
Understanding environmental behavioural change through communication: a new perspective of environmental education

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Abstract: This paper describes a five-year research project in the field of communication sciences, focused on the communicational understanding of the concept of environmental behaviour change. In our research, responsible environmental behaviour (REB) was studied from the communication perspective in order to understand the individual and the social factors that lead to the adoption or rejection of the REB. We developed a model that explains how the concept of responsible environmental behaviour is modified and translated as the communication exchange between actors take place. Our communication model was applied to explain how REB is defined, translated and implemented in relationship to water in the case of Mexico. Perceptions and interests are key elements in the communication interactions concerning the adoption of this new behaviour. The communication perspective gives us some tools to improve the environmental education practice.

Keywords: communication; innovation; interest; Mexico; perception; responsible environmental behaviour.

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Biographical notes: Dr. Anna Kurtycz is a Mexican biologist who received her PhD in Information and Communication Sciences from Paris Nord University in 2003. Her research interests concern environmental issues, communication and environmental education. After her research work on communication and water at the Maison de Sciences de l'Homme, Paris Nord, in France, she is currently working as a Consultant and Researcher on communication and environmental education issues. She has published papers in several conference proceedings and international journals.

1 Introduction

Since its genesis in the sixties, the ecological crisis and its mediation have promoted the international reflection upon the environmental problems. Part of this reflection was done during the seventies at international conferences like the United Nations Conference on the Human Environment, Stockholm, 1972, the International Workshop on Environmental Education, Belgrade, 1995 and the Tbilisi Intergovernmental Conference

on Environmental Education, 1977. At these conferences it was presumed that in order to solve environmental problems it was necessary, besides the technical and scientific solutions, that everybody adopted a different behaviour towards the environment.

Developing a 'responsible environmental behaviour' became one of the tasks of environmental education. Unfortunately changing behaviour through environmental education confirmed itself as a difficult task. The first approaches linking knowledge to attitudes and attitudes to behaviour proved wrong in practice [1] and environmental education was forced to change and evolve its practices. Many environmental education researchers and practitioners consecrate themselves to understand the responsible environmental behaviour in order to improve environmental education.

In the field of environmental education the research on responsible environmental behaviour has been directed in two main directions: the predictors of a responsible environmental behaviour within the individual, and the link between environmental behavioural change and its outcomes in practice. Different models have been proposed in order to present the factors that environmental education have to take into account in order to shape behaviour. In most of the cases the models and predictors presented at the environmental education field have been based on the individual perspective. In the model of Hines et al. [2] for example, the responsible environmental behaviour is the product of personality factors, action skills and knowledge that influenced the intention to act [1]. Even if Hines et al. [2] presented situational factors as well, these factors are considered from the individual's point of view. In the case of Hungerford and Volk [1] their 'behaviour flow chart' presents entry level variables, ownership variables and empowerment variables that are all attributed to the individual. They talk about environmental sensitivity, personal investment, intention to act and locus of control. From her side Emmons [3] presented the environmental action model based on positive environmental action as a goal and focusing on student learning areas (as action skills, environmental concepts, attitudes and empowerment).

The research on the individual factors that shape behaviour has been very useful in guiding the environmental education practice, but it has relatively neglected to address the fact that environmental education is not isolated from social dynamics. We believe that social dynamics have also an influence in the way the behaviour is shaped. In this sense the interaction between individuals in the adoption of REB is valuable if we want to know how the individuals that adopt a particular behaviour towards the environment are influenced and influence the others, or how the interaction between individuals influence the definition, translation and implementation of the REB.

In order to enlarge the environmental education approach to the REB change, we began, in 1998, a study on communication and environmental issues at the Laboratory of Information and Communication Sciences of the Paris University, Paris 13. We use communication theories in order to understand behavioural change towards water. Our study analyses the interaction between the different actors dealing with water, specifically for the case of Mexico. It aims at identifying the communication mechanisms that people, with different interests and perceptions of water, use in order to define, translate and adopt a responsible environmental behaviour.

A communication approach can give us a new perspective of responsible environmental behaviour. It allows us to consider it not only from the individual perspective but also from a societal perspective. In this paper we will explain the communication approach to responsible environmental behaviour and the communication model that we develop to understand how the concept of REB has been defined,

translated and implemented. We will describe our particular research on REB and water. We will end with a return from the communication perspective to the environmental education practice.

2 Defining responsible environmental behaviour

Before entering our subject we have to make a stop to define what do we mean when we talk about responsible environmental behaviour. Some definitions can be found in literature. Sivec and Hungerford and, Cottrell and Graefe [4,5] define the general responsible environmental behaviour (GREB) as all individual or group action directed to do what is right to protect the environment. From her side Emmons [3] make a distinction between ‘environmental behaviour’ and ‘positive environmental action’ considering that the first one is not necessarily self-determining and that the positive environmental action “is a deliberate strategy that involves decisions, planning, implementation and reflection by an individual or a group”.

For practical purposes (and not aiming to get stuck in a debate on semantics) we will define the ‘responsible environmental behaviour’ as

“the whole of actions of an individual within the society, that take into account, in a conscious way, the perennial and harmonious relationship between these actions and the environment.”

From this definition we can say that we are interested in the ‘whole of actions’ and not in isolated actions (as in the case of the positive environmental action) and in the consciousness of those actions. This means that the REB is what Emmons and Deci [3,6] classifies as a ‘self-determined behaviour’: in order to be responsible we need to be conscious about the way our acts influence the environment. The third element of this definition is related to the perennial relationship between our actions and the environment. This takes into account the fact that our actions are inscribed on a time line and that the responsible environmental behaviour should be inscribed too. Finally we talk about the concept of harmony. This is close to the idea of ‘do what is right’ present in the definition of the GREB that we just described. But ‘do what is right’ is not easy if we do not know the value scale of what is right and what is wrong. From our point of view the harmonious relationship between our actions and the environment suppose from the individual a kind of adjustment to the reality. Its departure point is not a preconceived idea of what is right. It is constructed in corelationship with the changing environment.

2.1 The communication approach to responsible environmental behaviour

The idea of understanding the communication factors that influence the adoption of the responsible environmental behaviour comes from earlier experience on environmental education. At the beginning of the 1990s the *Oficina de Comunicación del Lago* (a Mexican NGO specialised in water and communication) developed an educational branch to address the problem of water. The programme assumed that children’s behaviour towards water was shaped by the interaction with others at school, family and community. It was clear that, in order to develop the tools and methodologies to deal with water environmental education at school, it was necessary to understand the learning process from the communication perspective. We believed that the communication

perspective could help us to understand individuals and their interactions as sources of learning about the environment. Gradually, the scope was broadened from the interaction between school, family and community to the study of social and political dynamics around the concept of responsible environmental behaviour.

2.2 *Why communication?*

In everyday speaking communication is often reduced to providing information, marketing or technical means (television, telephone) that are part of the so-called information and communication technologies. This is not what communication is about from a scientific perspective. Communication as we use it is a way of approaching and explaining processes in society. Like mathematics or economics it fosters a particular way of describing the world. It is another hole in the box through which we can look at reality, although reality can only be explained partially from our perspective.

We can define communication as “the exchange processes among the individual and group members of a given society” [7] These processes, that involve interlocutors, codes, rules, networks, techniques and content [7], can represent a different point of view to observe social phenomena considering the individual level and also the individual in relation to other individuals, groups and institutions. The REB can be translated as well in terms of interlocutors, codes and rules and understand its dynamics from a network perspective. This perspective can be very advantageous in order to understand how the individual acts or behaves, ruled by its relation to the whole system. Planning and implementing environmental education can be improved if we improve our understanding of those communication interactions that take place.

In the case of our study, the communication approach allows us to see the environmental educational practice in the context of a system that goes from the definition of the REB to its translation and implementation. But, what does the communication approach mean in concrete terms? In our case the REB is part of the discourse and can be communicated. It will be influenced by the interlocutors, codes and rules and will circulate in the communication network.

2.3 *The REB as a conceptual innovation*

In order to approach the REB from the communication point of view we decided to consider it as an innovation and to analyse using communication theories dealing with innovations. But what is an innovation? An innovation is an idea, practice, or object that is perceived as new by an individual or other unit of adoption [8]. In this case the REB could be taken as an innovation. It was supposed to replace an existing behaviour, appears as a rupture of the relation between humans and their environment and was indeed perceived as new by those susceptible to adopt it.

Different models and theories have been developed to understand how an innovation is created, transformed and adopted. From the communication point of view we can mention the diffusionism theory [8, p.11], the translation model [9,10] and the technical model [11].

At the beginning of the twentieth century different authors coming from different disciplines became interested in the diffusion, i.e. the process in which an idea, object, innovation, opinion, attitude or practice is diffused within a population [12]. The current

of diffusionism was established in 1963 when Everett Rogers published the book 'Diffusion of Innovations'. He defined the diffusion as

"the process by which an innovation is communicated through certain channels over time among the members of a social system. It is a special type of communication, in that the messages are concerned with new ideas." [8, p.5]

For Rogers [8, p.18] the process of innovation comprises

- an innovation
- an individual that knows and carries the innovation
- one or more individuals that do not know the innovation
- a communication channel that connects innovators with those susceptible to adopt the innovation.

In his book, illustrated with different research projects all over the world, Rogers presents a precise typology of different elements that participate in the diffusion process:

- A diffusion process, that evolves from the first knowledge of the innovation to the confirmation of the adoption.
- Different users of the innovation, classified by their degree of innovativeness.
- Five characteristics of an innovation, as perceived by individuals, that help to explain the different rates of adoption [8, pp.15, 16]:
 - *Relative advantage*: the degree to which an innovation is perceived as better than the idea it supersedes.
 - *Compatibility*: the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of potential adopters.
 - *Complexity*: the degree to which an innovation is perceived as difficult to understand and use.
 - *Triability*: the possibility to experiment on a limited basis.
 - *Observability*: the degree to which the results of an innovation are visible to others.

In opposition to the diffusion model other innovation researchers, Akrich et al., developed in the 1980s, a new model called translation sociology [13]. The contribution of this theory, closely related to the Sociology of Scientific Knowledge (SSK), is to consider the technical innovation as a social-technical complex [14], and to explain its adoption and evolution through the negotiation between actors. As Akrich et al. [10] mention, the future of the innovation depends on the active participation of all those that have decided to make it advance.

As a variation of the translation sociology Thierry Bardini proposed the technical model in the 1990s [11]. Bardini proposed a communicational approach of the technical change, where the innovative practices are inter-influenced. He presents a level between the individual and the collectivity and searches to rebuild the socio-technical network where the innovators and their perceptions act.

The innovation perspective shows us that the REB is an innovation that is difficult to adopt. When we use Rogers' characteristics of the innovation to analyse the REB [15] it

is clear that we are confronted with a particular innovation. The advantage of its adoption, for example, is not easy to valorise. We talk about future generations and collective advantage that is far from the individual advantage of a non-responsible behaviour.

We have the same problem in the case of the visibility. We can take shorter showers, but it will be difficult to measure, at least from the user's perspective, the result of this action on the health of the environment. It is a problem as well in the case of its compatibility with our way of life. The REB is constructed on a value system that is in opposition to the market system that many countries have, where nature is an economical good to exploit and not a common patrimony to share and preserve. The triability is a characteristic that the REB has. It can, and it is, experimented in a limited basis. Unfortunately this triability is not necessary an advantage to the environment. As Gigliotti [16] says

“People have selectively screened the environmental education messages and constructed belief structures to support their own value systems rather than alter their lifestyles to any great degree.”

Finally we have the idea of complexity and simplicity. For Rogers [8, p.16] “new ideas that are simpler to understand are adopted more rapidly than innovation that requires the adopter to develop new skills and understandings”. The REB is a complex innovation: it answers to a complex set of environmental problems, it has a definition that is far from the concrete practices that are part of this innovation and its adoption implies a radical change in the daily life of individuals.

Even if the existing theories give us some insights into the REB as an innovation, and they can show us how difficult its adoption is, they are insufficient to understand why it is difficult to adopt this particular innovation. Rogers' diffusion of innovation theory, for example, is too centred on the interpersonal dynamics, simplifying the process. It lacks a perspective that takes into account all the actors, from the international to the local level, that are part of the process of diffusion of the REB.

The translation model gives us the opportunity to address the REB from its evolution, giving a value to negotiation and interaction between actors. However, it lacks the elements to understand the interaction of actors from different levels. Used to understand technological innovations, it is difficult to adapt to a non-technical innovation like the REB.

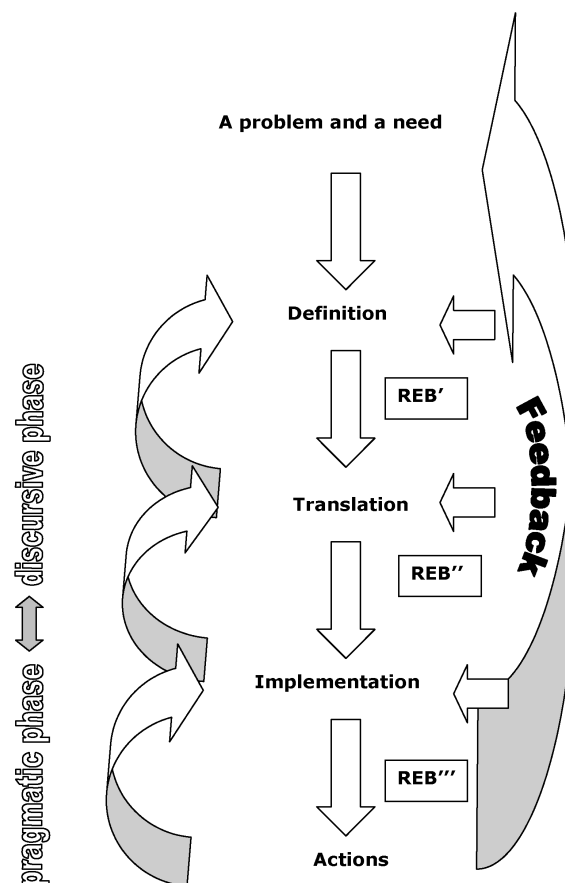
Finally, the technical model provides us with the possibility to treat the invention, diffusion and adoption of the REB inside a communicational system in terms of negotiation and actor networks. It gives us a collective vision of the innovation. Nevertheless, it is also based on artefact innovations and the individual/collective perspective is not enough to understand how the global and the local level interact.

3 The communication model

For understanding the REB from a communicational perspective, we develop a communication model adapted to study our particular innovation from its definition, translation and implementation. Our model (see Figure 1) is based on the following principles:

- The REB is a conceptual innovation [17–19], which means that it passes mainly through communication channels before being implemented. In that sense we can distinguish a discursive nature and a pragmatic nature of the innovation.
- There are three communication levels (definition, translation and implementation) where the innovation circulates. These levels are neither hierarchical nor sequential. All levels evolve simultaneously and are for a large part self-sufficient, but interactions are common.
- The REB is influenced and transformed by the interest and perceptions of those that communicate about it.
- At the same time the REB carries the interests and perceptions of those that communicate about it.
- The interaction between actors carrying different interests and perceptions allow the REB to evolve.
- It is by negotiation and dispersion that the innovation passes from one communication level to another.

Figure 1 The communication model and the responsible environmental behaviour



In this case the difficulty of implementation of the REB at the educational setting (at the implementation level) is explained not by the individual factors that allow or stop the behavioural change, but by the communication factors that affect the innovation since its definition to its implementation.

3.1 *Using the communication model to understand the REB related to water*

In order to understand the evolution of the REB we used our communication model to analyse the particular case of water. Fresh water today is facing environmental problems that demand a different behaviour from users. Water professionals agreed that besides scientific and technical solutions, another kind of behaviour, based on a responsible participation from all levels of society, is needed to solve those problems [20]. At recent water conferences, as the Second World Water Forum at the Hague, many people agreed on the importance of participation and responsibility. As Falkenmark says

“... many of our ideas have been inherited from earlier generations, from a time when the population was small, human activities limited, and the waste produced was effectively evacuated by rivers without causing any disturbing pollution.” [21]

In order to solve water problems today it is necessary to reconsider those inherited ideas and to act in a different way. Present water problems demand, from the technical, social and scientific sectors, new ideas and different approaches to water.

In order to understand the emergency and implementation of the idea of a behavioural change in the water world we based our research on the following questions:

- How is the concept of REB being translated and implemented in the case of water?
- Which interests and perceptions have an important effect on the difficulty to implement a responsible environmental behaviour towards water at the local level?
- What kinds of communication interactions are meaningful in the case of water?

We presumed that the understanding of those factors would give us the tools to improve our particular environmental education practice on water issue. We proceeded to use our communication model to analyse three particular cases concerning water use: agriculture, domestic use and health.

A series of semi-directive interviews were made to actors from the international level to the local level. The questions were about perceptions, interests, practices and communication skills dealing with water problems. The interviews were complemented with the discourse concerning REB presented in brochures and documents from the global to the local level.

Some particular case studies were chosen to follow the REB within and in between the three levels (definition, translation, implementation). We were looking for the ways the perceptions and interest of the actors influenced the innovation. We were particularly interested to describe the negotiations and dispersions that influenced the innovation in order to explain why it was so difficult to be adopted.

For reasons of brevity, we will limit ourselves in this paper to describe our findings concerning the domestic water use. We will use it as an example to show the contribution of our communication model to environmental education as well as the failures that have to be taken into account in future research.

3.2 *The domestic use of water and the REB*

When we talk about water uses we can find a division into three categories: agricultural use, industrial use and domestic use (what we know as well as household use). The domestic water use comprises all the uses that are made for the activities of the population. In a global perspective only 10% of the water extraction is used for domestic use, not much in comparison with agricultural use (70%) or industrial use (20%) [22]. The domestic use of water means not only the water supply but also the evacuation of wastewater. According to Shiklomanov [23] we discharge between 300 and 350 km³ per year (data from 1995) into the environment, which means 86% of domestic water. In most of the cases this water is not treated provoking problems of pollution.

Mexico is a country of contrasts, and water is not the exception. Even if the national water balance is positive, more than half of its territory is confronted with water shortage. The northern and central parts of the country face the most difficult condition of water shortage, over exploitation and dense pollution (two thirds of the population is located in these semi-arid and arid zones [24]). For big cities like Mexico City, Guadalajara and Monterrey, the problem of the access to water for domestic use is already a reality that threatens and compromises the present living conditions and future development. To this we have to add that most of the sewage water from the cities goes directly into the ecosystem without any treatment.

It is under this panorama that the idea of changing behaviour towards water appears. But, to what an extent is this true for the domestic use of water in Mexico? We can say that while the REB was defined by the environmental education conferences in the seventies, the water world, through its particular conferences, filtered the concept and translated into the idea of efficient use of water. For the global and national levels the 'efficient water use' became part of the water discourse even though there is no clear definition of what it really means. It was more a translation strategy, than a definition strategy that took place. We can see how, the idea of changing behaviour in order to solve the water problems appears in the texts of different conferences about water [25]. This translation reflected already the vision of water that the water world had, and the interests of the actors that are part of it.

In our analysis water as a service is one of the perceptions that appears to influence the way the REB was translated in the case of domestic water use. This vision of water came together with the economic interest, in the case of the managers, and the utilitarian interest in the case of the users. The ideas that people will change behaviour if water is privatised and if we charge more for it appear in the discourse since the Water Conference in Dublin (1992). The translation made by the water world ignored two important aspects of the REB: the idea of consciousness of this behaviour and the idea of the environmental concern that was at the origin of the concept.

With respect to the first aspect we can see that the idea of changing behaviour towards water is present, but this behaviour is not necessarily conscious. Most of the mechanisms proposed are part of the coercive measures, like taxes and legislation that are more linked to the idea of service and the economic interest than to the ecological interest and the idea of a common resource of which we have to take care. The second aspect underscores that the environmental concern was not an interest shared by all actors. The technicians, for instance, were interested in the conduction and distribution of the resource and the efficient water use was linked more to the technology efficiency than to environmental efficiency.

This does not mean that there were no environmental education strategies about domestic water use implemented in Mexico. In fact the domestic case is one of the cases where we can find relatively many references to the environmental education practice (especially in contrast with our two other cases, agriculture and health, in which environmental education is fairly absent). We were surprised to find that most of them were based on the idea that in order to change behaviour it is sufficient to give information (the linear approach to behavioural change). Actors like the municipal water board in Guadalajara propose visits to schools and produce some leaflets, but most of their efforts are directed to obtaining a positive image among the population. On one side there is not a real interest in the behavioural change: there is a lack of evaluation of the real impact of the activities or broader initiative that take into account the school and the other initiatives around it. On the other side there is a real interest in the image of the institution: they are interested in the number of children that participate in their presentations, they invite media and they use it as publicity information.

At the level of implementation, the REB was confronted with the users that had as well interests and perceptions that influenced the way they saw and adopted this new concept. Even if we found the REB towards water in the discourse, in practice the utilitarian interest of the user and its perception of water as a service filtered this REB. Behaviour was linked to the idea that the user has the right to use water in a particular way because he pays for it. When the REB passes from the discourse to the implementation, the communication interaction between actors has a big influence in the success or failure. The confrontation of interests and perceptions and the possibility to arrive at a consensus between the interests and perceptions (the existing ones and the ones introduced by the innovation) are a fundamental factor.

Our research shows us that the responsible environmental behaviour means different things to different people and the difficulty of its adoptions comes from the fact that each concerned actor gives a different definition based on its own perceptions and interests. This definition is linked to the particular interests and perceptions and from the negotiation that actors with different perceptions and interest undergo or undertake.

Hence, the REB is mobilised in order to serve particular interests, not always the environmental ones. The openness and lack of definition of the concept of responsible environmental behaviour gave access to a lot of actors that adopted it solely as part of their discourse. The same openness made its implementation difficult, at least in the way it was proposed by environmental education. In most of cases important aspects like the responsibility, the consciousness and the environment were rapidly left aside.

3.3 *How can the communication approach help us to improve the environmental education practice?*

The communicational approach allows us to understand the complex framework in which the environmental education practice takes place. Interests and perceptions influence the way individuals from different levels (global, national, regional and local) or perspectives (individual, institutional) interact. The innovation, in our case the responsible environmental behaviour, is transformed through this interaction and is influenced when it passes from discourse into practice.

We are conscious that other elements, besides interests and perceptions, influence the way the responsible environmental behaviour is adopted. We do not want to compete with the individual approach to the REB but to complement it in order to broaden our

understanding and our capacity to act from an educational point of view. One of the differences between the environmental education approach and the communication approach to behavioural change is that for the former the REB is defined beyond the scope of the individual and related to an external and more stable (though not necessarily less ambiguous) concept of what it means. In contrast, for the communication approach the concept is changing and those changes hamper its implementation. In other words the communication approach explains the difficulties to change behaviour from the lack of stability of the innovation. In this case the fact that individuals susceptible to learn and change their behaviour towards the environment are influenced by the interaction they have with other individuals. This interaction modifies and transforms the concept of responsible environmental behaviour, which they are supposed to adopt.

The communication perspective opens the door to another kind of tools that environmental educators can use in order to improve the educational practice. The idea that we learn and transform our concepts and behaviour through the communication interaction has to be taken into account when environmental education projects are designed.

One important thing that we learn in our study is that REB means different things to different people. It has been used in different discourses (political, economical, social) and with different means, modified by interests and perceptions. As a result, even though a lot of energy and money has been used in order to promote responsible environmental behaviour through environmental education, the results are not as good as they were expected. In order to improve the educational practice the models of responsible environmental behaviour should take into account the communication interaction that takes place between the individuals that are supposed to adopt a particular environmental behaviour. Interests and perceptions must be included as important factors of the communication process around the new concept.

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