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Come in: Science lives here! The experience of the Casa da Ciência with the popularization of science for different audiences

Abstract

The Casa da Ciência is a Cultural Center of Science and Technology of the Universidade Federal do Rio de Janeiro and develops projects in different language to popularize scientific knowledge. The activities reveal to the public the results, associated with daily life in environments that stimulate curiosity and imagination for discovery in a playful way. There are many possibilities of interacting with the public and promoting science through scenographic exhibitions with scientific, physical, or virtual experiments, that are paired to debates, courses, and seminars, or through the association between art and science. Plays, mime, music, art, workshops, and science shows can be used to achieve this goal. The actions are based on the assumption that science knowledge today has a strategic role in an individual's exercise of citizenship. In this way, the activities seek not only to communicate science but also to promote a space for dialogue between the university and the population so that people can learn more about the research produced at the university and appropriate the knowledge generated from these. The search for new languages in this process transforms the relationship of disinterest for science, coming from the specialized approach, into something interesting and pleasurable, promoting the imagination, reflection, and appropriation of scientific knowledge.

Keywords : popularization, social appropriation, science communication, museum, science centers.

Résumé

La Casa da Ciência est le centre culturel de science et de technologie de l'Université fédérale de Rio de Janeiro. Il développe des projets dans différentes langues à la recherche d'une diffusion scientifique. Les activités révèlent au public les résultats obtenus par la science, associés à la vie quotidienne, stimulant la curiosité et l'imagination pour une découverte ludique. Il existe beaucoup de possibilités d'interaction entre le public et la science au sein d'expositions scénographiques, avec des expériences scientifiques, physiques ou virtuelles, associées à des débats, des cours, ou grâce à l'association entre art et science. Des pièces de théâtre, de la musique, des ateliers, des spectacles scientifiques et même des scénarios pour des écoles de samba peuvent également être organisés dans ce cadre. Les actions reposent sur l'hypothèse selon laquelle les connaissances scientifiques jouent un rôle stratégique dans l'exercice de la citoyenneté. Ainsi, les activités ne se limitent pas à la communication scientifique, mais favorisent également le dialogue entre l'université et le public afin que le public soit plus informé sur la recherche universitaire et se l'approprie. La recherche de nouveaux langages dans ce processus diminue le désintérêt pour la science, résultant de l'approche spécialisée en faveur d'une expérience agréable, favorisant l'imagination, la réflexion et l'appropriation du savoir scientifique.

Mots-clés : popularisation, appropriation sociale, communication scientifique, musée, centres scientifiques.

1. Presentation

The Casa da Ciência - Cultural Center of Science and Technology of the Universidade Federal do Rio de Janeiro (UFRJ) seeks to awaken curiosity through the relations between science, art, and culture. It uses different languages in a playful and interactive way to reflect on science concepts, providing their popularization. A lot of creativity guides the actions of this institution, determining its identity as a science museum within the contemporary perspective. We will talk about that next.

We understand cultural centers as « spaces that propose to produce and disseminate different forms of artistic expression, such as visual arts, performing arts, music, dance and cinema » (MUNICIPAL DEPARTMENT OF CULTURE, 2018). Thus, the creation of a space for the realization of events that associate science, technology, and art, while stimulating critical thinking about the influence of scientific discoveries on people's daily lives. The challenge is to promote an active participation of society in the dynamics of scientific transformations in order to establish a connection between the audience and science.

The concept of the museum which guides our work is given by the Brazilian Institute of Museums (IBRAM): « museums are houses that guard and present dreams, feelings, thoughts and intuitions that take shape through images, colors, sounds and shapes » (IBRAM 2010, p. 133). The actions developed at our « house » seek to give this tone by creating scenographic and multimedia spaces for the visitor to interact and experience sensations that are usually impossible with the collection. Touching, tasting, and smelling can provoke an immersion through interactive supports.

The museology recommended by the International Council of Museums (ICOM), within the National Museum Policy (PNM) understands science and culture centers as museum spaces in which the experience to be lived by the audience is more determinant than the existence of the collections:

« Currently can be considered museums institutions not only monuments, botanical gardens, and zoos, aquariums, galleries, scientific centers, planetariums, nature reserves, but also cultural centers, cultural practices capable of preserving intangible legacies and creative activities of the digital world » (IBRAM 2010, p. 133).

According to the PNM, museums are « at the service of society » and are essential for the improvement of democracy, social inclusion, and contributing to social development. According to ICOM, the museum:

« is a permanent, non-profit institution at the service of society and its development, open to the public, which acquires, preserves, studies, exposes and transmits the material and intangible patrimony of humanity and its environment, with the purpose of study, education and delight » (DESVALLÉES & MAIRESSE 2013, p. 64).

Thus, we approached a « science museum » as a place that exhibits collections, even if temporarily, available at the service of society. Moreover, it presents itself as a cultural center discussing the interactions between art and science in constant experimentation of the different areas of knowledge through immersive communication practices.

The intention is to transform the relationship of disinterest in science, derived from the content approach, into something attractive. Therefore, the experiences lived by the audience in the exhibition do not take place exclusively through contact with the exposed collection; they also take place through the sensations shared in each visit. For these reasons, the Casa da Ciência, as well as other science centers in our country, are part of the Brazilian Register of Museums of IBRAM in the category Science and Technology Museums.

Regarding space, the built area of the Casa da Ciência occupies around 700 square meters, and the exhibition hall has 200 square meters. The rest is an auditorium, a workshop space, and a small administrative area. Being a cultural center and having only one exhibition hall, the option for temporary and itinerant exhibitions enables to discuss countless aspects of science in different scenarios. It encourages the accumulation of experiences and development of expertise in a range of exhibitions, events, activities, and actions on the most varied themes and styles.

The Casa da Ciência offers, on average, two exhibitions per year, with about 5.000 visitors per month. Since 1995, 56 exhibitions on different themes have been held¹. The themes and contents are studied so that the approach is made innovatively in order to engage and thrill

¹ This number includes exhibitions held until August 2019.

the audience, besides stimulating a critical attitude towards the proposed scientific knowledge.

In addition to the exhibitions and their complementary activities, the program includes editorial production that covers several publications, other than presenting plays of theater, mime, music, artistic workshops, science shows, video production. Several forms of expression that associates art and science including even the construction of plots for samba schools, for example.

To interface the exhibition with the audience, we conducted the *Mediators Program*, aimed at undergraduate students of UFRJ from different areas of knowledge. At each exhibition, the mediators form multidisciplinary teams and are guided by academic coordinators, professors, and technicians specialized in the themes of the exhibitions, complementary activities, and extramural projects. The training program of these students strengthens the inseparability between teaching, research, and extension, which provides citizens a critical and more human academic education.

There are also a series of actions outside the physical space of our museum, what we call extramural activities. Among them, we can mention the research and development of plots for the GRES Unidos da Tijuca, in 2004 and 2005;² the coordination of integrated events in the city of Rio de Janeiro during the National Science and Technology Week, from 2004 to 2007; and also the coordination of the event in about 50 municipalities in the state, from 2009 to 2014; also acted in the articulation and coordination of the scientific tourism project Darwin's Paths, in twelve municipalities of Rio de Janeiro.

The touring of exhibitions is a practice in the Casa da Ciência and today very much driven by the Brazilian Association of Science Centers and Museums (ABCMC)³. The exchange of exhibitions (most museums have fixed and temporary exhibition spaces) plays an important

² In 2004, the plot developed with the carnival Paulo Barros was *The dream of creation and the creation of the dream. The art of science in the time of the impossible*, with this plot the GRES Unidos da Tijuca was second in the Special Group of the League of Samba Schools. See: <https://galeriadosamba.com.br/escolas-de-samba/unidos-da-tijuca/2004/> (accessed on October 11, 2021). In 2005, the plot was *Entered on the one hand, it came out the other. Whoever wants you to make another one!* It also came in second. See: <https://galeriadosamba.com.br/escolas-de-samba/unidos-da-tijuca/2005/> (accessed on October 11, 2021).

³ The Brazilian Association of Science Centers and Museums, founded on July 15, 1999, is a non-profit, philanthropic, assistance, promotional, recreational, and educational Civil Society, with the objective of representing Brazilian science centers and museums. Available on: <http://www.abcmc.org.br> (accessed on January 17, 2017).

role in museums and science centers, so designing projects with characteristics that facilitate and allow touring is necessary. Partnerships between public and private institutions and society strengthen bounds and the exchange of experiences to carry out projects in order to consolidate more and more the encounter between science, art, and culture.

To exemplify one of these partnerships, we present below the exhibition *Adventure inside the human body*, held between June 4 and August 4, 2019, and resulting from a partnership with the Museu da Vida / FIOCRUZ⁴.

2. *Adventure inside the human body* exhibition: communication and audience

The exhibition was developed especially for the audience from 4 to 10 years old. However, it meets all age groups. The exhibition's scenography has made it possible to cross a giant nose, know the systems that form our organism, assemble a 3D puzzle with full-size organs replicas, and interact with real organs, among other things. The real organs are part of the collection of the Institute of Biomedical Sciences of UFRJ.

The exhibition was mediated by undergraduate and graduate students of the UFRJ, who promoted the debate on the proposed themes, also presenting what knowledge the university produces on the subject. The exhibition was on display for only two months but reached more than 28.000 visitors from different regions of the State of Rio de Janeiro⁵.

2. 1. Visitation on display by the general audience

When we consider the number of visitors in such a short time, we point out that in the context of Rio, this is a very expressive data, assuming a scenario of non-visitation of museum spaces by the population. According to the research on the public perception of Science and Technology (2019, p. 15): « Most Brazilians do not visit or participate in activities in S&T spaces. [...] The least frequented were planetariums, art museums, science and technology museums, and national science and technology week. »

⁴ The Oswaldo Cruz Foundation (Fiocruz) is a scientific institution for the promotion of health and social development, generation, and dissemination of scientific and technological knowledge, located in Rio de Janeiro, Brazil.

⁵ 28.000 visitors are officially registered in the book of signatures. The number estimated by the team from the daily record data reaches 32.000.

In relation specifically to Rio, the research by Neiva and Meirelles (2018) sought to map the cultural habits of residents of twelve capitals in Brazil. The searchers pointed out that 63% of the population of the City of Rio did not visit any museum in the last twelve months on the date of the study.

Contrary to the above, the exhibition *Adventure inside the human body* received visitors from more than 80% of the neighborhoods of the City of Rio. As previously stated, this number is even more expressive when considering the size of the exhibition space available in the Casa da Ciência. In this space, the exhibition had a limit of 60 visitors per hour, which caused a long line outside. Even with a long service hour (Tuesday to Friday, from 9 am to 8 pm and Saturdays, Sundays, and holidays, from 10 am to 8 pm), many people gave up visitation due to long lines. On the first weekend, more than 3.000 people circulated in the Casa da Ciência and the average daily visitation over the period of the exhibition was 600 people per day. We emphasize that part of the exhibition occurred during the July school holidays, which considerably increased the number of families visiting throughout the week, in addition to the previously scheduled groups.

2. 2. Visitation by schools and groups

The audience was quite diverse; it was composed not only of families but also scheduled groups. The exhibition visit could be scheduled in advance (especially on days during the week); we provide about seven scheduled time slots per day throughout the week and about four on weekends and holidays. The demand for the exhibition was so high that in about three weeks, all available time slots were filled (for the two months of the exhibition), either by school groups or by organized groups (churches, scouts, NGOs, parent groups, etc.). We highlight the relevance of school visits to cultural place such as Museums, especially in our reality within a « scenario of non-appropriation of the museum spaces where the school is often one of the only possibilities of the most popular layers of society to have access to these spaces. » (PAULA 2017, p. 30).

In this context, Köptcke (2003, p. 124) affirms the importance of these visits and the partnership established between museum and school, in a perspective of democratization of access to culture and cultural spaces: « The educational partnership between formal education and the museum finds justification within a social and political project of democratization of culture and education. » Along the same lines, Costa corroborated by stating that:

« The collaborative work of museums with schools is fundamental, among other things, for the popularization and deepening of the work carried out by the museum, and consequently, for the expansion of the social reach of the museum, since the school is the institution with greater penetration into society and ability to promote systematization with continuity of educational action. (KÖPTCKE 2003, p. 124) »

Therefore, it is noted that the relationship that the Casa da Ciência establishes with schools is of fundamental importance. In this exhibition, we received about 3.198 scheduled visitors, of which 2.065 came from public schools and 1.133 from private groups.

2. 3. Reach on social networks

With the expansion of Internet access made possible by the use of smartphones, social media has become part of the daily life of the population, as a democratic space for exchanging information and a channel of communication between the public and institutions.

We understand these media as part of the audience's experience with Casa da Ciência. At the event created on Facebook to promote the exhibition, we reached 1.2 million accounts and gained about 54.000 followers. Of these online interactions, we highlighted 517 messages received with questions in Facebook Messenger. We organized them into six categories, as shown by the graphic below:

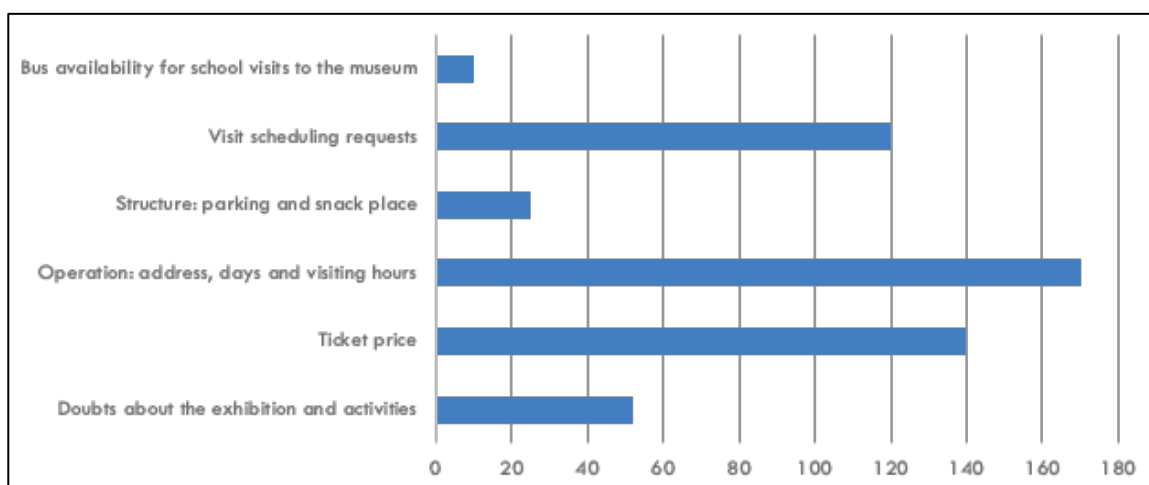


Table 1 - Questions received by Facebook messenger.

We observed that the most frequent questions were about the functioning of the institution, with 32% of the questions and 27% were about the ticket value. These results indicate how important the price of the ticket is in deciding whether or not to visit a museum space.

In a country whose social inequality is quite large, we find that having a free entrance and keeping the doors open guarantee access to a significant portion of the society that cannot afford to pay an entrance fee.

3. Final considerations

These results, therefore, reinforce the performance of the Casa da Ciência of UFRJ and its partnerships as a space that provides differentiated experiences of non-formal education and scientific dissemination. It is capable of contributing to the construction of public policies aimed at democratizing access to the benefits offered by science, art, and culture.

From the data presented, we consider that the exhibition *Aventura pelo Corpo Humano* had a positive impact with regard to the interest of schools in visiting our space. From future perspectives, we hope that the relationship with the schools that visited the exhibition can be solidified so that the visit to the Casa da Ciência can be recurrent.

This article is being written during a quarantine imposed by a virus⁶, which resurfaces the discussion about investments in science, technology, and health in our country and in the world. The scientific dissemination and all scientific apparatus in our country have been suffering budget cuts in the last five years. By demobilizing Brazilian science funding agencies and promoting the dismantling of public universities, we become increasingly dependent on the import of technologies developed in other countries and lose the ability to develop our own technological industry.

In addition, we highlight that despite our performance in communicating science via social media applications, digital exclusion still affects the Brazilian population. The pandemic has exposed this and other social inequalities that cannot be resolved by simply transforming the discussions made in person into virtual through the use of technology.

⁶ Coronavirus is a family of viruses that cause respiratory infections. The coronavirus agent was discovered on 12/31/19 after cases registered in China. It causes a disease called COVID-19. In March 2020, a pandemic was declared by the World Health Organization (WHO). Source: <https://coronavirus.saude.gov.br/> (accessed on March 25, 2020).

It is also our responsibility as science centers and museums, to discuss and disseminate the political aspects related to the appropriation of scientific knowledge; this is the scenario in which the dissemination of science reaches its noblest dimension. The use of science is part of our daily lives, so we need to offer to society, through our exhibitions, inputs to make decisions so that the population understands the impacts (positive and negative) that science has on daily life. In this context, we realize how fragile our performance is since it is difficult to discuss the negative impact of the development of science on people's lives.

Finally, we emphasize the importance of the reflection on the museums and science centers themselves by the public to whom it has served, as well as whether discussions about science, technology and society have been made. Especially when dealing with museums inserted in the university sphere, bringing to light the impacts that their exhibitions have in their surroundings is of fundamental importance in constructing spaces of dialogue between the university and society.

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