

PONTO UFMG – Challenges of an itinerant museum

Jessica Norberto Rocha

Universidade de São Paulo

jessicanorberto@yahoo.com.br

Lara Mucci Poenaru

Universidade Federal de Minas Gerais

larapoenaru@gmail.com

Tânia Margarida Lima Costa

Universidade Federal de Minas Gerais

tmlc08@gmail.com

Abstract

When an exhibit moves, things time and space are different. Ponto UFMG Itinerant Museum is an interactive science and technology museum that, because it is built in a mobile unit, can visit schools and towns in the state of Minas Gerais (and in the whole country) which usually do not have access to this kind of activity. It aims to achieve some goals: making science more popular, reaching the audience in its own space and time. It is a tractor trailer adapted into six different rooms. In Brazil, the museum presents an innovative and risky proposal. It does not only transport artifacts and equipment to build external exhibitions, shows and workshops in a total of approximately 800 square meters, but it also offers activities that use technological apparatus in its six internal rooms. Travelling science is challenging, specific and unlimited: you have to be creative because of the reduced space, you need a sharp didactical approach because of the short time, you must go straight to the point because you can afford just a few exhibits. Another innovation is its pedagogical proposal. There are courses for its staff to establish personal

interactions with the public, and workshops specially directed for teachers - in order to set a *continuum* between the formal and the informal learning of science.

Introduction

PONTO UFMG Itinerant Museum is an interactive science and technology museum that, because it is built in a mobile unit, can visit schools and towns in the state of Minas Gerais and in the whole country of Brazil which usually do not have access to this kind of activity. Our mission is to work for a broad communication and comprehension of science and technology (S&T), as well as making them more popular in order to reach the audience in its own space and time.

Museums and interactive Centers of Science and Technology around the globe have been pointed as institutions and spaces where public communication of science and technology occurs effectively and that are able to connect the advances and issues related to science to the society interests. Moreover, they have activities in order to promote informal education and to support to the formal education system, to make a stimulus to scientific and technical vocations and to stimulate the development of a critical awareness about science. Thus, it's expected that visits to museums contribute to build a scientific culture with a civic dimension, i.e., constituted of social relevant elements and that provide to the citizens the possibility of participating in a well-informed way and, therefore, more consistently, in scientific and social debates.

Nowadays, in Brazil, the motivation isn't different: a scientific culture to citizenship. Such motivation occupies a field that goes from national prosperity to the recognition of scientific knowledge as part of human culture, including, in its meaning, the evaluation of risks, political and economical choices, and decisions about personal life issues.

In this perspective, the Brazilian government has been promoting a huge effort to establish a popularization of S&T policy that could answer to the growing demands of the population and that could straighten the distance between science and daily life. In the last decades, there was a significant expansion of federal and state government's actions, through the Ministry of Science, Technology and Innovation, S&T bureaus and foundations to support research, universities, and others.

As a part of this policy, science and technology centers and museums were created in different regions and Knowledge competitions and fairs and courses for teachers were encouraged. In the same period, there was a growth in the publication of books, magazines and websites; largest media coverage of scientific issues; organization of popular lectures and other events that arouse interest in diversified audiences throughout the country.

In parallel to these government initiatives, actions have emerged to develop instruments to measure the levels of Public Understanding of Science (PUS) and society's Scientific Culture. Such research has been legitimized as a tool for researchers and practitioners from the public sphere to know the main trends of opinion and also general behaviors about science, constituting, thus, a channel of knowledge about values and attitudes, as well as specific aspects of the S&T.

Recently, in 2010, the Ministry of Science and Technology of Brazil, in collaboration with UNESCO, conducted the survey "Public Understanding of Science and Technology in Brazil" with about two thousand people in many regions of the country. The main objective was, through questionnaires, to survey the interest, information, attitudes, knowledge and ideas that Brazilians, aged over 16 year old, have about Science and Technology. The survey revealed that the percentage of people with great interest in science is 65%. Brazilians, also, revealed themselves as optimistic: 82% believe that science has brought more benefits to your life and 50% that the situation of the advancement of Brazilian science is intermediate. However, despite the interest, the positive view of science and access to information through television and the internet, the vast majority of Brazilians have little knowledge in the area: only 15% of the interviewed audience was able to cite any Brazilian Institution dedicated to scientific research and few could name a famous scientist.

Beyond that, the presence of the population in scientific spaces (museums, botanic gardens and science centers) is small and unequal throughout the country: only about 8% said they had visited at least one museum in the last year (MCT, 2010). This is not surprising since, for example, according to information published in *Museus em Números* (IBRAM, 2011), Minas Gerais, which is the state with the largest number of towns in Brazil (853), second in terms of absolute population, with approximately 20 million

people, has only 319 museological institutions. Else, its relationship between population and number of museums is of 60,419 inhabitants per institution, close to the national rate of 60.822. In addition to it, in the state, there are only 16 science centers and museums (ABCMC, 2009). Eight of them are located in Belo Horizonte (the capital), two in Viçosa and one in each of the following cities: Juiz de Fora, Uberaba, Lagoa Santa, Barbacena, Ouro Preto e Ipatinga.

Apart from this reality, according to national and international studies, such as the Program for International Student Assessment (PISA/OECD), science education in Brazil – at different levels – has shown alarming shortcomings. PISA covers the areas of Reading, Mathematics and Science, not only to the knowledge of each specific curricular area, but also concerning the relevant knowledge and skills necessary for adult life. Brazilian results in Science are not satisfactory when compared with the level reached by other countries. In 2000, from 43 countries evaluated, Brazil ranked 42nd place with 375 points, up only from Peru; in 2003, from 41 countries evaluated, Brazil was also only one putting up the last, Tunisia, although we went up to 390 points. In 2006, in 57 countries, we stood in position 52 above Colombia, Tunisia, Azerbaijan, Qatar, Kyrgyzstan, maintaining an average of 390 points from the previous review. In 2009, from the 65 participating countries, we stood in position 53 with 405 points, and, finally, in 2012, we kept with 405 points, but decreasing to the position 59. (OECD, 2000, 2003, 2006, 2009, 2012).

As it can be observed, the development of the Brazilian Scientific Culture remains fragile and limited, since large portions of the population still have little access to scientific education and to qualified information regarding S&T. In order to try to improve this challenging scenario, the Federal University of Minas Gerais (UFMG) implemented an Itinerant Museum of Science and Technology in the state of Minas Gerais.

PONTO UFMG Itinerant Museum was designed to be itinerant, dynamic, and work interactively various areas of science and technology, always considering the reality of the community to be visited. A space dedicated to students and teachers, which aims to excite people for knowledge and for scientific method and opinion, awakening scientific vocations.

Space description and museum pedagogy

In Brazil, the Museum presents an innovative and risky proposal. Travelling science is challenging, specific and unlimited: our exhibitions have to be creative because of the reduced space and need a sharp didactical approach because of the short time in the visited cities. Also, its maintenance is continuous and expensive. Everything that is interactive, hands-on, manipulative and moves around a lot, needs maintenance, paintings and adjustments frequently.

The truck, which transports artifacts and equipment to build external exhibitions, shows and workshops in a total of approximately 800 square meters, also has its inside space transformed in an exhibition area, offering activities that use technological apparatus in its six internal rooms.



Figure 1 – PONTO UFMG Itinerant Museum

Another innovation is its pedagogical proposal. The Museum provides courses for its staff to establish personal interactions with the public, and workshops specially directed for teachers - in order to set a *continuum* between the formal and the informal learning of science. There are, also, on line courses, open to any people in the country who wants to work as an explainer in PONTO UFMG Museum or in any other museum, and a post-graduation course in Scientific Education provided by the Open University of Brazil (UAB) in partnership to the museum.

In most contemporary scientific and cultural spaces, what can be seen today is that there is not a predominant communicative and educative approach. In fact, the museum pedagogy occurs in the interaction of elements of various approaches in a same place or activity, thereby reaching an audience in different ways. When selecting the theme, objects, formats, audiovisual resources, the types of interactions and the expected public spaces provide an educational commitment to the visitor. The social and cultural approach to science and technology is a means of bringing the culture of local people into the museum, so that the current and past scientific and technological knowledge can be discussed.

In this way, at PONTO UFMG Itinerant Museum, dialogical models are valued and the communication between science and society is not a one-way route or in a top-down model. Our exhibition is intrinsically situated in social and cultural context. Moreover, we appreciate the dialogue between scientists and non-scientists and place a particular emphasis on the importance of language, social influences and the relationship with the cultural context. Forums debates, conferences or scientific chats are part of our travelling program and are performed involving the visited community and one or more invited scientists.

Considering all these assumptions, PONTO UFMG Itinerant Museum exhibitions are built around the main theme of: “Mankind and its relationship with environment”, placed in two main places: the mobile unit – inside the truck, and the external exhibition, containing more than 30 experiments from different areas of knowledge.

Inside the truck

PONTO UFMG Itinerant Museum is the only one in Brazil that has transformed the truck in its own exhibition area. It has six internal rooms:

Womb room: It consists on the simulation of intrauterine environment, bringing to the visitors information and sensations experienced during their stay inside mother's womb. The intention is to promote the reflection about yourself, your origins and your future as a human being. **Senses room:** The visitor can interact with the environment, discovering ways of interacting with the world using his senses (sight, hearing, touch, taste and smell). The senses room explores the relation between humankind and the

world. People experience, interpret and feel the world through organs, brain and senses. **Biomes room:** The room explores the diversity of flora and fauna of some Brazilian biomes as well as the impact of anthropic activity in each one of them. **3D projection room:** This room presents scientific movies and documentaries in 3D that shows an amazing trip through the planet and the development of science and technology. **Submarine room:** The submarine's room explores mysteries of ocean's depth and the life's condition of animals that live there. Inside the room, the visitor has a sensation of being on board of a real submarine. In this room, there is a discussion about the conditions necessary to the existence of life in a given environment. **City room:** On the city room, the visitor will have the opportunity to visit many cities on the globe, with only a click, through Google Earth. The visitor will discover monuments and cities such as Paris, São Paulo, Belo Horizonte, New York, and many others.



Figure 2 – Inside the truck

External Exhibition

The exhibit continues on the external area, called "Man Gallery". It consists of more than thirty experiments that link different areas of knowledge. In addition, there are rooms for conducting educational workshops for teachers, workshops for students, shows, forums and debates between scientists and society.



Figure 3 – External Exhibition

Final remarks

Since the Museum was opened, in 2012, it has already travelled to six cities from different states in Brazil: São Paulo/São Paulo, Recife /Pernambuco, Uberlândia, Ituiutaba, Ouro Branco and Téofilo Otoni/ Minas Gerais, and has organized many scientific fairs in its own town: Belo Horizonte/ Minas Gerais.

We expect that this Museum contributes to awaken vocations in science and the interest in scientific and technical studies in various areas of knowledge. In addition, we

also hope to improve the relationship between the different agents of our governmental system and stimulate citizens awareness about the importance of science and technology for their own welfare.

Website: museu.cp.ufmg.br

Facebook: www.facebook.com/MuseuItinerantePontoUfmg

References

ABCMC (2009), Guia de Centros e Museus de Ciências do Brasil 2009, Rio de Janeiro, Associação Brasileira de Centros e Museus de Ciência; UFRJ; FCC; Casa da Ciência: Fiocruz; Museu da Vida.

Allum, N., Bauer, M. W., Miller, S. (2007), “What can we learn from 25-years of PUS research? Liberating and expanding the agenda”, *Public Understanding of Science*, 16, pp. 79-95.

Auler, D., Bazzo, W.A., (2001) “Reflexões ara Implementação do Movimento CTS no contexto educacional brasileiro”, *Ciência & Educação*, pp. 1-13.

Cazelli, S. (1999), “Tendências Pedagógicas das Exposições de um Museu de Ciência”, *Atas do II Encontro Nacional de Pesquisa em Educação em Ciências*, São Paulo, Editorial Valinhos.

Falk, J. and Dierking, L. (2000), *Learning from museums: visitor experiences and the making of meaning*, Boston, Editorial Altamira Press.

Hein, G. E. (1998), *Learning in the Museum*, London, Editorial Routledge.

Hooper-Greenhill, E. (1994), “Education, Communication and Interpretation: towards a critical pedagogy in museums”, *The Educational Role of the Museum*, London, Routledge, pp. 3-25.

IBRAM (2011), *Museus em Números*, Brasília, Instituto Brasileiro de Museus.

Mcmanus, P. (1992), "Topics in Museums and Science Education", *Studies in Science Education*, 20, pp. 157-182.

Ministério de Ciência e Tecnologia (2011), "Pesquisa de Percepção Pública da Ciência, 2010", 20th February. Available at: <<http://www.mct.gov.br/index.php/content/view/328259.html>>

Norberto Rocha, J. (2013), *A Cultura Científica de professores da Educação Básica: a experiência de formação a distância na UAB/UFMG*. 2013. Dissertation (M. A. in Divulgação Científica e Cultural), Universidade Estadual de Campinas, Campinas.

OECD (2011), *Program for International Student Assessment (PISA) (2000, 2003, 2006, 2009)*, 20th February. Available at: <http://www.oecd.org/pages/0,3417,en_32252351_32235731_1_1_1_1_1,00.html>

Oppenheimer, F. (1968), "A Rationale for a Science Museum", *Curator*, n. 11, n.3, pp. 206-209.