

Public Communication and Popularization of Science: The Ministry of Science, Technology and Innovation and its Research Units

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Introduction

In recognition of the importance of popularization of science as a way of education for citizenship, the Ministry of Science, Technology and Innovation (MCTI) has created important internal structures. The Secretariat of Science, Technology and Social Inclusion (SECIS), established in 2003 is an example. The Department of Popularization and Dissemination of Science and Technology (DEPDI) is part of the SECIS. One of its responsibilities is “subsidize the formulation and implementation of policies, programs, and the definition of strategies for popularization and dissemination of scientific and technological knowledge” (Brazil, 2015).

The SECIS has made undeniable progress towards science popularization. Among them we highlight: i) the systematic creation of public bidding processes for the installation and modernization of museums of science, and for the development of products and materials for dissemination of knowledge (videos, interactive games, books, websites); ii) the creation of the National Week of Science and Technology, in 2004 (SNCT); and iii) support for public communication of science to the media. However, it appears that the government's investment in strategies, infrastructure, human resources and specialized technologies in the area of Science Communication in the last two decades has not responded to the demands of the policies outlined by the Ministry itself.

Digital communication and institutional identity

In addition to being a vector of social inclusion, the strategy of popularization of science is important to enhance the institutional image of the governmental organizations that act in this area, and are ultimately responsible for national policies on Science, Technology and Innovation (ST&I). Doing quality research is not enough. It is necessary that the stakeholders - media, academics, educators and students, and the government - have, in a very clear way, this perception.

The corporate identity is a demonstration of tangible personality of the organization (Kunsch, 2003, p.173). For this reason, it needs to be developed, processed, maintained and monitored, so that it becomes a positive aspect, and not a negative agent. Otherwise, this could turn against the organization itself. For Torquato do Rego (1986, p.97), the identity of the organizations can be "clear, confused, diffuse and even a 'non-identifiable identity', to the extent

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that nobody understands what it does, just know it exists". By identity, therefore, we need to understand the sum of ways that an organization chooses to identify itself to its audiences.

It is no exaggeration to say, from the results of this study, that most of the 13 Research Units (UPs)² linked to the MCTI falls into the category of "non-identifiable" identities, before the broad audience. Therefore, it is important to try to identify the structural and political problems that hinder the development of an integrated communication policy in the MCTI and its UPs, which can contribute to the creation of an identity of its own.

After two decades from the spread of the Internet use (1995), the corporate websites have become the very corporate identity of any company, whether public, private or third sector. The information, data, images and audiovisual and interactive materials available on the worldwide web introduce the company/institution to its diverse audiences.

Thus, this article presents a summary of the analysis of the Public Communication guidelines of MCTI and its 13 UPs. The main focus is the use of Digital Communication via websites for the dissemination of knowledge and popularization of science.

Method

The body of work is constituted by institutional websites of 13 UPs linked to the MCTI. These Research Units are important sources of scientific and technological knowledge by the ST&I system in the Country. The website of the Ministry itself is also an object of evaluation. For this study, we selected only the Homepage of the websites and one more level thereafter (1st level) (this, only as a way to complement or support certain aspects of the Homepage analysis). We also analyzed the Press Offices pages.

We analyzed the websites version available in the period from 01 March to 31 May 2015. We sought to focus the analysis of the 14 websites (13 UPs + MCTI) within the shortest period, for which there was not a large distance in time between the evaluation of the first and the last website. The depth of analysis was limited by the high number of institutions involved and the amount of variables involved.

Based on the concepts of Public Communication (Silva, 2009; Duarte, 2009), this study aimed to evaluate the overall structure of the websites; the institutional identity (and how it is linked or not to the MCTI institutional identity); contents available; the language used, and the frequency of information updating.

The method of websites analysis is based on categories and parameters set forth by the studies of Vilella (2003) and Dias (2001), as well as the analytical structure of De Falco (2009), adapted for this work. From Vilella (2003), we used the set of parameters and specific criteria for

²National Observatory (ON), Emilio Goeldi Museum (MPEG), National Institute for Technology (INT), Brazilian Center for Research in Physics (CBPF), National Institute of Amazonian Research (INPA), Brazilian Institute of Information in Science and Technology (IBICT), National Institute for Space Research (INPE), Center of Mineral Technology (CETEM), National Laboratory of Scientific Computing (LNCC), Center for Information Technology (CTI) Renato Archer, National Laboratory of Astrophysics (LNA), Museum of Astronomy and Related Sciences (MAST), National Institute of the Semi-Arid (INSA).

the evaluation of officials governmental websites, organized into three dimensions: i) the content (quality and reliability of information); ii) the usability (ease of use); iii) and the functionality (ability to comply with the proposed requirements). Dias (2001), in turn, provides seven heuristics addressed to creators of Internet content (content authors and website developers), which explain how to improve the usability of corporate websites.

We also note the conformity of the websites with the guidelines of usability established by the Federal Government in its Booklet of Usability - web standards in Electronic Government (Brazil, 2010), and with the Normative Instruction nº 08, dated 19 December 2014. This Normative Instruction makes the deployment and management of default identity of Digital Communication of the Federal Government organizations and entities.

To better understand the relationship of the Press Offices with the media, we use eight of the nine categories created by De Falco (2009): location, way of access, content, public relations contact, multimedia capabilities, real-time interactivity, updating for media, and search engine.

Structurally, the analysis is organized in: 1) general aspects: 2) content, 3) usability and 4) functionality, always with focus on scientific dissemination and popularization of science, the articulation between the UPs, and between them with the MCTI.

In order to evaluate the initiatives of popularization of science present in the websites Homepages, we checked: the presence of the institution in social networks; the existence of a link for scheduling visit requests; link to the “Canal Ciência” (Science Channel) website; and availability of educational materials (videos, booklets etc.).

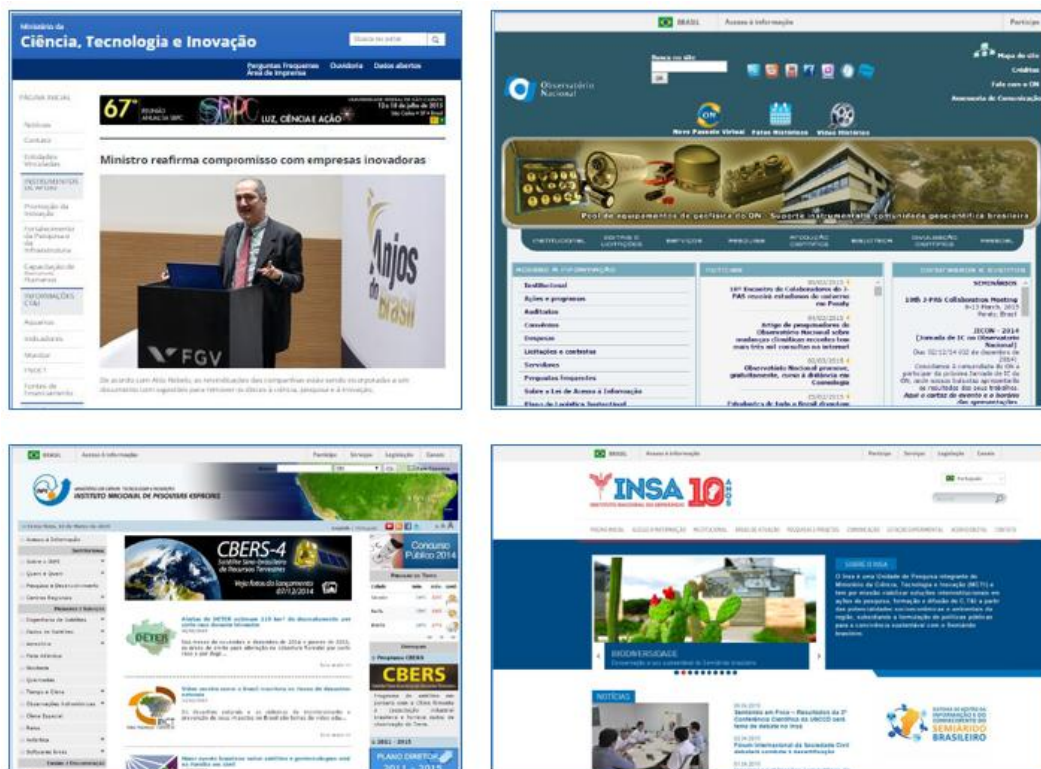


Fig. 1: Homepages of the websites: the MCTI; the National Observatory (ON) (older UP, founded in 1827); the National Institute for Space Research (INPE) (the largest UP); and the National Institute of the Semi-Arid (INSA) (the newest UP, founded in 2004). (Veiga, 2015)

Analysis

The analysis of institutional websites of the MCTI and its UPs reveals that these do not reflect a strong institutional image of the Brazilian ST&I. The websites also do not show a realistic view about the scientific and technological knowledge produced by these institutions. The lack of a standardized visual identity contributes to this fragmented vision of the institutions. It is not possible to realize a clear connection between the UPs, neither of these with the Ministry.

Regarding the activities of scientific dissemination and popularization of science - the object of this work, it is clear that the Internet tools are still underused by the majority of the UPs and by MCTI itself. Although news are present in all analyzed websites, these prioritize, in general, the Institutional Communication, and not the communication of science.

When they appear on the main page, the popularization of science projects and initiatives deserve little attention. Also, in most cases, these activities result, in fact, of individual initiatives and not of an institutional strategy, therefore not continuous and systematic.

It is important to note that there is not always a direct relationship between what appears in the websites and what is happening in the “real” world of institutions. In general, their real life is richer and more dynamic than the virtual one. Issues of budget or shortage of human resources prevent the maintenance of a dedicated structure that deals with the websites. So, their form and content are very far from the institutional reality of the Ups. Being the website a window through which society sees the organization, a negative perception of it creates a bad influence on the institutional image perceived by the public.

This discrepancy between the real and the virtual world is true specifically in the initiatives of popularization of science. It is possible that some institutions do not provide their products and activities for the dissemination of knowledge in digital format, although they develop effective and successful interaction with the community (lectures, exhibitions, workshops etc.). However, in the current context of the Digital Age, if these actions and materials are not well presented on the Internet, the effectiveness of communication is significantly compromised.

Results

The lack of standardization of the MCTI and their UPs websites starts in the access address: 8 of the 14 institutions websites end in “.br” (e.g. www.inpe.br), while the other 6 are “.gov.br” (e.g. www.inpa.gov.br). In other words, more than half of the UPs does not register the bond with the Federal Government in their website addresses. Except the National Institute for Space Research (INPE) and the National Institute of the Semi-Arid (INSA), no UP mentions the bond with the MCTI in its website Homepage.

In May 2015, only 3 of the 14 analyzed websites presented their Homepages in accordance with the standard identity of Digital Communication established by the Secretariat of Communication of the Federal Government (SECOM/PR) in December 2014: the MCTI, the National Astrophysics Laboratory (LNA) and the Center for Information Technology Renato Archer (CTI).

The websites of the National Institute for Space Research (INPE), the National Observatory (ON), the Emilio Goeldi Museum (MPEG) and the Brazilian Institute of Information in Science and Technology (IBICT) are designed to be viewed in the traditional computer monitor format (4:3, "square"). In the now common widescreen monitors, more horizontal, these websites occupy only the central area of viewing, looking "small" on the screen. The font size used is also smaller than the more modern projects, such as the one created by SECOM/PR, for example. During the period of this analysis, the websites of the Museum of Astronomy and Related Sciences (MAST), INT and INPA had the identity of the Federal Government (at top of page) out of date. The portal of IBICT had no identification, contrary to the SECOM/PR determination.



Fig. 2: IBICT Homepage, without the identification of the Federal Government, and LNA Homepage, with the identification (red highlight). (Veiga, 2015).

The domain, the top bar of the government identification and the visual design of the website are fundamental elements of building and standardization of corporate identity. As the UPs are represented in their websites, they seem to be isolated institutions and not belonging to the same ST&I System. Even the websites that already have established the government standard identity, did not do it completely. So, their internal pages still have the old layout (e.g. the MCTI and LNA websites), confusing the user.

Content

In general, the websites analyzed are divided into three major areas of content: (a) the institutional area, where most UPs post the information required by Access to Information Law of the Brazilian Federal Government; b) the research and development activities; c) news. The texts of the news area are updated at least weekly. This conveys the idea of a dynamic website. However, the content of the news is predominantly agenda, i.e., events, activities of the leaders, external visits, calls for papers and grants, courses. Little is seen of dissemination of scientific and technological production of the UPs. Thus, a precious space of accountability in the use of public resources for ST&I is lost.



Fig. 3: Homepage of the CTI website: agenda news, at the expense of the dissemination of ST&I. (Veiga, 2015)

Another aspect to be considered is that except for the institutions whose main activity is the popularization of science (ON, MPEG and MAST), few UPs post educational resources on their Homepages. Some even create quality products, but are unfortunately kept hidden in internal pages, with difficult access.

For example, we can find the Scientific Dissemination link on the ON Homepage. This link goes to the Educational Activities Division page (DAED). This internal page is not attractive. It has just a menu with the following items: The DAED, Events 2014, Distance Learning - 2015, Itinerant Project, Newsletter, Animated Movie, ON and the World Cup 2014, The Little Scientist Booklet, Comic Books, Booklets, Team, Playing with Science Site, The Little Scientist Site, Collaborations. This rich material of scientific dissemination and popularization of science requires three levels to be accessed by the user. Also, it is posted in a bureaucratic way, no images or texts summarizing the contents of each product or informing the target audience to whom it is addressed.

Usability

In terms of usability, most of the websites analyzed do not fully meet the requirements of e-Government web standards. The most common problems are associated to the context and navigation. Only the websites of the MCTI, CTI, MPEG, INT, INPE and IBICT clearly identify the navigation, showing the path followed by the user. Not all websites have a high contrast version for the visually impaired - another requirement of the Federal Government.

The ON website, for example, is not attractive to the user. It has an old-fashioned look, without images or multimedia resources, in addition to using small fonts to current standards of web design and computer monitors. The horizontal menu below the header repeats information contained in the body of the page, such the link "Institution".

The INPE website, in turn, presents issues inherent to the institution size and characteristics of its structure, in addition to the consequent high density information.

Functionality

Regarding the functionality, the most common problem in the websites of UPs is the difficulty in finding and accessing information. The terms used in the tabs of the menus are often based on the institution's organizational structure, and not in the main areas of user interest. Information about the importance of the research conducted by the institution remains hidden in internal pages or do not exist.

For example, the ON is responsible for the Brazilian Official Time – a curious information, which would deserve a more attractive visual appeal in the Homepage. It could be the access point to information about time zones and other subjects related to time. However, the official time is represented by a small icon (a clock) beside the links to social networks, on the top of the Homepage, not attracting the user interest.

Being an organization of information in ST&I, the IBICT correctly divides its website on: "Information for Society", "Information for Research", "Information to ST&I Management", "Researchers and Post-graduate Students", "Information Technology" and "Publications". In contrast, the menu the LNCC website is summed up in: "Access to Information" and "Institutional" (divided in "The LNCC", "Research and Development", "Coordination", "Academic Programs", "Events", "Computational Resources", "Structuring Projects", "Scholarships in LNCC" and "Library"). Where can the activities performed by the institution be found in this menu? The Research and Development tab leads to a submenu, in turn containing: "Research Lines", "Technical and Scientific Production" and "P&D Projects". Only a very persistent normal user will continue in this navigation in search of scientific information.

In this sense, INPE operates more efficiently, bringing to its Homepage the subjects of greatest interest for society. For example, the Atmospheric Electricity Research Group is called simply "Lightning"; the Satellite Monitoring of Brazilian Amazon is "Amazon". The official structure of the Institute can be found at the "Research and Development" link.

These examples demonstrate that there isn't a consistent pattern of communications from the MCTI and its UPs to society. The implementation of the governmental Digital Communication standards could even unify the visual identity, but will not be able to standardize the language and the discourse. For this, it is necessary to establish an institutionalized communication policy.

Press Offices

Ten of the 14 websites analyzed have links to the Press Office (or Press Area, Press Room, or simply Communication) in their Homepages. However, the content of these pages is far from meeting the requirements created by De Falco (2009). Only five Press Office pages inform the press officer name and contact. Multimedia resources are available in only four websites. It is surprising that the MAST doesn't have a Press Office. Being a museum, the organization should have a better structure to interact with the media.

Some considerations

Since May 2015, when this study was performed, several UPs have updated their websites according the guidelines of the SECOM/PR. However, there is no national policy of scientific dissemination and popularization of science. This shortcoming hinders the implementation of strategies for public communication of science, as detailed below.

The results of field research in this study indicate that, except for the institutions that have the popularization of science as their mission, (e.g. the museums) the other UPs, in general, practice a communication eminently bureaucratic, This public communication aims more to serve their own interests rather than those of citizens. There is no clear policy for public communication of the scientific production of these institutions. In other words, the UPs websites do not reflect the research of excellence developed within the MCTI institutions. The digital communication features are not used to strengthen the institutional identity and to the promotion of scientific dissemination.

Thus for example, the UPs websites announce seminars, courses, lectures, post-graduate programs, activities of the leaders, academic publications and awards, and recognitions received, but not the scientific and technological production developed by them. They also don't tell us how this knowledge can be converted into well-being, quality of life, and social inclusion.

The management, staff, and structure shortcomings are clear. It is difficult for the UPs to develop basic activities such as the production of scientific dissemination content and the maintenance of updated information on website pages.

The popularization of science contents available on websites almost always receive secondary treatment (except for the institutions that have as primary mission the dissemination of knowledge). These contents are often produced by *ad hoc* initiatives and with great effort at institutional level. Actions and programs held by the UPs (interaction with schools, products created to the SNCT, for example) are not efficiently publicized nor explored in the websites.

The communication area of the UPs is not always the responsible for the management and updating of the websites. The autonomy of the Public Relations Department (PR) is usually restricted to the news pages. The other updates are, in general, under responsibility of the IT Department, without any coordination with the PR.

The issuing of press releases to the media and other stakeholders is precarious, without specific tools to send the newsletters, target and direct the information and contents based on the journalist area of interest and location, monitor its reception, etc. There is no proper press clipping service at the UPs. Not every Press Office team has a photographer or a multimedia professional.

Popularization of science materials (games, booklets, videos) are produced basically twice a year, for the two major related events, the annual meeting of the Brazilian Society for Science Progress - SBPC and the National Week of Science and Technology - SNCT. Occasionally, these materials are made available on the Internet, mostly without any specific adjustment for the digital media.

Recommendations

Considering the analysis of the websites, some recommendations of actions can help to improve the public communication of the MCTI and its 13 UPs. They are:

1. Develop a specific communication policy for the MCTI, focusing on the popularization of science, considering the peculiarities of this Ministry.
2. Greater visibility of the UPs in the MCTI website, not only within the institutional framework, but with emphasis on their science and technology production.
3. The presence of the Science Communication as a cross-cut research line in every UP.
4. Develop standards for the websites contents, to unify the language and to meet diverse audiences. These guidelines should encourage scientific dissemination and the production of materials for the popularization of science (videos, games etc.).
5. Create a manual of institutional identity of the MCTI and its UPs, establishing rules for the use of organizations names and brands.
6. Perform a public perception survey to detect the expectations regarding the science communication made through the UPs websites.
7. Promote greater interaction and integration between the UPs and the “Canal Ciência” (Science Channel) team, aiming to improve the content of scientific dissemination in the websites.
8. Greater approximation of UPs with the SECIS, aiming to establish terms of technical cooperation for the development of projects of popularization of science.
9. Improve the relationship with the media. Many small newspapers in the interior of Brazil have no structure to produce quality material on ST&I. Thus, the UPs communication structure should have the capacity to work as a private communication agency, keeping a high level relationship with the media, providing multimedia products (for press, radio, TV and web).
10. Guide the UPs to include in their master plans goals and/or strategic guidelines related to Institutional Communication, Scientific Dissemination and Popularization of Science, as well as incorporating the area into their organizational structures.
11. Create sections like “Ask the researcher”, highlighted on the websites, as a way to open a dialog path with the public, approaching people from of the scientific community. This and other mechanisms of interaction, such as making better use of social networks do not require financial investments and are easy to operate, but require human resources for its maintenance with quality and efficiency.

Finally, it is important to make it clear that the deficiencies pointed out regarding the activities of Public Communication and popularization of science in the MCTI and its UPs, especially in Digital Communication, are structural. Everything that exists today in terms of ST&I Public Communication within the UPs is due in large part to the commitment and dedication of their journalists and other communication professionals, whose work goes beyond the limits of the functional competencies. The awareness of the importance of their work for the development of

scientific culture as a tool for social inclusion and as a subsidy to the collective construction of knowledge is the driving force for overcoming daily challenges.

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