

Science popularization actions developed by Seara da Ciência in Ceará, Brazil

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Abstract

In 1999 Seara da Ciência, the science museum of Federal University of Ceará (UFC) was founded. Created by a group of teachers from UFC, Seara aims to stimulate curiosity for science, culture and technology by making connections with everyday life and by promoting interdisciplinarity. The institution, which has as its motto the phrase "It's forbidden not to touch", brings together several projects aiming to popularize Science. For the analysis we used a hybrid approach, combining case study with the method of participant observation, and semi-structured or e-mail conducted interviews. The field research was divided into two moments: the first occurred in the month of July 2013, when interviews were conducted with teachers and monitors working in the organization in order to establish a historical overview of Seara's work. The second part took place in December 2013, when the State Science and Culture Fair was held. The science fair was promoted by the state government in partnership with Seara da Ciência. We interviewed 22 public school students and 9 teachers who participated of this initiative. Curiously, most of them had never stepped into a science centre or museum and many of them had never heard of Seara da Ciência. As results we can mention the low rate of visitation (considering high school enrollment in Fortaleza), the predominance of non-voluntary public (school visits and science fairs) and the lack of awareness of Seara's work by the students who participated in the State Science and Culture Fair in December 2013.

Introduction

The public communication of science plays a central role in modern societies, not only for the formation of citizens and for the management of democracies, but also by a need of science itself. “If never was science without communication, today many scholars are beginning to say that there is neither science without disclosure and communication to the public” (VOGT et al., 2006, p. 87).

Lévy-LEBLOND (2006, p. 43) emphasizes that the goal of science communication can not be thought of in terms of knowledge transmission from experts to laypeople, it should be for all members of our society to have a better understanding not only of the results of scientific research, but of the very nature of scientific activity. Science communication actors have the role of mitigating the gap between the growing interest of people in science and technology and the misunderstanding of the issues addressed.

According to Moreira (2006), the 1920s and 1930s of the last century were marked by the intensification of science popularization in Brazil. These activities were promoted by a small academic elite and sought to convince the public authorities of the need of creating and maintaining institutions related to science, and to enable greater social recognition of research activities. But at this time the character of science communication was still fragmented and incomplete.

In the late 1940s and early 1950s the massive institutionalization of science in Brazil was started. In 1948 the Brazilian Society for Scientific Development (SBPC) is created and in 1951 the National Council for Scientific and Technological Development (CNPq) and the Coordination of Improvement of Higher Education Personnel (CAPES) are founded. Moreira (*op. cit.*) says that at this time, science was seen as an instrument to overcome national underdevelopment. Following this optimistic political moment for Brazilian science, in the 1960s, an educational movement dedicated to experimentation in science education emerged, leading to the foundation of science centres and museums around the country in the 1980s (Moreira, Massarani, 2002, p. 58).

The International Council of Museums (ICOM) defines a museum as a “non-profit, permanent institution in the service of society and its development, open to the public, which acquires, conserves, researches, communicates and exhibits the tangible

and intangible heritage of humanity and its environment for the purposes of education, study and enjoyment” (ICOM, 2007).

McManus (1992, p. 159) divides science museums into four stages of development: the ancestral museum form of the cabinet of curiosities, natural history (first generation), science and industry (second generation), scientific concepts and phenomena (third generation). Science centres such as Seara da Ciência belong to the third generation. “The third generation emphasis is usually on contemporary science or technology and they use interactive exhibits requiring visitor thought and manipulation as vehicles for communication” (*idem*, p.163).

At present, there are two strands to the third generation form of museum science communication. The first is the non-object based thematic exhibition, with interactive exhibits, which was described earlier as the late development of the first and second generation museums. Such exhibitions are often concerned with the larger concepts of science which are likely to arouse a personal response — ideas such as those related to heredity, evolution, nutrition and food production, ecology and the human body. The second strand is the science centre, in which a decontextualized scattering of interactive exhibits, which can be thought of as exploring stations of ideas (usually in the physical sciences), is presented in a small centre or in a gallery in a traditional museum. Often they display similar exhibits since they are all limited by the need to use robust, wear-resistant equipment. Some centres sell exhibit 'clones' to other science centres and arrange travelling 'science shows' (*ibidem*, p. 163-164).

Seara da Ciência

In 1999, Seara da Ciência, the science museum of Federal University of Ceará (UFC) and the Brazilian Association of Science Centres and Museums (ABCMC) are founded. Created by a group of teachers from UFC, Seara aims to stimulate curiosity for science, culture and technology by making connections with everyday life and by promoting interdisciplinarity.

The document that creates Seara da Ciência, signed by the UFC Rector in 25 January 2000, says that the organ was created considering the need to: a) contribute to the scientific, technological and cultural dissemination; b) promote better integration with the institutions responsible for basic education in Ceará; c) create a space for discussion and dissemination of knowledge; d) spread in Ceará the scientific and technological development with character of science popularization, encouraging the various areas of knowledge. This document establishes the centre as a supplementary organ of UFC with the following purposes: I – to contribute to the improvement of the educational system in relation to science activities, emphasizing the empirical aspect, particularly in basic education; II - strengthen the development of the scientific spirit in students of different levels of education; III - to encourage, among teachers, researchers and students from UFC, the interest for the study, creation and development of new techniques for scientific phenomena demonstration; IV - to promote the contact of the community with equipment and information that lead to scientific, technological and cultural knowledge; V- to encourage interaction between various areas of knowledge, contributing to strengthen the concept of interdisciplinarity; VI - to provide an instrument of knowledge to the community, presenting it in a playful dimension; VII - to develop projects with other institutions that provide ways for the fulfillment of its purposes.

The institution, which has as its motto the phrase "It's forbidden not to touch", brings together several projects aiming to popularize science. Seara stands out from most museums that use the hands on model because it incorporates regional features in part of its experiments, in the theater plays and videos, instead of adapting models from foreign countries. In 2012, Seara was transferred to a new and wide building in the Campus of Pici, where the UFC science and technology courses are located. The new building has an exhibition hall three times larger than the old one, a theater with 220 seats, four teaching laboratories, twenty classrooms, space for conferences and workshops and teacher's offices. An Angaturama Limai (Figure 1), a midsize spinosaurid who lived in the Araripe Basin, in Ceará, in the early Cretaceous Period is the institution's mascot.



Figure1 – Angaturama Limai

Other actions developed by Seara that incorporate regional features of Ceará are the collection of videos "Santo de casa", launched in 2010 in partnership with the Foundation for Support in Scientific and Technological Development of Ceará (FUNCAP). These videos are about the life and work of renowned scientists from Ceará. We can also mention the scientific theater play "Ceará por opção – uma desbiografia Rodolfo Teofilo¹". This play can be watched on-line on Seara's Youtube channel: <https://www.youtube.com/watch?v=O-Swxk5GN3M>). The script written by Andrei Bessa is inspired by the book "The Power and the plague", by native writer Lira Neto.

The centre was responsible for the organization of the 4th edition of the "Science in Scene" (Ciência em Cena) festival, which was held in August 2010 in Fortaleza. Thirteen groups of scientific theater from Brazil and Portugal participated in this event.

Seara also promotes visits to its exhibition hall, the local Science, Art and Culture Fair, in partnership with the Municipal Education Secretary (SME), the State Science and Culture Fair, in partnership with the Department of Education of the State of Ceará (SEDUC), basic Chemistry, Biology, Mathematics and Astronomy courses to public school students and sky observations. The institution is also responsible for the coordination of the Brazilian Physics Olympiad in Ceará.

Despite all the efforts and actions developed, according to Seara's Annual Activities Report of 2013, only 14.814 people visited its exhibition hall and laboratories, a negligible number considering enrollment in secondary education in Fortaleza, the capital of Ceará (111,887, according to the Brazilian Institute of Geography and Statistics).

This paper aims to show part of the science popularization actions developed by Seara da Ciência in Ceará, Brazil, focusing on the 7th edition of the State Science and Culture Fair that was held in December 2013. Seara was responsible for the basic education students. One hundred projects were subscribed and 60 were selected to be presented on the fair. The best projects received 20 Junior Scientific Initiation scholarships offered by CNPq. According to Seara's 2013 Annual Report, the State Science and Culture Fair had approximately 3,000 visitors.

¹ Rodolfo Teofilo was a scientist and writer. One of his greatest achievements was the campaign of vaccination against smallpox (a disease that killed thousands of people in Ceará in the transition years of the nineteenth to the twentieth century).

Methodology

For the analysis we used a hybrid approach, combining case study with the method of participant observation, and semi-structured or e-mail conducted interviews. The field research was divided into two moments: the first one occurred in the month of July 2013, when interviews were conducted with teachers and monitors working in the organization in order to establish a historical overview of Seara's work. The second part took place in December 2013, when the State Science and Culture Fair was held. We interviewed 22 students and 9 teachers who participated of this initiative.



Figure2 – State Science Fair

Using the semi-structured interviews the teachers were asked to answer the following questions: How the project that your students are presenting was elaborated? Do you notice student's interest by Science? Do you use different materials on your

classes (magazines, movies, visits)? Have you ever been to a museum? - Which one? And to a science museum? Do you know Seara da Ciência? – If yes, how did you arrive there? What do you think of Seara? What has drawn your attention in there? What can be improved? Have you visited its website, Facebook or Twitter?

The students were asked which project they were presenting, if they liked Science, if they thought that Science was on their everyday life and how, which careers they intended to follow, if they had ever been to a museum and to a science museum, if they knew Seara da Ciência – if yes, how did they arrive there, what did they thought about Seara, what had drawn their attention, what could be improved and if they had visited its website, Facebook or Twitter.

Discussion

Of the 22 students we interviewed during the State Science and Culture Fair, only four of them said that they knew Seara da Ciência. This number is unexpected because Seara was promoting the Science Fair in partnership with the Department of Education of the State of Ceará. Seven of the students said that they had never been to Seara, but they had heard of it and two of them said that they were having the first contact with Seara's works through the fair. Fourteen of them had never accessed Seara's website and four had entered on the site very quickly to look for information about the fair. Three out of the four students who said they knew Seara da Ciência were from Fortaleza, the state capital. The data seems compatible with the 2010 survey sponsored by the Brazilian Ministry of Science, Technology and Innovation (MCTI) and by Museu da Vida/Casa de Oswaldo Cruz/Fundação Oswaldo Cruz. The results show that only 8.3% of the Brazilian population go to science centres and museums. According to the MCTI study, 36,8% of the 2016 interviewed people said that they do not visit or participate of scientific events because there are no such initiatives in the regions that they live. Sixteen of the 22 students we interviewed during the State Science and Culture Fair do not live in Fortaleza. They are from cities like Jaguaribara, Hidrolândia, Maracanaú and Quixeramobim, which are far from the state capital, so the difficulty of access is probably one of the main reasons why these students had never been to Seara da Ciência but it

does not explain why so few students have entered at Seara's website, since they were participating of a science fair organized by Seara.

Among the 9 teachers we interviewed, 5 of them had already gone to Seara da Ciência and the other 4 had at least heard of it. Seven teachers said they had the habit to access Seara's website to search for practices and experiments and one of them had worked there as a monitor when he was a Biology student. When he was asked what he thought about Seara da Ciência, he said: "It is sensational. I think it was the best time of my life. I learned a lot there". A Geography teacher that we interviewed said that he had gone there with his students twice in 2013, besides participating in the local Science, Art and Culture Fair, which is also held in Seara. We asked him what had drawn his attention during the visits and he said "the involvement of science communication that they have and the opening not only to the academia, but also to the world of elementary and middle school education. They are very opened to it. And the structure that they have there and the events that they organize, such as the local fair, which gives us opportunity to participate".

Conclusion

Despite being an important science popularization centre in Ceará, on its fourteen years of experience, Seara still has little insertion in the State. According to Seara's Annual Activities Report of 2013, only 14.814 people visited its exhibition hall and laboratories, a very small figure considering enrollment in secondary education in Fortaleza, the capital of Ceará (111,887, according to the Brazilian Institute of Geography and Statistics). Similar to what happen in other brazilian science centres and museums, we see the prevalence of non-spontaneous audience – people who come to Seara through school visits, science fairs and Olympiads organized by it.

The lack of knowledge of the students interviewed during the State Fair of Science and Culture, in December 2013, may indicate difficulty of access of these students to Seara, what is consistent with the 2010 survey sponsored by the Brazilian Ministry of Science, Technology and Innovation (MCTI) and by Museu da Vida/Casa de Oswaldo Cruz/Fundação Oswaldo Cruz, but it may also represents evidence of failures in Seara's communication processes with its main target audience: public school students.

It is known that Brazilian children and adolescents have the habit of accessing the Internet, especially social networks. Better use of these tools by Seara da Ciência could improve the knowledge of their actions by their main target audience. The absence of a communication professional in the institution may explain this gap.

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