

RADIOGRAPHY OF COMMUNITY ENVIRONMENTAL EDUCATION: A BIBLIOMETRIC REVIEW OF SPAIN, LATIN AMERICA AND THE CARIBBEAN (2000-2020)

**RADIOGRAFÍA DE LA EDUCACIÓN AMBIENTAL COMUNITARIA: UNA REVISIÓN
BIBLIOMÉTRICA DE ESPAÑA, AMÉRICA LATINA Y EL CARIBE (2000-2020)**
**RADIOGRAFIA DA EDUCAÇÃO AMBIENTAL COMUNITÁRIA: UMA REVISÃO
BIBLIOMÉTRICA DA ESPANHA, AMÉRICA LATINA E DO CARIBE (2000-2020)**

Gabriel PROSSER BRAVO* & Camilo Andrés CARO ZÚÑIGA**

*Universidad Academia Humanismo Cristiano, **Pontificia Universidad Católica de Chile

Received date: 14.IX.2020
Reviewed date: 09.XI.2020
Accepted date: 14.IV.2021

KEY WORDS:

Community
environmental
education;
Bibliometric review;
Community;
Environmental
education

ABSTRACT: At the international and Hispanic American level, there are few academic and research exercises that allow for a synthesis of environmental education with a community approach, even though it is an increasingly valued and implemented framework. In this context, the objective of the present study is to describe the bibliometric data of research on community environmental education, written in Spanish and published in specialized journals in the last 20 years. A descriptive bibliographic review was carried out, using the same search strategy in the databases Web of Science, Scopus Elsevier, SciELO, Dialnet, Redalyc and JSTOR, including a final corpus of 151 studies.

A progressive but discontinuous increase in the number of studies was identified, Cuba, Mexico and Colombia were the countries with the most publications, the journal with the most papers was *Avances* and most of the research was supported by higher educational institutions. It was found that qualitative methodologies and techniques such as surveys, interviews, participant observation and Participatory Action Research (PAR) are mainly used, with community members, children and adolescents, teachers, and community leaders as the main participants. Finally, the relevance of research on communities and their environmental education processes is discussed, concluding on the importance of carrying out synthesis research exercises to have an overview of the challenges, strengths and lessons learned in the field of community environmental education.

CONTACT WITH THE AUTHORS
GABRIEL PROSSER BRAVO. E-mail: gabriel.prosser@uacademia.cl

<p>PALABRAS CLAVE: Educación ambiental comunitaria; Revisión bibliométrica; Comunidad; Educación ambiental;</p>	<p>RESUMEN: A nivel internacional e hispanoamericano, son escasos los ejercicios académicos e investigativos que han permitido realizar una síntesis de la educación ambiental con un enfoque comunitario, a pesar de ser una orientación cada día más valorada e implementada en diversos territorios. En este contexto, el objetivo del presente estudio es describir los datos bibliométricos de las investigaciones sobre educación ambiental comunitaria, escritas en español y publicadas en revistas especializadas en los últimos 20 años. Se realizó una revisión bibliográfica descriptiva, realizando idéntica estrategia de búsqueda en las bases de datos Web of Science, Scopus Elsevier, SciELO, Dialnet, Redalyc y JSTOR, incluyéndose un corpus final de 151 estudios.</p> <p>Se identificó un aumento progresivo pero discontinuo de los estudios, que Cuba, México y Colombia son los países con más publicaciones, que la revista con más trabajos fue Avances y que la mayoría de las investigaciones son soportadas por instituciones de educación superior. Se constató que se utilizan principalmente metodologías cualitativas y técnicas como las encuestas, las entrevistas, la observación participante y las IAP, teniendo como principales participantes a miembros de la comunidad, niños, niñas y adolescentes, docentes y líderes comunitarios. Finalmente, se discute en torno a la relevancia de investigar sobre las comunidades y sus procesos educativos ambientales, concluyendo sobre la importancia de realizar ejercicios investigativos de síntesis para tener una panorámica de los desafíos, las fortalezas y los aprendizajes en el campo de la educación ambiental comunitaria.</p>
<p>PALAVRAS-CHAVE: Educação ambiental comunitária; Revisão bibliométrica; Comunidade; Educação ambiental</p>	<p>RESUMO: A nível internacional e hispano-americano, são poucos os exercícios académicos e de investigação que têm uma síntese da educação ambiental com enfoque comunitário, apesar de ser uma orientação cada vez mais valorizada e implementada em vários territórios. Nesse contexto, o objetivo deste estudo é descrever os dados bibliométricos de pesquisas sobre educação ambiental comunitária, escritas em espanhol e publicadas em periódicos especializados, nos últimos 20 anos. Foi realizada uma revisão bibliográfica descritiva, utilizando a mesma estratégia de busca nas bases de dados Web of Science, Scopus Elsevier, SciELO, Dialnet, Redalyc e JSTOR, incluindo um corpus final de 151 estudos.</p> <p>Identificou-se um aumento progressivo, mas descontinuo de estudos, que Cuba, México e Colômbia são os países com mais publicações, que a revista com mais trabalhos foi Avances e que a maior parte da pesquisa é suportada por instituições de ensino superior. Constatou-se que são utilizadas principalmente metodologias qualitativas e técnicas como encuestas, entrevistas, observação participante e IAPs, tendo como principais participantes membros da comunidade, crianças e adolescentes, professores e lideranças comunitárias. Por fim, discute-se a relevância de investigar as comunidades e seus processos de educação ambiental, concluindo sobre a importância de realizar exercícios de pesquisa-síntese para se ter uma visão geral dos desafios, potencialidades e aprendizados no campo da educação ambiental comunitária.</p>

1. Introduction

Nowadays, humanity faces an epochal change in which it is dangerously close to the sustainable limits of the planet and the biosphere (Bedford & Cook, 2013; Raworth, 2017). In this context, environmental educational processes have emerged as a civic need and a pedagogical reaction to the current civilizational crisis (Caride & Meira-Carrea, 2020). Within this field, some have taken a neutral or at least offhand stance, being promoters of alphabetization about the climate or the environment, which gives little possibility of change and transformation in view of our subsistence (González-Gaudiano & Meira-Carrea, 2020).

In this global situation, the place that communities play in education is crucial, since they are in the front line for the generation of mitigation and adaptation measures (González-Gaudiano & Maldonado-González, 2017; Noguchi, Guevara, & Yorozu, 2016). In a context in which institutional and formal environmental education has not been able to provide communities with capacities, skills and knowledge to understand and deal with

the underlying factors of the climate emergency (Caride & Meira-Carrea, 2020; González-Gaudiano & Arias-Ortega, 2009), which is partly reflected in the non-compliance of global institutional instruments such as the Sustainable Development Goals (SDGs) (Collado-Ruano, 2016).

As a disciplinary field, Environmental Education (EE) has a common past and fully recognizable milestones (Bautista-Cerro, Murga-Menoyo & Novo, 2019), within which it is possible to identify a diaspora of approaches, visions, and meanings that have had as a result the development of a range of studies and initiatives (Berryman & Sauvé, 2016). Within this diversity -and in concordance with the aforementioned-, a strong development of the community approach has been identified in recent years (Aguilar, 2016; 2018; Covas-Alvarez, 2004; Prosser & Romo-Medina, 2019), which has been promoted at various levels and sectors of public and citizen policy, as an effective measure for social transformation through the design and local management of educational initiatives of an environmental nature (Battaini & Sorrentino, 2020; Blair, 2008, Espejel -Rodríguez & Castillo-Ramos, 2019).

In particular, the Latin American version of Community Environmental Education (CEE) is based on a systemic and complex perspective that puts the questioning of the local reality as the nucleus that generates educational action (Calixto-Flores, 2012; González-Gaudio & Maldonado-González, 2017; Tréllez-Solis, 2015). It is also based on critical theory, assuming that there is a series of relationships and power games both in educational and community spaces, which are constructed and at the same time construct the various factors that compose them (Robottom, 2005).

In this way, the CEE is directly opposed to the scientific and banking vision of some traditional currents of EE (Jensen, 2002), since it allows questioning the role that the diverse environmental knowledge plays in the discipline, being possible to value a range of counter-hegemonic knowledge and rationalities, which have historically been subjugated (Calixto-Flores, 2010). Remark the same condition of oppression, Eloísa Tréllez Solís, since the beginning of the century, stated that “the future of the communities, their culture, and their nature has not always been explicitly present in the concerns of Environmental Education” (Tréllez -Solís, 2002, p. 8).

Almost 20 years after the words of Tréllez-Solis (2015), it is now possible to glimpse a CEE based on the autonomy of the communities and their own needs, in order to develop educational processes that “must have a conscious character, an adequate orientation of its objectives, as well as an environmental perspective that has as a task the motivation and commitment from the community itself” (Paredes-Díaz, Acosta-Hernández & Pérez-García, 2015, p. 115).

In this way, the CEE aims to generate co-educational and self-educational processes *from, for and by communities*, thus being a company based on territoriality and active social participation. Thus, the CEE contributes to the constitution and strengthening of community groups that operate and decide at the local level, which generates greater self-organization and democratization in decision-making; reinforces the commitment and links between institutions and civil society; and it facilitates the generation of feelings and collective identities based on territorial roots and cooperativity (Moreno-Fernández, 2015; Paredes-Díaz et al., 2015).

Despite the aforementioned benefits, these experiences face a series of challenges as a result of their implementation in real contexts. This means that putting the community approach to EE into practice implies facing conditions, needs and barriers, as well as having backing and supports. In

this sense, Moreno-Fernández and Navarro-Díaz (2015) state that the objectives and contributions of the CEE are hampered by factors and situations, such as:

1. Difficulties in the continuity of community projects, due to the lack of economic resources and support from local authorities.
2. Problems with networking, both between public administration institutions and citizen organizations.
3. Lack of evaluation of the impacts and participation achieved by the projects, which generates a feeling of insecurity about the effects of the program and regarding whether the time invested has been wasted.
4. On occasions, those who seek to promote CEE projects do not come from the same communities, making their insertion and relationship with them difficult. In some cases, it is even impossible to correct the mistrust and rejection that is generated in this regard.

Based on these obstacles, it is possible to think that the community approach clashes with the model of society and education that exists in various contexts, largely due to the low participation and involvement of certain key actors, in another, due to the lack of administrative support political and economic that receive this type of initiative (Calixto-Flores, 2010). Therefore, it is essential to have the human and material resources, as well as the political, academic, financial, and cultural conditions that promote solid participation of all members of the community (Moreno-Fernández & Navarro-Díaz, 2015; Polo-Espinal, 2013).

Along with the need for these resources, it is essential to build processes that allow managing knowledge within this field. Knowing the context of international scientific production (Aguilar, 2018; Briggs, Trautmann, & Forunier, 2018), this does not only mean to accommodate a diaspora of productions but also to tend to synthesis exercises that allow reflecting the progress achieved.

In this framework, despite the social acceptance of the CEE (Blair, 2008; Calixtos-Flores, 2012) and the existence of some bases and outlined frameworks (Noguchi, Guevara, & Yorozu, 2016), it is not clear its political, programmatic, and academic development. It has even been difficult to synthesize definitions or basic assumptions that are common to all the experiences that are defined under the CEE (Aguilar, 2016). For this reason, the present study aims to describe the bibliometric data of CEE investigations written in Spanish in the last 20 years, published in journals indexed by authors from Spain, Latin America,

and the Caribbean. In order to delve into this, a series of reviews in the field of EE are presented below, in order to visualize relevant background to the objective of the research.

2. Reviews on environmental education

In the last 10 years, consistent efforts have been made in order to synthesize and analyze EE research and policies (Aikens, McKenzie, & Vaughter, 2016; Chawla & Derr, 2012), with a pending task to carry out similar actions around the community focus of the field, or directly on the CEE (Aguilar, 2018; Briggs, Trautmann, & Forunier, 2018). A good part of these reviews focusses on higher education (Lorenzetti & Delizoicov, 2009; Molano-Niño & Herrera-Romero, 2014; Tovar-Gálvez, 2017), although they generally characterize scientific productions associated with a series of approaches within the EE.

In Spanish, it is worth mentioning the study that Sepúlveda Chaverra (2015) carried out on Education for Sustainable Development (ESD), pointing to Spain as the only Hispanic-American country or kingdom that is among the ten that publishes the most. The similar result among the most quoted articles, with the vast majority of these written in English. In similar research but carried out regarding Education for Climate Change (ECC), García-Vinuesa and Meira-Cartea (2019) point out that only Spain, Mexico and Brazil are among the countries that publish the most worldwide, in turn, the Autonomous University of Tlaxcala and the National Pedagogical University (Mexico) are the Spanish-American institutions with the most participation in studies. Even so, as seen in the study by Sepúlveda Chaverra (2015), only 10% of the works were carried out in a language other than English (García-Vinuesa & Meira-Cartea, 2019).

Despite the aforementioned, a series of general reviews of EE have mentioned aspects related to its community angle. At an international level, Nicole Ardoin and her collaborators (2013) synthesized the main topics or central themes of EE, recognizing community action and learning as axes of the teaching-learning process, which must be adapted to the environment and ecosystem in which each community coexists. The same author, in an even more recent review, points out that these are also central aspects of *Early Childhood Environmental Education* (Ardoin & Bowers, 2020).

Along the same lines, Varela-Losada, Vega-Marcote, Pérez-Rodríguez and Álvarez-Lires (2016), identified the educational purpose of a series of EE articles written worldwide between 2008 and 2013. Within five possible purposes,

they highlighted the interest of a series of studies to involve the community in educational processes. Even so, they were critical of this type of experience, as they pointed out that, in general, they did not measure the impacts of educational actions in the communities, and they showed that a good part of them originate and deploy actions from the schools to the community.

In Latin America, it is difficult to trace similar exercises with respect to the community sphere, although it is possible to distinguish some general reviews on EE. In the first place, it is worth mentioning the large syntheses carried out by the Mexican Council for Educational Research (COMIE in Spanish), which made it possible to verify an increase and diversification of publications in EE from 1982 to 2015 (González-Gaudio & Arias-Ortega, 2015).

A year earlier, Medina and Páramo (2014) presented a bibliometric analysis of 77 articles, mostly from Venezuela (26), Colombia (16) and Mexico (14). According to the authors, the magazines Luna Azul (12), Educere (10), Revista Electrónica Actualidades en Investigación (6), Investigación y Postgrado (5) and the Revista Mexicana de Investigación Educativa (5) were the main media where it was published. They also highlighted descriptive studies and documentary analyzes as the main methodologies used.

Briggs and his collaborators (2018) reviewed 84 publications that emerged in Latin America, adding value to having tracked these in Spanish, English, Portuguese and French. The results indicate that Brazil is the country that concentrates about 60% of the studies in the area, followed by Mexico and Colombia. The authors also describe a strong tension on the continent between the visions of ESD and EE, and between the actions carried out in and out of school. Even towards the end of their text, they point out that it is essential and useful for the field to develop reviews focused on the community or the popularity of EE (p.18).

Finally, it is worth mentioning the review carried out by Prosser and Romo-Medina (2019) of 174 EE articles that work with children and teenagers, published between 1999 and 2019 in Latin America. It was found that Spain, Colombia and Mexico were the countries with the most publications and that within the empirical studies the majority were qualitative, followed by research with mixed methodologies, and finally, quantitative ones. At the same time, they point out some thematic trends, among which the EAC stands out, valuing its contributions to local environmental management and the promotion of a greater participation of children and adolescents in EE activities.

In summary, it can be evidenced, on one hand, a series of studies that describe within their central themes the community, and on the other, those that highlight the results and implications of hosting EE in the community. Even so, it is very difficult to point out that there is a systematic academic exercise that allows us to describe with certainty the trends and impacts of CEE as an academic field, much less link it to a series of bibliometric variables.

For this reason, the present investigation sought to carry out a descriptive bibliometric review (DBR) of CEE publications, written in Spanish in the last 20 years. In this way, the relevance of the article is linked to achieving a description of the characteristics of the studies in terms of i) chronological progression, ii) geographic distribution, iii) methodology, iv) impact, and, v) institutions and journals involved in its publication. Likewise, it will seek to identify the main keywords, in order to go in depth in the description of CEE as a field of study in Latin America.

3. Methodology

In order to identify trends and critical nodes within the CEE, this study used the DBR (Grant & Booth, 2009). Its use is based on the ability of this methodology to describe bibliometric parameters, to explore emerging areas and fields of knowledge, as well as to generate states of the art, and synthesize lines of research, authors and associated institutions (Booth, Sutton, & Papaioannou, 2016).

During the development of this research, the recommendations of various authors were followed (García-Vinuesa & Meira-Cartea, 2019; Sánchez-Meca & Botella, 2010), especially regarding: diversifying the search strategies by which the research; use both inclusion criteria and a series of exclusion filters; diagram the flow of the procedure; report the process in the identification, selection, election and inclusion phase; and using mechanisms to give greater systematicity to the treatment of the data.

3.1. Search strategy

A search was made of those articles published in the Web of Science, SCOPUS Elsevier, SciELO, Dialnet, Redalyc and JSTOR databases. In all these academic spaces we proceeded in the same way, entering the Boolean code: "Comunidad OR Comunitaria OR Comunitario AND Educación Ambiental OR Educación para el Desarrollo sostenible OR Educación para la Sustentabilidad OR Educación para el Cambio climático OR Eco ciudadanía".

Additionally, and to add rigor in the search, other investigations were tracked by introducing a series of keywords, namely: community, communal, environmental education, education for sustainable development, education for sustainability, education climate change and eco citizenship. The entry of these terms to the search engines responds to the fact that the EA receives different names in Latin America according to the position of each author, while the scope referred to the community is generally expressed employing these two words.

3.2. Inclusion criteria

The application of the inclusion criteria on the studies was carried out jointly by both authors, having as a condition absolute consensus for each of the selected articles. Regarding the fulfillment of the criteria, it was carried out in a dichotomous and qualitative way, being the works classified as "accepted" or "rejected", according to the presence of the following criteria:

1. Academic works or scientific articles that are framed in the field of study or other related ones.
2. Published in Spanish in the last twenty years (from 2000 to August 14, 2020). With this, an attempt was made to access the works that emerged in Latin America.
3. Published in scientific journals with an indexing system that ensures a minimum quality (Liberati et al., 2009).
4. Studies with direct or indirect reference to the community, the community sphere or an aspect of it.

A bibliographic record matrix was prepared using Microsoft Office Excel program where the articles that met the aforementioned criteria were deposited. In this it was recorded: authors, number of authors, gender of the first author, article title, year of publication, journal, citations by text, url and / or doi of publication, institution, country, keywords, summary, methodology, information gathering techniques and participants.

3.3. Exclusion criteria

The process of exclusion of the studies was carried out in two stages: in the first, the repeated articles were discarded, those that were constructed from lectures or congresses, as well as those that had a language other than Spanish and that escaped the inclusion filters. For this first stage, special attention was paid to the title and the abstract of the works. In the second, the texts were

read in-depth and those that were experiences of School Environmental Education (SEE) or from areas other than the CEE were excluded.

In the first part of the procedure, the Boolean code was entered in the search engines, which allowed the identification of 2,401 studies. Inclusion criteria were applied to the identified studies,

obtaining 215 articles. Subsequently, the first stage of the exclusion criteria was carried out, leaving a total of 163 articles. Finally, with the application of the second stage of the exclusion criteria, it was possible to constitute a final corpus of 151 articles. This entire procedure is synthesized by means of Figure 1 shown below.

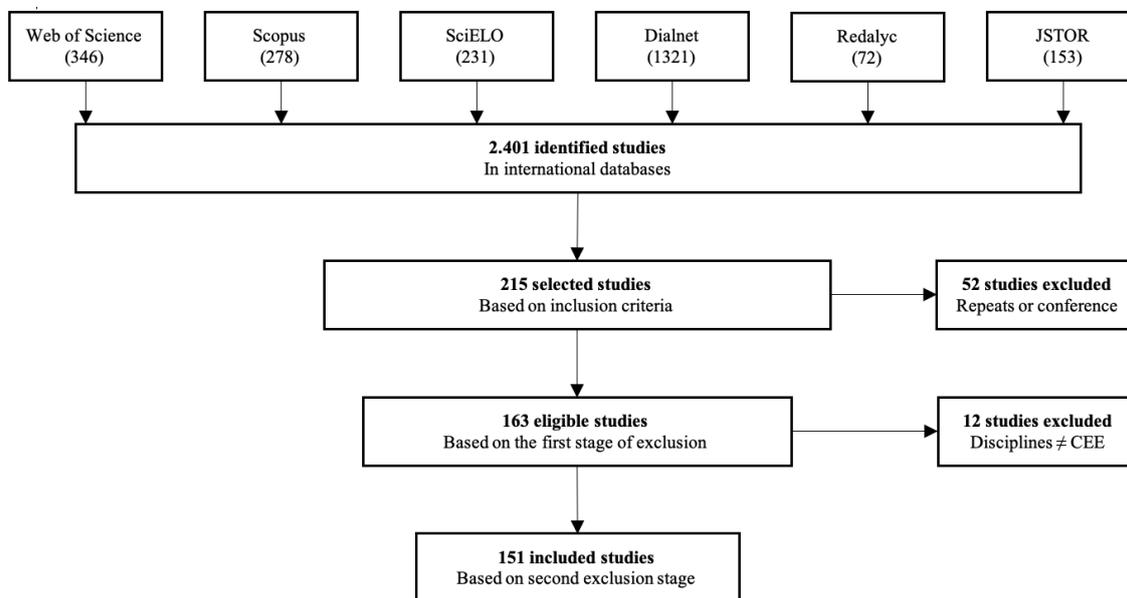


Figure 1. Review flow chart. Source: Own elaboration.

3.4. Information analysis

The final corpus of articles was distributed between both authors and then a set of variables was defined to identify in the texts (see Table 1). Taking these variables into consideration, each of

the authors made a superficial reading to identify them. Later, the studies that raised doubts or those in which the authors disagreed with their classification were jointly discussed. For the definitive identification of the works, readings were crossed, having a 100% consensus as a reliability criterion.

Table 1. Operationalization of variables to be recorded for each study

Variable	Operationalization
<i>Author(s)</i>	Full name of each of the persons listed as authors of the text
<i>Number of authors</i>	Total number of authors indicated in text, expressed in whole numbers.
<i>Gender</i>	Gender of the first author of the text
<i>Year</i>	Year in which the text was published inside the magazine
<i>Magazine</i>	Full name of the journal in which the text was published
<i>Impact</i>	Number of times the text has been cited in another research
<i>Country</i>	Place where the research was carried out, or, if not, the nation to which the first author's institution belongs.
<i>Institution</i>	Institutional affiliation indicated by the first author of the text
<i>Methodology</i>	Green (2015) distinguishes three methodological approaches. The quantitative methodology oriented to the testing of hypotheses, through the extraction of numerical data for statistical analysis. The qualitative methodology oriented to the deep understanding of phenomena under investigation through interpretive, descriptive, narrative, ethnographic approaches, among others. Finally, the mixed methodology, in which data collection and analysis is carried out both quantitatively and qualitatively.
<i>Techniques</i>	Data collection techniques used in the research. Based on the work of Green (2015), particular techniques were associated with each type of methodology (e.g. PRA), and there may also be cross-cutting techniques (e.g. questionnaires).
<i>Participants</i>	People involved in the study as a sample. The social group to which the groups involved in the research belong is described.
Source: Own elaboration.	

Given the nature of this review, descriptive statistical analyzes and heterogeneity were performed for each of the variables to examine the data, in order to characterize the included studies. Additionally, a thematic analysis (Vaismoradi, Jones, Turunen, & Snelgrove, 2016) was carried out on the keywords of the studies, aiming to delve into the range of issues raised concerning to CEE. These analyzes were incorporated to complement the descriptive presentation of the results, which generally marks this type of studies (Ardoin & Bowers, 2020).

4. Results

The results were structured in four subsections: a brief characterization of the final corpus of included articles and their authors; a description of

the articles, authors, journals, countries and institutions with the most publications and citations in them; also an exposition of the main methodologies used, the techniques and the participants of the studies; to finally expose a more qualitative analysis that is reflected in the analysis of the keywords of the writings.

4.1. Characterization of studies

To carry out the characterization, four specific variables were taken into consideration: the year, the country, the gender of the first author and the number of authors recognized as such in the text (see Table 2). As can be seen, most of the people who participate in the research as the first author are women and, in general, the studies are carried out with one, two or three authors.

Table 2. Characterization of included studies					
Variable	n	%	Variable	n	%
<i>Year of publication</i>			<i>Gender</i>		
2000-2005	8	5,2 %	Women's	78	51,7 %
2006-2010	24	15,9 %	Men's	73	48,3 %
2011-2015	53	35,1 %			
2016-2020	66	43,7 %			
<i>Country</i>			<i>Number of authors</i>		
Cuba	48	31,7 %	One	37	24,5 %
Mexico	32	21,1 %	Two	47	31,1 %
Colombia	28	18,4 %	Three	36	23,8 %
Spain	12	7,8 %	Four	18	11,9 %
Venezuela	10	6,5 %	Five or more	13	8,6 %
Ecuador	8	5,2 %			
Argentina	4	2,5 %			
Costa Rica	4	2,5 %			
Chile	2	1,3 %			
Other countries	3	<1 %			

Source: Own elaboration.

Regarding the countries, almost a third of the texts come from Cuba, followed by Mexico and Colombia. Further back appear Spain and Venezuela, adding among these five nations more than 80% of the total publications. From what can

be measured in Table 2 and Figure 2, there is a growth in the number of publications from 2000 to date, although this progression is discontinuous over time.

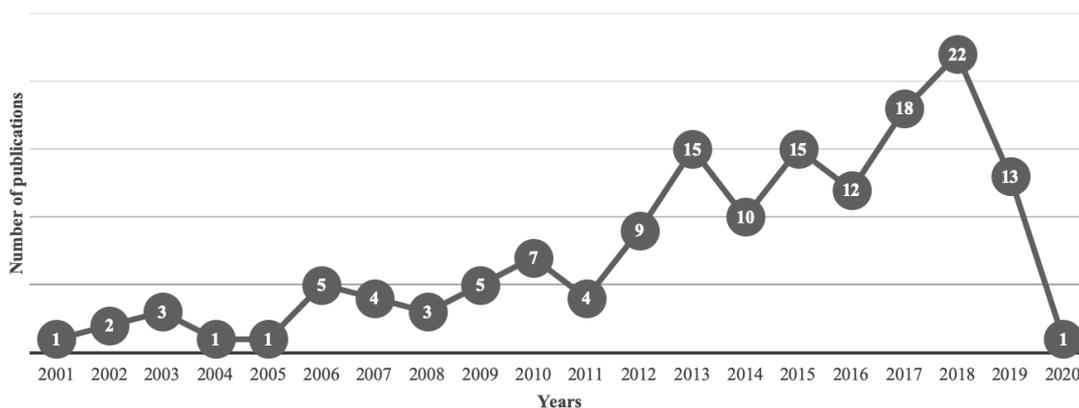


Figure 2. Number of community environmental education studies from 2000-2020.
 Source: Own elaboration.

4.2. Impact of the studies

In order to know the publication spaces and the degree of impact of the studies, a series of variables are described below: number of citations per country; number of citations between the years 2000-2020; main journals and institutional affiliations of the authors; as well as the authors with the highest number of publications.

From Figure 3 it is identified that Mexico is the country with the highest number of citations,

followed by Spain, Colombia and, to a lesser extent, Cuba. On the opposite, it is possible to identify Chile and Brazil as those countries that do not have studies that have been quoted by other investigations. Finally, it is found that countries such as Ecuador, Costa Rica, Venezuela, Peru and Argentina have a medium number of citations of their studies, while Bolivia has a low number of mentions.

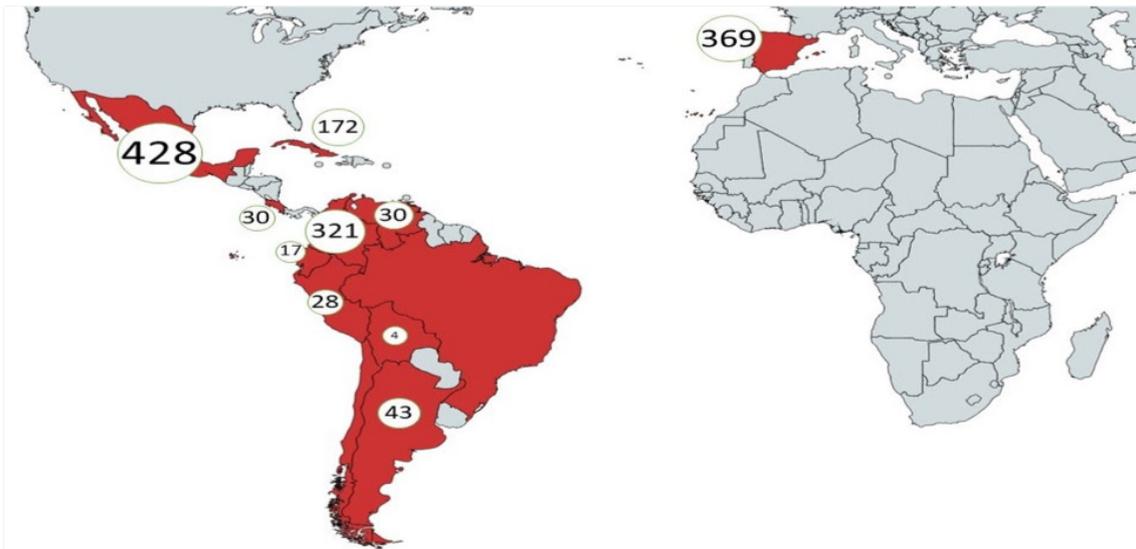


Figure 3. Number of citations by country of study. Source: Own elaboration in MapChart.

It was possible to verify that between the years 2001-2011 there is a discontinuous development of the total number of quotations of the identified studies (see Figure 4). This situation changes as of 2012, a year with an abnormal number of citations.

Subsequently, a progressive discontinuous decrease in the number of citations of the studies is identified, which may be related to the recentness of these.

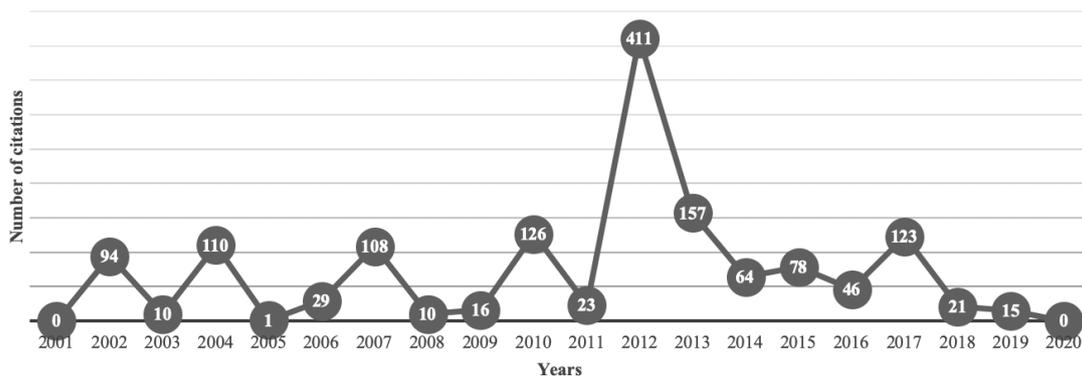


Figure 4. Number of citations of the studies in the period 2000-2020. Source: Own elaboration.

Regarding the journals of publication and number of citations (see Table 3), it is possible to verify that *Avances* is the one that has published a greater number of CEE texts in Latin America. Regarding the countries to which these main journals belong, Cuba has three among those that publish the most articles. On the other hand, concerning to the number of citations, the Mexican Journal

of Educational Research stands out, which has a good number of articles on the subject. Finally, it is striking that the journals *Avances*, *Horizontes Sanitarios* and the *DELOS Magazine* have a low number of citations compared to the other journals, as they present the highest number of published articles.

Table 3. Main journals of publication and institutional affiliation of authors

Variable	Country	Citations	n	%
<i>Magazine</i>				
Avances	Cuba	19	15	9,9 %
Health Horizon	Cuba	38	12	7,8 %
DELOS Magazine	Spain	48	8	5,2 %
Blue Moon	Colombia	83	7	4,6 %
Mexican Journal of Educational Research	Mexico	223	5	3,3 %
Mendive. Education Magazine	Cuba	3	4	2,5 %
<i>Institution</i>				
University of Pinar del Río	Cuba	10	19	12,6 %
Juárez Autonomous University of Tabasco	México	38	12	7,8 %
National University of Costa Rica	Costa Rica	30	5	3,3 %
National Pedagogical University of Mexico	Mexico	162	4	2,5 %
University of Las Tunas	Cuba	111	4	2,5 %
Universidad Pedagógica Experimental Libertador	Venezuela	5	4	2,5 %
Central University of Las Villas	Cuba	3	4	2,5 %
Source: Own elaboration.				

Regarding the institutional affiliation of the authors, the University of Pinar del Río is found to be the one with the largest number of assigned research, followed by the Universidad Juárez Autónoma de Tabasco and the Universidad Nacional de Costa Rica, which together represent close to 25 % of the writings. Additionally, it should be noted that almost all of the first authors were attached to a university institution, and it rarely happened that they belonged to state, municipal institutions or civil society organizations (NGOs).

The authors with the most publications were also tracked, highlighting the Mexicans Eduardo López-Hernández (n = 12) and Ana Rodríguez-Luna

(n = 9). Edgar González-Gaudio from Mexico (n = 4) appears further back; Julio Cesar Tovar-Gálvez from Colombia (n = 4); and Evelyn Pérez-Rodríguez, Mayra Casas-Villardell and Rosa Hernández-Acosta de Cuba (n = 4). It should be noted the strong presence of texts by classic authors of the field such as the Mexican Raúl Calixto-Flores (n = 3), the Mexican Adelina Espejel-Rodríguez (n = 3), the Spanish-Peruvian Eloísa Tréllez-Solís (n = 3) and the Spanish Olga Moreno-Fernández (n = 3). Therefore, we can observe a high presence of authors from the same countries that publish the most and have the most impact: Cuba, Mexico, Colombia and Spain.

4.3. Study methodology

When characterizing the various methodologies of the studies (see Table 4), an intentional categorization was carried out that recognized the systematizations of experiences from the rest of the theoretical studies (essays, reflections). Likewise,

as already mentioned, the rest were categorized according to the taxonomy of Green (2015), prevailing the qualitative methodology (51.8 % of the empirical studies), followed by the mixed methodology (39.75 % of those mentioned studies) and quantitative (8.43 %).

Table 4. Methodologies, techniques and participants of the studies					
Variable	n	%	Variable	n	%
<i>Methodology</i>			<i>Techniques</i>		
Quantitative	7	4,6 %	Survey/questionnaire	49	32,5 %
Qualitative	43	28,5 %	Interviews	36	23,8 %
Mixed	33	21,8 %	Participant observation	30	19,9 %
Theoretical	27	17,9 %	PAR	29	19,2 %
Systematization of experiences	41	27,1 %	Documentary analysis	16	10,6 %
			Group devices	13	8,6 %
<i>Participants</i>					
Community members	35	23,2 %			
NNA	25	16,6 %			
Teachers	13	8,6 %			
Community leaders	12	7,8 %			
Cooperatives	5	3,3 %			
Indigenous communities	5	3,3 %			
Managers	5	3,3 %			
Women	5	3,3 %			
Youth	5	3,3 %			
Source: Own elaboration. Fishermen, farmers, artisans, among others.					

Within the data collection techniques, surveys and / or questionnaires are primarily identified, followed by interviews and more participatory techniques, also highlighting the high presence of documentary analysis. When analyzing the participants, most of them are distinguished as community members, children, teachers or community leaders. Further back appear a series of collectives and social subjects (cooperatives, indigenous people, young people, women), with the appearance of others not linked to these community logics (eg businessmen, local authorities, armed forces) being almost nil.

4.4. Keywords from the studies

The keywords were entered into a word cloud processor, resulting in Figure 5. As in general EE, CEE is related to the concepts of development, especially sustainable development, linking education and progress. It can also be verified that the CEE is linked to formal education, through the school, as well as with informal or non-formal educational factors that are in the territory, neighborhood, sector or the family.

Universidad Juárez Autónoma de Tabasco of Mexico and the Universidad Nacional de Costa Rica.

The predominance of universities, as the main agents that support the selected studies, allows us to see that the financing of CEE initiatives is limited and focused mainly on the design and evaluation of actions or particular studies (Calixto-Flores, 2010; Polo-Espinal, 2013). These results contradict, in a certain grade, the primary objective of the CEE in relation to developing educational processes for and from the community, which can make it difficult to insert these interventions into the communities or the relationship of external mediators with them (Moreno-Fernández & Navarro-Díaz, 2015). Even so, it is necessary to continue investigating the role that university extension can have, or its link with the environment in the evaluation of the CEE.

Additionally, and taking into account the results of the review by Varela-Losada and his collaborators (2016), the scarcity of impact studies on CEE could be due to the lack of financing by other entities and institutions, which do not prioritize reporting the advancement of the field, nor manage the knowledge produced through their actions. This situation makes ruling the development of a CEE based on a public institutional infrastructure that makes it possible to provide sustainability and replicability to this type of initiative (Calixto-Flores, 2010; Florez, 2012).

As with the universities, it is possible to identify the school as another institution strongly linked to the CEE, which shows: 1) on one hand, an interest in transferring environmental educational actions from the school to the neighborhood, from the educational spaces formalities towards community settings, from educational factors to territorial factors (Espejel-Rodríguez & Castillo-Ramos, 2019; Espejel-Rodríguez & Flores-Hernández, 2012); 2) on the other hand, a difficulty to leave a space where EE was historically developed (González-Gaudiano & Arias-Ortega, 2009); and where this type of initiatives is frequently implemented, which from the school, seek to raise environmental awareness in the communities (Prosser et al., 2020).

Here we can see a vision of the CEE where the school is one more element of the community gear, which contributes to managing environmental action locally. This can be linked to the results of this study, regarding the presence of both community and school actors in the development of CEE initiatives, since there is a strong relevance of actors such as teachers and managers, but also community members and leaders. This could well be a reflection of the essential of participation and territorial action for this field (Moreno-Fernández,

2015; Paredes-Díaz et al., 2015; Tréllez-Solis, 2015), so that future research could investigate, using other methodologies, in the degree and quality of participation that is encouraged in these educational actions.

Continuing with the involvement of the participating actors, a link is identified between the children and teenagers and the CEE, which indicates them as a relevant subject within community spaces. In this sense, previous research has highlighted the importance of considering children and adolescents and their particularities in the community teaching-learning process, as well as their active contribution to local environmental management (Ardoin & Bowers, 2020; Prosser and Romo-Medina, 2019). Similarly, greater attention could be paid to the place of women, going on depth on the importance of educating in community spaces from the perspective of ecofeminism (Aguilar & Limón-Domínguez, 2017).

Considering the keywords identified in the studies, the permanence of the tension between ESD and EE can be verified (Briggs et al., 2018). This situation could rather speak of certain lines of ESD that point out the importance of questioning the root causes of the crisis, taking into account the environment and the communities in which the educational exercises are carried out (Anderson, 2012).

In general, bibliometric reviews show a series of biases and limitations inherent to the decisions of their authors, the methodological procedures used and the finally selected corpus (Sandy & Tripney, 2017). In the present study, it was decided to consider only the Latin American region and research in the Spanish language, leaving aside countries strongly linked to CEE, such as Brazil (Briggs et al., 2018; Lorenzetti & Delizoicov, 2009). This limitation represents an opportunity for future research to include other regions that carry out CEE initiatives, as well as possible collaborations between authors/institutions that allow covering other languages and conducting comparative studies.

Another limitation of this type of studies refers to its merely descriptive claim, which means an opportunity to develop new research that is capable of analyzing analytically going in depth on the themes of CEE studies and initiatives, in order to know in depth how the community is unfolds and braids in these educational processes. In this same sense, it is necessary to continue promoting more theoretical research, which allows more precisely to recognize the principles, strategies, approaches and central components of the CEE (Aguilar, 2016; 2018).

On the other hand, it should be pointed that the development of this type of research in the field of CEE, allows a synthesis of environmental educational processes that respond to the civic and pedagogical need that emerges from the climate crisis (Caride & Meira-Cartea, 2020). For this, it is essential that research is not only developed from university institutions or academic speakers, but also from territorial and community organizations, where the diversity of perspectives and methodologies of the interested actors converge.

In this sense, there is a baseline limitation to the study presented here, in that the exercises of a community and popular nature are not expressed or communicated through institutional and/or academic-written channels. The claim behind this study responds rather to the need to

gradually build clear and dynamic limits to a field about which much is said, but little is known, due to the scarcity of synthesis exercises. Similarly, in the future, it could be considered to systematize rather good practices or community-based interventions with a proven effect on EE.

In this way, progress must be made in the construction of an education for change (González-Gaudio & Meira-Cartea, 2020), as a field that puts as a priority the generation of mitigation measures and adaptations from and for the communities, by means of processes based on their senses, knowledge and possibilities. All this, due to a horizon that allows giving life and hope to the educational processes raised by EE, as well as the communities that share and recreate it, in order to configure a social pedagogy that is the basis of a good living collectively and sustainably.

References

- Aguilar, O. (2016). Examining the literature to reveal the nature of community EE/ESD programs and research. *Environmental Education Research*, 24(1), 26-49. <https://doi.org/10.1080/13504622.2016.1244658>
- Aguilar, O. (2018). Toward a theoretical framework for community EE. *The Journal of Environmental Education*, 49(3), 207-227. <https://doi.org/10.1080/00958964.2017.1397593>
- Aguilar, N. M., & Limón-Domínguez, D. (2017). Educar en espacios comunitarios de participación, cooperación y eco-desarrollo desde una perspectiva ecofeminista. *Revista Electrónica Educare*, 21(1), 16. <http://dx.doi.org/10.15359/ree.21-1.22>
- Aikens, K., McKenzie, M., & Vaughter, P. (2016). Environmental and sustainability education policy research: A systematic review of methodological and thematic trends. *Environmental Education Research*, 22(3), 333-359. <https://doi.org/10.1080/13504622.2015.1135418>
- Anderson, A. (2012). Climate change education for mitigation and adaptation. *Journal of Education for Sustainable Development*, 6(2), 191-206. <https://doi.org/10.1177%2F0973408212475199>
- Ardoin, N. M., Clark, C., & Kelsey, E. (2013). An exploration of future trends in environmental education research. *Environmental Education Research*, 19(4), 499-520. <https://doi.org/10.1080/13504622.2012.709823>
- Ardoin, N. M., & Bowers, A. W. (2020). Early childhood environmental education: A systematic review of the research literature. *Educational Research Review*. <https://doi.org/10.1016/j.edurev.2020.100353>
- Battaini, V., & Sorrentino, M. (2020). Educação ambiental local e global: políticas públicas e participação social em Fernando de Noronha. *Pedagogía Social. Revista Interuniversitaria*, (36), 49-61. https://doi.org/10.7179/PSRI_2020.36.03
- Bautista-Cerro, M. J., Murga-Menoyo, M. A. y Novo, M. (2019). La Educación Ambiental en el S. XXI. *Revista de Educación Ambiental y Sostenibilidad* 1(1), 1103. doi: 10.25267/Rev_educ_ambient_sostenibilidad.2019.v1.i1.1103
- Bedford, D., & Cook, J. (2013). Agnotology, scientific consensus, and the teaching and learning of climate change: A response to Legates, Soon and Briggs. *Science & Education*, 22(8), 2019-2030. <https://doi.org/10.1007/s11191-013-9608-3>
- Berryman, T., & Sauvé, L. (2016). Ruling relationships in sustainable development and education for sustainable development. *The Journal of Environmental Education*, 47(2), 104-117. <https://doi.org/10.1080/00958964.2015.1092934>
- Blair, M. (2008). Community environmental education as a model for effective environmental programmes. *Australian Journal of Environmental Education*, 24, 45-53. DOI: 10.2307/44656500.
- Booth, A., Sutton, A., & Papaioannou, D. (2016). *Systematic approaches to a successful literature review*. California: Sage publications.
- Briggs, L., Trautmann, N. M., & Fournier, C. (2018). Environmental education in Latin American and the Caribbean: the challenges and limitations of conducting a systematic review of evaluation and research. *Environmental Education Research*, 24(12), 1631-1654. <https://doi.org/10.1080/13504622.2018.1499015>
- Calixto-Flores, R. (2010). Educación popular ambiental. *Trayectorias*, 12(30), 24-39. <https://www.redalyc.org/pdf/607/60713488003.pdf>
- Calixto-Flores, R. (2012). Investigación en educación ambiental. *Revista Mexicana de Investigación Educativa*, 17(55), 1019-1033. http://www.scielo.org.mx/scielo.php?pid=S1405-66662012000400002&script=sci_arttext

- Caride, J. A., & Meira-Cartea, P. Á. (2020). La educación ambiental en los límites, o la necesidad cívica y pedagógica de respuestas a una civilización que colapsa. *Pedagogía Social. Revista Interuniversitaria*, (36), 21-34. DOI: 10.7179/PSRI_2020.36.01
- Chawla, L., & Derr, V. (2012). The Development of Conservation Behaviors in Childhood and Youth. In *The Oxford Handbook of Environmental and Conservation Psychology*. Oxford University.
- Collado-Ruano, J. (2016). Una perspectiva transdisciplinar y biomimética de la educación para la ciudadanía mundial. *Educere*, 20(65), 113-129. <https://dialnet.unirioja.es/servlet/articulo?codigo=6540935>
- Covas-Álvarez, O. (2004). Educación ambiental a partir de tres enfoques: comunitario, sistémico e interdisciplinario. *Revista Iberoamericana de Educación*, 35(1), 1-7. <https://doi.org/10.35362/rie3512941>
- Espejel-Rodríguez, A., & Flores-Hernández, A. (2012). Educación ambiental escolar y comunitaria en el nivel medio superior, Puebla-Tlaxcala, México. *Revista Mexicana de Investigación Educativa*, 17(55), 1173-1199. http://www.scielo.org.mx/scielo.php?pid=S1405-66662012000400008&script=sci_arttext
- Espejel Rodríguez, A., & Castillo-Ramos, I. (2019). Educación ambiental en el bachillerato: De la escuela a la familia. *ALTERIDAD. Revista de Educación*, 14(2), 231-242. <http://dx.doi.org/10.17163/alt.v14n2.2019.07>
- Flórez, G. (2012). La educación ambiental: Una apuesta hacia la integración escuela-comunidad. *Praxis & Saber*, 3(5), 79-101. <https://doi.org/10.19053/22160159.1135>
- García Vinuesa, A., & Meira Cartea, P. Á. (2019). Caracterización de la investigación educativa sobre el cambio climático y los estudiantes de educación secundaria. *Revista Mexicana de Investigación Educativa*, 24(81), 507-535. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S1405-666620190002000507
- González-Gaudiano, E., & Arias-Ortega, M. Á. (2009). La educación ambiental institucionalizada: actos fallidos y horizontes de posibilidad. *Perfiles educativos*, 31(124), 58-68. http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982009000200005
- González-Gaudiano, E., & Arias-Ortega, M. (2015). La investigación en educación ambiental para la sustentabilidad en México 2002-2011 (vol. 1). México: ANUIES-COMIE.
- González-Gaudiano, E., & Maldonado-González, A. L. (2017). Amenazas y riesgos climáticos en poblaciones vulnerables. El papel de la educación en la resiliencia comunitaria. *Teoría de la educación*, 29(1), 273-294. <http://dx.doi.org/10.14201/teoredu2017291273294>
- González-Gaudiano, E., & Meira-Cartea, P. Á. (2020). Educación para el cambio climático: ¿educar sobre el clima o para el cambio? *Perfiles Educativos*, 42(168). <https://doi.org/10.22201/iisue.24486167e.2020.168.59464>
- Grant, M. J., & Booth, A. (2009). A typology of reviews: an analysis of 14 review types and associated methodologies. *Health Information & Libraries Journal*, 26(2), 91-108. DOI: 10.1111/j.1471-1842.2009.00848.x
- Green, C. J. (2015). Toward Young Children as Active Researchers: A Critical Review of the Methodologies and Methods in Early Childhood Environmental Education. *The Journal of Environmental Education*, 46(4), 207-229. doi:10.1080/00958964.2015.1050345
- Jensen, B. B. (2002). Knowledge, action and pro-environmental behaviour. *Environmental education research*, 8(3), 325-334. <https://doi.org/10.1080/13504620220145474>
- Liberati, A., Altman, D. G., Tetzlaff, J., Mulrow, C., Gøtzsche, P. C., Ioannidis, J. P., ... & Moher, D. (2009). The PRISMA statement for reporting systematic reviews and meta-analyses of studies that evaluate health care interventions: explanation and elaboration. *PLoS medicine*, 6(7), e1000100. <https://doi.org/10.1371/journal.pmed.1000100>
- Lorenzetti, L., & Delizoicov, D. (2009). La producción académica brasileña en Educación Ambiental. *Utopía y Praxis Latinoamericana*, 14(44), 85-100. http://ve.scielo.org/scielo.php?script=sci_arttext&pid=S1315-52162009000100007
- Medina, I., & Páramo, P. (2014). La investigación en educación ambiental en América Latina: un análisis bibliométrico. *Revista Colombiana de educación*, (66), 55-72. <https://doi.org/10.17227/01203916.66rce55.72>
- Molano-Niño, A. C., & Herrera-Romero, J. F. (2014). La formación ambiental en la educación superior: una revisión necesaria. *Revista Luna Azul*, (39), 186-206. <https://www.redalyc.org/pdf/3217/321732142012.pdf>
- Moreno-Fernández, O. (2015). Educación y Ciudadanía Planetaria. Concepciones del alumnado participante en programas educativos andaluces. *Pedagogía Social. Revista Interuniversitaria*, (26), 229-261. https://doi.org/10.7179/PSRI_2015.26.09
- Moreno-Fernández, O., & Navarro-Díaz, M. (2015). Educación ambiental, ciudadanía y participación. *IJERI: International Journal of Educational Research and Innovation*, (4), 175-186. <https://upo.es/revistas/index.php/IJERI/article/view/1470>
- Noguchi, F., Guevara, J. R. y Yoroza, R. (2018). *Comunidades en acción: aprendizaje a lo largo de toda la vida para el desarrollo sostenible*. Hamburgo: Instituto de la UNESCO para el Aprendizaje a lo Largo de Toda la Vida (UIL).
- Paredes-Díaz, R., Acosta-Hernández, R., & Pérez-García, J. J. (2015). Programa de Educación Ambiental Comunitaria en la Cooperativa de Producción Agropecuaria, Jesús Suárez Soca. *Avances*, 17(2), 113-123. <https://dialnet.unirioja.es/servlet/articulo?codigo=5350935>

- Polo-Espinal, J. C. (2013). El Estado y la Educación Ambiental Comunitaria en el Perú. *Acta Médica Peruana*, 30(4), 141-147. http://www.scielo.org.pe/scielo.php?pid=S1728-59172013000400017&script=sci_arttext
- Prosser Bravo, G., & Romo-Medina, I. (2019). Investigación en educación ambiental con menores en Iberoamérica: Una revisión bibliométrica de 1999 a 2019. *Revista Mexicana de Investigación Educativa*, 24(83), 1027-1053. http://www.scielo.org.mx/scielo.php?pid=S1405-66662019000401027&script=sci_arttext
- Prosser, G., Bonilla, N., Pérez-Lienqueo, M., Prosser-González, C., & Rojas-Andrade, R. (2020). No basta con la semilla, se ha de acompañar al árbol: Importancia del contexto de implementación en los programas de Educación ambiental. *Revista Colombiana de Educación*, 1(78). <https://doi.org/10.17227/rce.num78-9322>
- Raworth, K. (2017). A Doughnut for the Anthropocene: humanity's compass in the 21st century. *The Lancet Planetary Health*, 1(2), e48-e49. [https://doi.org/10.1016/S2542-5196\(17\)30028-1](https://doi.org/10.1016/S2542-5196(17)30028-1)
- Robottom, I. (2005). Critical Environmental Education Research: Re-Engaging the Debate. *Canadian Journal of Environmental Education*, 10(1), 62-78. <https://eric.ed.gov/?id=EJ881775>
- Sánchez-Meca, J., & Botella, J. (2010). Revisión sistemática y meta-análisis: Herramientas para la práctica profesional. *Papeles del psicólogo*, 31(1), 7-17. <https://dialnet.unirioja.es/servlet/articulo?codigo=3150797>
- Sandy, O., & Tripney, J. (2017). Systematic review and meta-analysis. In Wyse, D., Selwyn, N., Smith, E., y Suter, L. E. (eds.), *The BERA/SAGE Handbook of Educational Research*, 452-475. Londres: Sage publications.
- Sepúlveda Chaverra, J. (2015). Estado de la investigación sobre educación para el desarrollo sostenible: un análisis cuantitativo de la producción científica en el período 2005-2014. *Revista Luna Azul*, (41), 309-322. DOI: 10.17151/luaz.2015.41.17
- Tovar-Gálvez, J. C. (2017). Pedagogía ambiental y didáctica ambiental: tendencias en la educación superior. *Revista Brasileira de Educação*, 22(69), 519-538. <https://doi.org/10.1590/s1413-24782017226926>
- Tréllez-Solís, E. (2002). La educación ambiental comunitaria y la retrospectiva: una alianza de futuro. *Tópicos em educação ambiental*, 4(10), 7-21. http://www.ecominga.uqam.ca/ECOMINGA_2011/PDF/BIBLIOGRAPHIE/GUIDE_LEC-TURE_3/1/7.Trellez_Solis.pdf
- Tréllez-Solís E. (2015). Educación ambiental comunitaria, participación y planificación prospectiva. *Voces en el Fenix*, (48), 185-191. <https://www.vocesenelfenix.com/content/educaci%C3%B3n-ambiental-comunitaria-participaci%C3%B3n-y-planificaci%C3%B3n-prospectiva>
- Vaismoradi, M., Jones, J., Turunen, H., & Snelgrove, S. (2016). Theme development in qualitative content analysis and thematic analysis. *Journal of Nursing Education and Practice*, 5(6), 100-110. <http://dx.doi.org/10.5430/jnep.v6n5p100>
- Varela-Losada, M., Vega-Marcote, P., Pérez-Rodríguez, U., & Álvarez-Lires, M. (2016). Going to action? A literature review on educational proposals in formal Environmental Education. *Environmental Education Research*, 22(3), 390-421. <https://doi.org/10.1080/13504622.2015.1101751>

HOW TO CITE THE ARTICLE

Prosser, G., & Caro, C. (2021). Radiografía de la educación ambiental comunitaria: una revisión bibliométrica de España, América Latina y el Caribe (2000-2020). *Pedagogía Social. Revista Interuniversitaria*, 38, xx-xx. DOI: 10.7179/PSRI_2021.07

AUTHOR'S ADDRESS

GABRIEL PROSSER BRAVO. E-mail: gabriel.prosser@uacademia.cl

CAMILO ANDRÉS CARO ZÚÑIGA. E-mail: camilo.caro@uc.cl

ACADEMIC PROFILE

GABRIEL PROSSER BRAVO. Académico e investigador del Centro de Salud Mental en Comunidades Educativas (CSMCE) de la Escuela de Psicología de la Universidad Academia Humanismo Cristiano, Facultad de Ciencias Sociales, Condell #343, Providencia, Santiago. Licenciado en Psicología de la Universidad de Chile. Coordinador académico de la Corporación BOSQUEDUCA, orientada desde 1998 al desarrollo integral de la educación ambiental en todo Chile. Sus líneas de investigación son la psicología ambiental, en especial el bienestar socioemocional ambiental, y el estudio del diseño, implementación y evaluación de programas, proyectos y acciones de educación ambiental tanto escolares como comunitarias. E-mail: gabriel.prosser@uacademia.cl

CAMILO ANDRÉS CARO ZÚÑIGA. Psicólogo de la Universidad de Chile, Diplomado en Psicología Educativa de la Universidad de Chile. Estudiante del Magister en Asentamiento Humanos y Medio Ambiente de la Pontificia Universidad Católica de Chile. Sus líneas de investigación son la resiliencia ante desastres socionaturales, educación ambiental para la adaptación ante la crisis global ambiental y vulnerabilidad socioambiental. E-mail: camilo.caro@uc.cl

