

Exploring Science where it is made: an open air and digital museum in a Brazilian university

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Introduction

Historically, Museums and Science Centers have played an important educational role as they are privileged spaces for the provision of non-formal teaching practices, as recalled by Jacobucci (2008). Although such spaces allow new and different possibilities for reading the world, they are not restricted to institutionalized and merely instrumental knowledge (Trilla, 1996).

These characteristics favored the establishment of a framework in which Science and Natural History Museums, Science Centers, Zoological and Botanical Gardens increasingly assume a pedagogical bias, being considered as an extension of formal educational practices, that is, of school itself. This aspect has been a reason for concern and warnings about a total schooling of such spaces (Queiroz et al, 2002; Vieira, 2005), which would cause them to lose their characteristic of favoring new readings to reduce them to reproducers of formal educational content.

Another aspect to be observed from a critical point of view about traditional Science Centers and Museums is the central role in the educational process that is attributed to phenomena and objects (Wagensberg, 2005). Such centrality is justified when these phenomena or objects have unique characteristics or, also, when they are not easily accessible. However, in general, most of these phenomena and objects do not present such singularities and, thus, are only displaced from their place of origin (Fabrício et al, 2013), offering an average experience and constituting, as Adorno (2010) calls it, an experience of semi-formation.

In addition, the abundant sums of financial resources needed to build spaces for the allocation of Museums and Science Centers and the training, hiring and maintenance of teams for these institutions have increased the need to develop innovative proposals that allow the implementation of new projects, with low costs, aimed at knowledge diffusion and scientific education.

Objectives

The present work aims to present the reflections and questions that supported the development of the “Knowledge Paths” (Caminhos do Conhecimento, in Portuguese, its original language), its operation and some impressions from its establishment and first activities.

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Development

The approach used in the design of the project was based on the references of Educating Cities and STS (Science, Technology, Society) together with Environmental education, focusing on the educational potential of physical spaces - especially those that allow reflections and experiences of interrelationship between Science, Technology, Society and Environment - and their social representations (Fabrício, 2016). This articulation allows a rupture of the “walls” that limit the spaces of the institutions for the dissemination of knowledge. These walls, not necessarily in their literal sense, impose symbolic barriers, making public access difficult, either due to lack of interest, ignorance of their function or, also, due to the absence of what Chassot (2010) calls a “minimum scientific literacy”.

Our efforts were aimed at the development of a platform that facilitates the processes of knowledge diffusion, starting from spaces of collective, daily life and of meeting and sharing with others, as we believe that this perspective can provide unique opportunities for reflection in the face of challenges imposed by today's society. We believe it because the construction of our biographies directly depends on the social articulations we establish in different contexts, allowing us to appropriate, from our experience, meanings concerning the world we live in.

As Bondía (2002) reminds us, what we understand as experience is an individual and relative knowledge, which carries our subjectivity. Such a perspective is close to that of a reader, who, in surrendering to reading, finds a multiplicity of meanings, opening up new dimensions where supposedly only uniformity is offered (Forster, 2012).

Considering such thoughts, the project turned to the development of an alternative to traditional Science Museums and Centers to be implemented in one of the campuses of the Federal University of São Carlos, located in the city of São Carlos, state of São Paulo, Brazil, in a first experimental stage to, later, be adopted also in the other three campuses of the institution, in the cities of Araras, Sorocaba and Buri, all in the same Brazilian state. Therefore, it departed from three central points: mapping and definition of visitation itineraries; design and development of the platform; and development of specific content for each itinerary.

Results

The itineraries took into account the definition of points of interest for the dissemination actions, based on the specificities of the areas of knowledge and considering the physical aspects of the campus spaces, as well as the dynamics of its visitors. A number of 17 points were established for the first stage of the project, related to all areas of knowledge present at the University. Such points are linked to spaces that refer from Philosophy to Engineering, passing through Biological Sciences, Chemistry, Computing and Health Sciences, among other areas of knowledge. From the definition of these landmarks, it was possible to set up a circular itinerary around the campus, observing the priority routes for the movement of pedestrians.

The points of interest were identified as: Bento Prado Júnior – Philosophy; Ramon Margalef – Limnology; Marie Curie – Chemistry; Charles Darwin – Biological Sciences; Leonardo Da Vinci – Engineering; Ernst Ruska – Microscopy; Galileo Galilei – Astronomy; Alan Turing – Mathematics and Computing; Carlos Chagas – Medicine; Ana Néri – Health Sciences; Leon Battista Alberti – interdisciplinarity; Gertrude Cox – Statistics; Alexandria Library – access to knowledge; Albert Einstein – Physics; Edmundo Navarro de Andrade – Ecology and Conservation; Al-Qarawiyyin –

university; Paulo Freire – Education. At each of the points, the physical support related to the theme is located, as shown in Figures 1.a and 1.b.

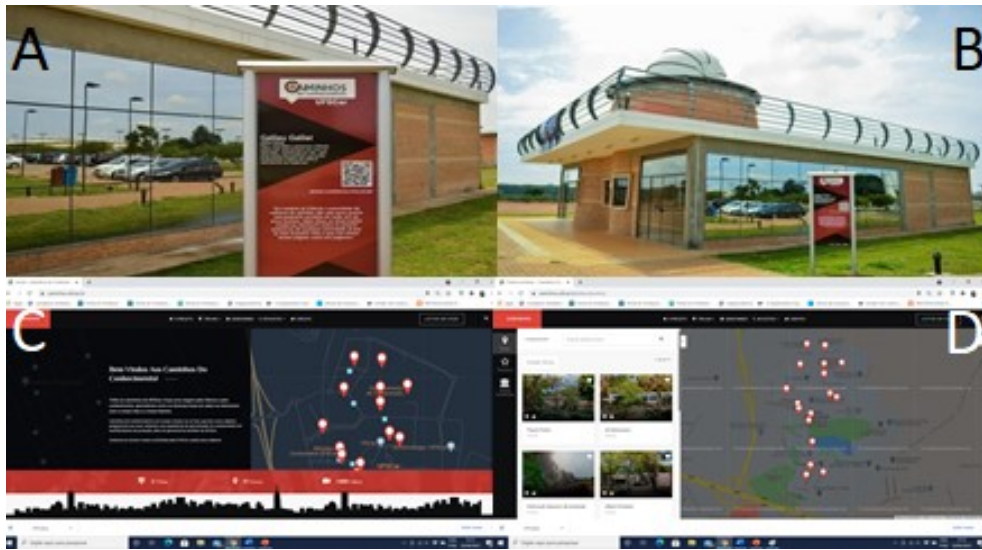


Fig. 1: a. and b. Physical support (totems) with information and QR codes; c. and d. Virtual interface.

The physical support platform presents the names of the points, informative texts on the area of knowledge and QR Codes that allow access by cell phones and tablets to the virtual support of the museum. The system interfaces are shown in Figures 1.c and 1.d.

In the web version it is possible to go through the entire itinerary of the museum having access to the contents remotely. In the mobile version, it is only possible to access content by reading the QR code in order to stimulate the movement around the campus, bringing the virtual experience closer to the concrete experience in the spaces where knowledge is built.



Fig. 2: First series that constitute the 2 tracks in operation, a. image from some of the episodes of the “Knowledge Paths” series and b. characters from the series “The adventures of Ultraviolet and her companion Photon”.

In addition to accessing the Museum's virtual content using mobile devices, visitors can access the University's laboratories and chat directly with some of its researchers. This access to the laboratories, however, is only offered on guided visits, individual or for groups, scheduled in advance with the project monitors.

Currently two itineraries are in operation, the ‘Knowledge Trail’ - which passes through all points and addresses all areas of knowledge - and the ‘Light Trail’ - aimed at children and with a shorter itinerary. The video series of each of the tracks are represented in Figures 2.a and 2.b.

Conclusions

The beta version of “Knowledge Paths” started operating in 2015 and since then it has had more than 8,000 accesses via mobile and around 12,000 via the web. The project has proved to be an interesting alternative to traditional Science Centers and Museums, considering costs involved, no need of physical collections and also the flexibility offered by the platform, with the possibility to add new themes and contents.

From the launch of version 2.0 and with the end of the pandemic restrictions, the monitored activities will be intensified, with an increase in the number of monitors and the provision of a greater number of available hours and partner laboratories that are willing to receive visitors, which will make it possible to conduct more complete research on the impressions and perceptions of museum visitors.

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