

An Investigation in Environmental Education and Sustainability in Mexico: A Study of Tendencies and Challenges

Liberio Victorino Ramírez

Professor Autonomous University Chapingo

Areopagita Yésyka Bustillos Gómez

PhD Student, Autonomous University Chapingo

Abstract

The intention of this article is to analyze the scientific production in the field of investigation in Environmental Education for sustainability in Mexico during the decade 2002-2012. This was done with the purpose of informing researchers of the achievements, trends and challenges ahead in this area of investigation. In order to establish a framework to determine the current state of knowledge firstly, researchers set up work teams primarily on a national scale, both regional and federal, to detect the scientific production in distinct institutions at university level, and in formal and informal educational sectors; secondly, they read and reviewed the gathered material to make an extensive analysis of its contents determined by the type of investigation, as well as distinctive characteristics and scientific contribution. This article concludes with recognizing the advances realized, including the trends and challenges to achieve investigations of improved quality and social relevance in the field of research on sustainability in Mexico.

Keywords: scientific production, environmental education, sustainability.

Introduction

In Mexico there is a national organization that brings together researchers in education from very different levels of the national educational system, with distinct methodological practice as well as from diverse disciplines and fields of knowledge. This organization, independent from the Ministry of State Education (SEP for its initials in Spanish), and political parties, is the Mexican Council for Investigation in Education. (COMIE for its initials in Spanish). Every ten years this council invites various researchers, whether members or non-members, to carry out a primary investigation in more than fifteen areas of educational research with the intention of evaluating the scientific research that has been produced over the past decade. In this case we refer to the research in Environmental Education on Sustainability in Mexico 2002- 2012.

In the previous decade, this field of science was included in Bertely & all (2003) Vol. 3, "Education, Social Equality and Rights, 1992 – 2002", COMIE, Mexico. The first volume was dedicated to "Education and Cultural Diversity and Education and the Environment", meanwhile it was not considered as a field of autonomous research, but this was not as exclusive as in the next period 2002 – 2012.

At present it is categorized within Area 3 – Environmental Education for Sustainability (EAS for its initials in Spanish) by the COMIE and works autonomously and is recognized as such, as part of COMIE– ANUIES (The National association of Universities and Higher Education Institutions for its initials in Spanish) with publications under the same umbrella organization. This includes a substantial body of work at national level, in which, ourselves, as part of an academic body from The Autonomous University of Chapingo (UACH for its initials in Spanish) collaborate with the federal entities of Morelos and Guerrero and especially with the higher education institutions (IES for its initials in Spanish) of the State of Mexico, in this case The Autonomous University of Chapingo.

At the International Level

The discourse in Environmental Education has been continuing for over 45 years. From its beginnings in 1970 in Stockholm, Sweden when the idea of Ecological Development was first raised, and again in 1977 in Tbilisi, ex USSR when the importance of Environmental Education in both formal and informal educational contexts was reconsidered to diminish environmental concerns. In RIO plus 20, twenty years afterwards in 1992 the importance of including Environmental Education for Sustainability EAS in the national education systems of countries was again reassessed. In 2002, The Johannesburg Environmental Education Agreement was signed.

The time of analysis of this study by the COMIE coincides with the period which UNESCO defines as the Decade of Education for Sustainable Development. 2005 – 2014. A World Conference for Sustainable Development titled “Learning Today for a Sustainable Future” (UNESCO and the Government of Japan, 10 – 12 November, 2014), concluded the decade. There is no doubt this series of conferences has had worldwide repercussions, but we will have to see what effect it has on Mexico.

At National Level

It must be noted that in the 12 years of Government by PAN (National Action Party for its initials in Spanish) (2000 – 2012) environmental education was well managed on paper and included development plans as well as government commissions. However, while environmental concerns were being raised continually, national government policy did not make it the backbone of their environmental policy they had promised in their campaigns nor was it reflected in the design of a national and sectorial policies in the area of social development.

With the PRI (Institutional Revolutionary Party) government once again in office, the National Development Plan 2013-2018 establishes a Mexico with five strategic approaches: Mexico in peace, Mexico all inclusive, Mexico with quality education, Mexico with prosperity and a Mexico with Global responsibility. It would be desirable to include A Mexico towards Sustainability too.

Government policies are in line with their neoliberal economic model, with the result that environmental issues are dealt in the context of economic growth, and thus oriented towards privatization of natural resources.

EAS requires a serious debate, the results of which, would enhance the Nation’s project and lend relevance to sustainability.

This could have a decisive influence not only on environmental policy, but in the area of social and economic policy as well. In meeting this challenge, Environmental Education becomes the highest political and social priority (Gonzalez & Arias).

Methodology

As a theoretical reference, there has been controversy between economic and social development since the 1970’s when it was recognized that economic growth was incompatible with environmental preservation of forests, flora and fauna. The Mexican government initiated a series of strategies that reduced care for the environment, primarily ecological, and in the schools, environmental education is presented positively as a process of limited knowledge but separate from and somewhere in between Natural Sciences and Social Sciences.

In the best of cases Mexico’s Social Economic model has been criticized for its neo –liberalist stance, a criticism which could open the door to taking environmental concerns into account as one of the high priorities in the National Development Plan. However, after 30 years under a staunch neo-liberalist economic framework, the government has not only refused to recognize this as a failed approach, but has embraced it more firmly. (Victorino 2013)

The appearance of the concept of sustainable development in the 190's, after a period of extended debate was the result of theoretical consolidation of a discursive, unfocused approach. Less favored proposals such as eco-development and endogenous development (or local) development were left behind, rejected for being considered dangerous to the interests of powerful international capitalist groups (Gonzalez & Arias 2015). If we add to this the recurring economic crises in one of the most powerful countries in the World, The USA, in the context of globalization, understood as a phase in World development, the globalization of central, powerful states and the impact of this process on peripheral and dependent countries has transformed our country into an area of risk where social crisis and political, economic and industrial risk are increasingly evident and beyond the control of the industrialized world.(Beck, 2002; Giddens 1990)

Based on the above-mentioned conceptualization, the findings of the research based on the concept of sustainable development were explored, preferably from a variety of distinct publications. The Academic material to be revised was categorized under established headings; books, degree and pot-graduate theses, random journal articles, articles from national and international conferences, research reports, training programs, research presented at events, academic bodies, lines of investigation among others of noted relevance.

Research teams and working groups from nearly all the states joined forces and there were two national reunions in Xalapa, Veracruz, September 2011 and in Mexico City (CDMX for its initials in Spanish) in November of the same year. The purpose of the gathering was to agree upon how to proceed in the two phases of investigation as well as how to handle the documents reviewed. The production of scientific material was quantified in the first phase using a format proposed by the COMIE as well as a complementary database from the University of San Luis Potosi (USLP for its initials in Spanish)

Figure 1 Research teams all over Mexico



Source: Authors property.

The 2nd phase: We produced an interpretation of the work to gain an understanding of the types of research involved, the content of their postulates and evaluations, as well as their contributions to the field of EAS.

The field of research in environmental education on sustainability

From a review of a whole series of bachelors' and post-graduate these and other aforementioned materials-all registered in the COMIE database, we can see how the writing of these theses proceeded in the period analyzed.

Table 1 Thesis production and year of publication.

Year	Frequency	Percentage
2002	21	5.5
2003	21	5.5
2004	26	6.9
2005	42	11.1
2006	51	13.5
2007	41	10.8
2008	30	7.9
2009	49	12.9
2010	50	13.2
2011	23	6.1
2012	25	6.6
Total	379	100.0

Source: Gonzalez &Arias, 2015.

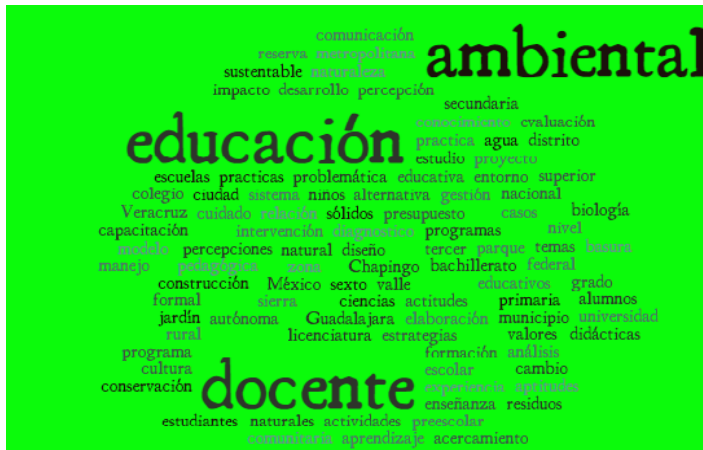
In the following tables we find a description of the published theses, although the lack of specificity in the database casts doubt on the reliability of the information. Nonetheless, Word cloud gives us a general idea of the information included in thesis production published between 2002 and 2012. The theme of environmental education is the most cited concept in bachelors' and post-graduate theses and although this includes a good deal of work at the level of basic education, it is often in the form of proposals and strategies for the inclusion of environmental education in the curriculum.

Table 2 the subject of the thesis and year of publication.

Year of Publication	Environmental Education onSustainability	Virtual Learning Platforms	Learning Development	total
2002	19	0	2	21
2003	21	0	0	21
2004	26	0	0	26
2005	42	0	0	42
2006	50	1	0	51
2007	35	0	1	36
2008	25	2	1	28
2009	43	1	2	46
2010	45	0	3	48
2011	37	2	1	40
2012	19	1	0	20
Total	362	7	10	379

Source: Graphics (Gonzalez & Arias) 2015.

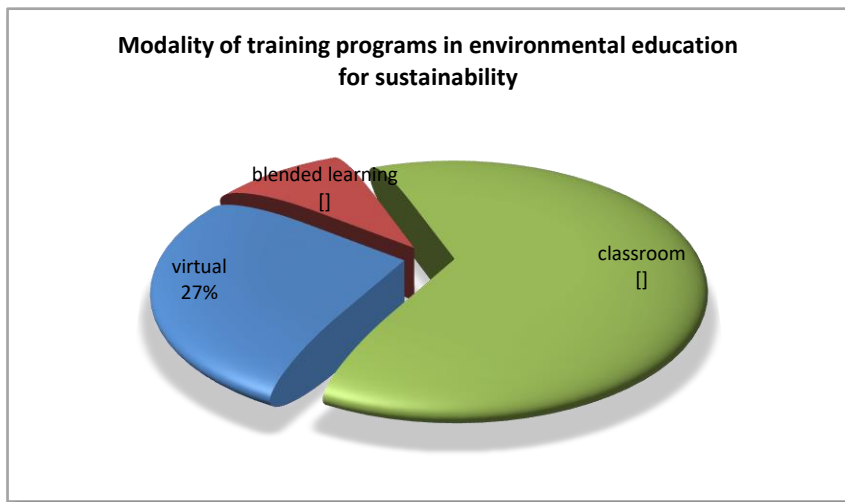
Figure 2. Word cloud analysis and evaluation of published theses



Source: Gonzalez and Arias, 2015

Among the various environmental training programs in sustainability, the following stand out:

Figure 3 Training program modality in environmental education on sustainability



We can see that classroom-based learning continues to set the pace in growth and is the predominate program modality (accounting for 64%), while those incorporating information and communication technologies (TIC, for its abbreviation in Spanish) continue to be less common in this field in comparison with other areas more associated through institutions of higher education (IES for its abbreviation in Spanish) to broad training programs offering exclusively virtual learning.

We rendered an interpretation of publications including books, chapters and magazines, and observed that environmental themes related to theoretical and descriptive research were addressed generically (182 works). The specific themes (126 in all) receiving the greatest attention were biodiversity (50), sustainable development (20), waste (17), water (16), and climate change (10); these were associated with the intervention report, enabling research, participatory action-research and qualitative research, respectively.

Findings and Perspective on the Field

Encouraging the generation of knowledge in the environmental research and educational communities in Mexico is challenging, but there are nonetheless substantial differences in perception which invite us to continue analyzing their visions for improvement over the decade (2012-2022).

From a quantitative perspective, it is important to recognize that knowledge production over the last ten years increased 36% compared to the state of knowledge in the previous decade (1992-2002). In summarizing production from 2002-2012, the following stand out: "theses (379), chapters of books (50), and books (86)" (Gonzales and Arias: 2015, 114). No doubt this production includes interesting and worthwhile work. However, these figures likely also rest on a shallow treatment of the subject, and include omissions and inadvertent errors, raising doubts concerning some of the findings of the material reviewed.

It is important to emphasize how fortunate we have been to find research work on a variety of themes related to environmental education, such as studies on coastal ecosystems, environmental vulnerability, protected natural areas, public health and sustainability, among other similar themes with an educational and sustainable focus.

One important issue is the type of publication in which the reviewed materials appeared, with 96% being published in Spanish – this in a globalized world in which the preponderance of entries and publications are in English. This leaves us isolated among ourselves, without a presence on the international stage which using dominant language of the world scientific community would provide.

Final Reflections

As summarized in the final report of the Second Congress of the Institute for Socioenvironmental and Humanistic Research in Rural Areas (IISEHMER for its initials in Spanish) issued on November 19, 2015, a number of final reports from national teams were presented - including the one we produced dealing with the states of Mexico, Guerrero, and Morelos - and, at the institutional level, in conjunction with the Autonomous University of Chapingo. While we appreciate the advances that have been made, we also recognize the difficulties in incorporating transversely in environmental education across the curriculum. In addition, transforming this awareness into a sense of social consciousness and responsibility among parents, students and faculty –and taking this right into the homes of the students themselves has also proven very challenging. This appears to be the most difficult aspect of creating agro-ecological schools or fostering genuine environmental consciousness for sustainability.

According to our research, discussion is taking place at the national level concerning the difficulties of addressing environmental education on sustainability under current circumstances in Mexico. At the same time, we recognize the efforts of working groups within the country, such as those within COMIE, which have fortunately always shown a willingness to do so, dating back to the work of project initiators in previous decades.

In terms of achievements and improvements, we see that there have been positive advances in the support provided by universities and some government agencies, such as Ministry of the Environment and Natural Resources (SEMARNAT for its initials in Spanish). Positive trends and advances include the following:

1. Expansion and consolidation of existing research groups. In addition to establishing postgraduate programs, specifically master's and doctoral programs in the environmental field, we have seen the creation of academic bodies (thematic networks recognized by Conacyt) with multidisciplinary and interdisciplinary connections to the natural and social sciences, openly "related to (the field of) health, engineering, development, design, tourism and inter culturalism, among other important aspects" (Gonzalez and Arias, 2011:134).

2. Increase in the number of articles and other publications in prestigious magazines and publishers. The five most recognized research journals in Mexico, produced by the following organizations, as identified in parentheses - The Mexican Journal of Research in Education (COMIE for its initials in Spanish), Educational Profiles (ISUE-UNEM for its initials in Spanish), Journal of Higher Education (ANUIES for its initials in Spanish), the Electronic Journal of Research in Education (UABC for its initials in Spanish), and the CPU-E (UV) - frequently publish articles related to EAS. Although the magazine on environmental education, *Temas*, linked to CECADESU-SEMARNAT, ceased publication, a new magazine, "Decision, wisdom for adult education," (CREFAL (2013) and JANDIEKUA) has appeared. The Mexican Journal of environmental education of the University of Guadalajara, 2002-2012.

3. The continuing presence of postgraduate programs in environmental education. In 2001 the only new public university which opened was the Autonomous University of Mexico City (UACM for its initials in Spanish), with its master's degree in Environmental Education, similar to the master's degree offered by the University of Guadalajara, and three masters offered at different branches of the National Pedagogical University (UPN for its initials in Spanish). In addition, the National Autonomous University of Mexico (UNAM for its initials in Spanish), the Autonomous University of Nuevo Leon (UANL for its initials in Spanish) and the University of Veracruz (UV for its initials in Spanish), feature doctoral programs dedicated to sustainability. In addition, of course, there are several doctoral programs which include research in sustainability, including that of the Autonomous University of Chapingo (UACH for its initials in Spanish), which offers a doctorate in Agricultural Education, as well as another doctorate offered by the Meritorious Autonomous University of Puebla (BUAP for its initials in Spanish).

4. UNESCO Chairs. Of the 26 recognized academic chairs in Mexico, only five are linked to research in the field of EAS, all of them also linked to instructional fields in universities, research centers and institutes, which undoubtedly contribute a great deal to consolidating this field as a result of the recognition accorded to its postgraduate program by Conacyt and the research staff of the National Council on Science and Technology of Mexico (SIN-Conacyt for its initials in Spanish).

The most obvious challenges

The mention here of several key challenges does not mean that the 17 challenges outlined in the report on the state of previous knowledge for the period 1992-2002 (Bertely, 2003) have been resolved; they continue to represent a high priority for improving the level of studies in EAS. The following are among the most important:

1. Overcoming isolation. For more than 20 years a process of disconnection between research projects has been found at the individual level, often within the same institution, to say nothing of what occurs at the regional level or within supposedly national universities. What can be done to overcome this isolation is the most difficult question to answer (Victorino, 2016). One approach would be to transform these disparate projects into a transdisciplinary and interinstitutional network of collective research projects linked to various departments of teaching, research and service (DEIS for its initials in Spanish), as in the case of the Autonomous University of Chapingo.

2. Improving Socioenvironmental quality and relevance. It is all too common to encounter postgraduate programs in the IES related to environmental education focusing on the incorporation of a subject into a given study plan, or - for example - looking at the environmental effects of a community garbage dump. While these efforts are unquestionably important, in some cases these studies formed part of previous research projects, thus wasting opportunities to open up new and more relevant areas of investigation. It is therefore imperative to promote "educational topics related to climate change, water conservation, disasters related to extreme hydro meteorological phenomena, and risk, social vulnerability and community resilience" (Gonzalez y Arias, 2015: 138).

3. Developing interinstitutional research networks. According to evaluation commissions of the National System of Researchers, institutional networks focused on themes such as water, complexity, science and society already exist, as do as others in which we could participate, focused on the environment and sustainability, ecosystems, and hydro meteorological and climatic disasters. But none of these constitutes a network focused on present and future areas of our work on educational or social themes linked to environmental and sustainability issues,

4. Strengthening international cooperation by means of joint projects. There is currently little experience with such projects, and they largely remain in the realm of good intentions, surfacing when researchers in the field cross paths at international and regional conferences, and exchange email correspondence agreeing to work together on future projects. A good number of these joint projects - which should be undertaken in IES postgraduate centers and institutes - represent student and professorial exchanges within the in the field. Post-doctoral residencies of lecturers and the Conacyt department chairs themselves are presented as good instruments of exchange policies for various programs strengthening this field of knowledge.

In the next decades, the field of research in environmental education with a focus on sustainability in Mexico could see rapid growth. We must be alert in order to overcome the weaknesses and obstacles of our current policies. For this reason, this conference contributes valuable elements that must be constantly reviewed, above all in IES training programs.

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