Organizational Identity and the challenge of a scientific dissemination geared towards the social inclusion: situational analysis of the actions of a research unit

Giuliana Capistrano Cunha Mendes de ANDRADE
Laboratório Nacional de Astrofísica (LNA/MCTI)
Universidade Metodista de São Paulo (UMESP)
gcapistrano@lna.br

Márcia de Souza LUZ-FREITAS
Universidade Federal de Itajubá (UNIFEI)
marcialf@unifei.edu.br

Abstract

The dissemination of the science in Brazil has a record of difficulties. One of those relates to the social inclusion through the access to the science produced in the country. The aim of the present work is to analyze the difficulties related to the development of actions of scientific dissemination and social inclusion from the research unit studied. It is alleged that the main difficulty lies in the institutional framework, of which profile is still the same of the science centers from the early years of the tenth decade, where the priorities were on the researches and on assisting researchers. This study used the action research methodology, preceded by a phase of desk research. It was made a analysis of the activities in progress in the institutional unit, activities that were defined as the target during its master plan. This first moment allowed the indication of questions that involve the institutional identity. It was defined as theoretical principles, therefore, the conceptual field of the organizational identity. The main conclusion that has occurred from the stages that has already been done is the perception of the great challenge of the institution, in its

process of transformation in order to follow the new practices required by public policies, mainly when it is related to the social inclusion.

Introduction

The scientific dissemination, linked to the scientific education, is the result of the interaction between science and society, and acts as an eye-catcher to the scientific literacy. Just like the issues involving the education and the scientific literacy are recent in the Brazilian scenario, it is correct to claim that the dissemination of science in Brazil, in the same way, is a matter of many fragilities. The hard access of a large portion of the population to the scientific education and, as a consequence, to the science produced in the country has stimulated a series of proposals and programs intended to overcome this situation.

The study was developed on a research unit in order to analyze the development of its actions of scientific dissemination and the difficulties regarding the social inclusion. It is assumed that the main difficulty lies right in the institutional framework, created with a profile that is still the same of the science centers from the early years of the tenth decade. This profile reveals an institution which identity is based on the prioritization of research activities and on assisting researchers, with the result that the dissemination is being pushed into the background.

It was used the action research methodology, supported by desk research, and the first step was the institutional analysis of the activities in progress defined as the target by the master plan of the research unit. This study made it possible to draw the institutional identity, using as theoretical principles, the conceptual field of the organizational identity. It should be noted that there is a big institutional challenge in its transformation process to adapt to the new practices required by public policies, mainly when it is related to the social inclusion.

The development of the present article is divided into three sections. The first part delineates a brief history of the science in Brazil. The second part discusses the history of the research unit studied. The third part is about the master plan of this unit and how this master plan shows the institutional identity, highlighting some specific actions of

scientific dissemination and its inclusiveness character trait. The article ends with the conclusions obtained from the study.

Science and scientific dissemination in Brazil: a brief background

The scientific dissemination in Brazil is shown in distinct phases in which flow, albeit slowly and weakened by historical and social circumstances, is crescent, due to the context of national learning and development. In this section there are six main phases.

During the colonial Brazil period, the scientific activities were practically unheard. Also, there were not enough initiatives in order to disseminate the science produced in other countries, and at that point, it was concentrated on Europe. According to Motoyama (2004) and Massarani et al. (2002), the circumstances that led to that historical moment[1] contributed to the establishment of a culture without any regard for scientific experiments.

With the Royal Family coming to Brazil, there was the emergence of the first indications of science dissemination marked by the creation of scientific texts. The first Brazilian newspapers published news with scientific content (MASSARANI *et al.*, 2002).

The next important step came in the second half of the nineteenth century, when part of the population expressed an interest in science applied to the industry. Massarani *et al*. (2002) reports the publishing of periodicals and specialized magazines as well as the organization of exhibitions that are important way to disseminate the science activities.

At the beginning of the twentieth century, the scientific dissemination increased in a consistent way in Rio de Janeiro, due to a group of self-employed professionals interested in the development of scientific research. The idea was sensitize the authorities in order to create scientific institutions and stimulate research activities.

In the second half of the twentieth century, it was created the first science colleges and important research institutes. The first public agency that encouraged research, the Brazilian National Research Council, now knew as National Council for Scientific and

[1] It could be listed the submission of the colonies to the interest of the metropolis, slavery, bad education conditions, the contempt of the elite group towards the work and the prohibition to publish books.

Technological Development (CNPq), was created in 1951[2]. There was an increased interest in the scientific dissemination, however, it evolved slowly.

The beginning of the twenty-first century was marked by the expansion of actions as the creation and strengthening of museums and scientific centers, the expanding publication of magazines and books, publications about science on social networks, specialized journalism and, foremost, public policies promoting the social inclusion by the usage of scientific literacy[3]. Even so, only a very small part of Brazilian people has the access to the science produced in the country.

According to the Brazilian Association of Science Centers and Museums (ABCMC),

> A popularização da ciência é um movimento mundial motivado pela crescente demanda da população por um entendimento mais amplo do papel social da ciência, cujas pesquisas e descobertas têm influenciado e interferido no cotidiano da humanidade. No Brasil, esse movimento se fortaleceu nos últimos anos, com a implantação de políticas públicas no âmbito dos governos federal e estaduais, o que, entretanto, ainda é pouco frente à demanda existente. A desigualdade no país também se reflete nessa área, onde a maioria dos espaços científico-culturais (museus e centros de ciência, planetários, observatórios, jardins zoológicos, jardins botânicos, unidades de conservação e centros culturais de ciência e tecnologia) se concentra nas regiões Sul e Sudeste [4] (ABCMC, 2010, p. 1).

---

[2] CNPq: website. Available URL: <http://www.cnpq.br/web/guest/o-cnpq;jsessionid=74145C5B7EF859C4DC391D7D5CAE86BD>.

[3] The management and accomplishment of these public policies are responsability of the Ministry of Science, Technology and Innovation) MCTI, its offices and its other agencies (<http://www.mct.gov.br/index.php/content/view/105.html?execview=>).

[4] Free translation: The popularization of science is a global movement motivated by the growing population demand for a broader comprehension of the social role of the science, which researches and findings has influenced and interfered on mankind's daily life. In Brazil, this movement has become stronger in the last few years due to the implantation of public policies under the federal and state governments and, however, it is still not much given the existing demand. The inequality in the country also is reflected on this field, where the major part of the scientific-cultural spaces (museums and science centers, planetariums, observatories, zoos, botanical gardens, conservation units and cultural centers of science and technology) is located in South and Southeast regions

It should be emphasized the expression "scientific-cultural spaces", split in parts that contain institutions that are perceived by their touristic value instead of scientific. Pereiro (2002), when talking about museums, points these spaces as a symbol of national identity, given the importance to their cultural, esthetic and educational value, without noting the scientific aspect. It is possible affirm that the initiatives to popularizing the science appear to be still linked to the scientific marketing instead of being based on the real value that the science acquired to the present world and on the importance of the scientific education.

Laboratório Nacional de Astrofísica: the research unit studied

The Laboratório Nacional de Astrofísica (LNA)[5], placed in Itajubá, Minas Gerais, belongs to the Ministry of Science, Technology and Innovation (MCTI). It was created in the first years of the eighties decade, to promote scientific studies in astronomy, prioritizes the researches and the development of scientific instrumentation. The institution manages the largest Brazilian telescope on the ground, located in Observatório Pico dos Dias (OPD)[6], in Brazópolis, Minas Gerais. It also manages the Brazil participation with two international partnerships: the Gemini Observatory and SOAR Telescope, located in Chile and Hawaii.

The OPD history is linked to the Brazilian astronomy history. It was the responsible for increase the quality of this science after 1980. In 1989, LNA turned into a permanent research unit belonging to the CNPq that in turn belonged to the Ministry of Science and Technology (MCT), now MCTI and, in 1992, established its own headquarters in Itajubá. In 2000, LNA formally became a MCTI research unit. Since then, LNA followed its inclination to the dissemination of the Brazilian astronomy and, more than conduct the OPD, it became a manager of Brazilian participation in international laboratories.

In 1993, Brazil became a partner of Gemini Observatory, which owns two identical telescopes, with 8.1m diameter mirrors, respectively located in Chile (South

[5] The information useful to the construction of this chart is from the institution official webpage (< http://www.lna.br/>).
[6] OPD, named inicially as Brazilian Astrophysical Observatory (OAB), was created 30 years ago and it is LNA corner stone. In 1985, OAB became the first national laboratory and received the name of Laboratório Nacional de Astrofísica.

Gemini) and in Hawaii (North Gemini). LNA has assumed the role of Gemini national office. The Brazilian participation in the consortium increased from 2.5% to 6% when some partners left. Brazil is the country with the largest production in proportion to past data from Gemini, which shows the importance of the observatory to the scientific community.

In 1999, MCTI signed an agreement with the United States[7]due to the construction and operation of a latest innovative telescope, with an opening of 4.1m, located in Cerro Pachón, near South Gemini – the SOAR telescope. Besides being responsible to the commission which deals the telescope time and give the support to the users, LNA was also the responsible for design and build, in its own workshop, two instruments for the telescope. So, LNA started to develop its latest talent: scientific instrumentation. In the last decades, it expanded its technological capacity when conceived and created instrumentation for partner observatories and for observatories from other countries. Nowadays, LNA is an international reference point in scientific instrumentation. In 2008, MCTU signed an agreement with Canada-France-Hawaii Telescope (CFHT), a telescope located besides North Gemini. LNA is the responsible for the management of the Brazilian time, also in this telescope.

LNA history could be organized three action fronts: the first one involves the creation, the development and maintenance of OPD; the second one begins with the first steps of Brazil to join the consortiums in order to build the large international telescopes; the third, the development of instruments to the astronomy research, field in which there is a huge effort from the institution and highlight its future vision.

The contributions from the master plan and from the LNA actions to the institution identity and the challenges of scientific dissemination and social inclusion

The current master plan (LNA, 2010) is the second existing, developed to embraces actions to be developed between 2011 and 2015. Its main part, made of strategic axis, guidelines and structure projects, defines and outlines initiatives that clearly reflects the strategic aims of strengthen the technological development and

[7] Represented by the *National Optical Astronomy Observatory*, by The University of North Carolina and by The Michigan State University

improve the management of the existing infrastructure to the observational astronomy, summed up in the institutional mission: plan, develop, supply, operate and coordinate the resources and the infrastructure in order to stimulate, with cooperation, the Brazilian observational astronomy. The mission of LNA has always been considered clear and consistent, almost as the summary of a strategic plan. The assertion makes clear the identification of LNA as an institute geared towards the researches development, both observational or on the instrumentation field.

The identity of an organization is essential to its development. One of the features of the modernity is the growing concern about the expectations from its interest groups. According to Almeida (2012), the organization can achieve a better relationship with many specific groups if it has a strong and convincing identity. In this sphere of identity, there are contributions of Alvesson (1990), Fombrun (1996), and Van Riel & Balmer (1997).[8]

The idea of organizational identity is not that accurate but, according to Almeida (2012), it is possible understand it as a group of organizational tributes considered specific by their members. Bueno (2012, p. 21) says that the identity can be understood as

> a 'personalidade' da organização e está umbilicalmente associada à sua cultura e ao seu processo global de gestão (filosofia gerencial, competência técnica ou de inovação etc). Ela inclui o seu portfólio de produtos ou serviços, a forma de relacionamento com os seus públicos de interesse (fornecedores, acionistas, clientes, funcionários, imprensa etc.), a sua história e trajetória (social, cultural, política, econômico-financeira) e mesmo, o que nos interessa bastante, o seu sistema de comunicação (canais de relacionamento, como *house-organs*, SACs, *call centers*, *sites* etc.).[9]

[8] ALVESSON, Mats. Organization: from substance to image? *Organization Studies*, v. 11, n. 3, p. 373-94, 1990; FOMBRUN, Charles J.; *Reputation*.: realizing value from the corporate image. Boston: Harvard Business School Press, 1996; VAN RIEL, Cees B.M.; BALMER, John M.T. Corporate identity: the concept, its measurement and management. *European Journal of Marketing,* v.31, n.5-6, p. 340-356, 1997.

[9] Free translation: the "personality" of some organization and it is umbilically linked to its culture and to its global management process (management philosophy, technical or innovative competence etc.). It includes its services and products portfolio, the relationship model to its target public (suppliers, shareholders, clients, employees, press etc.), its history and trajectory (social, cultural, politic, economic-financial etc.) and even,

All of these attributes make the organization unique and allow the setting of an image and a reputation that not to be confused with the identity. Almeida (2012) asserts, quoting Johnson e Zinkhan (1990)[10], that the image is a perception of the organization as a whole, sustained by different public segments. The image of an organization changes according to the personal perception, it is a individual phenomena, but it can be shared with a group of people as a collective phenomena (ALMEIDA, 2012). It is recognized that an organization can have more than one image, because the experiences, living conditions, information that a person from a group associates to an organization are multifaceted, distinct, particular and sometimes contradictories (BUENO, 2012).

The image of LNA changes according to the public to which it keeps a relationship. The image that the institution has created among the scientists from many research institutes and universities across the country is very positive due to the excellent job developed. When fulfill its mission, LNA achieves a good reputation before the Brazilian astronomic community. Bueno (2012) teaches that the reputation is a better consolidated and developed representation of an organization, although, just like the image, it must be formed by the perception, in a mental synthesis. Amongst the lay public, however, LNA has a different image, which is linked to the distance and obscurity in its works. LNA, besides the institutional and scientific dissemination performed, is still unknown by this public and the specialized media.

The vision of a institutional future remains the same planed during the first master plan, just before the current one, which is

> ser reconhecido nacional e internacionalmente como referência brasileira em desenvolvimento instrumental para a astronomia terrestre, e como contato principal em assuntos de abrangência nacional na área de astronomia observacional, com o intuito de otimizar as condições de pesquisa da comunidade científica e de

which is very interesting in this case, its communication system (relationship channel as house-organs, SACs, call centers, websites etc.).

[10] JOHNSON, Madeline; ZINKHAN, George M. Defining and neasuring company image. In: Annual Conference of the Academy of Marketing Science, XIII, New Orleans, LA, Apr. 1990.

> socialização de conhecimento, e desenvolver pesquisa científica e tecnológica de ponta[11] (LNA, 2010, p.14).

Although there is no specific reference about scientific dissemination and social inclusion, both can be included when mentioning the idea of optimize the conditions of the research community and knowledge socialization. The concern about social inclusion is modest, but noticeable in the vision of future quoted in 2006-2010 master plan:

> a visão do futuro formulada acima não visa a "glória maior" para o LNA, mas é o meio para uma finalidade maior que deve beneficiar toda a comunidade astronômica, e, além disso, deve, diretamente (através de divulgação pública) e indiretamente (p.ex. através de benefícios provindos do desenvolvimento tecnológico), beneficiar a comunidade como um todo, contribuindo, desta forma, para a socialização do conhecimento[12] (LNA, 2006, p.18).

Although the current master plan shows strategic axis, guidelines and structure projects, only mentions the scientific dissemination and social inclusion in the first of these topics. The institution may follow three strategic axis established by MCTI (I, II and V) detailed in the document. There is a single course of action in the axis V, named C T & I[13] for social development: the strengthening of public dissemination of astronomy. The program that led this course of action is described as public dissemination and astronomy popularization, and scientific literacy with special emphasis on social inclusion, both regional, by products and services for the local population, and national, by actions with the help of multiplying agents (LNA, 2010).

[11] Free translation: being recognized nationally and internationally as a Brazilian model of instrumental development for astronomy and, as main contact in issues related to national range in the observational astronomy field, in order to optimize the conditions of the research community and knowledge socialization, and develop cutting edge scientific and technological research.
[12] Free translation: the vision of future above is not concerned in giving LNA "greater glory", but it is the mean to achieve a better end which may benefit the whole astronomy community and, besides that, may, directly (by public dissemination) or indirectly (by the benefits from the technological development, for example) benefit the community as a whole, thus contributing to the knowledge socialization.
[13] C, T & I means Science, Technology and Information.

The four goals of the program together with other actions previously developed at LNA[14] focusing on social inclusion are shown in Chart 1. The Chart 2 shows the actions involving the society in general. The period considered during the data collection was the beginning of the master plan until the end of 2013.

All of these actions, even they are registered and documented[15], they didn't receive to the present moment, any qualitative analysis about their range. For example, the records about school trips to OPD and OnT mention their nature (public – municipal, state, federal – or private), but they do not mention the range or the effect of the dissemination in each one of these public. Specific data about the changes in LNA image over this period in relation to the lay public could be obtained from the analysis of this material.

The lack of this analysis is a reflection of the fact that the scientific dissemination is not an institutional priority. In the same way as the master plan expects only timid actions of scientific dissemination, it is even lower the number of specific activities in order to study and describe the results obtained. As the social inclusion is a consequence of the scientific dissemination, without claiming to be more important than that, there is no measurement of the results not even a tangible aim that could subsidize the production of more effective data.

[14] In addition to the goals of the current master plan, LNA was already developing activities of scientific dissemination, some of them from the previous master plan, and other ones realized some time ago, as the visits to OPD, for example.

[15] While the research-action was being realized, it was used in the execution of all the steps of the actions and development of forms and documents needed for the records.

Chart 1 – LNA Goals and Actions to promote scientific literacy with special emphasis on social inclusion

Goals Described as determined by the master plan (LNA, 2010, p.22-23)	18: Operationalise by the end of 2011 the OnT (Roofing Observatory) and implement, by the end of 2012, a program to use this action as public dissemination.	LNA has a regular system of public visitation to OPD, without the possibility of observing the sky. The construction of a roofing observatory, with evening visitation, meets an old request of the institution. The OnT was created and a program to use it effectively has been implemented and also, to disseminate the astronomy activity. The sky observation is open to the general public and they also can watch lectures about astronomy.
	19: Perform, by the end of 2012, a minicourse to journalists, with the help of other national institutions, with regular realization.	The idea was to increase the institutional visibility towards the national media. The journalists, besides learning basic notions of astronomy, they could know more about LNA laboratories structure and the laboratories where the Brazilian astronomer use to work in. LNA would be a source of news and contacts. The goal was not achieved because of budget cutback with tickets and daily expenses.
	20: Perform, by the end of 2012, a study about LNA development since the beginning of OPD until now and publish a book about its history to the general public.	The book was written with the help of the Museum of Astronomy and Related Sciences (MAST) and is currently in the rewriting, editing and publishing phases.
	21: Create, by the end of 2015, with the help of the MAST, the OPD virtual museum.	The aim is to preserve the memory of the technical development by using the impressive evolution of the observation techniques and to register astronomical data, observed during the creation and development of OPD. The actions to create the museum are in progress.
Actions	OPD visitations	The OPD visitations are scheduled and guided by a trained person who is able to guide students and teachers. The visitations consist of knowing the OPD installations and are related to a research based on astronomy. Generally the visitations are preceded by a lecture and end with the appreciation of the campus, placed at 1.864m high. It is the oldest LNA action of dissemination.
	Afternoons and evenings of open visitations	Created in 2005, this event consists of open the OPD gates to the general public, one a year, from 2pm to 10pm, so they can see the campus and observe the sky during the afternoon and the evening, with the usage of special filters to protect from the sun rays. The programming includes video sessions about astronomy and orientation about what is being observed. This event has become traditional across the region and, in the past few years, has received about 1.700 people.
	"Astronomy for students" contest	The contest was realized for the first time in September 2013. With the support of the team which organizes the Brazilian Olympiad of Astronomy (OBA), it was advertised throughout the country. 267 students and 92 teachers from 72 cities and 18 states took part in the event. The students should select one astronomical project and justify the choice. The prize for the best proposal was the picture of the astronomical object chosen, made by professional astronomers using the SOAR telescope. The winner, a student from the high school in Natal-RN, will receive the printed and framed picture. The winner school will receive a lecture from a LNA astronomer who will talk about that object and will give the prize to the student. The student and the teacher who helped with the proposal will travel to Chile to visit the installations of SOAR telescope. The next edition of the contest is already being planned.

Chart 2 – Actions involving the general public (number of person by year)

Actions	Year			
	2010	2011	2012	2013
Visits to OPD	981	1.631	2.372	2.225
Visits to the observatory	-	-	826	452
Afternoons and evenings of open visitations	1.720	1.357	1.674	920
"Astronomy for students" contest	-	-	-	269

Conclusion

The present challenge related to the scientific dissemination is to reach the population who is still considered excluded when talking about scientific education. So, it is a responsibility of the research, science and technology institutions set goals and plan the way they will act in order to these plans and programs achieve effective results. LNA repeats in its history the same steps of the scientific dissemination in Brazil. In a light-hearted manner the fragile actions are gaining in importance. As the institution strengthens its image before the lay public and makes the scientific dissemination an identity trait, it is contributing to the social inclusion by giving the access to the scientific education.

References

Associação Brasileira de Centros e Museus de Ciência (ABCMC) (2010), Programa nacional pop ciência 2022. 4ª Conferência Nacional de Ciência, Tecnologia e Inovação, Brasília, ABCMC.

Almeida, Ana Luisa de Castro (2012), "Identidade, imagem e reputação organizacional: conceitos e dimensões da práxis", en Kunsch, Margarida Maria Krohling, Comunicação Organizacional: linguagem, gestão e perspectivas. São Paulo, Saraiva, pp. 215-242.

Bueno, Wilson da Costa (2012), Auditoria de imagem das organizações: teoria e prática, São Paulo, All Print Editora.

Laboratório Nacional de Astrofísica (LNA) (2006), "Plano diretor 2006-2010", LNA. Available at: http://www.lna.br/lna/relatorios/PD_LNA_FINAL.pdf [March, 4th 2014]

Laboratório Nacional de Astrofísica (LNA) (2010). "Plano diretor 2011-2015". LNA. Available at: http://www.lna.br/lna/LNA-PDU-2011-2015.pdf [March, 4th 2014]

Massarani, Luisa; Moreira, Ildeu de Castro; Brito, Fatima (2002), Ciência e público: caminhos da divulgação científica no Brasil, Rio de Janeiro, Casa da Ciência.

Motoyoma, Shozo (2004), Prelúdio para uma História: Ciência e Tecnologia no Brasil, São Paulo, Edusp.

Moreira, Ildeu de Castro (2006), "A inclusão social e a popularização da ciência e tecnologia no Brasil", Revista Inclusão Social, RJ, Ibict, Vol1, n2.

Pereiro, Xerardo (2002), "Do museu ao ecomuseu: os novos usos do património cultural", en Pardellas, X., Turismo Natural e Cultural, Pontevedra/Vigo, Universidade de Vigo, pp.141-158.