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Successful Experiences and Good Practices
in Chemistry Education

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CHEMISTRY DISSEMINATION THROUGH CIÊNCIA@BRAGANÇA PROJECT

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Abstract

Ciência@Bragança was a pioneer project developed at Bragança - Portugal, in an interesting and regular cooperation between a research institution (IPB), a science museum (CCVB) and several media (press, radio and television) during a period of two years.

The project aimed to bring science closer to the population, allowing it to discover new concepts and bringing awareness to different subjects related to several scientific domains, including chemistry. The diffusion of scientific information was accomplished through the local press, regional radio stations and television programs and also through posters with scientific curiosities in the city urban furniture. All scientific materials produced are available at the project website www.cienciabraganca.pt.

Chemistry was a particularly interesting area explored during this project for its widespread use in daily routine. In the scope of the project, several scientific materials have been published, which covered topics on chemistry and its applications, namely food chemistry, essential oils from native plants, chemistry and bioactivity of edible mushrooms, soap manufacture, among many others.

It is possible to conclude that this project promoted and disseminated scientific and technological knowledge, particularly in the chemistry and related fields.

1. Introduction

According to Bybee & McCrae [1], scientific literacy leads to and depends on scientific knowledge. The application of this knowledge allows formulating new questions and hypothesis, explaining scientific phenomena or even acquiring new knowledge. High levels of scientific literacy and the individuals' ability to apply scientific knowledge in everyday situations, currently have, more than ever, an unquestionable importance [2-3]. Ciência@Bragança project contributed undoubtedly to increase the population scientific literacy. It is defined as an initiative for the dissemination of science and technology, promoting the acquisition of new knowledge and allowing the population to interpret, relate and apply this knowledge to daily life phenomena.

Ciência@Bragança was a pioneer project developed in Bragança - Portugal, in an interesting and regular cooperation between a research institution (Instituto Politécnico de Bragança - IPB), a science museum (Centro de Ciência Viva de Bragança - CCVB), three press agents (Jornal Nordeste, Jornal Mensageiro de Bragança and Jornal Outra Presença), two radio stations (Rádio Brigantia and Rádio RBA) and one television contents producer (Localvisão TV). This project had the duration of two years (2011-2013).

The project aimed to bring science closer to the population, allowing the local inhabitants to discover new concepts and bringing awareness regarding different subjects in several scientific domains, such as chemistry.

The diffusion of scientific information was accomplished through the local press, regional radio stations and television programs as well as through posters with scientific curiosities in the city urban furniture.

1.1 Ciência@Bragança

In the scope of the Ciência@Bragança project, several scientific materials were designed, developed and produced. All of them were made available in the project website www.cienciabraganca.pt, purposely designed to store and organize all the information. The website also includes a participatory space consisting of a "scientific office" where internet users can ask questions that were answered by teachers and researchers working with science in their professional activity.

Simultaneously, a Facebook page was also created, aiming at extending the project scope to wider target audiences. Its current 2114 subscribers have, at their disposal, access to various scientific curiosities.

Alongside the social network, a newsletter was created, on a weekly basis, in order to inform and engage the target population. The newsletter had 43 digital editions and can be downloaded after signing on the "Newsletter" module in the project site.

1.2 Ciência@Bragança products

The outcome was a total of 652 science communication products, gathering contributions from 130 researchers in many scientific areas (see Table 1). The 288 scientific posters were displayed in bus stops and other street furniture. The 144 press articles were published regularly, on a weekly basis, providing more in-depth information. Radio spots were also used to inform and to explain several curiosities to the audience. Finally, 76 TV episodes were directed and made available on the Internet. In particular 129 chemistry products were made (N.C. products) (Table 1).

Table 1. Total scientific products

Media institutions	N. products	N. C. products
Press	144	24
Radio	144	35
TV	76	18
Scientific posters	288	52

Although the products covered several scientific domains, chemistry was a particularly interesting area because of its widespread use in everyday life. In the scope of the project, several materials covering topics on chemistry and its applications have been produced, concerning food chemistry, native plants essential oils, chemistry and bioactivity of edible mushrooms, soap manufacture, and many others.

2. Impact on society

The availability of this sheer number of scientific products, in several media and formats, lead us to organize two surveys, one directed to the general public and the other to the media partners of the project. Their goal was to collect information about the perceptions of the impact that the initiative was having within the Bragança community. Moreover, we also analysed the results to realize how the project could be improved for future editions.

The investigation was carried out among partners in the form of a structured interview, according to a preconceived script. Five interviews were conducted from 22 to 30 January 2013 at each partner, to the person which most closely followed the project.

All the interviewees were informed in detail about the various aspects of the project. The results of the interview allowed us to realize that, in their opinion, the items/products do, effectively, reach the population, because of the accessible language and interesting subjects. They also agree that most of the products have a very good quality.

Regarding the population survey, we followed a face-to-face questionnaire, carried out in the streets of Bragança, to a random sample of 100 people, between 2 and 10 May 2013; 50% of the answers came from females and 50% from males. Their ages were mostly situated between 31 and 64 years (56%), with most of them being students (26%), teachers (22%) and retired (16%). A significant percentage (34%) had a higher education degree. The survey consisted of four simple questions (Table 2).

Table 2. Questionnaire answers

Questions	Yes	No
Do you know the project?	52%	48%
Do you know where the project is published?	62%	38%
Do you think the language used is accessible?	55%	45%
Did you discuss some topic with someone?	50%	50%

Regarding the question "Do you know the project?", the answers were almost perfectly split between "yes" and "no". Fifty-two percent heard about the project, mainly through posters located at strategic points in city (27%), but also through friends (15%), teachers (15%) and over the internet (12%).

Regarding the question "Do you know where the project is published?", the posters got the majority of answers (62%).

The subjects that attracted the most attention of the local population were related to health (10%), and the majority believed that the kind of language used was accessible (55%). Half of the population interviewed (50%) discussed some topic with someone, mostly with colleagues (48%) and family (32%).

Finally, when asked about the subjects they would like to see discussed, the opinions were diverse. The greatest emphasis was given to health, illness and healing (18%), economy, crisis, money and savings (18%), research results and scientific discoveries (16%) and new technologies, computers (12%). Finally, issues related to biology, nature and environment (10%) and general themes related to people (8%) have also been mentioned.

After analysis of this survey, the project team devoted extra attention to the topics that most interested the population, in subsequent products.

Since audiometric studies are extremely expensive, the numbers presented below are estimates based on certain criteria, established by the media partners.

Press

- "Nordeste" Journal – Weekly newspaper with 4500 subscribers. Further 1000 copies are freely distributed with the "Expresso" Journal and 400 copies are put on sale on newsstands.
- "O Mensageiro de Bragança" Journal – 5000 copies are distributed, shared by subscribers of the publication and sales in various points.

Radio

- "RBA Radio" – Without precise estimates, the group of broadcasters RBA, emits in three frequencies strategically located in the interior north of Portugal, covering the districts of Vila Real (207 thousand inhabitants) and Bragança (136 thousand inhabitants), but also part of unquantifiable districts of Viseu, Guarda, and Braga. The broadcast also covers some territory in Spain, in the provinces of Galicia and Castile-Leon.

- "Brigantia Radio" – According to the coverage map of Radio Brigantia Group, the range is estimated at 500 thousand people, in the districts of Bragança and Vila Real, but also in parts of the districts of Viseu and Guarda. From estimates based on direct daily programs, which include participation of listeners, with about 50 to 60 daily calls, it is estimated that the rubrics issued under this project may daily reach around 50-60 thousand people, in average. It is estimated that the number of distinct individuals that actually were exposed to scientific rubrics is between 100 and 120 thousand people.

Television

- "Localvisão TV" – The set of all video productions, available online, had a total of 10934 views. The long term documentaries were also produced in a DVD version. Starting in October 2012, the production company diffused the contents through a cable channel included in the offer of many cable TV operators, which greatly increased the dimension of exposure to the public. There are no audiometric studies, but the responsible for "Localvisão TV" estimate that the channel's audience is between 40 and 80 thousand people on average daily.

It is expected that the impact of this project, which formally ended in late 2013, may be effective beyond the period during which it ran. The project website will remain online for a period of at least two years. The contents posted will be integrated in thematic activities to be held at Centro Ciência Viva de Bragança, and used as a showcase of research produced by the Polytechnic Institute of Bragança.

3. Conclusion

Ciência@Bragança project was a challenge that improved the connection between the scientific community of IPB and CCVB and the population.

It is possible to conclude that this project promoted and disseminated scientific and technological knowledge, particularly in the chemistry and related fields, contributing to health promotion and to the increase of scientific literacy of the northeaster Portuguese population.

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