

Focus

Science and communication in Brazil: evolution, globalization, and contingencies

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The scientific institution in Brazil is marching to a good rhythm. Despite problems in funding (and in the very irregular distribution of such funds), universities and private research centers changed and grew over the last few years. In 1999, Brazil (whose external debt is over 50% of GDP), invested 0.87% of GDP in Research & Development: a percentage comparable to that of several Mediterranean countries. The number of persons who obtain a Master or PhD degree in Brazil has more than doubled in the last ten years. Scientific productivity has grown in parallel, with the number of Brazilian papers published in those scientific journals included in the Science Citation Index increasing 4-fold between 1985 and 1999, and their percentage over the world-total doubling: it surpassed 1% and it is still increasing (to have a comparative idea, France produces 5% of indexed scientific papers, India 1.5%, and China 1.7%).¹ Both public universities and private education institutions have created over the last five years new campuses throughout the country and multiplied their formative offers: new PhD and specialization courses are born almost every month. In a similar way, in the basic education area, the efforts made by the country (which is penalized by very low levels of literacy, especially when compared to those of countries with similar GDPs) are quite marked. Today, more than 95% of Brazilian children go to school. Even if data, as is often in Brazil, show a wide gap in development as a result of the discouragement represented by social injustice and racism,² there is no doubt that science is growing and that Brazilian researchers and research projects are receiving more and more international recognition.

Communication, a fundamental part of the science system, has progressed accordingly: both internal scientific communication and public communication of science and technology are growing in Brazil at a good pace.³ The SciELO (Scientific Electronic Library Online),⁴ for example, makes available on-line a remarkable corpus of Latin-American scientific journals. “The results of scientific research”, SciELO’s organizers write, “are mainly communicated and validated through publication in scientific journals. This is valid for developed and developing countries. However, scientific journals from developing countries face several distribution and dissemination barriers, which limit the access and usage of locally generated scientific information. SciELO [...] provides an efficient way to assure universal visibility and accessibility to their scientific literature, contributing to overcome the phenomena known as ‘lost science’. In addition, the SciELO model comprises integrated procedures for the measurement of usage and impact of scientific journals”.

Public communication of science is also intense and articulated both in private and public sectors.⁵ Many research institutions produce press-releases or even internet portals or magazines of popular science: the National Research Council of Brazil (CNPq) produces a news site;⁶ the Ministry of Environment has several scientific information or popularization services;⁷ the Ministry of Science and Technology funds a news agency⁸ and an on-line magazine⁹ and began to organize, this year, a national “science week”; the Brazilian Society for the Advancement of Science (SBPC) produces a daily newspaper (*Jornal da Ciência*,¹⁰ distributed on-line for free), a high level science magazine (*Ciência e Cultura*,¹¹ both printed and an integral, free version on-line), and a popular science magazine for teenagers and the general public (*Ciência Hoje*), which has also a version for children;¹² whilst FAPESP, one of the biggest public research funding institutions in Brazil,¹³ produces a remarkable publication: a science magazine that is directed not only to researchers but also to the general public and distributed in news-stands.¹⁴ Many other public research organizations have followed similar paths,¹⁵ as well as some NGOs linked to science or technology.¹⁶

Therefore, when we began to investigate if peculiarities existed within the systems and mechanisms of Brazilian science communication, it seemed to us that there were several. For example, the so-called “extension programs” give Brazilian universities (as also happens within other South American countries) an extra responsibility within the greater community. Whereas in Europe universities usually provide research and education, every university in Brazil, whether private or public, must have a third purpose, not only to do research and education, but also to make the “extension”, i.e. to provide useful social activities linked to the region and to the daily life of the communities living there. So it can happen, for instance, that professors of pedagogy have to teach not only their students, but must also organize, together with them, adult literacy courses for land-less peasants or for the citizens living in the *favelas* near the university. At the same time, students of medicine or odontology gain experience and practice providing free services to local communities, whilst students of journalism may produce newspapers or radio and television programs directed towards nearby communities. Others studying theater or arts may be involved in cultural activities for the city; whereas those from scientific faculties participate in science or environmental education activities, or in monitoring and reclamation work within the region, and so on. Thus, the osmosis between research and society is deep and intense, as it is in Europe, but perhaps more emphasized than we find here. It is more institutionalized and officially encouraged, and it is perceived socially as a necessity: a crucial feature of science communication in our times,¹⁷ i.e. its character of ineludible necessity for science itself as well as for society as a whole, appears here in all its strength, maybe more than in the north of the world.

Besides this, the growth in the number of institutions, both public and private, that are dedicating themselves to public communication of science or to science popularization, is also remarkable, not to mention the birth of different academic and non-academic groups interested in making research in these fields.¹⁸ The Brazilian Association of Science Journalists (ABJC),¹⁹ for example, organizes congresses on the public communication of science, and has started publishing a journal on this topic: *Ciência e Comunicação*.²⁰ The University of São Paulo (USP), one of the most important in Latin America, organizes post-graduation courses in science journalism, owns a center for the popularization of science and culture,²¹ a museum park of science and technology,²² and a research group that produces several publications, both popular and theoretical.²³ In S. André (near São Paulo), a big school park of science and arts is being built. At the University of Campinas (Unicamp), a Laboratory for Advanced Studies in Journalism (Labjor) organizes a master’s degree in science journalism and produces, with SBPC, an on-line science magazine.²⁴ The University of Rio de Janeiro (UFRJ) has a *House of Science*.²⁵ Private universities, such as the Methodist University of São Paulo (Umesp), are also very active. Researchers in several regions of the country produce journals and magazines about science and its relationship with communication.²⁶ Moreover, some science museums and science centers in Brazil provide a wealth of activities.²⁷ The Museu da Vida,²⁸ in Rio de Janeiro, for instance, hosts a research center directed to investigating public communication of science and relationships between science, politics and society. During the last carnival, we saw science in action together with samba.²⁹

In the context of such intellectual fervor, the debate on standard or alternative models of public communication of science also appears quite remarkable: Brazil entered relatively late into this arena, but has been quick to place itself in quite advanced theoretical positions, debating critical and complex points of view. In spite of this, as we will see in the next contribution, the practice of science journalism and popular science tends to be driven by dynamics that are similar to those already observed elsewhere. Two-stage³⁰ diffusion models, based on some types of “deficit” approaches, compete with other models to propose communication based more on social contexts or historical processes (contextual models), or to recognize the importance of local and lay knowledge (lay-knowledge models). Alternatively, they try to catalyze real democratic debate and engagement, and active participation of people in decisions of science and technology (participation models, or engagement models). Even these “global” modalities, in Brazil, take forms and trajectories in which local history contributes strongly, being marked by social representations and discourses about a “deficit” that is incorporated, or imagined, at different levels, and used for several different purposes.

In physics, it is well known that motion equations of material systems show very high levels of universality and generality and may assume very simple forms, but that initial conditions (or boundary conditions, depending on how we describe the system) determine the extraordinary variety in possible trajectories and evolutions of the system itself. In living systems, the Darwinian theory of evolution,

based on two conceptually quite simple elements (the variability associated to mutations and the pressure and necessities represented by natural selection) explains the amazing diversity of forms of life we observe on our planet: the variety in organisms and ecosystems show, at the same time, the universality of evolution and the crucial role played by the environment and historical contingencies. Cultural phenomena, of course, are different. But, *mutatis mutandis*, and taking into account that every analogy is weak (as a Latin aphorism says), we can use the metaphor of universal forces that give place to different trajectories in different conditions, to tell how social and cultural peculiarities of a country may be the result of the joint action of historical contingencies and local interest when they interact with global dynamics. The relationships between science, other social institutions, and the public in Brazil are, maybe, an interesting example in this sense. Brazilian science, which is growing and structuring itself in forms that are quite “post-academic”³¹ (linking S&T to big private capitals and network structures, showing a lesser clear distinction between pure and applied research, going toward more and more complex and pervasive public communication systems), is also showing interesting trajectories, in part specific to local context.

Revision by Prof. Mark Davison.

Notes and references

- ¹ See, for instance, the S&T indicators published by Fapesp: <<http://www.fapesp.br/indct/indica.htm>>
- ² Five million children have to work in Brazil. In several *favelas* of the country, homicide is the first cause of death for children and teens. In a country in which 45% of people declare themselves black or mulatto, 98% of university professors are white. 70% of the 22 million people under the poverty line are black. Brazil is in 54th position in the human development index (HDI). But the index for the white population only is equivalent to that of Kuwait (46th position), while that for the black population is similar to that of El Salvador (107th in the list).
- ³ See, for example, L. Massarani, “Challenges for science communication in Latin America”, *SciDev*, 12 July, 2004. <<http://www.scidev.net/Editorials/index.cfm?fuseaction=readeditorials&itemid=121&language=1>>
See also the comments section in the “e-guide to science communication” published by *SciDev*: <http://www.scidev.net/ms/sci_comm/index.cfm?pageid=297>
- ⁴ <<http://www.scielo.br/>>
- ⁵ Some of the major popular science magazines in the country are *SuperInteressante* (<<http://super.abril.com.br/super/>>), *Galileu* (<<http://revistagalileu.globo.com/>>), the Brazilian version of *Scientific American* (<<http://www2.uol.com.br/sciam/>>). For a detailed list, see for example <<http://www.abjc.org.br/links/conhecimentos.htm>>
- ⁶ <<http://www.cnpq.br/noticias/index.htm>>
- ⁷ <<http://www.ibama.gov.br/>> e <<http://www.mma.gov.br/index.cfm>>
- ⁸ <<http://agenciact.mct.gov.br/>>
- ⁹ <http://agenciact.mct.gov.br/index.php?action=/content/view&cod_objeto=12561>
- ¹⁰ <<http://www.sbpnet.org.br/publicacoes/jciencia.htm>>
- ¹¹ <<http://cienciaecultura.bvs.br/>>
- ¹² <<http://www2.uol.com.br/cienciahoje/ch.htm>>
- ¹³ In 1989, the new constitution of São Paulo State, established that FAPESP should receive every year at least 1% of the state income.
- ¹⁴ <<http://www.revistapesquisa.fapesp.br/>>
- ¹⁵ In Minas Gerais state, for example, the state funding agency produces the magazine *Minas makes science*: <<http://revista.fapemig.br/>>
- ¹⁶ For example (but there are many more) see: <<http://www.socioambiental.org/>>
- ¹⁷ P. Greco, “Communicating in the post-academic era of science”, *Jcom*, Vol. 1(1), 2002. In: <<http://jcom.sissa.it/editorial/edit0101.pdf>>.
- ¹⁸ For useful links on science journalism and science communication projects in Brazil, see: <<http://www.prossiga.br/divulgaciencia/>>, <<http://www4.prossiga.br/museus/asp/SaidaCat.asp?cod=7&codintermed=31&id=port>>
- ¹⁹ <<http://www.abjc.org.br/>>
- ²⁰ <http://www.jornalismocientifico.com.br/rev_artigos.htm>. The Brazilian Association of Science Popularizers (ABRADIC) is also active in the country: <<http://www.eca.usp.br/nucleos/njr/abradic/>>
- ²¹ <<http://www.cdcc.sc.usp.br/historico.html>>
- ²² <<http://www.cientec.usp.br/pag1.htm>>
- ²³ <<http://www.eca.usp.br/nucleos/njr/>>. See also: <<http://www.eca.usp.br/nucleos/njr/esprial/>>, <<http://www.eca.usp.br/nucleos/njr/proscintiae/>>, <<http://www.eca.usp.br/nucleos/njr/lanternaverde/>>. Besides these, USP, in collaboration with other institutions, also has a science communication portal: <http://www.sciencenet.com.br/site_english/index_english.asp>

²⁴ <<http://www.comciencia.br>>

²⁵ <<http://www.cciencia.ufrj.br/>>

²⁶ A remarkable example is the science journalism portal directed by Wilson da Costa Bueno: <<http://www.jornalismocientifico.com.br/>>. See also: <<http://www.mic.ufsc.br/>>, <<http://www.comtexto.com.br/home.htm>>, <<http://www.agricoma.com.br/revista.htm>>, <<http://www.jornalexpress.com.br/comsaude/>>

²⁷ See, for example, <http://www.eciencia.usp.br/site_2004/default.html>, <<http://www.mct.pucrs.br/>>, <<http://www.museudinamico.ufjf.br/apresentacao.htm>>, <http://www.campinas.sp.gov.br/portal_2003_sites/conheca_campinas/cc_atracoes_culturais_museus_museu_dinamico_de_ciencias.htm>

²⁸ <<http://www.museuvida.fiocruz.br/>>

²⁹ L. Massarani, "Science display wins award in Brazil's carnival", *SciDev*, 5 March, 2004.

<<http://www.scidev.net/gateways/index.cfm?fuseaction=readitem&rgwid=1&item=News&itemid=1262&language=1>>

³⁰ S. Hilgartner, "The dominant view of popularization: Conceptual problems Political Uses", *Social Studies of Science*, 20(3), 1990, p. 519-539.

³¹ P. Greco, "Communicating in the post-academic era of science", cit.

J. Ziman, *Real Science: What it is, and what it means*, Cambr. Univ. Press, Cambridge, 2000.