

**Marginalized communities and their social inclusion: the emergence of a target public in México for science communication**

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**Abstract**

In Mexico, as in many Latin American countries, poverty and marginalization in areas of rural and indigenous population has generated a systematic exclusion of several communities. This situation includes no access to health care, fresh water, electricity nor education, as well as a segregation from any contact with science. Thus, the communities in this context have a set of particular attributes as social groups. Nevertheless, it has to be acknowledged that popularization strategies in general have ignored these contexts in alternatives that focus on closing the gaps between science and society. In fact, the attention has been focused mainly with mass and social media in urban settings, which adds more to the exclusion of the rural sector in Mexico.

However, marginalized communities in Latin America should receive a priority attention from public communication of science. This intention should be translated into strategies designed with objectives that focus on their current contexts, issues and needs. We should also support, through the use of participatory strategies, the processes of social appropriation of knowledge that will contribute to their social inclusion. These initiatives, if planned through a series of knowledge interfaces, represent a good alternative to top-down models or any sporadic activity within traditional practices of science communication. The foregoing has been demonstrated by the present research, a

case study about three fisher communities from Alvarado, Veracruz, Mexico, that moved away from traditional fishing to aquaculture through a 15-year process of interaction with scientists and scholars from the University of Veracruz. It is to noticed, that the University is embedded in the southeast region of Mexico, which represents the 84% of marginalized communities in the country and encloses 50% of the illiterate population.

## **Introduction**

Mexican state of Veracruz is populated by seven and a half million people. More than 70 per cent of its inhabitants live in certain degree of poverty; two million people did not finish primary school, almost 900 thousand are illiterate, 500 thousand are indigenous people, and more than 12 thousand districts endure some degree of social deprivation (CONEVAL, 2012). Although the estimates vary depending on data analysis methodologies, the established number of poor people (or “excluded from development”, as they are called in the official reports) is set to 53 million for Mexico (*Ibid.*), and 164 million for Latin America (CEPAL, 2013).

If science communication is seeking to close the gap between science and society, and to reach out the widest possible audience (Calvo, 2003), then should it concentrate its efforts only to those living in urban zones, who are studying or have studied, or to those with internet and media access, who are able to visit museums, go to conferences, buy books, magazines or newspapers? The answers seems obvious; nevertheless, empiric data confirms the exclusion of marginalized groups, rarely taken into consideration by science communication initiatives.

On the other hand, in marginalized planned interventions occur often, as part of many initiatives from academic institutions, social and government organizations, looking for a way to influence on the every day practices of the local actors. These “knowledge interfaces” (Long, 2007), being co-existing interactions between various kinds of knowledge with differing power quotas, generate symbolic disputes and opposition which preclude communication among participants –herein understood as meaning sharing rather than information transfer–, and hamper individual and collective action when facing environmental emergencies.

However, evidence shows that the interfaces may generate an effective

transformation of the practices and mutual learning among the main participating actors, although there are few studies analyzing the factors that contribute to achieving it. This research represents a contribution to this area; it sought to understand, from a sociocultural, diachronic and qualitative perspective, if the interaction between the bearers of scientific knowledge and local knowledge influences the symbolic reconfiguration of knowledge, and how this process operates in a long-term interface (15 years). This study derived from a study case involving three fisher communities in Alvarado, state Veracruz, Mexico, who moved from their traditional fishing techniques to aquaculture by interacting with scientists and academics from Universidad Veracruzana, the state's university, a transformation that reduced the economical vulnerability and poverty level of the local actors.

This analysis may be used as a model to reinforce the emergence of marginalized groups and communities as the central audience for public communication of science, and to provide a landmark for the creation of alternative strategies to the exchange of knowledge among asymmetric power spheres.

### **Methodology**

The approach for this study was guided by the phenomenological perspective of Alfred Schütz, an important theoretical referent that aids in the devising of the symbolic routes that come along with the transformation of the productive practices on this case study. The ways of engagement, knowledge itself, motives and action courses, together with their spatial-temporal displacements, allow to locate the meaning coordinates that influence the process.

Hermeneutics, as a methodology, guides the analysis of the discursive reconstruction of the experience lived by the participating actors. 11 semi-structured interviews (six of them to the fishermen, five to the university staff) bring along the symbolical structures that work as a framework which guides everyday life, and also provide the key to re-think the tensions and balances involved in knowledge interfaces. Such interfaces are the starting point for the proposition of new approaches within science communication to planned interventions, and they are also fundamental in marginalized scenarios where communitarian actions is crucial to face diverse situations,

including environmental emergency and poverty.

## **Results**

Since this is not a quantitative research, only some of the elements of the hermeneutical approach to the social phenomenon are presented as the results, emphasizing particularly on the perspective of the communities from the case study and their local knowledge.

Within the complex settings of what is meaningful for the local actors—who live on educational and socioeconomical deprivation, as mentioned before—scientific knowledge lacks the empirical referents because science's logical and schemes, concepts and specialized language lack of meaningfulness to them. Other reasons include the fact that such communities privilege everyday life practical knowledge and traditions, there, scientific knowledge lacks the high status the academy has granted it, because of its attributes of rationality, truth, rigor and universality.

The initial interaction in the present case study focused on the emotive factor as first contact, rather than knowledge itself. This form of interaction implies, from the communities' perspective, an oblique introduction of scientific knowledge in the community's way of life. Such introduction also implies the decentralization of expert's knowledge during the carrying out of the projects, according to the local actors.

The reconstruction of this experience offers elements to think about a sudden shift in the status that scientific knowledge acquires within the community's meaning frameworks as it is implemented. This displacement does not reduce the emotiveness of the interactions, which keeps strengthens in parallel. The new knowledge separates from the academics to play an active role in the lives of people from the community.

Although the fishermen interpret their appropriation of scientific knowledge as a collateral consequence from the interaction, much less meaningful than its emotive consequences, a large part of their productive practices gradually transforms into very different logics from the traditional ones; among them there is the control exerted over the variables in the production of "cultivated" species, the tracing and rigorous monitoring of the process, the interpretation of the natural phenomena through the use of technical concepts, and the cost-benefits balance.

For the members of the community, it is in practice where scientific knowledge acquires meaningfulness, especially in the inquiry stage. This process is not exempt of contradictions and conflicts derived from the disparity between the knowledge systems and rationality that supports them: tradition and direct experience on the local level; validation and collective construction through rigorous and verifiable methods on the scientific.

The symbolical reconfiguration of the local body of knowledge, where new information is included and assimilated into their lives, becomes crucial to their everyday life practices, although their explicit acknowledgement seems absent. This is mechanism that allows putting forward the idea that new knowledge does not substitute previous one, but it integrates to their existing one, thus making scientific knowledge compatible with the community's own meanings framework. In the case under study, the knowledge became integrated in a subtle way, mingled with meaningful experiences which relate more with the other's experience and subjectivity in daily contact than with the scientific knowledge per se, that is, the reconfiguration of the body of local knowledge integrates with scientific knowledge together with the experience of being in contact with those who transmit it.

This interpretative proposal of the process of inquiring into the community's own temporal and spatial coordinates, and within their own meanings framework (which is where the new knowledge becomes meaningful), renders instrumental approaches, which intend to transmit scientific knowledge through discourse, however colloquial or, in the best of cases, reiterated, questionable.

## **Discussion**

Although literature on science communication collects a vast amount of definitions and related terms on this activity, be it as a practical field or as field of study, a common element present in almost all the reviewed approaches is the network concept of "audiences" (Fayard, 2004, Burns, O'Connor, y Stocklmayer, 2007), understood as groups of individuals who share customs, norms, social interactions, needs, interests, attitudes and knowledge level (Lewenstein, 1998). Apart from these features, socially structured contexts should be taken into consideration.

The concept of audience should suffice to ask and answer the appropriate questions when seeking to work as a mediator, promoter or inspector to promote the communication mechanisms between science and society, be it in the individual, collective, group, massive or personal levels. Promoters should consider the following questions: what kind of science should science communication promote and for what purpose? What answers are sought/expected from others? What are the characteristics of these audiences? What elements should we consider when designing approximation strategies? And, also, assuming an honest stance and possessing good evaluation tools: are we accomplishing our objective?

After reflecting and interpreting the data from the case study, I dare to put forward some easily recognizable basic facts, outcomes on previous discourses, as well as to question some of the proposed alternatives meant to close the gap between science and society (especially the gap between scientists and not scientists) through a sociocultural approach to public communication of science.

I will start by pointing out that the link we found between motivation for action, emotion and reason, in the most subjective dimension of human beings, turns out to be crucial in order to answer the research question in similar contexts to the one from our case study: How do the modes of interaction between the bearers of scientific and local knowledge influence the symbolic reconfiguration of the local body of knowledge? From the onset, by configuring the level, intensity and quality of the emotive links which set up through personal daily coexistence, which is the starting point to achieve openness to the universe of meanings that sustain communitarian knowledge, and by influencing them.

From my research question and its appropriateness I want to highlight three elements: the importance of social context for science communication processes in vulnerable and marginalized zones, the features of the ways of engagement and the enclaves that both keep the interaction in co-presence as a pathway to the construction of shared meanings. These elements reunited create a set of particularities absent from the dominating models in the science communication field. They strive to be an incentive, a pitch to research lines, to integrate the study of similar constructs in the collective development of this knowledge area.

In developing countries, maintains Castillo (2005), it is necessary to bring back

participative strategies, as there are important differences in terms of social structure, infrastructure, agency and options to be chosen by the local actors and society in general that make generation, communication (dissemination, exchange and feedback) and use of scientific knowledge (Carneiro, Da Silva, 2010) very different from those of industrialized countries. Knowledge interfaces adjust to this scheme, provided that the interactions are based in trust and compromise derived from the bidirectional exchange and the establishment of a true dialogue (Castillo 2005). If trust is attained then it is possible to establish rapport between the researchers and mediators and local actors, and to seek that the scientific knowledge is more appropriate for the everyday life of the people involved (Milligan et al. 2004).

Castillo believes that, through the efforts of practitioners and professionals of public communications of science, ecological science might be able to establish a bridge for interaction among the diverse social sectors. However, retaking the idea of quality between the links generated in this interaction, I dare to suggest that scientists themselves are able to set up the common ground through knowledge interfaces, if they are willing to let themselves be penetrated by other kinds of knowledge or to nourish the necessary attitude for horizontal and sustained dialogue, which in its turn, will depend of their own personal stories.

In fact, the study carried out in Australia by Milligan et al. (2004) on the interaction modes between researchers and citizens which generated a classificatory typology concluded by pointing out that “the personal features of the researchers, more than the research or the knowledge themselves, can be the driving force behind interaction, dialogue and communication” (p. 9).

Science and technology as extensions of the democratic project (Aibar, 1990) are put into question when it is visible that hierarchies oppose to any transfer from the “possessors of and the excluded from knowledge” (Roquepló, 1974:18). In this context, popularization of science can only function as the necessary illusion to justify science’s principle of authority, which implies that no communication strategy would be possible as “distribution”, if it is not through struggling against such ideology of power.

## **Conclusions**

By presenting this approach I am inviting to explore a research line in Public Science Communication that involves the initiatives of planned intervention as the organizers of communication strategies in marginalized, rural, vulnerable and/or indigenous zones. A model that questions the application of the deficit model, and that gives way to more complex problems by placing the cultural characteristics of a target zone and the sedimentation of knowledge as the main focus when designing projects.

Accepting this challenge may lead researchers and planners alike to re size the reach of communicative strategies or, when appropriate, to think in the long term effects as one the requirements for the science communication projects. Of course the intention is not to plan the establishment of emotional links to utilize them as a means to manipulate the decisions of a community, but to open new pathways that include elements which take into consideration the human factor in Public Science Communication, not because it is strictly necessary to combine knowledge and emotion, but because in communities, such as the one from our case study, there is no dissociation between scientific knowledge and its carriers (the scientists); moreover, because an exchange process that is able to generate changes and appropriation of knowledge that goes beyond the mere positive attitude or favorable opinions requires enough time to settle.

While the scope of this research is limited, as it outlines the analysis of a specific case, this study is a milestone to begin acknowledging the meaningfulness schemes that may serve as a guide for communities, especially those settled down in the geographical zone located in the wetlands of Alvarado, Veracruz, which implies, from the start, the acknowledgement of specific cultural guidelines and ways of acting and perceiving scientific knowledge and vice versa, as well as the motivations that determine their courses of action in planned intervention projects from government institutions and dependencies.

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