



RESEARCH ARTICLE

AN EDUCATIONAL INTERVENTION TO GENERATE ENVIRONMENTAL BEHAVIORS IN THE FAMILY

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ABSTRACT

The rational use of natural resources and the protection of the environment, means acting with responsibility and opportunity. To generate environmental behaviors in the family, its members must have environmental culture. Therefore, to re-educate parents in this field, the non-formal environmental educational program of the training workshop "Environmental culture for the family", was implemented in three schools. The final group of participants in this study was integrated by 23 volunteer parents: 22 female and 1 male. The outcomes confirmed the usefulness of implementing this type of educational intervention, for it was demonstrated that parents or guardians who participated in it, by increasing or achieving new knowledge, they were enabled to strengthen their decision-making with those alternatives that they could not have had incorporated into the process of training and practice of values and environmental habits in their homes, otherwise.

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INTRODUCTION

Environmental Education (EE) is an alternative to acquire knowledge, adopt ethical and environmental values, change attitudes and generate environmental behaviors, in order to use resources rationally, protect the environment and mitigate its degradation (UNESCO, 2005; Macedo and Salgado, 2007; Álvarez y Vega, 2009). In developed countries like Finland, Iceland, Sweden and Denmark, public environmental policies were designed in EE's formal and informal modalities to educate citizens for sustainability (EPI, 2016). In developing countries, like Mexico, formal environmental education (FEE) was predominantly adopted; thus, EE became limited in time and space because it only took place during the individual's academic training (Coombs and Ahmed, 1975, de la Llata-López and Sampedro-Rosas, 2017). Considering that education in Mexico faces significant challenges and that out of the total enrollment of students in preschool and elementary education, only 64.8% were taught FEE (OCDE, 2009, 2010), the causes that have made the building of environmental culture (EC) process increasingly complex and costly, in economic, social and environmental terms, are clear. Mexico created the

Directorate of Environmental Education of the former Secretariat of Urban Development and Ecology (SEDUE, for its name in Spanish) in 1983. Nevertheless, it was until 2006, when EE was officially included in the high school educational subsystem (Diario Oficial de la Federación, 2006; Reyes and Bravo, 2008; Calixto, 2015). More than two decades of delay in the construction of the population's EC facilitated a generation gap between parents without EE and children with it. Hence the need of implementing a non-formal environmental education program (NFEEP) aimed to reeducate parents and guardians of minors to generate environmental behaviors in the family. The educational intervention discussed in this paper is a proposal based on the premise that the EE must be a lifelong process that must start since birth, and that it will certainly make a difference if parents or guardians are to model care and respect for the world of nature; an ideal behavior which might help to avoid the conflict that arises when minors, who learn EE at school, realize that the uses and customs practiced at home do not agree with what they are taught in the classroom. Consequently, in order for parents or guardians to be able to model environmental values, attitudes and habits, they also need EE. EE or education for life, as Martin Molero (1994) refers to the kind of education that seeks to change people's values and habits, involves more than achieving knowledge. It takes household learning and that what has been learned must be transferred to daily life, as

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Cánovas (2002) recommends. FEE needs to be articulated with the household's NFEE for both modalities should establish an integrating bridge house-school-community in the sphere of EC to reduce the generational gap that separates environmental theory from environmental practice. With EE for all, it will be far more feasible to progress in the building of EC and its consolidation in Mexican society. In account of the aforementioned, the main aim of this educational intervention was to validate the NFEEP designed to educate/reeducate parents and guardians with minor children, within the framework of EC, for environmental behaviors need to be adopted by all members of the family, not only minor children.

MATERIALS AND METHODS

An educational intervention, using the participatory action research method (Hernández Sampieri et al., 2010) was implemented in three schools in Acapulco, Guerrero, once their educational authorities had granted facilities for its implementation and approved a participation agreement, as well. School A stands for a public school of elementary level, located in Colonia Cumbres de Llano Largo, which participated with one group; school B for a private school that provides services for preschool, elementary, junior high and high school levels, located in Fraccionamiento Balcones de Costa Azul, also with one group of participants; and C₁-C₂ (subscripted for two groups were integrated to comply participants' need) stands for a private higher education institution whose services also include preschool, elementary, junior high and high school (only parents of students attending these four levels were called to participate), located in Fraccionamiento Magallanes. With the purpose of presenting the NFEEP's training workshop "Environmental culture for the family", as agreed with the educational authorities, a parents' conference was held in every school. Its agenda included a diagnostic test to be administered to all attendees before the presentation started. The findings of this test will be discussed further on. After having explained the content of each of the five didactic sequences of the workshop's NFEEP, the tasks and types of assessments (Figure 1) and announced that the workshop was designed to last 16 hours of in-class work and 4 hours of homework, attendees were asked to register for the workshop. The sessions' frequency, dates and timetable were determined by those parents or guardians who volunteered to participate, considering their preferences and time availability but subject to the school's facilities and working hours. These group's specifics were set as it is shown in Table 1. A total of 109 parents attended the presentation meeting, and 63 of them volunteered to register. However, the initial object population was integrated by the 35 participants who attended the first session of the workshop (Table 2). Total attendance to session 2 was the highest registered in all the five sessions, with 36 participants of the four groups. From sessions 3 to 5, attendance was in a far lower proportion, as it is shown in Table 3.

The diagnostic test of 22 items, designed to determine what participants already knew about the fundamental concepts and skills to be covered by the NFEEP, was distributed in two types of questions: 16 matching-format items and 6 multiple choice affirmations with positive directionality, of Likert-scale type, with four response options. Once the theory part of the NFEEP, sessions 1, 2 and 3, was completed, to monitor the participants learning, students wrote a formative assessment questionnaire of 22 items, distributed in 10 correlation questions, 8 for gap-filling and 4 of short response. The

summative assessment of the NFEEP was administered only to those participants who had written the diagnostic and formative assessment tests and attended four out of the five sessions, at least, which were the mandatory requirements established since the beginning of the course. Out of the initial object population of 35 participants, only 23 of them, in all the four groups, fulfilled the requirements, and they were administered this final test. The 30-item questionnaire designed for this purpose consisted of 5 multiple choice questions, 10 gap-filling, 10 matching, and 5 short response. They also contributed to the assessment of the NFEEP and the facilitator's performance. The survey questionnaire of 15 items included 10 multiple choice affirmations with positive directionality, of Likert-scale type with four response options, 2 items for respondents to choose their preferences, and 2 contingency questions. In order to analyze and interpret the results of these assessments, the quantitative data analysis method was chosen, using descriptive statistics by frequency distribution.

RESULTS

The initial target population consisted of 35 volunteers: 33 women (94%) and two men (6%), only 23 participants in all four groups – 22 women (96%) and 1 man (4%) – thoroughly completed the NFEEP. The average age was 45 years old, within an age range of 32 to 62. Regarding the level of schooling, 48% said they had a bachelor's degree, 39% had a high school diploma, and 13% had only basic education (tables 4, 5, 6, and 7). On the diagnostic assessment, population A scored only 55% of correct answers; B scored 67%, C₁ achieved 69%, and C₂ with 76% of correct answers achieved the highest score of the four groups. When comparing the scores of the diagnostic assessment test to those of the formative and summative, the scores show an advance in learning. Population A showed more enthusiasm of all in participating in classroom theory and practice activities; a factor that could have been translated into achieving knowledge. A went from a score of 55% of correct answers to 66%, and finished with a score of 80%. Population B's performance was different: it went from a 67% to an 83%, but then it went back to 75%. Populations C₁ and C₂, like A, both kept a growing trend: their terminal percentage of correct answers was higher than that of the diagnostic. The comparison of the four-group educational intervention findings are detailed in Figure 2. All of the four groups presented a similar lack of knowledge in eight of the sixteen key concepts that were addressed in the instrument: biodiversity (only 22% of the participants knew the correct answer), ecosystem (26%), habitat (26%), environment (43%), dumping (43%), natural resources (52%), environmental culture (52%) and environmental protection (57%). In general, the summative assessment scores showed that all of the four groups had improved their learning. Out of 30, 25 items were correctly answered in a range of 74% to 100% of the participants. But in the other 5 items, where participants were asked to identify the types of public services available to a sustainable society, only 54% of them knew the right answers; when asked to identify the non-renewable natural resources existing in the state of Guerrero, 50% answered correctly; only 52% knew the convenience and benefits of practicing the 3 Rs; about the relationship between the planet's health, its deterioration and the quality of life, 52% knew about it; and, only 57% of them knew the type of solutions the authority had to promote to protect the environment.

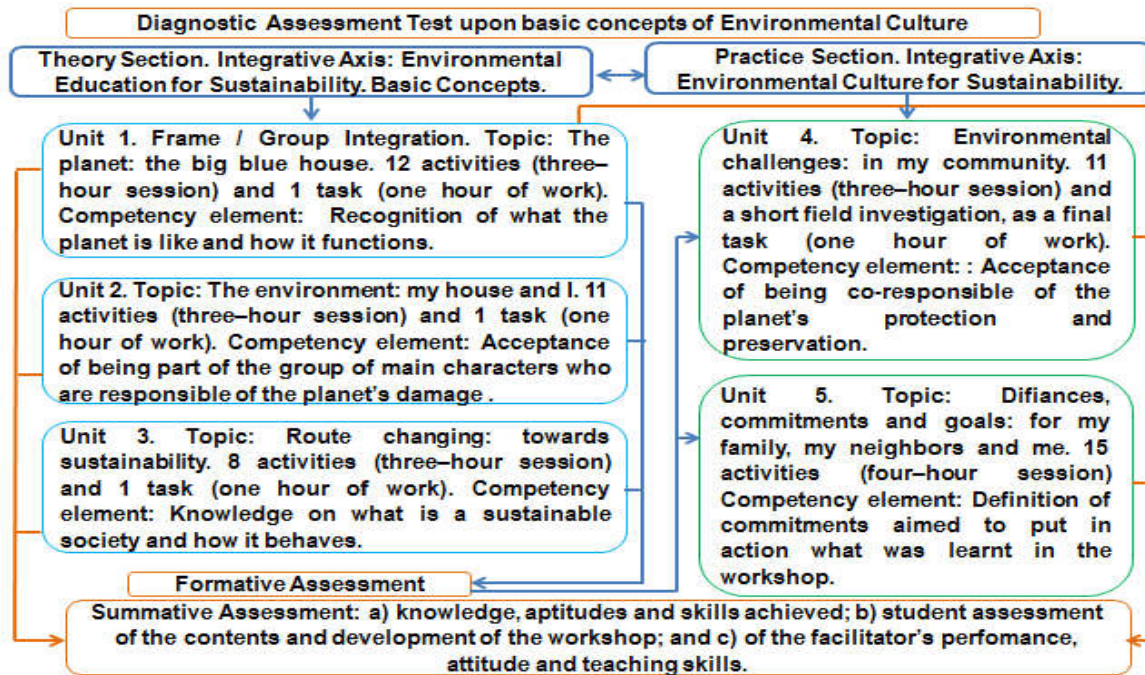


Figure 1. Non-Formal Environmental Education Program (NFEEP) of the workshop "Environmental Culture for the Family"

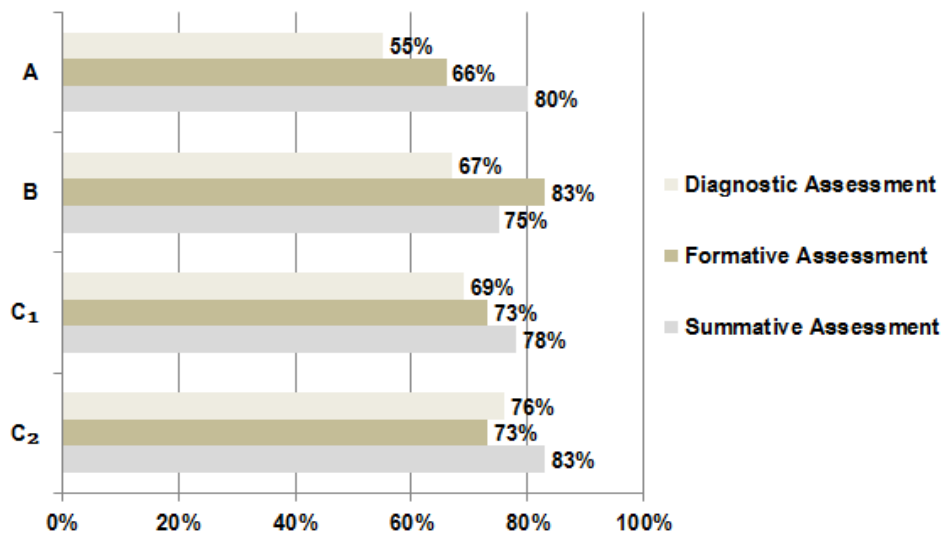


Figure 2. Comparative of achievement' averages, by type of assessment and group

Table 1. Calendar of sessions, by type of participating school and group

Type of participant school and group	Type of school / Time	Session number				
		1	2	3	4	5
A	Public /12:00 pm -3:00 pm.	May 12	May 18	May 23	May 31	June 1
B	Private /08:00 am -11:00 am	May 25	May 30	June 6	June 20	June 27
C ₁	Private /08:00 am -11:00 am	June 21	June 22	June 23	June 26	June 28
C ₂	Private /4:30 am -7:30 pm	June 22	June 22	June 23	June 26	June 30

Table 2. Comparative of attendance of the initial target population, by participant school and group

Participant schools and groups	A	B	C ₁	C ₂	Groups
Type of school	Public	Private	Private	Private	4
Initial target population, by group (integrated by parents or guardians who attended session 1)	21	3	7	4	35
Number of participants by sex and relationship with minor(s)	1 male parent 18 female parents 1 female grandparent-guardian 1 female-external guest (with no minor children)	2 female parents 1 male parent	6 female parents 1 aunt-guardian	2 female parents 1 female grandparent-guardian 1 guardian-aunt	

Table 3. Comparative of attendance by group and sessions

Group	Session 1	Session 2	Session 3	Session 4	Session 5
A	21	19	12	11	10
B	3	6	5	3	3
C□	7	6	6	7	7
C□	4	5	2	4	3
Attendance by session, in all 4 groups	35	36	25	25	23
% Rate	100%	103%	71%	71%	66%

Table 4. Terminal population's profile of participants in group A, by age, schooling, and the number of children and grades they attended, at this public elementary school

No.	Age (All female participants)	Age range	Number of participants in the same age range	Equivalent percentage of participants in the same age range	Schooling	No. Children/ students	Elementary school Children's grades
1	50	50-54	1	10%	College Graduate	0	External Guest
2	44	40-44	4	40%	College Graduate	2	1 y 4
3	44				Junior High	1	2
4	41				College Graduate	2	1 y 6
5	40				College Graduate	1	4
6	39	35-39	3	30%	High School	1	1
7	36				Junior High	1	5
8	35				Elementary	2	3 y 5
9	34	30-34	2	20%	High School	1	3
10	34				High School	2	2 y 6
			10	100%		12	

Table 5. Terminal population's profile of participants in group B, by age, schooling, and the number of children and grades they attended, at this private school

No.	Age /Sex	Age range	Number of participants in the same age range	Equivalent percentage of participants in the same age range	Schooling	No. Children/ students	Children's grades
1	46 / female	45-49	2	66.7%	College Graduate	2	3 and 8
2	46 / female				College Graduate	1	8
3	32 / male	30-34	1	33.3%	High School	1	K
			3	100%		4	

Table 6. Terminal population's profile of participants in group C₁, by age, schooling, and the number of children and grades they attended, at this this private school or at any other public or private school in town

No.	Age (All female participants)	Age range	Number of participants in the same age range	Equivalent percentage of participants in the same age range	Schooling	No. Children/ students	Children's grades
1	55	55-59	2	28.50%	College Graduate	1	11
2	55				High School	0	External Guest
3	54	50-54	2	28.50%	College Graduate	1	11
4	53				College Graduate	1	9
5	43	40-44	2	28.50%	High School	1	10
6	41				High School	3	5, 10 and 12
7	36	35-39	1	14.30%	College Graduate	1	2
			7	100%		8	

Table 7. Terminal population's profile of participants in group C₂ by age, schooling, and the number of children and grades they attended, at this private school or at any other public or private school in town

No.	Age (All female participants and guardians)	Age range	Number of participants in the same age range	Equivalent percentage of participants in the same age range	Schooling	No. Children / students	Children's grades
1	69	65 -69	2	66.7%	High School	1	6
2	62	60-64			College Graduate	3	Nursery, K and 7
3	59	55-59	1	33.3%	High School	1	5
			3	100%		5	

Regarding the assessment of the NFEFP, 96% of participants found that the topics discussed had been very important, and they were important to 4%; 96% and 4% said that the teaching and learning materials used to support the dictation of the class were very good or good, respectively; among the different teaching and learning materials, when asked to choose those three they liked the most, 100% chose videos, 57%, the

participant's manual, and 48% photograph and video testimonials on the local environmental problem in Acapulco. To measure their preferences among the diverse classroom activities, they also chose those three they liked the most, to 74% of them, team working was number 1; to 52%, writing a script for a drama was number 2, together with watching videos; and, to 30% of them, in equal percentage, number 3

were: participating in the drama session, and singing. The classroom, the school's facilities and conditions of the school furniture seemed very good to 74%, and good to 26% of them.

About the duration of the workshop course, 36% of the participants said that it had been suitable, enough to 36% of them, and 30% thought it had not been enough; although, one participant (4%) thought it had lasted too long. When being asked how often the sessions had started and finished on schedule, 92% of the participants in all of the four groups said sessions had always started and finished on time; 4% said that it had been almost always and also 4% said that sometimes. Regarding the facilitator's performance, 96% said that she had always had the group's attention and control, and 4% said that she had done it almost always; 96% thought that the attention and treatment they were given by the facilitator had been very good and 4% said that it had been good; 79% of the participants thought that their doubts had been clarified very well and 21% that the explanations had been well. 83% of the participants rated the facilitator's level of preparation very good and 17% rated it as good; about her punctuality, 79% considered that it had been very good, 17% that it had been good and 4% that it had been regular. To the question about whether or not having participated in the NFEED had been useful or not and why or why not, 100% of the participants said that in deed, it had been useful to them; overall, because it had helped them realize the correlation between the planet's health and the quality of life of all living beings, understand the importance of caring for the environment and the urgent need to acting to change to become environmentally friendly. And to the question if they would like to participate in further NFEED activities or workshops, 100% said they would. The overall reason 62% of them gave was that they needed to learn more about environmental issues; 17% said that it was the best way to know what to do and how to put it into practice and share it with their families, friends and neighbors; 17% gave other reasons related to different perspectives, but all favorable. Only 4% said that due to lack of time it would be very difficult to participate again.

DISCUSSION

Environmental science experts believe that the processes of enculturation and change begin within the basic cell of social life, that is, within the family, the sphere from where these processes continue into the other external spheres of the social structure, such as the neighborhood, the school and the local community (De la Lata-López and Sampedro-Rosas, 2017); hence, the need and importance to strengthen the environmental knowledge of parents or guardians for they are responsible of incorporating the process of training and practice of values and environmental habits and behaviors in their children and any other family members living at home. The implementation of this educational intervention, in terms of the environmental knowledge achieved by the four groups, proved to be efficient when comparing the percentages of the diagnostic assessment test of each one of the four groups increased from 55%, 67%, 69% and 76% to 80%, 75%, 78% and 83%, respectively, in the summative assessment test. Although having increased the participants' environmental knowledge should be taken as an accomplishment, this was only the first step to achieve the transformation of environmental attitudes and knowledge into sustainable behavior, as indicated by UNESCO (2005); Macedo and Salgado (2007); Álvarez and Vega (2009). The usefulness

of the knowledge achieved in the NFEED, and the interest and the disposition that all participants said they had are not enough to change values or habits. This kind of change implies a close and direct relationship between environmental awareness and concern and a sustainable lifestyle (Álvarez and Vega, 2009). Thus, the enculturation process by which any individual learns the traditional content of a culture and assimilates its practices and values means starting to learn since birth and at home and translating what is learnt into environmental behaviors; because knowledge has to be transferred to daily life (Martín Molero, 1994; Cánovas, 2002). As they were receiving information on specific topics, the participants of the four groups realized that due to ignorance they were part of the environmental delinquency, understood as the action of perpetrating offenses against the environment, by violating the laws of Nature (De la Lata-López, Juárez-López y Sampedro-Rosas, 2017). They were surprised and showed sorrow and regret for not having known before that mankind is polluting the environment at such a speed that Nature cannot "recycle" what is being discarded, (Foladori, 2001).

It is important to point out that only 23 out of the 35 participants who integrated the initial population completed the workshop by having fulfilled the requirements of 80% of minimum attendance and written all the three assessment tests (diagnostic, formative and summative). This outcome shows a 65.7% of participant retention and a dropout rate of 34.3%. The participants who abandoned the workshop expressed the following reasons: due to low time disposition, family reasons, house chores or business appointments. As the workshop progressed, the participants' curiosity to hear about environmental issues, turned into a sincere interest to learn new ways to protect the planet's health, as an opportunity to protect their own and that of their loved ones. Family love was the dominant intrinsic motivation shared by those who completed the workshop. Because of that natural human need to feel safe and protected, that was formulated by Maslow (1943), they found the way and made the necessary time adjustments to attend the sessions and accomplish what they thought was not only a commitment but a special family present. Another factor of significant influence was that participants of school A, which was the only public school that participated in this educational intervention, knew each other fairly good. Another factor could have been that they were all women and mothers with small children in elementary school. The levels of companionship and commitment were outstanding and prevailed during the whole workshop. They worked as a team and their results increased after each assessment. Participants of group B, three parents from a private school, were only acquaintances; they had not interacted before in any school activity. It could have been that because they were two mothers and one father, that they showed no real interest in working as a team until the fourth session. The populations of the other two groups from the same private sector, C¹ and C², showed a high level of enthusiasm, almost as high as that of population A. The difference probably was due to the fact that not all the participants knew each other and, their children attended different schools, but they made a great team and their results were also satisfying and showed a final increase

Conclusion

The importance of this type of NFEED intervention lies in the relationship between knowing and understanding. It is only

with environmental education that society can be able to understand, accept and respect the inescapable man-nature relationship. And not only parents or guardians but mankind should learn to care, protect and preserve the environment. An important indicator of the overall outcomes achieved with the implementation of the NFEEP that has to be taken into account is that the call reached a total of 113 parents or guardians of three different schools and, that only 23 of them participated and completed the workshop. If this call's response level were to be measured by the level of participation, then it could indicate a significant degree of indifference or lack of interest in environmental affairs among the potential participants who attended the presentation meetings. Although this is only a reading, it will be more than useful, for the following editions of this workshop, to consider seven or eight sessions instead of five, to give adult participants more chance to fit this activity in their daily agenda. In search of ways to increase the level of interest and participation of adults with great family responsibilities, to whom this and further editions of the NFEEP'S workshop "Environmental Culture for the Family" will be aimed at, we strongly believe that implementing some awareness-raising activities for the school's community, before spreading the call to parents or guardians to participate in the workshop, may serve to encourage participation and commitment. Activities such as conferences, information leaflets on prevailing environmental problems in the locality and solution proposals, posters with questions on environmental culture and values, current information and data of what is happening nowadays, and a wide dissemination of environmental, social and economic benefits that may be achieved if simple but significant change of habits to protect life in planet Earth are adopted at home. It is clear that a deep change like this, which tries to persuade adults to move to a sustainable society model, involves overcoming the natural resistance to change. We hope that the analysis and interpretation of this first implementation of the NFEEP, in four different groups, will come to be a useful reference parameter that will help inspire new and better proposals of NFEE models to enable the strengthening and proliferation of actions and measures to prevent and mitigate environmental degradation and preserve and improve the quality life in our planet; not only locally but globally. The degradation of planet Earth is not the exclusive product of large industries or livestock and agriculture, but the sum of all anthropogenic activities. What we do or not do is what matters. This was the central principle that inspired the determination in us to validate an NFEE model that seeks the common benefit of the planet and that of all living beings. Although the model of this educational intervention has been validated, for the next editions, the commitment of the authors is to assure that this NFEEP's content will be improved, thanks to the experiences shared between the participants and the facilitator; and see for better conditions that those in which this first edition was developed; and take its outcomes as a reference for the designing of other educational proposals on NFEE.

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