

## Comment

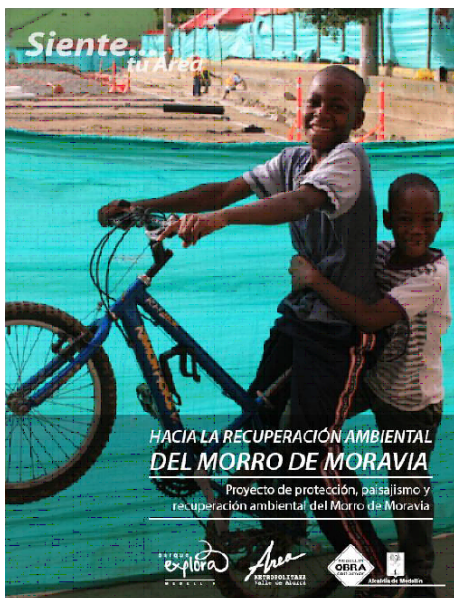
### SOCIALLY INCLUSIVE SCIENCE COMMUNICATION

## Science Centers. Which role can they play to participate in a city social reconstruction?

**Claudia Aguirre**

**ABSTRACT:** *Science centers are seen as places for the communication of science very focused on the mise en scène of the content and the methodologies of natural sciences. However, in recent history, these institutions are transforming their role within the education and transformation processes taking place in the society they are engaged with. This communication presents a social project in Medellín, Colombia, that involves a vulnerable community, the local authorities of the city, academic institutions and NGOs, and a science center in the neighborhood of this community.*

### 1 Introduction



**Figure 1.** Poster of the project.

Usually science centers are seen as places to communicate science in a fun way; to engage citizens in scientific or technological discussions related with their lives; to support and accompany school processes in K-12; even to promote vocations for the allegedly declining science and engineering higher education programs. There is an image of these institutions very focused on the *mise en scène* of content and methodologies associated with the world of the natural sciences. However, in recent times, expressions like “public engagement”, “social appropriation of science”, “citizenship education”, and “social inclusion” are increasingly evoked in these institutions, which reflects a major transformation of the science center role and a new involvement within the education and transformation processes taking place in the society they are engaged with.

The role played by each museum or science center deeply depends on the context in which it is immersed. And it is for this reason that in the history of a city marked by a violent past, drug trafficking and an inherent inequity such as Medellín, the appearance on the scene of a science center opens a range of possibilities in the form of a dialogue established between the various actors in the society.

This article reflects on a social project involving the interdisciplinary work of many actors in Medellín: a supremely vulnerable community because of living conditions and environment; the City Hall and environmental authorities of the city; universities, academic institutions and NGOs that proposed solutions to an old problem (the permanent installation of 2,654 families on a mountain of garbage); and finally a science center that was involved with the community in a joint search for alternative languages to promote horizontally a dialogue on social and environmental issues.

## **2 Medellín: its recent past**

Medellín is located 1,479 meters above sea level, in the Valley of Aburrá River in the central Andes cordillera of northwestern Colombia. Its formation as a metropolis is recent and consolidated in the mid-twentieth century as the most important industrial city in Colombia.

However, its rate of urbanization merely reflects the poverty and lack of options in the Colombian countryside and the best conditions and opportunities in the city. Forced displacement has also played an important role both in the time of La Violencia, when refugees from around the country rose slums near the historic center, as well as in recent decades, when informal settlements were established in the upper parts of the city [7].

In the last decades of the twentieth century, in the context of a spectacular bonanza for cocaine trafficking, critical sectors of the state — including justice and public authorities — were paralyzed by corruption, violence and terror, while the society was also paralyzed by impunity, fear and complicity [7].

In this atmosphere of uncertainty and lack of clearness, in the early twenty-first century, a wave of politicians with academic background arose, who were committed to advocate for education and culture as a solution to the more substantial problems. The periods 2004–2007 and 2008–2011 correspond to the term of two mayors, a mathematician and a sociologist respectively, who believed and invested in projects where education was the primary means but also the main goal of their administration.

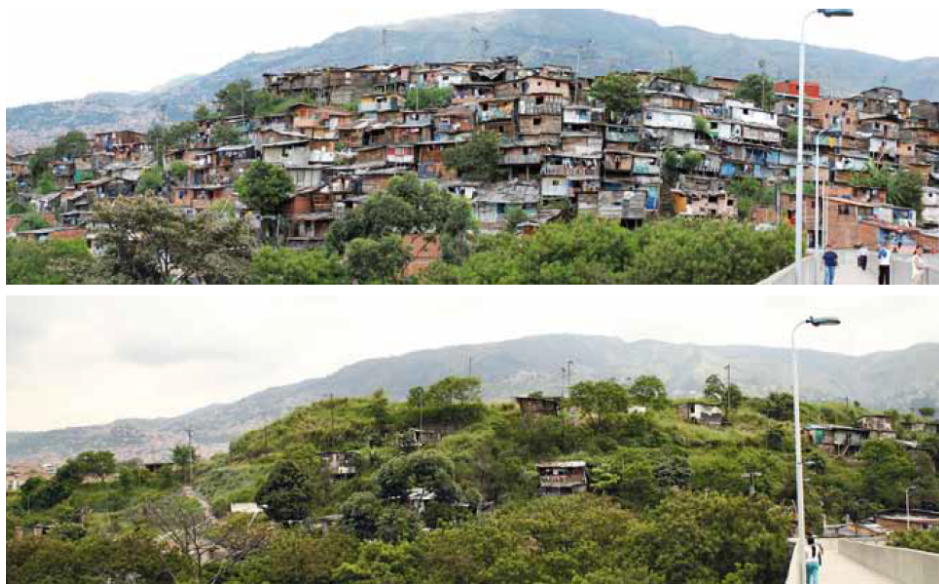
During this time large facilities such as the Library Parks, Quality Schools and Parque Explora were built. The city, with its urban policies, aimed at restoring peace and equity, making comprehensive urban projects in the poorest and most violent areas, under the conviction the idea that architecture and planning works go hand in hand with profound social and cultural changes in the communities.

### 3 Moravia

The Moravia area belongs to a zone of great vulnerability, with an index of human development and quality of life far below the rest of the valley. Moravia belongs to commune 4 and constitutes nearly 7% of the total population of the city.<sup>1</sup>

This neighborhood was developed in a strategically located land. Around 1977 the Mayor established the municipal dump there, which caused thousands of families displaced by the Colombian armed conflict or attracted by the economic boom of Medellin to settle there, and make recycling waste their means of subsistence. When the dump was closed in 1984, approximately 17,000 people lived in the environment known as El Morro (hill) of Moravia.

According to the census of 2004 made for the “Project of Integrated Intervention in Moravia and its area of influence”, 2,654 families were living in 10 acres of lands.<sup>2</sup> This mountain, 35 meters high, was totally made up by 1.5 million tons of garbage [8]. Soil instability, steep slopes, fragile constructions, the presence of industrial, clinical and domestic waste and the continuous release of toxic gases and leachate, made the inhabitants of Moravia subject to high chemical and microbiological risks. In 2006 it was declared a public calamity by the Ministry of Interior and Justice.<sup>3</sup>



**Figure 2.** Comparison of the brow of the hill of garbage 2004 (above)–2011 (below). A. Unknown/© Daniel Viadé [8].

<sup>1</sup>Perfil Sociodemográfico 2005–2015, Comuna 04 Aranjuez. Resultados Convenio Interadministrativo DANE-Municipio de Medellin. Agosto 2010.

<sup>2</sup>Programa de reasentamiento de la población del barrio Moravia, localizada en zonas de alto riesgo, o afectada por el macroproyecto urbano de Moravia y su área de influencia. PDF displayed in Medellin website <http://www.medellin.gov.co>

<sup>3</sup>Gaceta Oficial No. 2882. Resolución 984 de 2006.

By now Moravia is still a place with problems ranging from severe environmental pollution to issues of safety and displacement for residents. That's why it became necessary to develop processes to achieve social promotion with an educational impact in this area; by building scenarios which would encourage cultural exchange and environmental education through respect for a social endeavour. That's the main purpose of Parque Explora.

#### 4 Parque Explora

Parque Explora is a Science Center created for the appropriation and popularization of science and technology. It was conceived as part of the city's development program. Located in Moravia, in the northeast of Medellin, it is surrounded by the main Regional University, the Botanical Garden, an amusement park and a public square mostly visited by students and neighbors. This cultural pole has been conceived as an urban integrated space, aimed at the educational, cultural and touristic development of the city.



**Figure 3.** Parque Explora. In the upper right, the Moravia sector. ©Carlos Tobón.

Before its opening in 2007, Explora has developed a program with its neighbors, the inhabitants of the Moravia sector: the *Social Management Program*.

This Program has become an integrated department of the Park's Educational and Content Direction for articulating and developing programs to foster neighbouring communities reception to science and technology, to strengthen bonds with its immediate surroundings and to contribute to the reduction of the existing technology gap of the inhabitants of this area of the city.



**Figure 4.** Workshops in Explora with its Moravia neighbors. AMVA Project. © Biviana Alvarez.

A *social management policy* has been established, based upon four pillars that serve as a conceptual basis for the performance of intervention exercises. It strengthens the science center as an open space of the city for permanent dialogues and in tune with the urban transformations and dynamics.



**Figure 5.** Environmental Workshop. AMVA project, 2011. ©Biviana Álvarez.

The goal is to generate links that endow a sense of the physical infrastructure through the narratives; life stories and social appropriation which the participant communities generate when developing processes in which they recognize diversity as a transformation agent. For this reason a dialogic exercise was proposed from the local administration to Explora.

## 5 AMVA project

The environmental control agency of the Valley (Área Metropolitana del Valle de Aburrá -AMVA-), The office of the City Hall for Moravia, and Parque Explora joined forces to support the social and communication processes of environmental recovery of El Morro (Moravia Hill).



**Figure 6.** El Morro de Moravia. ©Biviana Álvarez.

AMVA has been leading environmental recovery activities in the Moravia Hill for several years now, but despite the time and the processes, communication between government agencies and the community remains a critical factor in the development of activities, specifically for the area of Moravia. Strong leader figures, with complex political and social histories, live there. Most of them have been victims of violence and displacement by the Colombian conflict which spans over 70 years.

AMVA considered the inclusion of the population from the area of influence of El Morro crucial in the generation, appropriation and communication of scientific knowledge and research about environmental recovery actions, to make for a smoother conversation.

AMVA considered it appropriate to join forces with Parque Explora for the development of this project for several reasons: its proximity to the area of influence; its experience in the development of educational, technological and innovation processes; its commitment to contribute to the development of vulnerable communities; and finally as a way to ensure the sustainability of the project with an institution constantly present in the territory.

The main purpose of the project was to combine efforts for social support, communication, research and education in order to achieve an environmental, social and landscape balance for the hill of Moravia.



**Figure 7.** Part of the landscape recovery of the Morro. ©Biviana Álvarez.

With the joint work of the entities involved in the project two fundamental parts were developed: one concerning the *Education and Participatory Management* of the project and the other related to the *Dissemination and Positioning* of the project among different public, private and community actors. The aim was to generate environmental, educational and cultural fallout from the inhabitants of the area of influence of the project over the inhabitants of the rest of Medellín.

The first part, the educational and participatory management, was aimed at the following objectives:

- Qualitative diagnosis of the sector and *état de l'art* of processes of social communication and culture appropriation developed in the area of influence of the Morro de Moravia.
- Assessment of the general characterization of the population through ethnographic tools.
- Content design through diagnosis, intervention and evaluation models for each stage of the project.
- Strengthening and consolidating research “Seedbeds” in topics of neighborhood memory and urban environments.
- Dynamization of massive networking events in the neighborhood with the Exploramóvil and the Science Theater Company.
- Training of eight neighborhood leaders, who acted as promoters of Community Environmental Recovery in the Morro and were the guides for the local Routes.
- Routes from Explora to Moravia that transited various sectors of the district, up to the Morro sector to observe the processes of transformation.

The final two components were crucial to the intervention project in Moravia. First, the training of leaders, who also participated in the “Seedbeds” and workshops, was fundamental in establishing a better level of dialogue with the community. When the intervention and relocation of families began, the communication was unsuccessful: for residents of El Morro, the City Hall was arbitrarily taking away their home, their livelihood (as many of them planted their food on the floor garbage, cooked with gas coming out of the mountain of waste, and also worked in the recycling of materials), their social relations, neighbors and family, all without any explanation.

For the City Hall it was evident that in addition to the declaration of public calamity and the urban landscape implications, there was a major public health problem, which was literally cooking there. But direct conversation never took place.

The strategy proposed by Explora consisted in the training of leaders so that would experience firsthand what were the scientific, technical, technological and health implications of the projects developed by the City Hall, the AMVA and other institutions (universities, NGOs, research centers, etc.). An example of the experimental activities carried out during this time, about soil pH:

#### **Acid such as lemon, basic as soap**

The substances in the soil can affect the growth and quality of vegetation and crops that are planted there. We will demonstrate with hands in the dough — or better in soils —.

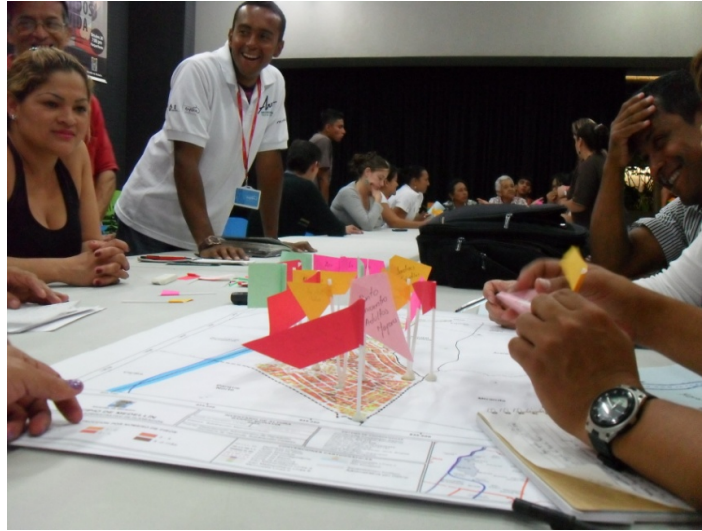
Do you now dare to cook a salad with slices of tires and batteries?



**Figure 8.** Workshop in Explora. Acid such as lemon, basic as soap. ©Biviana Álvarez.



Thanks to the workshops and training, the leaders recognized the environmental, social and landscape characteristics of the process taking place in Moravia through institutions, and could replicate them. The leaders were gathered through various community organizations, selected on the basis of their experience in community management. Their communication, ethnographic and project development skills were reinforced through specific trainings.



**Figure 9.** Cartography workshop in Explora. AMVA Project. ©Biviana Álvarez.

For the second part, *Dissemination and Positioning* of the project, a communication plan was developed, including one which was very important in the development of Routes: with the help of the community several *perceptions maps* were built about the central themes of the project. Participants described the way they relate to the transformed spaces, revealing the social attitudes and perceptions towards the activities conducted by the various institutions involved in the recovery process. This process resulted in a series of readings in the area, mostly listed in the map in Figure 10.

Explora was the starting point for the Routes to gain the chance of recognizing in some of the interactive exhibits on display key aspects of urban morphology, materials and elements that compose Medellín; moreover of developing some tools to reflect on the transformation of the city, particularly in Moravia. These Routes involved more than 3,000 people of District 4 (the District that Moravia belongs to) and 5,000 people from the rest of the city.

The first step was the interaction with a giant map of Medellín, in which the boundaries of the district were identified and the relevance of the territory of Moravia within the city. From there an experimental activity was carried out to give the participants an idea of the impairment of the soil by pollutants. Then, rather than tell the whole story, some landmarks in the neighborhood would display some features characteristic of the transformation of the sector.

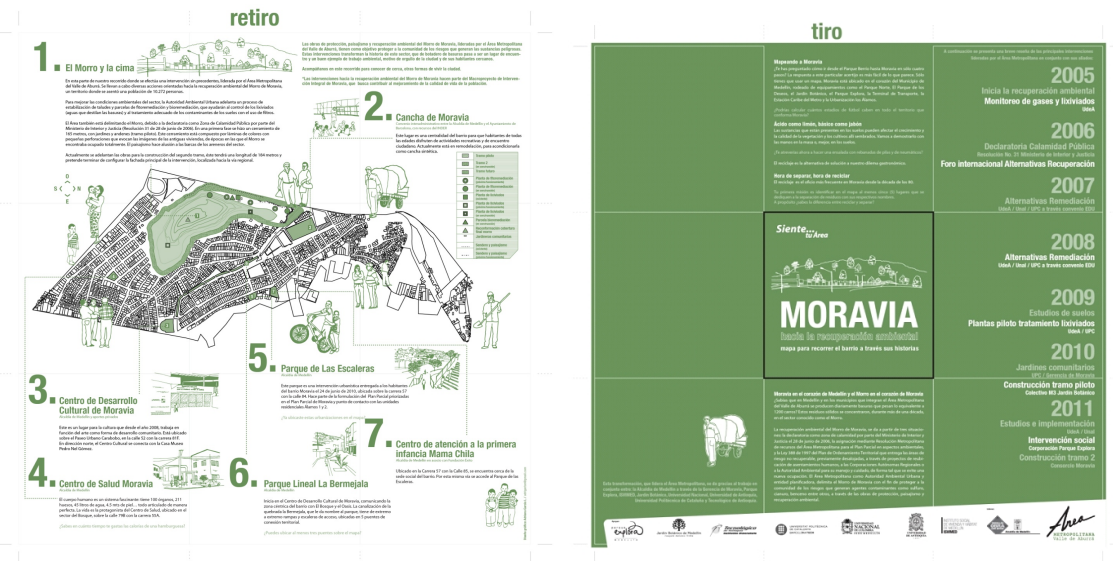


Figure 10. Map.

The Routes ended in the Morro sector to compare the insights gained from the science center, alternative spaces and experimental activities, with the reality of the environmental process in the hill. The emphasis was put on the recovery process (Phyto-remediation, leachate plant and enclosure) and on a process of reflection on cultural identity, neighborhood memory and heritage.

These routes were part of informal learning processes, focusing on offering better incentives for the understanding of some key actions in the processes of environmental transformation of El Morro. In addition, strategies on reflection about memory were developed through neighborhood stories, previously built with the communities of the “seedbeds”. The Routes were not tourist or informative routes, but field trips that allowed contrasts to be highlighted and stimulated reflections, keeping as central El Morro de Moravia.

### 6 Few final thoughts

Nowadays, almost all of the families who lived in El Morro have been relocated elsewhere in the City. However, this has created new social issues such as violence, unemployment, uprooting, mobility and access difficulties and integration problems in the new quarters.

Several of the leaders who worked on this project continue today to participate in guided tours through the neighborhood, as in the last World Urban Forum organized by the UN in Medellin from 11 to 15 April 2014.

The process described in this article of promoting in each component the development of individual as well as social interaction experiences motivated the strengthening of citizenship skills.



**Figure 11.** Route by Moravia. 2011. ©Biviana Álvarez.

Some reflections that resulted from this project, and are still considered in Parque Explora for future formulations of social appropriation of knowledge projects, are:

- Science museums should engage in creating scenarios for different audiences based on scientific and citizenship skills. This constant dialogue with various communities plays a key role. Communicating scientific or technological content regardless of the context in which this communication happens is not enough.
- It is necessary that citizens are offered different scenarios — science museums, but also, zoos, botanical gardens, etc. — to nurture reflection and knowledge sharing on topics of their interest. This not only helps keeping communities informed, but also engaged in local development processes.
- Working with developers and neighborhood leaders in vulnerable communities allows not only a close relationship with the population, but becomes a space for reflection on the reality of the target communities, and engages participants in the process even when the institutional presence ends.
- Alternative languages such as art, science and experimental activities become relevant for the approach to complex communities, which are more easily committed to the processes if they feel involved in the formulation and understanding of the problem. Community activities, rather than information scenarios, should be thought of as strategies of exchange of knowledge and discourses that belong to conciliation processes.

Finally, the science center must be aware of the limits of its intervention. The processes of social and communication intervention with resettled populations should in-

clude programs of direct social support, which means that a practical support to learn about other needs of the population, depending on their quality of life and access to basic resources, is required.

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