

# **Evaluation of a political socialization strategy within family communities, from a governance and sustainability approach, with an educational nature.**

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## Abstract:

This research centres around the study of political socialization with an educational nature within family communities, as a potential factor for change in behaviour, preferences and consumption decision-making, intended to protect natural resources from a governance and sustainability approach. Conclusion is that incorporation of knowledge and values, as well as development of competences inherent to implementation of an environmental management system within families as a specific instrument of the proposed strategy for political socialization, explain differentiated willingness in relation to saving on energy consumption, potable water and waste generation, in connection with changes in behaviour, preferences and consumption decisions intended for protection and rational management of natural resources, as well as for internalization of environmental externalities

Keywords: political socialization, consumption decision-making, environmental management system, family, governance.

## Introduction:

Even though it is considered that, within the domestic setting, such socialization consists of internalizing learning of beliefs, values, ideas, behaviours and attitudes that constitute the political heritage of individuals, in most of the research that can be referred to, the emphasized factors are linked to perception construction of the way political power is made and the way the world is organized around the citizen. Nevertheless, this paper's approach to the issue regards the family as one of its major agents, as it is an influential institution which instills rules and social values -as well as those related to economics- in their members.

It might be said that some of the main public problems originated in the difficulty to identify borders amongst education, public policies and daily life itself. Besides, they are constantly presented to us as relatively independent and differentiated subjects for academic purposes. Then, most of us are somewhat predisposed not to incorporate such concepts into our citizens' life.

Generally, when arriving at a service station we do not reflect on the general condition that would get the maximum consumption efficiency from our vehicle. We just kind of pray for our tank to be really filled up in the hope that fuel will be enough to obtain the best possible mileage. When walking through a supermarket's aisle we seldom look at products' labels.

The above paragraph shows some examples of daily life where a lack of incentives (public policies) to enable a change in civic behaviour (education) can be identified. Most alarming is the persistence of the belief that appropriate education is only obtained in classrooms, and that

public policies necessary to solve serious community problems are the sole responsibility of governments. This situation worsens if we take into account that the combined effects of the media and governments influence the way society perceives reality.

The dominant economic system during the last decades and its consequences have been identified as the main reasons justifying the emergence of a new concept of development. Components of such system to be highlighted are: rampant consumerism conceived never to be satisfied, the capitalist-neoliberal concept of development based almost entirely on consumption itself and production, new mass-media intervention strategies in every individual, and modern circulation of money and information, which causes an unprecedented volatility in global capital. As a result, individuals have been led to a virtually nonexistent participation in the most important element of community life: decision-making.<sup>1</sup>

“If it is not environmental educators’ job to cultivate that kind of understanding, whose job is it, then?”<sup>2</sup> or, in that very sense, who really are environmental educators?

In order to make education efforts effective and relevant, they must be incorporated to trends and rules of societies. Previously, nuances and relations of the different elements interacting to form our collective states of mind must be identified. It is all about shaping citizens regarding environmental matters so that they are able to assess complex information, to make informed decisions about issues that are not visualizable at the moment, by incorporating the ability relevant to achieve the necessary changes in attitudes and behaviours so as to clear the path to sustainable development.

With the aim of creating a deep connection with what is learnt, what is taught must provide (or have) real support to citizens’ life. Solutions most come not only from classrooms, but from homes and communities too.<sup>3</sup>

Then, the issue of environmental education must be put forward as a public policy from the perspective of politics itself and environmental law, as well as from the paradigm of sustainability.

This research paper presents the reasons leading the author to outline a wide research horizon as well as to a first exploration of the subject put forward in the initial project. The study problems approach the fields of political socialization in the family and public policies, as well as the way knowledge is generated from the implementation of such processes.

### Problems that give rise to research questions:

- According to INEGI (National Accounts System of Mexico). Financial and ecological accounts of Mexico, costs of what is known as *the rest of sectors* (trade, information and mass-media, financial services and insurances, corporate, healthcare services, sports services, hotels and restaurants) as well as those of the institutional sector *homes*, increased to \$459,846,644,000 Mexican pesos in 2016,

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<sup>1</sup> Rubio, Eduardo, *Reflexiones sobre el concepto de Desarrollo Sostenible, sus antecedentes y algunos apuntes para el momento presente (y futuro)*. XVI Congreso de Estudios Vascos: Desarrollo Sostenible-IT. el futuro (16.2006. Donostia), 2006, <http://www.euskomedia.org/PDFAnlt/congresos/16/16261270.pdf> Document consulted on 19th February 2014.

<sup>2</sup> Saylan, Ch. and Blumstein, D., *The Failure of Environmental Education (And How We Can Fix It)*, Los Angeles, California, University of California Press, 2011, p. 60.

<sup>3</sup> *Ibidem*, pp. 73-75.

but in the latter case they represent 58.4% of this economic sector as well as 49.9% of the total costs of depletion and degradation of this country's natural resources.

- The accumulated loss of purchasing power in the last 30 years, measured on the basis of the basic food basket, amounts to 80.08%. According to the analyses performed throughout several years by the National Autonomous University of Mexico (UNAM), a lack of recovery has been detected.
- In 2017, amongst the 35 member countries of the OECD, Mexico recorded the highest inflation regarding energy and the second highest inflation regarding food. In that year, the price of energy products in this country increased by 15.8% compared to that of 2016, which represents more than twice the 6.9 average recorded by the OECD associates.
- Regarding the observation of home-related national surveys (National Survey of Homes [ENH] and National Survey of Political Culture and Civic Practices [ENCUP]), the notion of political socialization was absent.

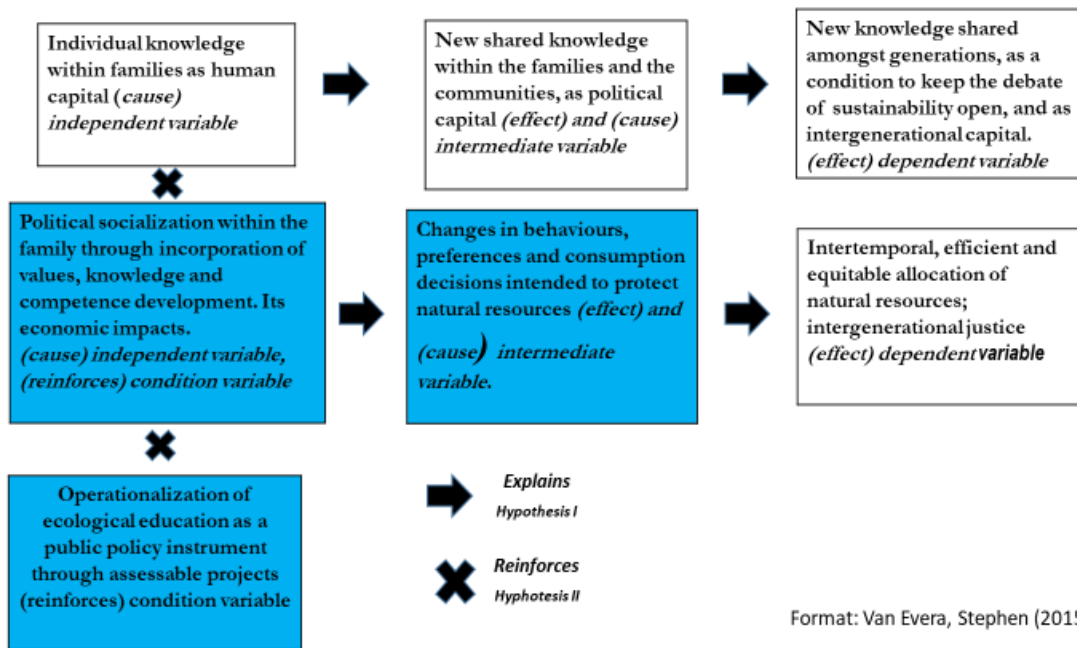
## Proposal and theoretical framework

The proposed theoretical scheme is built on the basis of a cause and effect chain *between potential changes in consumption behaviour and incorporation of values and knowledge acquired during the exercise (ethical practice) of political socialization within the family*, even more so when these processes are reinforced by the establishment of projects capable of operationalizing a public policy instrument. It also indicates that such changes in preferences, behaviours and decisions would explain, at the same time, *a prospective intertemporal, efficient and equitable allocation of natural resources*, as well as the proper conditions to establish justice as intergenerational equity.

Aimed to a politics of knowledge, another cause and effect chain scheme is proposed amongst new knowledge shared in families and communities (as political capital), and the individual insights of its members (as human capital), even more so when these processes are reinforced by the *incorporation of values and knowledge acquired during the exercise (ethical practice) of political socialization within the family (Fig.1)*

Then, research on concepts leading to vanish current frontiers amongst the concepts of education, public policies and daily life, as well as to favour their integration into the fields defining sustainable development is required. Given that this type of development is allowed by economic, environmental and social factors, concerns have arisen over the reason why they are presented to us as relatively independent and differentiated entities for academic purposes, as well as over our predisposition not to incorporate them appropriately into our citizens' life.

**Fig. 1. Theoretical proposition**



These are important issues, but they are very extensive to be answered in the same paper. Nevertheless, some questions can be posed stemming from the identification of problems originating such issues.

As for assessment, it is the stage of the public policies cycle that makes it possible to decide whether to continue applying them and, if so, whether with or without changes.<sup>4</sup> *¿Can the rol of political socialization (within the families), be reinforced as a factor for change in (consumption) preferences and behaviours towards decision-making intended to protect natural resources through projects suitable for assessment according to their economic impact? (research question number 1) ¿So, is it possible to operationalize ecological education as an environmental policy instrument? (research question number 2)*

Considering that both transition processes of members' individual competences<sup>5</sup> and joint actions required to achieve a social optimum<sup>6</sup> take place within the family: *¿Can political family socialization (education) be established as a factor for change in (consumption) preferences and behaviours towards decision-making intended to protect natural resources through incorporation of knowledge and values, as well as development of competences? (research question number 3)*

Finally, in the light of the intergenerational nature of family structure, it is fair to ask: *¿Would the previously mentioned changes and new decisions lead to an intertemporal, equitable and efficient allocation of such resources? (research question number 4).*

<sup>4</sup> Cardozo Brum, Myriam, *La evaluación de políticas y programas públicos*, México, D.F., H. Cámara de Diputados, LIX Legislatura and Miguel Ángel Porrúa, 2006, p. 27.

<sup>5</sup> White, James, *Advancing family theories*, Thousand Oaks, California, Sage Publications, Inc, 2005, pp. 130-133

<sup>6</sup> *Ibidem*, p. 102.

Once justification giving origin to this research project have been contextualized and questions expected to outline its course have been posed, the respective study object can be established: *political socialization (education) within the family as a factor for change in behaviours, preferences and consumption decision-making intended to protect natural resources from a governance and sustainability approach.*

Since this way to address the study problems put forward has been just slightly explored, the theoretical apparatus of this research comprises very diverse fields of science. Therefore, the path to identify a methodological instrument capable of *deepening in a first exploration* of interim answers to the questions already posed is analyzed.

When identifying a possible theory of social change (from norms and values linked to social structures), implicit in every public policy, enquiries are made about whether it can be implemented by means of changes in behaviour patterns, preferences and *consumption decisions intended for protection and more rational use of natural resources*, as well as for internalization of environmental externalities.

## Methodological instruments

### Design

Some methodological stances are the starting point leading to the initial research project. The first of them has an *explanatory nature (positivist)*, and a theoretical framework of cause and effect about observed phenomena has been proposed from it. It centres around the *rational choice stance* on the subject of decision-making for consumption. It focuses specifically on the analysis of the way groups of individuals (families) respond to challenges concerning political institutions (rules of the game), public policies (processes for solving public problems) and other inherent phenomena.

The second methodological stance is a *critical* one (under the qualitative paradigm). It lies either in emancipation or empowerment, being its main objective to help research participants to identify and understand the causes of their circumstances and then empower them for producing the change they deem necessary.

Similarly, this initial research incorporates a *postmodern (postpositivist) approach*, which highlights the importance that must be attached to time, situation and purpose of social actors, additionally to the event or behaviour themselves. This *methodological stance gives rise to a study case*. In this regard, researcher Myriam Cardozo Brum highlights the fact that social sciences have moved from the study of large structural (macro) processes with quantitative methodologies *to the social construction of meanings* in local communities under a qualitative paradigm. She stresses that the latter emphasizes analysis of differences, the study of individual (micro) matters, their causes and the emotions actors attach to *participatory experience*; social, cultural and political dimensions in which they develop, as well as life of groups in society, their actions and interrelations.

Moreover, such approach points out that, as *a part of the intuition* with which a theoretical proposal framework is constructed, one of the most important tasks of a researcher consists of interpreting a phenomenon itself before research on it can be carried out.

The initial project design is determined by a logical structure, which provides certainty that collected data are enough and appropriate to answer a research question thoroughly and with no ambiguities. Such design has an exploratory nature (scope) as a small sample is to be used in it. This sample will be essentially employed to obtain a greater perception of the phenomenon under study (*study case*), as well as to generate additional ideas concerning research problems, variables and other related matters. The reason why this alternative has been chosen is that exploratory studies are often employed as a first step in multiple-part research projects.

Data collection in this exploratory stage implies a combination of strategies considering both quantitative and qualitative elements. It is indicated that such data come from primary sources. This design includes elaboration of a baseline in order to *know willingness to implement an environmental management* family system within communities in Merida, Yucatan. The implementation of such system implies a political engagement of the whole family, led by parents (senior management) in order to carry out a set of actions aimed at improving their environmental performance; in this case, regarding energy and water consumption as well as reduction of urban solid waste generation (**Fig. 2**). This type of system has been chosen because of the analogy existing -in the sphere of economic resources use- between either a business or a government organization and a family organization.

Furthermore, its implementation in subsequent stages of the research project requires simple training provided by expert advisers to family communities through guidance documents connected to: Sustainability Related Management System Standards (like those designed both by the Secretariat of the Environment and Natural Resources [*Secretaría del Medio Ambiente y Recursos Naturales*]<sup>7 8</sup> and by the U.S. Environmental Protection Agency).<sup>9</sup>

*Through this baseline (ex ante evaluation) the information necessary to draw comparisons with results of subsequent stages of the research is generated, as well as to test -as though it were about an explicit or implicit hypothesis- whether the proposed strategy for political socialization within the family (either as a policy or a particular action programme) has been capable of producing the expected effects. This will entail making sure that such effects have been produced and the policy has been their only cause, thus dismissing impacts of other possible intervening variables.*

### **Process for gathering information:**

Information for this stage of the initial research has been gathered through a set of interviews along with a questionnaire (**APPENDIX I**), both carried out prior to incorporation of the political socialization strategy.

It is worth noting that such questionnaire's design is supported by the study of general predictors versus specific predictors of the environmental behaviours under assessment, by comparing the concerning effects of such behaviours' immediate precedents. These are comprised by the model developed in the field of social psychology by Icek Azjen and Martin

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<sup>7</sup>Secretaría De Medio Ambiente y Recursos Naturales. Centro de Educación y Capacitación para el Desarrollo Sustentable, *Más de 100 consejos para cuidar el medio ambiente desde mi hogar*. Brochure. 2008

<sup>8</sup>Secretaría De Medio Ambiente Y Recursos Naturales. Centro de Educación y Capacitación para el Desarrollo Sustentable, *¡Aprendamos a cuidar el medio ambiente! Para cuidar tu entorno, salud y bolsillo, unos consejos*. Brochure. 2010

<sup>9</sup>U.S.Environmental Protection Agency, *Sistemas integrados de administración ambiental. Una plantilla de manual para pequeñas empresas*, <https://nepis.epa.gov/search744R03001> Electronic document consulted on 31st October 2018.

Fishbein, *Theory of Planned Behaviour* (TPB), which means: intentions, attitudes, subjective norms and behavioural control perceived by the individual. Questions are grouped as follows: those exploring social situations and political perceptions in families (items 1 to 4), those concerning differentiated willingness intended to modify energy consumption and other environmental behaviours (items 5 to 11), and finally those (items 12 to 21) regarding willingness aimed both at implementing an environmental management family system (EMS) and sharing information related to current consumption (**Fig. 3**) and **APPENDIX I**.

The questionnaire (**APPENDIX I**) has been designed to determine what people know and think, *as well as the way they are willing to act*. Questions have been arranged in a logical sequence and have been formulated in the clearest possible way for people from all professional and educational backgrounds and ages. Prior to obtaining the sample, relevant modifications were made for a better understanding both of every item and pertinent explanations. To this end, knowledge and experience of interviewers (who were required to complete the instrument)<sup>10</sup> were taken advantage of concerning some of the elements that constitute political socialization within family communities.

In this regard, the questionnaire has been structured with the aim of gathering information useful to answer each study question by means of the respective case hypothesis testing, as well as to keep potential mistakes to a minimum. Besides, individual answers have been developed according to the data analysis plan with respect to codification, tabulation, their very analysis and interpretation. The questionnaire was arranged in such a way that respondents would feel motivated to answer all the questions, beginning with the wider and easier to answer ones and continuing with those more focused on details. Answering the latter often demands a significant effort from the respondents. It was intended to prevent respondents from interpreting the questionnaire as a very difficult task, otherwise they would often ignore questions. When possible, the so called *funnel sequence* for questionnaire design was adopted.<sup>11</sup>

Good case studies include some uniform and generalizable features, as well as others that seem to be relatively unique to the study case. *Case hypotheses 1 to 5 refer to differentiated perceptions about: the best environment for learning how to make a great change in politics and to design a family policy from home. Moreover, they refer to differentiated willingness to implement an environmental management family system. Hypotheses 6 to 10 concern differentiated willingness to modify consumption of electricity, fuel, LP gas and potable water, as well as solid waste disposal, concerning implementation of an environmental management family system. Case hypotheses 11 to 15 relate to differentiated willingness to modify such consumption concerning enhancement of an environmental management family system through incorporation of suitable for assessment projects. Finally, case hypothesis 16 conjectures about different preferences regarding time return to reinvest saving profits in consumption, regarding willingness to implement (or not) an environmental management family system (Fig. 3).*

The study case for this initial research has the following cornerstones: political-family communities in Constituency V of Merida City, Yucatán; tests concerning differences amongst groups resulting from preferences for implementing (or not) an environmental management

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<sup>10</sup> Mc Nabb, David, *Research methods for political science. Quantitative and qualitative approaches*, 2nd. ed., Abingdon-on-Thames, Routledge, 2015, p.31. Kindle.

<sup>11</sup>Mc Nabb, David, *ibidem*, pp. 112-114

family system; analyses (debates) concerning willingness intended to: a) *face family problems (energy consumption)* with an own policy; b) *express a family energy policy*; c) negotiate and agree to look for solutions (*setting up of goals with regard to saving*) within the family; and d) implement a strategy (with a *specific instrument*) for achieving all this.

### **Statistics:**

From a statistical point of view, the study case population consisted of about 41,314 families. Moreover, the sample size of 317 families was determined in accordance with the following factors:

- A confidence level of 95%, which determines critical value for standardized normal distribution  $Z=1.96$
- An acceptable sampling error of 5.5%
- A population proportion of 50%, which produce the largest possible sample size

The sampling framework was taken from both the electoral register and the INE's (National Electoral Institute) nominal list of voters<sup>12</sup>, as well as from the publication titled *Geografía Electoral. Distrito V* (Electoral Geography. Constituency V) by *Instituto Electoral y de Participación Ciudadana de Yucatán* (Electoral and Citizen Participation Institute of Yucatan).<sup>13</sup> A stratified sample was established according to the number of families comprised in each of the 51 electoral sections of constituency V.

The sample was obtained between June and November 2016 by 18 interviewers, 13 women and 5 men. As for the survey questionnaire, it was answered by 122 men and 8 women, as the responsible people for financial management at home.

### **Information analysis plan (data):**

Data were compiled in a spreadsheet, separately for each *questionnaire's item*. With the aim of carrying out contingency tests concerning hypotheses, family communities were classified into 5 socioeconomic levels, according to the assessed value of the plot where their homes were located, which was used as a parameter to measure household wealth value.

The concerning tabulation was made with the filtered data in the spreadsheet, according to the tests of independence to be carried out amongst categorical variables (**Fig. 3**).

The survey variables (data variables in **Fig. 2**) used for measuring economic impacts stem both from potential *willingness or unwillingness* to implement an environmental management system (independent variable), expressed in questionnaire item 11, and from *differentiated (percentage) willingness* in order to achieve certain savings goals (*intermediate variable*), expressed in *questionnaire items 5 to 9*. (**APPENDIX I**)

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<sup>12</sup> Estadísticas del padrón electoral y Lista Nominal de Electores, <http://listanominal.ife.org.mx/ubicamodulo/PHP/index.php> Electronic document consulted on 30th April 2015.

<sup>13</sup> Geografía Electoral. Distrito V, <http://iepac.mx/> Electronic document consulted on 30th April 2015.



In order to make comparisons of categorical answers' counts, cross-classification tables have been developed. They show occurrence frequency of success and failure concerning each variable (contingency tables).

Case hypotheses testing was performed (numbers 6 to 10) with the relation amongst these variables, through application of chi-square statistics as an independence test between two categorical variables (concerning difference amongst groups)<sup>14</sup> (**Fig.3**). The null hypothesis proposes that both...categorical variables are independent, that is to say, there is no relation between them, whereas the alternative hypothesis indicates that both variables are dependent, or more exactly, that there is a relation between them. In the event of null hypothesis rejection, comparisons were made of all pairs of variables using the Marascuilo procedure and it was determined whether or not there existed significant differences amongst them.

For measuring economic impacts, relations were established between potential *willingness or potential unwillingness* to incorporate a project -by sharing initial information- in order to reinforce implementation of an environmental management system (*conditional variable*), expressed in *questionnaire items 12 to 21*, and *differentiated percentage willingness* for achieving certain savings goals (*intermediate variable*), expressed in *questionnaire items 5 to 9* (**APPENDIX I**).

The relation between such variables was used to perform tests of case hypothesis -items 11 to 15- through application of chi-square statistic as a test for independence between two categorical variables (**Fig. 3**). The null hypothesis puts forward that both categorical variables are independent, that is to say, there is no relation between them, whereas the alternative hypothesis indicates that both variables are dependent, in other words, there is a relation between them.

In the event of null hypothesis rejection, comparisons were made of all pairs of variables using the Marascuilo procedure and it was determined whether or not there existed significant differences amongst them.

Validity evidence of the instrument is linked to its content, essentially because of the following elements: 1) Questionnaire design is supported by comparative effects of immediate antecedents of environmental behaviours, which are included in the Theory of Planned Behaviour (TPB) model, specifically: intentions, attitudes, subjective norms and behavioural control perceived by the individual; 2) Studies on general predictors vs specific predictors (in five of the environmental protection domains) of the environmental behaviours they evaluate. These studies were conducted by N. Carmi (*et al*)<sup>15</sup> for the Tel-Hai College in Israel during 2012 and 2013; 3) Other research works<sup>16</sup> where representation of content domain components (67%) of measured variables is observable.

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<sup>14</sup> Hernández Sampieri, Roberto, et al., *Metodología de la investigación*, 6ª. ed., México, Mc. Graw Hill-Interamericana Editores, 2014, pp. 109-111.

<sup>15</sup> Carmi, N, *et al.*, "Seeing the forest as well as the trees: general vs. specific predictors of environmental behavior", *Environmental Education Research*, Londres, agosto de 2014, p.1.

<sup>16</sup> Bamberg Sebastian y Rees Jonas, "Environmental attitudes and behavior: measurement, *International Encyclopedia of the Social & Behavioral Sciences*, 2a edición, 2015, Volumen 7, p.700; Kaiser, Florian G. *et al.*, "A general measure of ecological behavior", *Journal of Applied Social Psychology*, 28,5,1998, pp. 395-422.; Halkos George. *et al.*, "A multi-dimensional measure of environmental behavior: Exploring the predictive power of connectedness to nature, ecological worldview and environmental concern" Paper No. 84631 Munich Personal RePEc Archive, University Library of Munich, February 2018, p. 8.; Rhead Rebecca. *et al.*,

## Results:

It can be stated that results concerning case hypotheses 11, 13, 14 and 15 provide sufficient elements to obtain, in regard to evaluable projects on electricity, LP gas, potable water and solid waste respectively, a negative answer to research questions 1 and 2. Nevertheless, results concerning case hypothesis 12 provide sufficient elements to obtain, in regard to evaluable projects on fuels, a positive answer to research questions 1 and 2.

It can be observed that results of hypotheses tests 6, 7, 8, 9 and 10 provide sufficient elements to obtain, in regard to the case study, a positive answer to research question 3.

It can be asserted that results concerning hypothesis 16 provide sufficient elements to obtain, in regard both to the study case and long-term preference, a negative answer to research question 4. However, as far as the study case and medium-term preference are concerned, such results provide elements to obtain a positive answer.

## To conclude:

It can be concluded that incorporation of evaluable projects into the specific instrument of the proposed strategy for political socialization (into the environmental management system), does not lead to enhance differentiated willingness with reference to energy consumption, saving on potable water consumption and modification of waste generation, all in connection with a change in behaviours, preferences and consumption decisions intended for protection and rational management of natural resources, as well as for internalization of environmental externalities (linked to research questions 1 and 2). Yet, considering what can be observed, the subject of energy consumption in the field of fuel for vehicles poses an exception

Conclusion is that incorporation of knowledge and values, as well as development of competences inherent to implementation of an environmental management system within families as a specific instrument of the proposed strategy for political socialization, explain differentiated willingness in relation to saving on energy consumption, potable water and waste generation, in connection with changes in behaviour, preferences and consumption decisions intended for protection and rational management of natural resources, as well as for internalization of environmental externalities (linked to research question 3).

Moreover, it is concluded that, although there is a willingness to change preferences and behaviours towards consumption decision-making intended to protect natural resources, intertemporal allocation of financial resources released from such changes does not seem to be equitable and efficient, that is to say, it is not oriented in terms of sustainability. This, given the fact that preference for short-term and medium-term has been manifested (linked to research question 4).

In conclusion, it is proposed in this work to delve into *a path allowing to move from environmental education to political socialization and go back*.

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“Assessing the structure of UK environmental concern and its association with pro-environmental behaviour”, *Journal of Environmental Psychology*, vol. 43, September 2015, pp. 175-183; Bronfman Nicolás C. *et al.*, “Understanding Attitudes and Pro-Environmental Behaviors in a Chilean Community”, *Sustainability*, num. 7, 2015, pp. 14133-14152.

**Fig. 2. MATRIX OF OPERATIONALIZATION OF VARIABLES**

VARIABLES OF THE THEORETICAL PROPOSITION FRAMEWORK	CONCEPTUAL DEFINITION	OPERATIONAL DEFINITION		CASE VARIABLES (TYPES)	SOURCE OF DATA COLLECTION
		Factors	Indicators		
Implementation of political socialization strategy within the family (EMS) (independent).	It refers to the incorporation process of values and knowledge, as well as to competence development. <sup>i</sup>	Willingness to <b>pool values, knowledge and competences. It is inherent to the implementation process of an environmental management family system (EMS).</b> <sup>v</sup>	Implement EMS.  Do not implement EMS. <sup>ix</sup>	Categorical, nominal. Independent (It contains the stimulus or experimental treatment).	Questionnaire, 1st and 2nd parts. Items 3, 4 and 11.
Consumption saving (change). Waste reduction and generation (intermediate variable).	It refers to the process of change in behaviours, preferences and consumption decisions. <sup>ii</sup>	Willingness to save (change) on consumption and to reduce waste generation. <sup>vi</sup>	<= 5% <= 10% <= 15% >15% Regarding current consumption. <sup>ix</sup>	Categorical, nominal. Dependent	Questionnaire, 2nd part. Items 5 to 9.
Ecological education as a public policy instrument (elements allowing to clarify it and measure it as a [diffuse] concept). (Conditional variable).	Implementation of projects suitable for assessment according to their economic impact (reinforces implementation of EMS). <sup>iii</sup>	Willingness to share initial (current) information about consumption. It is <b>necessary as a first step to formulate ecological education projects</b> vii (measurement of the policy instrument).	Share current information.  Do not share current information. <sup>ix</sup>	Categorical, nominal. Independent. (It contains the stimulus or experimental treatment).	Questionnaire, 3rd part. Items 12 to 21.
Intertemporal, efficient and equitable allocation of natural resources (dependent variable).	It refers to an optimal distribution of resources during time frames, after making compensations amongst each time frame's groups. <sup>iv</sup>	Temporary preference on return ( <b>allocation as a compensation to a future group</b> ) of benefits derived from saving ( <b>regarding the current group</b> ) according to the type of good or service. <sup>viii</sup>	Preference for short-term.  Preference for medium-term.  Preference for long-term <sup>ix</sup>	Categorical, nominal. Dependent.	Questionnaire. Item 10.

<sup>i</sup> Powell, L. and Cowart, J., *Political campaign communication: Inside and out*, Boston, MA, Allyn & Bacon, 2013; Glasberg, Davita, and Deric, Shannon, *Political sociology: oppression, resistance, and the State*, Thousand Oaks, Pine Forge Press, 2011, p. 56; Matus, Odderey, Talleres de Didáctica General, [www.freewebs.com/.../TALLERES/DIDACTICA/GENERAL.doc](http://www.freewebs.com/.../TALLERES/DIDACTICA/GENERAL.doc)

<sup>ii</sup> Carmi, N. *et al.*, "Percibiendo el bosque, así como los árboles: predictores generales versus específicos, de las conductas ambientales", Environmental Education Research, London, August 2014.

<sup>iii</sup> U.S. Environmental Protection Agency, *Sistemas Integrados de Administración Ambiental. Guía De Implementación*, <https://nepis.epa.gov/search/744R03002>, p.111-117

<sup>iv,viii</sup> Common, Michael and Stagl, Sigrid, *Ecological economics. An introduction*, Cambridge, Cambridge University Press, 2005, pp. 311-320

<sup>v,vi,vii</sup> U.S. Environmental Protection Agency, *Sistemas Integrados De Administración Ambiental. Guía de Implementación*, <https://nepis.epa.gov/search/744R03002>, p.iii,19,23-28, 49, 118-136

<sup>ix</sup> Blackburn, William R., *The sustainability handbook. The complete management guide to achieving social, economic, and environmental responsibility*, London, UK, Earthscan, 2008, pp. 228-232

**Fig. 3. CORRELATION AMONGST CATEGORICAL VARIABLES.**

Research hypotheses tests	Case hypotheses tests	Questionnaire ITEMS (APPENDIX I)	X <sup>2</sup> Test (outcome value)	Critical value	Null hypothesis (H0): <i>there is no relation</i> amongst variables.
<i>Context tests for hypothesis</i>	H1	3	22.1089	9.4877	Rejected
	H2	4	6.5186	9.4877	NOT rejected
	H3	3 and 4	9.7371	9.4877	Rejected
	H4	11	20.9501	9.4877	Rejected
	H5	3 and 11	1.5439	9.4877	NOT rejected
Hypothesis I, between <i>independent variable and dependent variable</i> (item I.6)	H6	5 and 11	12.7239	7.8147	Rejected
	H7	6 and 11	13.4853	7.8147	Rejected
	H8	7 and 11	15.7477	7.8147	Rejected
	H9	8 and 11	21.1695	7.8147	Rejected
	H10	9 and 11	19.2790	7.8147	Rejected
	H16	10	15.0805	7.8147	Rejected
Hypothesis II, between <i>condicional variable and independent variable</i>	H11	12 (17) and 11	6.7608	7.8147	NOT rejected
	H12	13 (18) and 11	10.5480	7.8147	Rejected
	H13	14 (19) and 11	5.9080	7.8147	NOT rejected
	H14	15 (20) and 11	6.4544	7.8147	NOT rejected
	H15	16 (21) and 11	3.4291	7.8147	NOT rejected

Test for independence between two categorical variables, through an X<sup>2</sup> test. Decision rule: Reject Ho if X<sup>2</sup> > X<sup>2</sup><sub>u</sub> (critical value). Significance level ( $\alpha$ ) = 0.05

**APPENDIX I. QUESTIONNAIRE.**  
 “ENVIRONMENTAL INITIATIVE FOR FAMILY SAVING”

This short survey is intended to start a project about household saving (energy, water and solid waste generation).

*The project consists in implementing a simple environmental management system, introduced to your home by YOURSELVES, with the support of our institution's instructors and of qualified personnel specialised in energy saving and environmental protection (INCENTIVE OR STIMULUS).*

**ITEMS:**

- 1.- How many people are there in your family ?  
a) 2                      b) 3                      c) 4                      d) 5 or more
- 2.- Approximately what percentage of the family income do you spend on household electricity bills?  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other\_
- 3.- Which of the following do you deem the best environment so as to learn to make a great political change happen in Mexico?  
a) Firms      b) Schools and universities      c) The family      d) The neighborhood

*Considering that a family policy is a way (an instrument) to confront its daily problems and needs, with the participation of all its members, as a process to express everyone values, preferences, interests and commitments, aimed to find solution strategies.*

- 4.- Do you think people can learn to design family policies from within home?  
a) Yes                      b) No

Based on your CURRENT household expenditure:

- 5.- Regarding electricity, which of the following household saving targets would you be willing to achieve? (Remember that bills are issued bimonthly)  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other \_\_\_\_
- 6.- Regarding family cars fuel, which of the following household saving targets would you be willing to achieve?  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other \_\_\_\_
- 7.- Regarding kitchen and boiler LP gas, which of the following household saving targets would you be willing to achieve?  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other \_\_\_\_
- 8.- Regarding general-purpose potable water, which of the following household saving targets would you be willing to achieve?  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other \_\_\_\_
- 9.- Regarding reduction of solid waste generation, which of the following household saving targets would you be willing to achieve?  
a) 5 %                      b) 10 %                      c) 15 %                      d) Other \_\_\_\_
- 10.- How would you better invest your new savings?  
a) Other household needs      b) A forest precious-tree plantation      c) A fund for my child's higher education

**11.- In order to achieve these goals, would your family be willing to implement an environmental management system? (INCENTIVE OR STIMULUS)**

**Consider that during the project's life it will be necessary to share information about monthly and bimonthly control both of energy consumption and waste generation. In order to implement this family system and achieve our objectives, we also need some INITIAL information. Would you be willing to share it with us? (INCENTIVE OR STIMULUS)**

12.- Regarding energy consumption

a)Yes                      b)No                      17.- Our consumption in kWh    or    Our consumption in \$

13.- Regarding car fuel consumption

a) Yes                      b)No                      18.-Our consumption in lt        or        Ourconsumption in \$

14.- Regarding LP gas consumption

a) Yes                      b)No                      19.-Our consumption in kg        or        Our consumption in \$

15.- Regarding potable water consumption

a) Yes                      b)No                      20.-Our consumption in lt        or        Our consumption in \$

16.- Regarding solid waste generation

a)Yes                      b)No                      21.-Our generation in kg        or        Our generation in bags

*Thank you for your willingness to participate in this family and civic project. We will be in close contact with you.*

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