
An approximation at the practice of environmental education research in Mexico

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ABSTRACT

The practice of environmental education research is characterized by its complexity and dynamism, addresses issues, aspects and environmental problems, from an educational approach in different social, cultural and institutional areas, with great fellow's diversity, among other children, adolescents, country and native people, with multiple goals, among others: identify, explain, comprehend or interfere.

The question that brought this investigation up was raised in the following terms: Which characteristics theological-methodological prevail in the research works presented at the XIII National Congress of Educational Research?

The method used was the content analysis; the sample was delimited in the set or presentations in environmental education presents at the XIII National Congress of Educational Research, Mexico. Therefore, the content analysis included the revision of the text, the data selection, the identification of the registration units, the determination of frequencies and the establishment of partnerships with the categories and subcategories of analysis.

The results reveal the predominance of researchers from Mexico City (50%); the preponderance of studies based on the interpretive paradigm (78%); the existence of a greater interest in addressing the topics of the Education Sciences (59%); and a greater number of works oriented to basic research (62%).

Keywords: *Environmental education, educational research, paradigm, practice, training of researchers*

INTRODUCTION

Environmental education arises at the time when different sectors of society are aware of the effects of environmental problems on human health and environmental conditions; an international movement for the environment emerges, giving rise to a series of events of the international organizations promoted by the United Nations for Education, Science and Culture (UNESCO) the World Wide Fund for Nature (WWF) and International Union For the Conservation of Nature (IUCN), in favor of environmental education.

The beginning of the environmental education firstly occurs in the countries of the northern hemisphere, when various social actors systematize and disseminate the educational actions that are undertaken in favor of the environment. Tilly (1993–1994) refers that at the beginning of the 60's of the previous century social movements were formed which questioned the disinterest of the governments of the States to solve the environmental problems and of the great costs in the

quality of the life that are generated by the model of economic growth. These movements for the particularity of their demands were recognized as environmental movements. These groups were formed with activists who had previously participated in other political-social projects or in parties and politic organizations of the left but also with scientists, executives, country people, teachers, students, and housewives, among others.

In Mexico González-Gaudio (1999) has documented the development of environmental education, he mentions that since its origin has been linked to the natural sciences providing an ecological bias. For González- Gaudio it is in the nineties decade of the previous century, when environmental education is recognized in Mexico, acquiring more and more importance. According to Bravo (2003), the practice of research in education in Mexico, comes years later, between 1984 and 1989.

Research in environmental education includes a set of practices aimed at unveiling the different knowledge, attitudes and values associated with the environment; the results of the research contribute to generate knowledge, solve problems and discover meanings; the results of educational research improve the interventions and a greater understanding of educational processes and policies is acquired. González-Gaudio and Lorenzetti (2013) point out that research in this field is very interesting and significant in exploring certain problems and substantive issues related to the quality of the school in general and fostering genuine social participation; the results are useful for student learning of various topics related to the environment.

The article presents a first advance of a documentary research, through of the analysis of the presentations on environmental education of the XIII National Congress of Educational Research, held in November 2015 in Chihuahua City, Chihuahua, Mexico. These papers presented a finished or partial research work in environmental education.

The question that gave rise to the research that is working in this article was raised in the following terms: what theoretical-methodological characteristics predominate in the research papers presented at the XIII National Congress of Educational Research?

From this question the following objectives were raised:

- Describe the paradigms, topics and types of research of the presentations in environmental education.
- Identify the aspects that are rarely addressed in the presentations on environmental education.

The analysis carried out is a first approach to the practice of environmental education research in Mexico; the papers judged favorably and presented during this Congress were selected.

The article comprises three sections, the first describes the theoretical-methodological references; the second contains the results of the analysis performed; and in the last one a set of reflections on the practice of the environmental education research in Mexico is shared.

In the article, the classification of paradigms of educational research Koetting (1984), the delimitation of the topics of research in environmental education Caride (2007) and the proposal of the types of research Joliot (2001) are taken up.

The introduction of the paper should explain the nature of the problem, previous work, purpose, and the contribution of the paper. The contents of each section may be provided to understand easily about the paper.

THEORETICAL-METHODOLOGICAL REFERENCES

Environmental education as an object of interdisciplinary research line up different disciplines that articulate very diverse knowledge and practices, directed to environmental scientific knowledge, and related to the practice of research and decision making and the empowerment of people for environmental change.

In most environmental education research, the disciplinary view has been passed and has appropriated its own meaning; research in environmental education is linked to the inherent processes of forming an environmental, sustainable and planetary consciousness; goes beyond the classical parameters of educational research.

In Mexico, there have been many work meetings (seminars, forums, meeting, congresses) that have promoted the practice of environmental education research, among which are: the First Seminar on Environmental Education (1988) in Guadalajara, Jalisco; the First Ibero-American Congress on Environmental Education (1992) in Guadalajara, Jalisco; the Second Ibero-American Congress on Environmental Education (1999) in Tlaquepaque, Jalisco; National Forum of Environmental Education (1999) in Aguascalientes, Aguascalientes, the First National Congress of Research in Environmental Education (1999) in Veracruz, Veracruz; National Meeting of Environmental Education for Sustainable Development (2005), Aguascalientes, Aguascalientes, the Second National Congress of Research in Environmental Education for Sustainability (2011) in Puebla, Puebla.

At the Second National Congress of Research in Environmental Education for Sustainability (2011) it was possible to verify the existence of diversity of research perspectives, methodological approaches and “currents” of environmental education. 121 research papers were presented, 96 as papers and 25 in the poster format. This number of papers shows the existence of several groups of researchers, mainly in institutions of higher education.

Moreover, for more than 20 years, the Mexican Educational Research Council has been able to gather educational researchers from different fields of knowledge on a regular basis, so it can be used as a reference for the analysis of the trajectory of the practice of environmental education research.

In the various congresses organized by the Mexican Educational Research Council in different states of the republic (the first in 1981, the second in 1993 and from this year, every two years to the last in 2015) has been an important forum for the development of environmental education research.

The practice of research is recreated from the dissemination of results in these congresses.

The investigative practice can be understood as a process of mutual interaction and reflection and congruent between the subject, the object, the concrete action, the theoretical, epistemological and methodological components and the understanding-

interpretation or possibility of explanation of social or educational phenomena. Alfonso (2015, p. 75).

The practice of research in environmental education is characterized by its complexity and dynamism, it addresses issues, aspects and problems of the environment, from an educational perspective in different social, cultural and institutional areas, with a great diversity of subjects, among other children, youth, peasants and indigenous people, and with multiple objectives, among others: identifying, explaining, understanding or intervening.

...research in Environmental Education is important because responds to two main reasons: to provide the widening horizon of world vision or to promote the extension of the field of visibility of the relations between society and nature and offer meaningful answers to the anguish that involves solving problems in a practical way. (Ruscheinsky, 2005, p.138).

The practice of environmental education research is valuable in understanding the different pedagogical situations, the types of knowledge that are present, the frames of reference and the origin of various educational problems associated with the environment; with which the environmental education practice is fed back.

Research in environmental education is oriented to the identification, description, explanation and /or understanding of knowledge, attitudes, values and environmental behaviors, making it possible to identify the opportunities offered by environmental education in interaction and school or non-school work, as well as the types of constraints imposed by development models, and the relationships that society constructs with the environment, as well as the means to achieve greater social participation in the face of environmental problems; different forms of research coincide, it is not a homogenous field in which a single look predominates in doing research.

a) Theoretical references

Research on environmental education is at the intersection of ecology, culture and society, and is similar to the hologram metaphor referred by Foray and Hargreaves (2003). In which it moves from the social to the natural and vice versa. In the practice of environmental education research, the use of different paradigms, topics and types of research can be organized.

According to the objectives and methodological procedure of the investigations, and the nature of the data can have indications of the paradigm to which the research is inscribed. Sauvé (2008) points out the coexistence of the three research paradigms in the environmental education: the positivist, the interpretative and the critical. The term paradigm has been accepted by the academic community to refer to the ascription of theoretical-methodological models from which arise particular and coherent traditions of scientific activity.

These paradigms emphasize different characteristics of the object, construct it from certain referents, explain it and give it meaning, constitute the framework for the practice of educational research.

In a paradigm the nature of research is delimited; the choice of one another paradigm depends on several factors, among which are the aims that are pursued.

These paradigms are those commonly accepted by the academic community, which are present in environmental education research; these three paradigms are considered by Reid and Scott, (2006) for the investigative practice in environmental education.

In research in environmental education the topics proposed by Caride (2007) are identified: a) the one that emphasizes education sciences, b) those in the social and environmental sciences, c) quasi- experimental, and d) those that focus on interpretive studies.

A topic refers to a set of themes and /or content organized around specific aspects of one or more disciplines.

On the other hand, Joliot (2001), delimits three types of research in environmental education, according to its objectives and specific characteristics: basic, objective and applied.

Basic research, also called fundamental, aims to generate new knowledge about a thematic and therefore, the progress of knowledge in all specific fields; information is available in different contexts of diverse populations.

Research by objectives is that which responds to the concrete needs of society in those fields where the conceptual bases available are still insufficient; is addressed to new issues with proposals based on specific needs.

Applied research, as its name implies aims to apply the knowledge generated. Within this type of research are the intervention, innovation and technological projects; the results of experiences developed are systematized. This classification of Joliot (2001) makes it possible to identify the objectives and expected results of the research results.

b) Methodological references

The methodological process of this work was oriented as documentary research to the content analysis of the presentations related to research in environmental education presented at the XIII Congress of Educational Research organized by Mexican Educational Research Council (2015).

Content analysis is understood as: “...a research technique for the objective, systematic and quantitative description of the manifest content of communication” Berelson (1952, p.18) the analysis involves an objective, selective reading process aimed at identifying regularities, identifying associations and differences.

Election of the population: in this case of the papers presented at the Congress of Educational Research.

Sample: Presentations related to environmental education.

Units of analysis: text concerning the construction of the object of study, objectives and methodological definition.

The registration units comprise the specific segment of the text that addresses the aspects of the categories.

Construction of the categories based on the theoretical/conceptual proposals of Keotting (1984), Caride (2007) and Joliot (2001). These categories are: a) by research paradigms b) Topics and investigation topics and; c) by type of investigation. Each category in turn complied a series of subcategories. From the first category are detached as subcategories: positivist, interpretative and

critical; of the second category derive the subcategories: education sciences, social and environmental sciences, quasi-experimental and symbolic cultural relations; of the third category correspond the subcategories: basic, objectives and applied.

From each of the subcategories, there are a set of attributes that allow to perform the analysis in an objective way, in table three, some of these are noted.

The next stage consisted if revising the text, selecting data from the registration units, identifying frequencies and establishing associations with the categories and subcategories of analysis. The analysis of content is qualitative because categories are marked to passages of the text. Depending on the purpose of the study, researchers might decide to identify the relationship between categories and subcategories further based on their concurrence, antecedents, or consequences Morse and Field (1995).

Table. Category, subcategories and attributes

Category	Subcategories	Attributes
Research paradigms	Positivist	Structured
	Interpretative	Open
	Critical	Flexible
Topics and Research Topics	Education Sciences	Research on, in and for Environmental Education
	Social and Environmental Sciences	Contents Content Teaching
	Quasi-experimental	Contents Methodology Evaluation
	Symbolic-cultural relations	Culture Politics Socio-educational and environmental problems
Types of research	Basic	Generating knowledge
	By objectives	Targeted at specific needs
	Applied	Intervention, innovation and technological projects

The analysis allowed organizing, systematizing and analyzing the explicit content of the presentations; the analysis reflects the components of the practice of environmental education research.

RESULTS

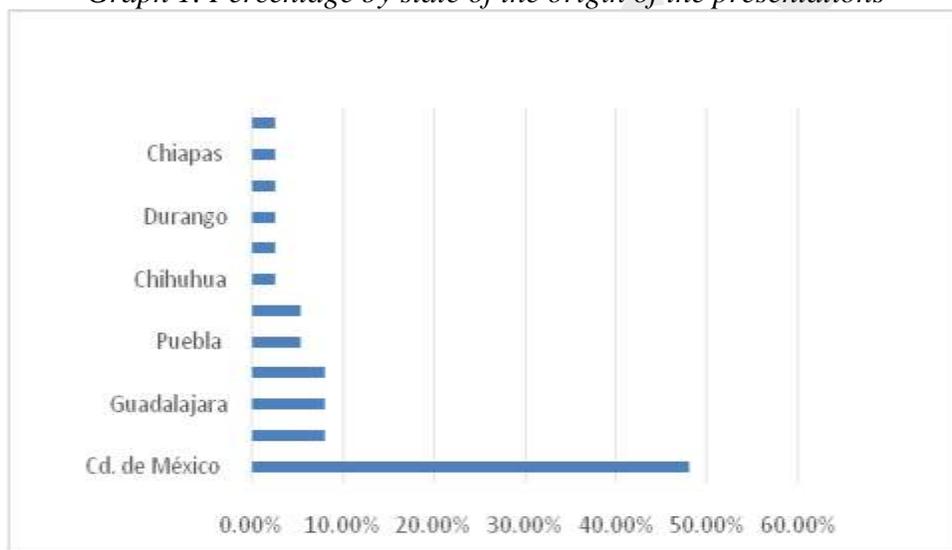
At the XIII National Congress of Educational Research (2015), the central theme was: “Contributions and reflections from educational research: What do we know?...What are we

missing?” , summoning for the sending of presentations of educational research in process or concluded in various general themes; among them is the general theme of “Diversity, interculturality and sustainability in education”, with the sub-theme Environmental Education for Sustainability; 52 works were accepted for this presentation. Of these, three were sent by researchers from other countries, one from Cuba (Matanzas University), two from Colombia (Francisco José Caldas District University and the National-Colombia Pedagogical University). Mexican researchers from different states of the country prepared the 44 remaining papers; there are the papers analyzed in this writing.

On the other hand it is necessary to comment that these were the approved papers, a similar number of papers were rejected because they did not meet any of the criteria of the call; and also gave graduate students the opportunity to present their research papers in the pre-congress.

The papers of researchers of Mexico City were 22; of Veracruz were 6; of Sonora, Puebla and Guadalajara were three; of the Morelos State were two; of Chihuahua, Baja California, Durango, Yucatan and Chiapas were one.

Graph 1. Percentage by state of the origin of the presentations

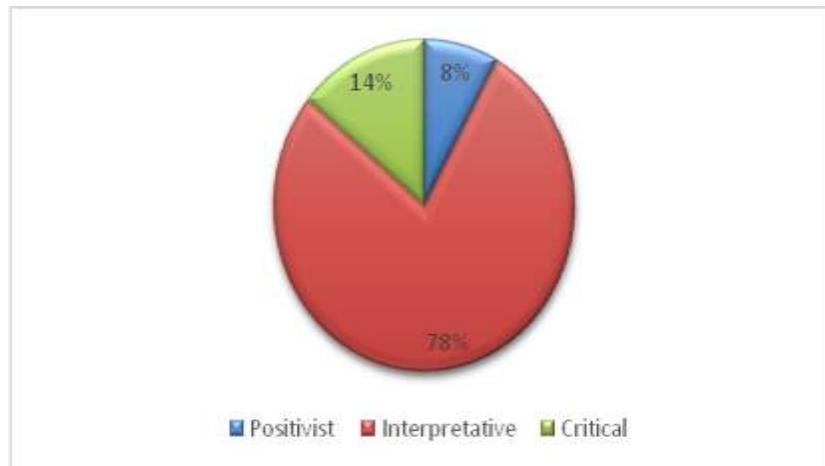


The largest number of papers were presented by researchers from Mexico City (50%); It is necessary to point out that some researchers from several states of the republic did not send papers to the Congress in the field of environmental education, for example the absence of research work from the State of Mexico and Nuevo Leon stands out, although there are researchers working in this area.

a) Research Paradigms

Regarding the paradigm in which the papers presented in the Congress are located, a majority proportion includes elements of the interpretative paradigm. As can be seen in graph 2.

Graph 2. Percentages of identified paradigms



The presentations describe a great variety of methods and techniques, such as the analysis of drawings, narratives, interviews, among others, in order to identify or describe the ways in which the subjects know and relate to the environment. The prevalence in the methods of qualitative perspective is well-known, as well as the systematization of experiences derived from the educational intervention.

The positivist paradigm is present in a smaller proportion of the papers (8%); In this paradigm the phenomena associated with environmental education are considered as stable; educational facts and phenomena have an objective character, independent of the consciousness of individuals, are observable and measurable.

The interpretative paradigm is the one that has a greater representation in the presentations (78%), in these the singularity and the complexity of the educational phenomena are recognized, they comprise a set of humanistic- interpretative theories, oriented in the description and understanding of what individual, the unique, the particular, the singular of the phenomena, rather than the generalizable; are oriented to the understanding of the meaning of educational actions, to interpreting the interactions of the educational world, emphasizing in the analysis of the subjective dimension of social reality, which it comprises as a set of multiple realities.

And the critical paradigm (14%) has a lower presence in the papers than the previous paradigm; in which education is conceived as a historical and ideological process and emphasizes not only the practical understanding of the educational fact, it is fundamentally proposed to transform the educational reality. This paradigm is based on the existence of a “critical community”, whose members play an active role in the conception and development of research work.

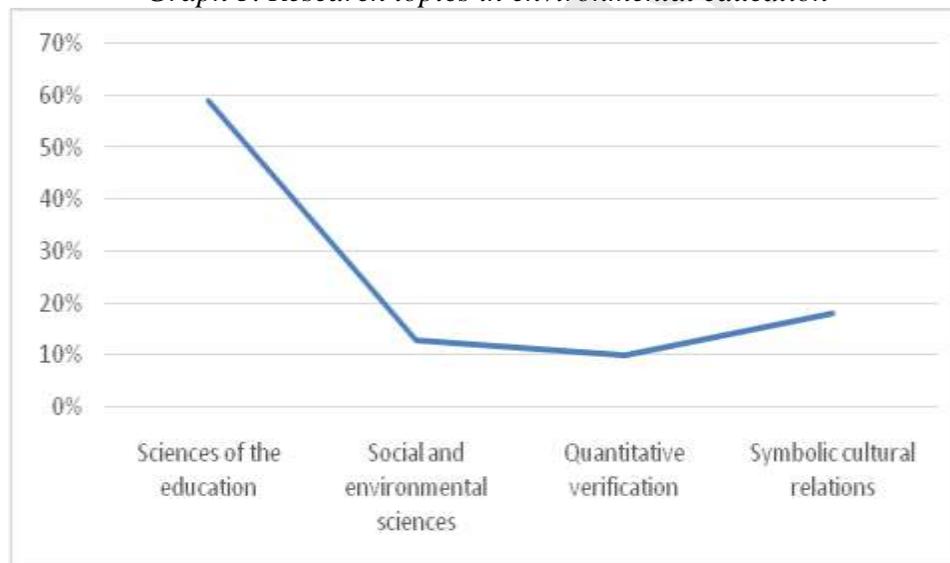
The presentations identifies in this paradigm are aimed at analyzing social transformations, offering answers to problems arising from them, with concrete actions that involve the community in question, in order to achieve the transformation of the conditions that gave rise to the problem.

House (1991) points out that in educational research the foundations of the different paradigms are found. Research in environmental education, according to the paradigm subsumed in the research process contributes in several aspects to a better description, explanation, interpretation, understanding or transformation of the various environmental phenomena interrelated with education.

b. Research topics

As far as topics are concerned there is a wide diversity, most of them are on the topic of Education Sciences (59%), with subjects such as cinema and environmental education, artistic appreciation, teacher training, among others. In the topic of Social and Environmental Sciences (13%) develop topics such as transdisciplinarity, interdisciplinarity, transdisciplinary studies, among others. The topic of quantitative verification (10%) included topics such as sustainable behavior, water conservation, environmental care, nature of science and technology, among others. In the presentations of the topic of cultural symbolic relations (18%), topics related to environmental promoters, agroecology and food sovereignty, community development, among others, have been worked on. The topics are presented in the graph 3.

Graph 3. Research topics in environmental education



The research topics are very varied, most are linked to the programs of educational institutions, such as teaching work and learning of students of different levels of education. Work was also found to address specific needs of rural populations.

The predominance on the researches with subjects of sciences of the education, obeys to the academic tradition that has endured of many years in the educational institutions, fragmenting the disciplinary knowledge; by the nature of the objects of study of environmental education itself, it is necessary to seek the integration of the sciences of education with other sciences; the objects of study are complex, claim a different look to address them, but also requires the humanist and cultural sense.

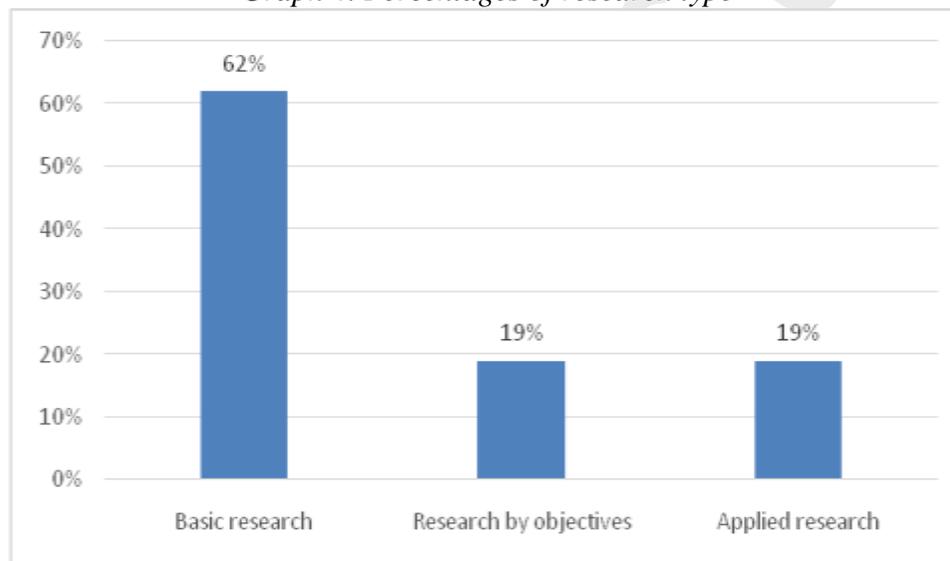
The increasingly frequent use of theories and concepts of other disciplines other than those of education makes the education sciences integrate with the social and environmental sciences. The trend of quantitative verification in environmental education is not frequent; this trend provides relevant information, in the test of instruments and scales, in the analysis of the results of strategies, sequences and /or methods.

In the research carried out in non-school contexts, the integration of environmental education with other disciplines that prioritize symbolic-cultural relations is more clearly observed. In some institutions, researchers address issues related to environmental knowledge and cultural practices, linked to environmental education.

c. Type of research

As for the research types of the presentations, 27 have the basic research features, eight presentations have elements of one research per objectives and eight presentations comprise aspects of applied research.

Graph 4. Percentages of research type



The trend in graph 4 shows that most research is oriented towards the identification, description or diagnosis of certain problems or situations related to environmental education at all educational levels.

However, in aspects as relevant to environmental education as consumerism, media, physical education, health education environmental education policy, little has been done; likewise, there is little work with indigenous communities, rural or peasant groups or associations; It continues to favor the study of educational institutions un urban areas. In the results, basic research predominates (62%). The most interesting aspects refer to the knowledge, competencies, representations, attitudes and values that teachers and students have on various environmental issues. Research on the environmental education of university students is also frequent, specifying the peculiarities of environmental problems, outlining possible routes of action.

In the second type of research, “research by objectives” (19%) involve the testing of teaching-learning strategies and processes; the results of the institutionalization and “environmentalization of the curriculum”; evaluation of programs and reports on the state of question of environmental education. While applied research (19%) is in an equal proportion to research by objectives, although it requires a greater involvement of the research teams with the environmental problems of the communities. Andrade and Ortiz (2004) refer that the generation of knowledge from the field of environmental education research will be able to design new development models and environmental management. Applied research focuses on the transformation of environmental problems within an ethical and political framework.

According to the above, in the papers analyzed, a greater tradition is observed in the practice of basic research; the research groups would therefore be relevant to consider increasingly the relevance of the other two types of research.

The results of research in environmental education mainly affect the improvement of educational practice, however, they do not yet have the expected implications in public policies.

DISCUSSION AND CONCLUSIONS

According to the analysis carried out in a small sample of environmental education research in Mexico, a series of coincidences are identified with the research carried out in other Latin American countries such as Brazil, in the growing number of research carried out in higher education institutions. In Latin America there is a favorable trend in the field of environmental education research (González- Gaudiano and Lorenzetti, 2013).

In the case of Mexico, in the papers analyzed, there is a greater number of papers with an interpretative orientation that delimit the object of study in the schooled areas; it is for this reason that a greater impetus of the research works in the non-schooled areas oriented to the understanding of the dynamics of the educational actions before the effects of the environmental problems in diverse communities is required.

Environmental education as an object of research has several aspects and edges that relate to a new ecological culture, the recognition of a new framework of perception and analysis of environmental problems and the development of an environmental policy (Pontón, 2011). It is in this last aspect that there is a weak articulation of educational research, not only of research in environmental education, with the implementation of educational end environmental policies. There is a great deal of concern about the evaluation of the results of activities, strategies and /or programs used to obtain environmental knowledge or to develop attitudes favorable to the environment.

In other countries, the practice of environmental education research highlights historical and theoretical foundations to issues related to gender, race and colonialism Stevenson, Brody and Dillon (2013). There is a concern on issues that deal with ethics, sustainability policy and environmental justice; Issues that tangentially addressed in the papers that were analyzed in this writing. Practically the various associated issues of environmental justice with environmental education are absent.

The obtained results constitute an approximation of the practices of the investigation in environmental education in Mexico; the sample of works is reduced, since there are several

groups of investigation throughout the country, that in this Congress did not send a presentation. González-Gaudio and Arias (2015) in a survey of environmental education research for sustainability in Mexico 2002-2011, indicate that in recent years there has been an expansion and consolidation of research in environmental education in different universities states of the country; however, for example states of Baja California and Chiapas, had little presence in Congress. The article proposes that environmental education is enriched with the results of practice of educational research, to feed it, create and innovate with proposals based on knowledge of environmental, cultural, social and educational issues.

In this context, is necessary to reflect on one of the main purposes of research, the generation of scientific knowledge with an ethical and political commitment.

The knowledge generated from the practice of environmental education research contributes to the formation of a conscience (environmental, citizen, solidarity or sustainable) in different societies, communities and groups; it seems that for many people the risks of a model of development that privileges the excessive use of natural assets is not evident; The research in environmental education, contributes to unveil these risks and to propose actions.

The results of the analysis provide elements to understand the different traditions in which instilling environmental education practices.

The research in environmental education has a complex object of study, which increasingly requires the development of research, multi-inter-transdisciplinary, perspectives that have to be considered in the practice of environmental education research.

Research in environmental education has a long way to go, contributing to a better understanding of environmental problems related to education; in addition, new challenges emerge, among them are the constitution of efficient mechanisms of integration and communication between the researchers of diverse institutions; The development of research from the paradigm of complexity, which requires the establishment of interdisciplinary research teams; and the approach of relevant issues that are still little studied.

The challenges are multiple for the research in environmental education, not only by the fields or subjects of study, but also by its theoretical and methodological foundations; but there are also other challenges that environmental research shares with other fields of study, including closer links with education policy that take into account the results of research, the development and /or strengthening of networks of researchers in environmental education, as well as the training of new researchers.

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