
Social representation of the way to interact with environment of the elementary school teachers of the Puebla's municipality (Mexico)

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Abstract: This work describes the concept of environmental education and civilisation model transmitted by teachers in elementary schools at Puebla's municipality. The analysis of this problem grounds on the theory of social representations within a structural approach. The research was carried out in four different phases:

- analysis of knowledge and environmental attitudes of elementary students
- civilisation's elements and educational models desired by elementary teachers
- assessment of environmental education by teachers, considering the parameters defined by them
- workshops conducted with teachers to determine their concept of progress.

Results revealed that children and teachers have a general concern about environmental problems. This concern is based in few data. They have constructed a 'thematic language' that allows them to talk superficially about the environmental problems.

Keywords: social representations; environmental attitudes; environmental knowledge; teachers; elementary education; civilisation.

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1 Introduction

The environmental issue is one of many crises that the world faces in the beginning of this millennium. This crisis is mainly related to the prevailing civilisation model, which considers humans as something strange and superior to nature. This problem is getting worst because of the great technological development reached by the obsession to dominate nature endangering earth's balance and the existence of the human being itself. This prevailing civilisation model is produced and reproduced in schools.

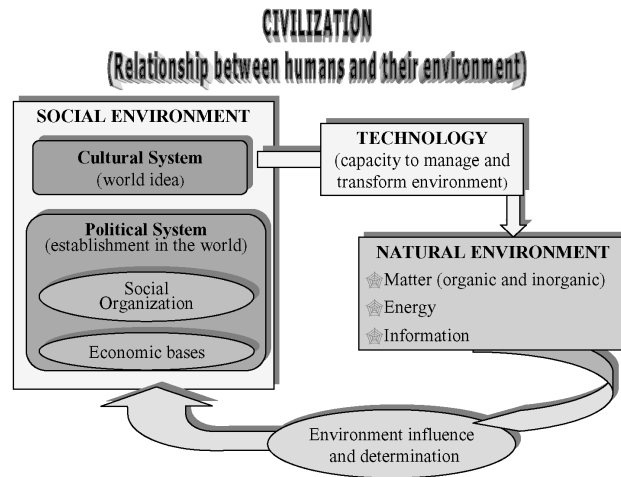
The *aim* of this work was to describe the civilisation model transmitted by elementary school teachers in the Municipality of Puebla.

For the purposes of this work, 'civilisation model' was defined as the way in which a human group interacts with the environment (Figure 1) including how this is conceived and transformed, as well as the manner in which humans are established on it.

The *key questions* are:

- which is the civilisation model produced and reproduced by elementary school teachers in the Municipality of Puebla (Mexico)?
- does civilisation model produced and reproduced by elementary school teachers promote a harmonious relationship with the environment?

Figure 1 ‘Civilisation model’ as the way in which a human group interacts with its environment



These questions gave rise to the following secondary queries:

- what does children learn about environment in schools?
- what is the teachers' idea of the world?
- according to teachers, what is the human being's position in the world?
- is the teacher's social representation of Science and Technology useful to consolidate a technological development in harmony with the environment?
- how do teachers perceive the relationship between people and their environment?

In order to analyse this problem we used the 'Social representation theory', particularly 'The central nucleus theory' which is a structural approach of this theory.

1.1 Social representation theory

A social representation is the set of ideas that a human group shares allowing them to understand and interpret their world. Such social representation is constructed collectively.

Social representations constitute a particular logic and language that represents a collective science or 'everyday-life' knowledge. This knowledge may include scientific concepts; however, it is very probable that the meaning of these scientific concepts change, allowing common people to talk about something unknown until that moment so that uncommon things become familiar. According to Moscovici (1979), a 'thematic language' is constituted in this way.

Social representations can be defined by two components:

- their content (knowledge, information, image, and attitude)
- internal structure of the content.

Thus, a social representation study requires methodologies that allow to determine the elements forming it, as well as the organisation of these elements (Abric, 1994).

The social representation structure includes some articulating elements, which generate or transform the meaning of other representation elements, and organise the social representation. These elements constitute the 'Central nucleus of the social representation' and are part of the collective memory. The central nucleus is presumably the most stable (less susceptible to change) part of social representation.

The most dynamic elements comprise the 'Peripheral system' and have three main functions: to define, regulate and protect the central nucleus against new information or practices that disagree with it. Therefore, the first changes in social representation are produced in the peripheral system due to its lower resistance.

According to this theory, two different groups have the same social representation if, and only if, the same central nucleus is shared; however, peripheral system may be different between both groups as these elements are adaptable to particular situations.

Social representations are defined by the contents given by information, activities, images and generally by a universe of points of view, proposals, reactions and evaluations that generate the social significance of objects and by processes that result in the change from unfamiliar to familiar, odd to conventional and to the autonomous dynamics that articulates the subject (individual or collective) with the object.

Social representations have three dimensions:

- *Information* including the knowledge that the group has about the represented social object.
- *Representation field or image* that includes the specific contents of the represented object.
- *Attitude*, which includes the affective and evaluative tendencies that the represented object assumes. In this sense, attitude is the main dimension, since it guides behaviour and prevails over reduced information or less structured images. This attitude concept has important differences compared to the traditional concept used by social psychologists.

This three-dimension analysis has some advantages: allows detecting structure, evaluative tendency and specific content that articulate social representation and comparison between social groups. It also permits to define how social representation is supported by specific contents and how it is articulated by information quantity and quality and its direction. However, this three-dimension analysis is just a methodological solution.

2 Method

A three-dimension approach analysis was used in this work defining some indexes to determine how much information is contained in a specific social representation. Different methodological strategies were developed to analyse specific contents, structure, evaluative tendency, and variables for group definition. These strategies were based on the definition of quantitative features, which allowed us to deduce qualitative features or at least, to pose a hypothesis on qualitative features of social representation.

This study included four phases:

- *Evaluation of children's knowledge and attitude at the Municipality of Puebla.* The cognitive and affective objectives proposed by the Emergency Plan for Educative Modernisation (Bojorquez et al., 1992) were evaluated because this is the official programme at this moment. A two-phase stratified weighed sample of around 5,000 children, distributed in approximately 500 groups of ten students each, was obtained. The survey considered three scholar cycles and two instruments (knowledge questionnaire and LIKERT attitude scale) were applied to each cycle. Three questionnaires containing open and close questions were produced to evaluate knowledge. Each one corresponded to one of the three cycles defined in the Emergency Plan for Educative Modernisation (Bojorquez et al., 1992) (Cycle I included 1st and 2nd grades; II, 3rd and 4th grades; III, 5th and 6th grades). Attitude was measured with a LIKERT multifactor scale selecting the 20 more significant items according to *t* values in a pilot test. Three scales were generated, one per each cycle. Attitude scale was graded from one to five, where five corresponded to a very positive attitude to the environment and one to a very low attitude (three corresponded to neutral attitude). Each questionnaire included five subclasses, one per each issue comprised in the emergent programme. Although attitude scales were generated according to the five issues proposed by the emergent programme in the process of interpretation, our results showed no significant correlation between answers to the items belonging to the same issues; therefore, items were regrouped to form natural groups, according to a principal component analysis.
- *Key elements of civilisation model desired by elementary school teachers*, which define the 'game rules' according to teacher's advice. An open question survey was applied to 103 teachers for this purpose. This survey was designed according to an 'Evocation analysis' proposed by Vergés (1994). The Hill's diversity index was used to analyse how many information contains the social representation of each concept (Ludwing and Reynolds, 1988; Krebs, 1999).
- *Evaluation of specific situations according to game rules defined by teachers* (some items include game rules defined by experts). A closed question survey was applied to 173 teachers for this purpose. A main component analysis was performed to detect main factors used by teachers to evaluate the specific situation of environmental education. This allows us to identify which factors had more agreement (Central nucleus of social representation), which had a divided opinion (Peripheral system of social representation) and which have little information.
- *Progress conception in elementary school teachers.* A workshop series was implemented to define teachers' progress conception of Mexico by the end of the 21st century. Workshops are a very useful tool for a comprehensive study of the essential aspects of the civilisation model desired by teachers, and allow us to have a qualitative view through participant research techniques. Content analysis and similitude analysis as described by Degenne and Vergès (1973) were used to analyse the results of these workshops.

This multiple approach technique provided us a deeper understanding of the studied issues, which in turn, validated the results by triangulation.

3 Results

3.1 What do children learn about environment in the school?

Table 1 shows that children’s environmental knowledge is very deficient, except for issues ‘Human being as part of the environment’ (Cycles I and II); living organisms and environment (Cycle I) and human communities (Cycle III). The problem is particularly important about ‘Earth is endangered’ and water issue.

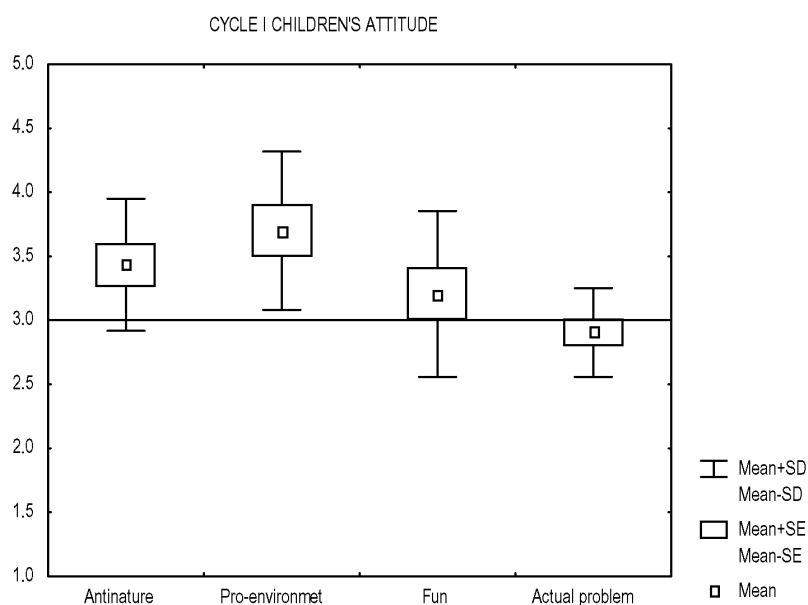
Table 1 Environmental knowledge of elementary school children in the municipality of Puebla

Issue	Cycle I 2nd grade	Cycle II 4th grade	Cycle III 6th grade
Human being as part of the environment	6.47	6.44	4.48
Living organisms and environment	7.28	3.52	3.66
Earth is endangered	4.9	3.87	4.14
Water: natural element and social resource	4.91	4.32	3.87
Human communities	4.82	5.8	6.02

It is worthwhile to mention that there is a reverse correlation between educational level and knowledge expected (first cycle had better performance than third).

With respect to attitudes, Figure 2 depicts that children in first cycle have a slightly positive attitude towards the environment, especially about those elements called anti-nature and pro-environment. In contrast, items regarding sacrificing fun for environment integrity or recognising the environmental problem as something current, presented a neutral or slightly negative attitude.

Figure 2 Environmental attitudes of children in Cycle I (2nd grade)



In relation to children in Cycle II, we found five dimensions accounting for their environmental attitudes. Figure 3 shows a positive attitude regarding a general environmental concern, adequate disposition to take pro-environmental actions, and also that children are not apathetic about these problems. However, there is no adequate disposition to sacrifice status, modernity or comfort in favour of the environment.

In Cycle III (Figure 4) we observed a tendency similar to that in children in Cycle II; therefore, there is a positive attitude in terms of observance to nature and taking environmental actions and less positive when this attitude means deciding between environment and status or comfort, or when they feel incapable to act. However, their attitude was always positive.

Figure 3 Environmental attitudes of children in Cycle II (4th grade)

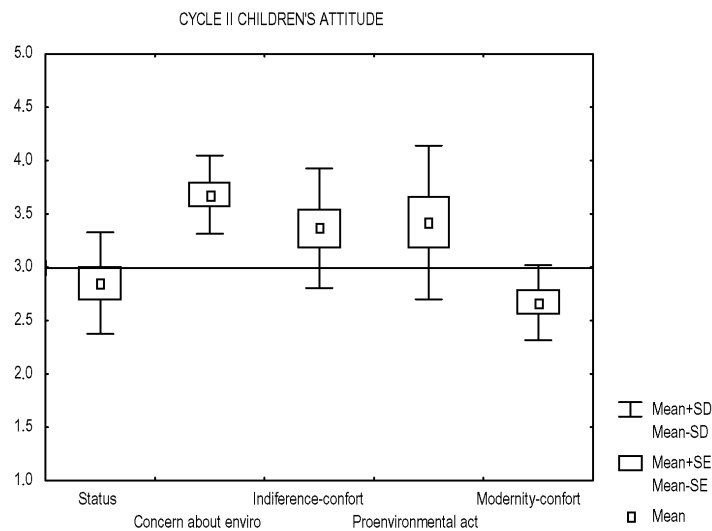
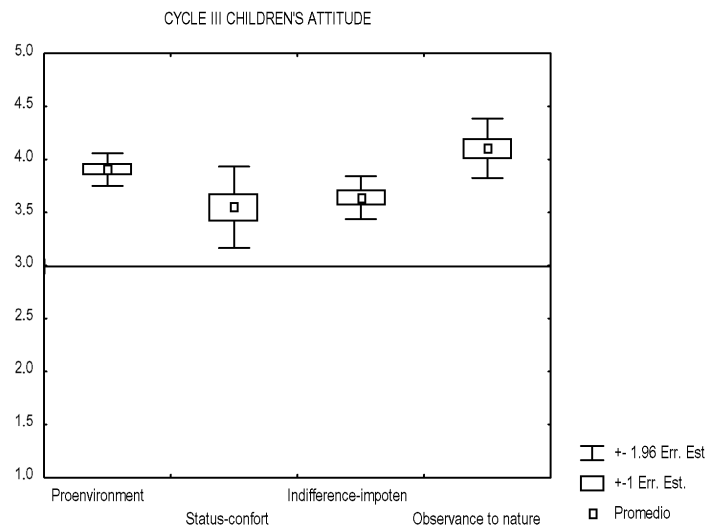


Figure 4 Environmental attitudes of children in Cycle III (6th grade)



It is interesting to point out that affective dimension was inversely related with cognitive dimension, as there was a positive relationship between scholarship level and environmental attitude. Generally, children’s environmental knowledge was deficient and attitude was slightly positive; however, attitude was negative when the current civilisation model was in risk, especially in relation to consumerism, preference for man built environments, and native cultures scorn.

3.2 *What is the teachers’ idea of the world?*

In general terms, teachers agreed with the idea of the precarious environmental situation because of ecosystem deterioration. Teachers were worried also about cultural level in Mexico (Table 2).

Table 2 Social representation of teachers concerning the concept of world

<i>Central nucleus</i>	<i>Peripheral system</i>	<i>Lack of information</i>
⊕ Country ecosystems are deteriorated or careless	⊖ Country ecosystems are wrecked	☹ Teachers know very little about rural way of life
⊖ Environment is dirty and polluted	⊖ Their community is participative and democratic	☹ Teachers do not know if their community is an example of culture
⊖ Domestic culture is not adequate and foreign culture is not well disclosed	⊖ National culture is respected, the same for everyone and wide	
	⊖ People in Puebla have progress	
	⊖ International culture is accepted and necessary	

⊕: aspects in which most teachers agree to consider it as positive; ⊖: aspects in which most teachers agree to consider it as negative; ⊖: aspects in which teachers’ opinion is divided; ☹: aspects in which teachers do not answer or say ‘I do not know’.

Although the ecosystem damage is perceived, there is no consensus about how serious it is. There is also divided opinion concerning community participation in problem solution; Mexico progress level or the value that society gives to domestic and foreign culture. There is also very little information about life in rural environments.

3.3 *Is the teacher’s social representation of science and technology useful to consolidate a technological development friendly with the environment?*

Teachers believe that science and technology are important for the progress of Mexico and they welcome modern agricultural techniques, which are considered as practical and beneficial but very expensive. On the other hand, traditional agriculture techniques are deemed as rudimentary and deficient; however, they really have very little information about agricultural techniques and they do not know the environmental impact of these techniques (Table 3).

Teachers also do not know if science and technology contribute to the environmental problem solution. Generally speaking, teachers have divided opinions regarding the role of science in the solution of everyday life problems and the utility of technology in the environmental problem solution. Still, teachers are worried as teaching is not carried out in laboratories.

Table 3 Teacher social representation on sciences and technology

<i>Central nucleus</i>	<i>Peripheral system</i>	<i>Lack of information</i>
☺ Science and Technology are important for progress and contribute to development	☹ Science contributes to problem solution in Mexico	☹ Teachers do not know if science and technology contribute to the solution of the environmental problem
☺ Modern agricultural techniques are practical and beneficial	☹ Technology contributes to conservation and other problem solution	☹ Teachers know little about environmental impact of agricultural techniques (especially, traditional ones) and their relationship with environment care
⊗ Modern agricultural techniques are expensive		☹ Teachers do not know if traditional agricultural techniques are anachronistic
⊗ Science is not taught in laboratories		☹ They do not know if technology has contributed to the solution of environmental problems in Mexico
⊗ Traditional agriculture techniques are deficient		
⊗ Traditional agriculture techniques are rudimentary		

☺: aspects in which most teachers agree to consider it as positive; ⊗: aspects in which most teachers agree to consider it as negatives; ☹: aspects in which teachers' opinion is divided; ☹: aspects in which teachers do not answer or say 'I do not know'.

3.4 *How do teachers perceive relationships between people and their environment?*

Teachers usually perceive a negative relationship between human beings and environment, as well as between people. They are specially concerned about the environmental law which according to them is not acceptable because the government does not punish individuals responsible for environmental destruction; however, they really do not know if the government is doing something to resolve environmental problems (Table 4).

Table 4 Teacher's social representation on the relationships between people and people, and with their environment

<i>Central nucleus</i>	<i>Peripheral system</i>	<i>Lack of information</i>
⊕ There is not a proper legislation and government does not punish individuals responsible for environmental problems	⊖ Natural resources are not enough for the Mexicans' needs	☹ Teachers do not know if relationship between countryside and cities is open
⊕ The way we use and distribute natural resources is inadequate	⊖ People in Puebla do not have a restricted use of water	☹ They do not know if the people in Puebla use water in a conscientious manner
⊕ Water distribution is neither fair, nor equitable, nor the same for everybody nor according to each one's needs. They also think water use is not in a conscientious way	⊖ Mexicans prefer natural products	☹ They do not know if government is doing something for the environmental problem solution
⊕ Product consumption is neither equitable nor balanced		☹ They do not know if natural resources are been used with proper conservation practices and restoration of used resources

⊕: aspects in which most teachers agree to considerate it as positive; ⊖: aspects in which most of teachers agree to consider it as negative; ⊕: aspects in which teachers' opinion is divided; ☹: aspects in which teachers do not answer or say 'I do not know'.

According to teachers, the way in which natural resources are used and distributed is inadequate, in part because consumption is neither equitable nor balanced. But they do not know if the use of natural resources is done with proper conservation practices including restoration of used resources.

In relation to water, teachers believed that its distribution is unfair or inequitable, and not the same for everybody or according to each one needs. They also think water use is not conscientious.

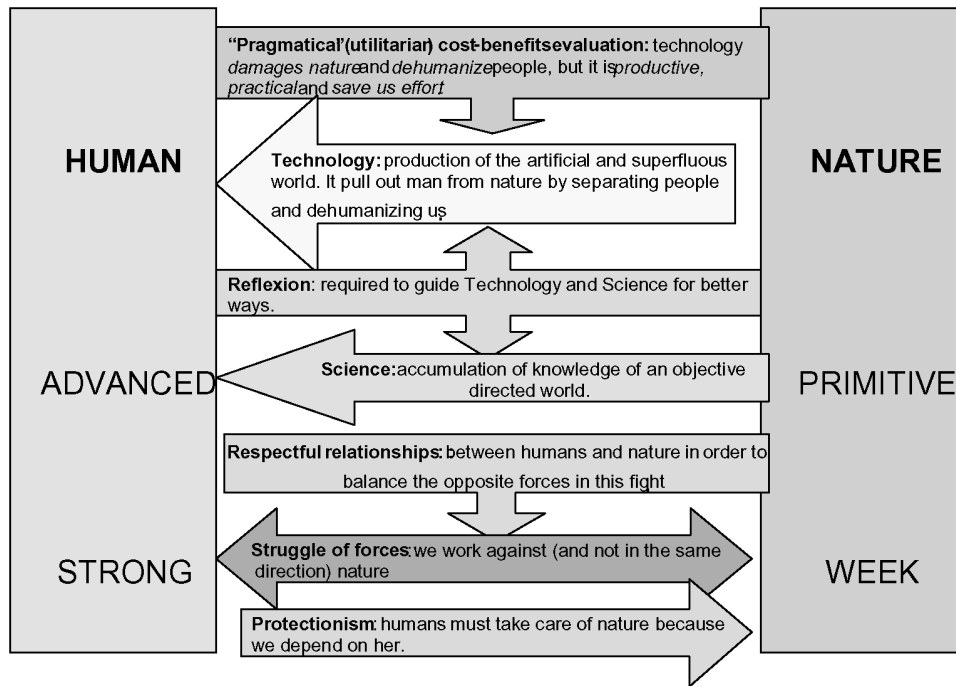
An interesting fact is that there is no consensus concerning if there are enough natural resources or not. This is important because in the past, teachers used to teach that Mexico was cornucopia-shaped (meaning by that then Mexico's natural resources were very abundant). According to this survey, this point of view is changing, although this idea is still in the peripheral system.

3.5 According to teachers, what is the human's position in the world?

According to Latour's (1997) classification, teachers have a 'modern' vision of the world, so they perceive humans and nature as two separated things, fighting between them. In this struggle of forces, nature is weak and humans are strong (Figure 5). This fight is because of we work against (and not in the same direction) nature. Technology plays a

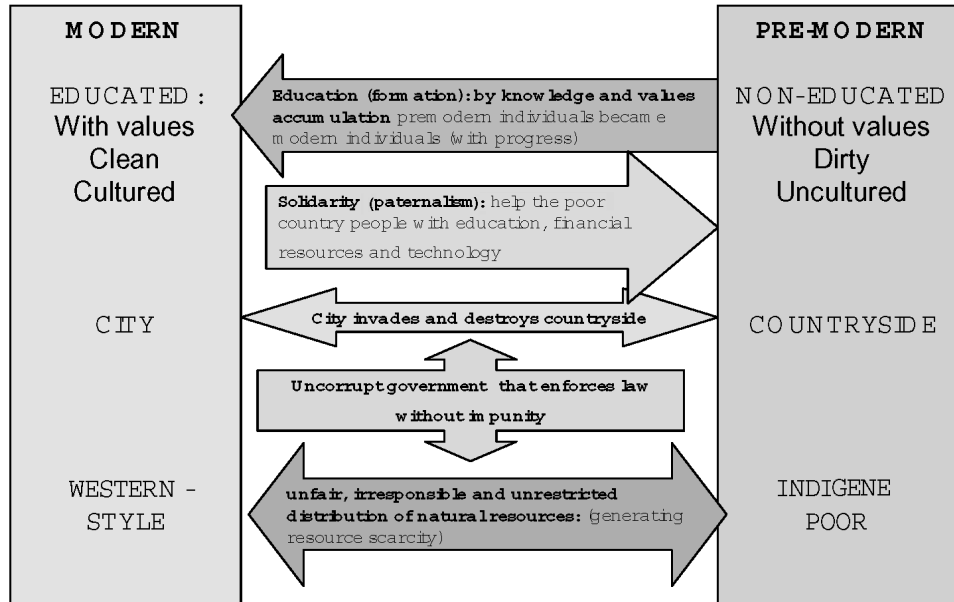
very important role in pulling out humans from nature. It also separates people and dehumanises us. However, in a cost-effective balance of technology, teachers believe that although technology destroys nature and dehumanises people, it is productive, practical and saves us effort.

Figure 5 Teachers civilisation model. First partition according to Latour (1997)



Teachers conceive science as the accumulation of knowledge of an objective-directed world. This knowledge accumulation divides natural (primitive) from human (advanced). As a result of these problems, teachers believe that technology and science have to be guided. They also consider that it is important to establish respectful relationships between humans and nature in order to balance the opposite forces in this fight. However, their final proposals were protectionist, and although they believe humans must take care of nature (because we depend on it), they consider it as an old, ill and weak mother.

According to Latour (1997), there is a ‘second partition’ between moderns and pre-moderns as results of this first partition between humans and nature (Figure 6). Teachers consider pre-modern subjects as dirty and uncultured individuals without values. Nevertheless, pre-modern individuals may become modern (clean and cultured, with values) individuals by education.

Figure 6 Teachers civilisation model. Second partition according to Latour (1997)

There is also an opposite force fight between pre-modern individuals (represented by countryside, native and poor people) and modern ones (represented by cities, 'western-style' and wealthy people). In this struggle, cities invade and destroy the countryside, generating resource scarcity. This problem increases because of an unfair, irresponsible and unrestricted distribution of natural resources. According to teachers, an unincorrupt government that enforces law without impunity could fix this problem.

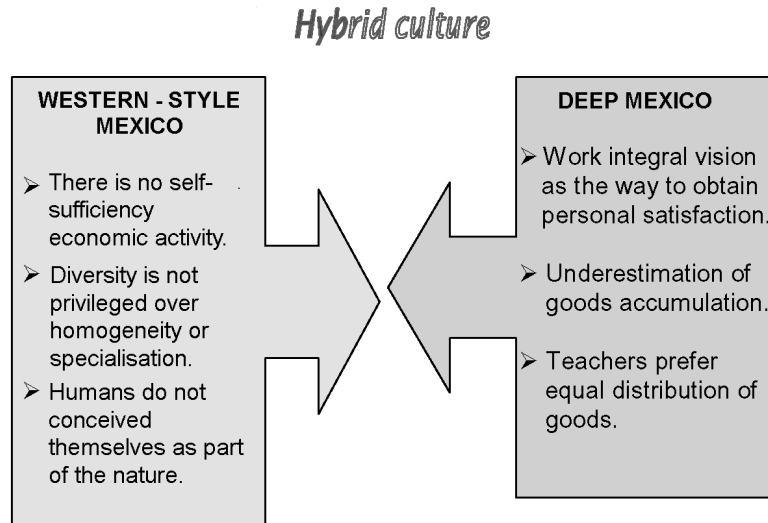
Finally, teachers propose paternalist relationships (called solidarity by them) to help the poor countrymen with education, financial resources and technology.

Nevertheless, we cannot state that teachers are modern and 'western-style' people. Actually, they have a 'hybrid culture' with native and 'western-style' modern elements (Figure 7). Among these indigenous elements, which Bonfil (1997) called elements of the 'deep Mexico', we can mention:

- work integral vision as the way to obtain personal satisfaction
- underestimation of goods accumulation
- teachers prefer equal distribution of goods.

In relation to 'western-style' elements, the following can be mentioned:

- there is no self-sufficient economic activity
- diversity is not privileged over homogeneity or specialisation
- humans do not conceive themselves as part of nature.

Figure 7 Teacher's 'hybrid culture' with native and 'western-style' modern elements

4 Conclusion

The results revealed that both children and teachers have a general concern on environmental problems; however, this concern is grounded in few data. Teachers and children have constructed a 'thematic language' on concepts such as *contamination* and *deforestation*, which allow them to superficially talk about the problem without questioning the way in which we conceive, transform and establish in the world. Their idea of the world is basically modern; therefore they conceive a human element separated from nature. There is a struggle of forces between humans and nature in which the last is considered as the weaker element and must be protected. There are, however, some elements of the Mesoamerican Civilisation in the teachers' social representation, such as non-consumerism, that are very positive to establish harmonious relationships with the environment.

Teachers believe, however, that they participate in the environmental problem solution (although without accurate information) by teaching children.

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