in Cali, Colombia, to improve the watering system in their neighborhood. Nowadays, it is the group of women who administer the water and deal with technical issues for their community. Another example is the creation of a productive community garden led by a science center and a group of local leaders in Medellin: https://www.astc.org/astc-dimensions/a-science-center-and-a-community-cultivating-hope-and-resilience-in-medellin/.

In a personal communication, a group of Mexican biologists once told one of the authors the following anecdote. When the group visited a remote community in the mountains to explain how bacteria spread and cause disease, their first approach was to "just show them the science". So they set up microscopes for the locals to see the bacteria with their own eyes. Later, when they asked the attendees for their thoughts, the researchers realized that their audience had interpreted what they saw in ways inconsistent with science, but consistent with their own worldview. "Just showing the science" had failed, as it often does. The researchers then changed their approach to a more dialogical one, where the locals and the scientists compared worldviews in a non-judgemental and convivial atmosphere.

This being said, acknowledging indigenous worldviews without imposing the views of modern science is a problem that has not yet been solved.

Reappraising our scientific heritage as a tool for science communication

Contributions to mainstream science from Latin America are scarce compared to countries with a well-established scientific tradition, but they are not necessarily negligible [see, for example, Nepote, 2021]. These contributions are, however, almost invisible, not only abroad, but in the very countries of their origin. Several factors are at play here. On the one hand, Latin American society's interest in science and innovation is historically lukewarm. This may well be a heritage from our Spanish ancestors, as exemplified by Spanish novelist Miguel de Unamuno, who famously said «let other nations dabble in invention, and let us profit from their efforts.» Societal indifference extends to official policy: governments in the region do not see the need to invest in science and technology, as some have even actively attacked scientific research in recent times (Chávez and Maduro in Venezuela, Bolsonaro in Brazil, Morales in Bolivia, and López Obrador in Mexico) [Chávez, 2019].

In spite of obstacles, there have at all times been individuals who pursue science. That their contributions are not better known is not only due to their scarcity and relatively low impact. It is also a reflection of deep-seated prejudice among scholars from Europe, and later the United States, against scientific advances emanating from «periphery» countries [Salager-Meyer, 2008]. Juan Nepote [2021] recounts the story of the Spanish-born Mexican scientist and engineer Andrés Manuel del Río, who in the early 19th century studied the properties of a novel mineral found in Zimapán, Mexico. Del Río concluded (correctly, as it would later turn out) that he had discovered a new chemical element. He sent his report to his friend Alexander von Humboldt for validation. Von Humboldt was wary. He thought Del Río's mineral was actually just chromium. With this in mind, he sent the report to a specialist in Paris, who, perhaps influenced by Humboldt, was prompt to conclude that Del Río had in fact discovered nothing. Decades later, the Swedish chemist Niels Gabriel Seftröm was credited with the discovery of the element now called vanadium. Disdain for science from developing countries is still widespread, as Françoise Salager-Meyer shows [2008] and anecdotes tend to confirm.

Moreover, science played an important role in the liberation process of some countries in Latin America. In Colombia, for instance, a 30-year botanical expedition inspired feelings of identity which propelled the independence of the country. The expedition was approved by king Charles III of Spain and led by José Celestino Mutis, a Spanish priest who was also a botanist, mathematician and

teacher. It took place in the territories of New Granada,[2] covering not only Colombia,[3] but also Ecuador, Panama, Venezuela, Peru, northern Brazil and western Guyana. As a result, a new generation of intellectuals conceived hope for a prosperous future in an independent new republic, based on the wealth and resources discovered by the expedition. Among the *criollos* (people born in the Americas to European parents) who stood out in this great expedition are Francisco Antonio Zea, Francisco José de Caldas, Pedro Fermín de Vargas, Jorge Tadeo Lozano and José María Carbonell. All of them subsequently took part in the liberation process.

Showcasing the scientific heritage of our countries may help alleviate the type of scholarly prejudice discussed earlier, but, more importantly, it could help kindle in our public a sense of pride and of confidence in their people's scientific creativity. One must be careful, however, to avoid a pitfall identified by French sociologist Clémence Perronnet [2019]. In an interview in the online magazine *Actualité École de la Médiation*, Perronnet warns that holding up models of scientific creativity in marginal societies for admiration could convey the idea that simply having the will to accomplish things is enough, as if there were no other serious impediments to science and innovation in the region.

Eliciting trust

Communicating the methods of science is as important as communicating its results, and sometimes more so. This was clear during the pandemic. An important result that needed to be conveyed to the public was that viruses cannot be killed with antibiotics. The public needs to know this in order to make better health and hygiene decisions. In a case such as this, it may be enough to communicate the facts. However, managing the pandemic also required the public's trust in the science behind vaccines, for example. In order to achieve this, the public needed to understand how scientists deal with uncertainty and probability, a question more of method than of results — what does it mean for a vaccine to be 96% effective in preventing hospitalization, and why is it impossible to raise that number to 100%? Trust in science — which is fundamental to enlist the cooperation of the public in matters of health — is better elicited by showing how science works than by listing facts. The responsible practitioner has to choose which way to go on a case-by-case basis.

Conclusion

Science has been "practiced in very much the same ways for a long time in all countries [...], but communication is culturally differentiated", said Brian Trench in his inaugural address during the PCST 2021 conference. Responsible science communication in the Latin American context is a good example. Aside from the matter of language, the particulars of the region's public and necessities require special strategies, some of which we have discussed in this article.

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[2] https://en.wikipedia.org/wiki/Viceroyalty_of_New_Granada.
[3] https://en.wikipedia.org/wiki/Colombia.

References

Baram-Tsabari, A. and Osborne, J. (2015). 'Bridging science education and science communication research'. *Journal of Research in Science Teaching* 52 (2), pp. 135–144. https://doi.org/10.1002/tea.21202.

Chávez, V. (12th August 2019). 'AMLO castiga y ataca a la ciencia como a la salud, acusan científicos'. *El financiero*. URL: https://www.elfinanciero.com.mx/nacional/amlo-castiga-y-ataca-a-la-ciencia-como-a-la-salud-acusan-cientificos/.

Massarani, L., Aguirre, C., Pedersoli, C., Reynoso, E. and Lindegaard, L. M. (2015). 'RedPOP: 25 years of a Science Communication Network in Latin America'. [RedPOP: 25 años de Red en Comunicación de la Ciencia en América Latina]. *JCOM* 14 (03), Y06. https://doi.org/10.22323/2.14030406.

Nepote, J. (2021). Museo portátil del ingenio y del olvido. Guadalajara, Mexico: Editorial Universidad de Guadalajara.

Perronnet, C. (19th December 2019). '[Point de vue] Inclusion : rencontre avec Clémence Perronnet «Il ne faut pas changer les publics mais changer les contenus culturels scientifiques»'. *École de la médiation*. URL: https://www.estim-mediation.fr/point-de-vue-rencontre-avec-clemence-perronet-il-ne-faut-pas-changer-les-publics-mais-changer-les-contenus-culturels-scientifiques/.

Salager-Meyer, F. (2008). 'Scientific publishing in developing countries: Challenges for the future'. *Journal of English for Academic Purposes* 7 (2), pp. 121–132. https://doi.org/10.1016/j.jeap.2008.03.009.

Sigüenza y Góngora, C. de (1681). 'Manifesto filosofico contra los cometas despojados del imperio que tenian sobre los timidos'. Reprinted 1957. URL: https://www.revistadelauniversidad.mx/download/453be1d6-612d-49d0-b050-efb559726e39?filename=manifiesto-filosofico-contra-los-cometas-despojados-del-imperio-que-tenian-sobre-los-timidos.

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