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Schoolteachers' Conceptions of Environmental Education: Reinterpreting a Typology for a Thematic Analysis

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Abstract

This article reinterprets Sauvé's typology of Environmental Education (EE) as an analytical framework to study the EE conceptions of 11 primary school teachers working in Monterrey, Mexico. Each teacher engaged in a sequence of three face-to-face semi-structured interviews that explored their ideas and teaching experiences in relation to EE. Sauvé's typology was used in the thematic analysis, concentrating on aims of EE, concept of the environment, and examples of EE teaching and learning activities. The findings identify full and partial associations between the teachers' ideas and Sauvé's typology. This diversity shows that the conceptions of the teachers were complex and could not be fully represented by single EE types. Two teacher case studies are presented to convey the influence of culture and social contexts on their conceptions. Overall, the article presents an alternative take on the typology and provides recommendations for future research on EE conceptions.

Keywords: environmental education, thematic analysis, environmental typology, environmental ideology, teacher cognition

Persistent 'Footprints' in Environmental Education

Environmental education (EE) is a socially constructed field that is constituted by debate, ongoing transformation and (mal-) adaptation to the environmental, political, cultural and technological changes of the world (González-Gaudiano and Buenfil-Burgos, 2009; González-Gaudiano, 2001; Wals, Stevenson, Brody and Dillon, 2012). EE has reflected a shifting flow of ideologies and multiple pedagogies, representing the values and social trajectories of specific personal and group identities that are involved in the field (Fien, 1993; González-Gaudiano, 2001; Scott, 1999). In undertaking the responsibility to foster consensus about how to tackle environmental issues, international public policy has had a major steering role in EE (González-Gaudiano and Arias, 2011; Palmer, 1998; Payne, 2016). It could be argued that the ideologies positioned by international public policy have often made the field appear less diverse and context-bound. This includes how international public policy at some point redirected the global take on EE by promoting Sustainable Development, which some scholars have considered it being based on a resource-oriented and anthropocentric ideology (Berryman and Sauvé, 2016; Sauvé and Berryman, 2005; Sauvé, Berryman and Brunelle, 2007). Debates over ideologies and the different takes on EE have been an important source of growth for the field but perhaps an occasional malady for the necessary actions to address the environmental crisis.

Besides the steering role of international policy, another constant of contemporary EE is the struggle to position this field in formal education. Traditional schooling systems challenge the prosperity of EE with their empirical-analytical or utilitarian curriculum designs, broad coverage of topics in discipline-led curricula, external and knowledge-based summative assessments, low levels of agency in

teaching, failure to address the multidimensional nature of social issues and so on (Edwards, 2016; Glackin and King, 2018; González-Gaudiano, 2007; Palmer, 1998; Saylan and Blumstein, 2011; Stevenson, 1993; 1997). For decades now, these circumstances have represented important challenges to positioning EE in formal education systems (Stevenson, 1987; 2007), to considering 'educational action as social action' (Sauvé, 2013, 83), and to recognising that teaching is a political process (Reid, McCallum, and Dobbins, 1998).

EE, whether it is explicitly catered for in the curriculum or not, is bound to make at least a stealthy appearance in the classroom given that environmental and social issues are ubiquitous in contemporary societies. When the occasion arises, a teacher is likely to frame their teaching of EE in a particular light, endorsing specific ideologies and creating what others have identified as *multidimensional conceptions* (Reid, Scott and Oulton, 1997; Robottom, 1987). EE experts have suggested that endorsing specific ideologies is the product of background experiences and individual and professional identities (Stevenson, Dillon, Wals, and Brody, 2012). Given the latter and the powerful influence of teachers on programme development and student learning outcomes, it is important to consider how teachers in different places regard EE, from both the environmental and the educational perspectives (Jickling, 1997). Teachers are at the centre of educational practice and, sometimes at the centre of social action; therefore, they are crucial to positioning EE in schooling. Overlooking the role of teachers' conceptions in the delivery of EE would mean to disregard the nature of the social phenomena upon which the field is constructed and a contribution to the ongoing failure of EE in formal education systems.

Scholars of EE have created various 'tools' to examine people's beliefs, knowledge, and their representation of EE in practice. In parallel, many of such tools are also part of the substance upon which prominent debates of EE are constituted (Reid, 2011). To mention a few, there is a spectrum of ecological literacy (e.g. Cutter-Mackenzie and Smith, 2003) and environmental ideologies (e.g. Corbett, 2006); models and strategies that attempt to outline the focus of EE programs (e.g. Lucas, 1972; Monroe, Andrews and Biedenweg, 2008); sets of key questions (e.g. Hart, Jickling and Kool, 1999); and typologies to engage with EE critically (e.g. Sauvé, 1996; 2003; 2005a; 2005b). For EE researchers and educators, selecting from any of these or other existing tools depends on the context of the research or learning situation.

In this study we explore the use of Lucie Sauvé's (2005a) EE typology, heavily cited and well known by the EE research community, to analyse the EE conceptions of 11 primary school teachers. We selected this tool because there are strong similarities between the content of the study's data and the parameters in the typology. Our aim here is to present the alternative analytical route we followed to study the EE conceptions of the teachers through Sauvé's (2005a) EE typology. Our alternative attempts to emphasise the multiple meanings and the contextual relevance of the specific educational circumstances that are represented in the EE conceptions of the teachers. We suggest that multiple meanings and contextual relevance in EE conceptions are important to understand the background of EE teaching and environmental action. Far from promoting a relativist stance, our intention is to emphasise the socially constructed nature of EE conceptions and its potential to drive social and environmental change.

A Typology for Environmental Education

Sauvé presents her proposal for an EE typology in several texts (2003; 2005a; 2005b; 2010). This typology highlights the plurality and diversity of propositions available within EE through 15 different 'currents' or EE types, representing a particular worldview in each current (2005a, 12). Sauvé described these EE currents as 'models or strategies' for EE (Sauvé and Berryman, 2005, 230) and as a 'general way of envisioning and practicing EE' (Sauvé, 2005a, 12). Others have interpreted the term 'current' as a metaphor for 'flow and mingling' (Steele, 2014, 242) or 'a vast ocean of ideas, principles, and practices that overlap and intermingle' in EE (Pedretti and Nazir, 2011, 603). Besides being crafted to offer a 'mapping' of the field, the typology was designed as a pedagogical tool to help teachers and other practitioners of EE to better situate and critically reflect on their theoretical choices and practices they conduct in relation to this field (Sauvé, 2005a, 32).

The EE currents or types in Sauvé's typology are the logical product of a classing operation that relies on 'classificatory principles' (Marradi, 1990) or parameters—as Sauvé might regard them. Every EE current in the typology is differentiated from the others by the specific values and traits of four parameters: dominant concept of the environment; primary aims of EE; main approaches or strategies; and, examples of activities or pedagogical models (Sauvé, 2005a). Table 1 provides an extract of the English version of the EE typology (2005a), displaying the primary aims of EE that Sauvé identified for each current.

[Insert Table 1 around here]

According to Marradi (1990) both types and their classes in a typology must be mutually exclusive and jointly exhaustive, contradicting Sauvé's (2005a) observation on the inevitable overlap between some EE currents. However, Sauvé (2005a; 2005b) did not consider the typology as a rigid and all-encompassing instrument because classifications are somewhat artificial when compared to how these elements display in reality and to the convoluted nature of EE. This fairly justifies Sauvé's intended 'carelessness' in securing mutually exclusive and jointly exhaustive EE currents. Likewise, Pedretti and Nazir (2011) argued that there are 'no mutually exclusive currents, but rather discernible currents or collections of ideas that come together to form potential routes' (603). Sauvé (2005a) stressed that 'a category is no more than a particular (and limited) attempt to apprehend a reality…' (32). As such, the traditional matrix structure of typologies induces people to read the EE typology in a strict and rigid fashion, naturally limiting and defining each EE current to the values in the set rows and columns (i.e. the parameters).

In 2010 Sauvé added the parameter 'some bonds with science and technology education'; we did not use this version of Sauvé's EE typology because the new parameter was not significant to our data. Instead of the 2010 version, we used the English version (i.e. Sauvé, 2005a) because it was relevant to our data and other authors had also recently used this version in their research. Regardless of the latter, we believe that any version of the typology is useful to analyse people's conceptions and the ideology(ies) within. Any version of this EE typology is a reminder of the historical pathway that led to adopting the contemporary mainstream ideologies, such as the 2030 Agenda for Sustainable Development and its 17 Goals for Sustainable Development (UN, 2015).

In recent times, scholars have described the typology as a 'comprehensive overview' (Steele, 2014, 248) and a 'fine-grain proposal' (Sim, 2014, 54). Yet, the meta-analysis that Sauvé conducted to generate the typology was not detailed beyond naming the databases that were used (i.e. ERIC and FRANCIS) and emphasising the Francophone, Anglophone, and Latin-American background of the selected sources (Sauvé, 2005a; 2005b). However, Sauvé clarified that her proposal needed further development, asserting that her typology is primarily an object of discussion and analysis and not a finished product (2005a, 31; 2005b, 27). Thus, Sauvé's EE typology is an open project, a map but not the territory (Sauvé, 2005a, 32), and a dynamic tool that, despite its longstanding usefulness, requires revision and expansion through a systematic and updated analysis.

Recent Applications of Sauvé's Environmental Education Typology

Over the years, the EE academic community has engaged with Sauvé's (2005a) EE typology in different ways. Mostly, the typology has been used in conceptual frameworks, usually to complement an argument that addresses the variety of choices available in EE (e.g. Barrett, 2006; Calixto-Flores, 2013; Jickling and Wals, 2008; Kronlid and Öhman, 2013; Peza-Hernández, 2013; Steele, 2011). In parallel, the typology has formed part of the major debates in EE (Reid, 2011). Another response of the academic community has been to use the typology as a basis or influence to create a new typology (e.g. McGregor, 2013; Pedretti and Nazir, 2011). The typology has also been used as an analytical framework in empirical studies (e.g. Calafell-Subirà and Bonil-Gargallo, 2014; Steele 2014; and Viteri, Clarebout, and Crauwels, 2012), the alternative upon which this article is generated.

Calafell-Subirà and Bonil-Gargallo (2014), Steele (2014), and Viteri et al. (2012) used the EE currents, or a particular parameter, as a reference point for coding and analysing empirical data. For instance, Viteri and colleagues (2012) used the EE currents to code the EE conceptions of teachers and students who answered their questionnaires. Their results highlight the general patterns or predominant EE currents in their participants' conceptions. Yet, Viteri and colleagues (2012) also identified 'answers that were scattered' and 'additional EE concepts' resulting from the partial overlaps with the EE currents. We find another example in Steele (2014), who compared Sauvé's (2005a) EE typology with another typology (i.e. Pedretti and Nazir, 2011), analysing the pertinence of each typology to study a series of food-themed secondary school lessons. Steele (2014) concluded that Sauvé's (2005a) EE typology is appropriate to identify 'broad strokes in EE' but unsuitable to analyse lessons (245). Around the same time, Calafell-Subirà and Bonil-Gargallo (2014) used the typology to identify the conceptions on the environment of EE professionals. In contrast with the other two studies, the analysis of Calafell-Subirà and Bonil-Gargallo (2014) is limited to the concept of environment, using this parameter to conduct a thorough and detailed analysis.

The three applications reviewed above demonstrate the versatility of Sauvé's (2005a) EE typology as an analytical framework: from identifying 'broad strokes' of EE to conducting a detailed analysis of people's conceptions about the environment. The variety in the application of the typology also means that there is potential for enhancing our understanding of how the typology is interpreted, especially in qualitative research analysis. This article explores such potential by offering a critical reflection of Sauvé's (2005a) EE typology and an alternative option to represent teacher conceptions of EE as complex and diverse in meaning. Representations are 'derivations of phenomena' that result from a rigorous process in which the researcher attempts to '… do justice to their participants and to properly

interpret their representations' or meanings (Morse, 2018, 807). The alternative route we present to use Sauvé's (2005a) EE typology makes the representation of participants' conceptions a central concern.

Research Design

This article draws from a broader interpretative multiple-case study of Year Six (11-12 years old) teachers working in Mexican primary education in the 2014-2015 school year (Benavides-Lahnstein, 2017). The multiple-case type is composed of various individual cases or units of analysis through which a social phenomenon is studied; usually, the phenomenon in question is shared or common amongst the individual cases. Here, the teachers are, in technical terms, the main units of analysis (Stake, 2006; Yin, 2014) and the teaching related to EE is the shared phenomenon. We focused on Year Six teachers because in Mexico they are typically experienced and familiar with all levels of primary education, enabling access to broader views of the EE-related content across this level of basic education. Because of the long-standing yet limited prevalence of EE in the National Curriculum, national primary school programmes and textbooks (Paredes-Chi and Viga-de Alba, 2017), our study aimed at recruiting teachers with at least five years of experience to maximise the chances of them being acquainted with EE or EE-related content.

Fieldwork was conducted in urban and low to mid-income areas of Monterrey, Nuevo Leon. This area of Mexico, similar to the capital of the country, has pressing issues related to the problematic development of an overpopulated and poorly managed urban area. For instance, in 2016, *Ciencia UANL*—the science magazine of the local state university—published an article exposing the long-standing lack of attention from federal and local authorities to the increasing atmospheric pollution in Monterrey and its metropolitan area (Martínez-Muñoz and Valdez-Cavazos, 2016), even though this and other issues are considered in the strategic development plan for the State (Gobierno de Nuevo Leon, 2016).

Practical research considerations and a convenience sampling strategy were used to select 12 state-regulated schools (i.e. public schools) and teachers as potential participants (Robinson, 2014). Nine mainstream schools were selected based on their location, and three schools were selected based on their locally well-known 'high standards' in schooling. The latter was judged by a researcher who is native to the culture and familiar with the educational context of the setting. Phone calls and meetings were first held with all the Head Teachers. As a result, six Head Teachers (Schools A to F, including two of the well-known schools) agreed for researchers to approach all their Year Six teachers. 11 schoolteachers (Table 2) voluntarily agreed to participate and remained involved throughout the fieldwork.

[Insert Table 2 around here]

To protect the anonymity of teachers, we do not provide individual details of the participating teachers and schools. Both the Head Teachers and teachers received a dossier that included a summary of the project, an explanation of their potential participation, and the authorisation document the local Sub-secretariat of Basic Education granted to conduct the research.

The Processing and Analysis of the Study's Data

This article focuses on the sequence of three semi-structured and face-to-face interviews held with each of the 11 teachers. The broader data set includes an analysis of 2011 National Curriculum documents (still current in Mexico) and 40 hours of non-participant classroom observation audio-recordings (Benavides-Lahnstein, 2017). The interviews were also audio-recorded and have an average length of 38 minutes. The initial interview explored the teachers' familiarity with EE and its representation in the 2011 National Curriculum and the Year Six programme. The second interview focused on the perceived influencing factors for EE teaching. The third interview prompted the teachers to talk about their latest experience teaching EE-related content in two of the five Natural Sciences learning modules.

The researcher native to the setting analysed the anonymized verbatim transcriptions of the interviews in Spanish. She carried out a recursive process of familiarisation and thematic analysis that was mainly influenced by the ideas of Braun and Clarke (2006), Kuckartz (2014), and Schreier (2012). The first round of thematic analysis similarities between Sauvé's EE (2005a) typology and the 'themes' in the participants' ideas about EE were identified. At this point it was noticed that all the participant-teachers referred to EE in terms of the environment, educational and citizenship-related aims, and examples of teaching and learning activities. These aspects were concurrent with three important parameters of Sauvé's EE typology. The latter led to a second round of thematic analysis, this time using Sauvé's (2005a) EE typology to reorganise the data according to the concept of environment, the aims of EE, and examples of EE teaching and learning activities.

Using the typology involved interpreting the parameters from Sauvé's (2005a) descriptions, wording the names of the parameters slightly different to serve the analysis. In our study, the concept of environment considered those interpretations describing values and attributes of the environment. The aims of EE were used to identify a broad direction given to EE through purposes and goals. The examples of EE teaching and learning activities were those fragments of data that illustrated how EE was developed or envisioned for practice. Having defined these main categories, the purpose was to find any full or partial associations between the aforesaid parameters and the interview data, and to connect these associations with Sauvé's EE currents. After this, the resulting associations were analysed in context, i.e. we considered the social and environmental circumstances of the teachers' personal and work circles. Field notes, summary reports of the interviews and audio-recorded non-participant classroom observations informed the contextualisation of the analysis.

'Full' and 'Partial' Association in the Environmental Conceptions of the Teachers

Using Sauvé's (2005a) EE typology to analyse the teachers' conceptions of EE was productive because it helped us identify suggestions of complexity and diversity in their conceptions. Our construction of these conceptions comprises full and partial associations between the teachers' ideas (as expressed in the interviews) and the EE currents (Table 3). We assigned a 'full association' when the parameters of an EE current were all represented in the ideas about EE of a teacher. We assigned a 'partial association' when only some parameters of an EE current were represented in the ideas about EE of a teacher. Hence, our distinctive use of the typology considered the full associations and the partial associations to interpret the EE conceptions of the teachers rather than attributing single EE types or currents to their ideas.

[Insert Table 3 around here]

Table 3 shows that full association of the EE currents was less common (0-4 across currents) than finding EE currents in partial association (0-9 across currents) with the teachers' ideas. Likewise, finding full associations in the individual case of each teacher was less common (0-2 for each teacher) whereas finding partial associations was more common (3-10 for each teacher). Those participants who openly expressed some interest, an involvement or a proactive attitude towards EE—i.e. Isabela and Rori (School E) and Mario (School F)—presented more complex and diverse conceptions of EE, an aspect that the partial associations emphasise. These teachers were involved in EE activism locally, talked of EE with evident passion, or had made adjustments in their lifestyle to adopt pro-environmental behaviours. That said, the cases of other teachers, such as José (School C) and Betty (School C), suggest that other factors besides preference for EE could be an influence to having diverse ideas about EE or partial associations.

José was not particularly keen on EE, but we could still recognise he had several ideas about it because of his in-depth knowledge of the school programmes. By contrast, Betty commented that she had changed important aspects of her life to reduce her carbon footprint—an indication of personal interest in EE related activities—yet her results do not present a significant accumulation of full or partial associations with the EE currents. This is because Betty mostly emphasised recycling and conducting activities to reduce the impact of rubbish in the surrounding environment. These outcomes indicate that the saturation of data in either full or partial associations was also an important feature of the analysis. We do not present these results in greater detail to limit the risk of distracting attention from the impact of the qualitative data regardless of the repetitions of an idea in the teachers' conceptions; although, we recognise that these results could be explored in this way to serve a different research goal.

Further Exploration of Full and Partial Associations: The Cases of Santiago and Isabela

In trying to make sense of the provenance of the full and partial associations we noticed that the life experiences of some teachers in places where nature is predominant, and the places where the teachers lived and worked, were significant when they talked about EE. In addition, elements of the school culture, such as the leadership of the Head Teachers or the EE-related activities in the participants' schools, also appeared influential to their views. To illustrate the role of these contextual details and expand on the notions of full and partial associations, the next two sections present brief portraits of Santiago's (School B) and Isabela's (School E) cases—two of the teachers who took part in the study.

The professional profiles of Santiago and Isabela were similar. They worked in schools where professional development and achievement was valued and supported. The general circumstances and infrastructure of School B and School E were similar. The buildings were located in a working-class residential area with few recreational spaces; there was a high urban density and a low density of green areas surrounding these schools. The culture around EE in these schools was markedly different, enriching the value of these two portraits.

Santiago–School B

The Head Teacher of School B highlighted that Santiago had recently received a state-level teaching award and described him as a committed teacher. At the time this research was conducted, Santiago had 12 years of teaching experience and confidently talked of the Year Six programme's content. School B was a part-time school operating during the afternoon. The school had large grounds and an average population of 600 learners per school year. At the time of the study, School B was conducting a school-level initiative to collect plastic bottles for recycling, which seem to have influenced Santiago's ideas about EE:

> (…) we have participated in various campaigns: from reforesting to cleaning areas, like the little square next to our school or our school gardens. All that helped us becoming a little more acquainted with environmental care. We also have an ongoing RECYCLING school project (...) (Initial interview, turn 38, capitals: interviewee's emphasis)

Recycling campaigns are popular in basic education because they can foster the participation of people of different ages and circles. Getting communities involved in recycling campaigns is a typical example of an EE that promotes environmental management and local environmental action, such as the Conservationist/Resourcist and Bioregionalist currents endorse. Recycling campaigns of polyethylene terephthalate bottles (i.e. PET) are popular in Nuevo Leon because local council household waste management strategies are focused on dealing with littering of streets (Gobierno del Estado de Nuevo León, n.d.). Besides the emphasis on recycling and cleaning campaigns, Santiago's conception of EE is in association with moral values and other notions about our relationship with nature:

[Insert Table 4 around here]

Santiago referred to his early life experiences in rural territories as motivators of his interest in experiencing nature and becoming familiar with it (Intermediate interview, turns 45-48). The partial associations with the Ethnographic and Naturalistic currents—which promote discovery and immersion activities in nature—were identified in Santiago's reflections of his previous experiences with nature and his interest in potentially taking his students on school trips to visit local reservoirs and recreational parks. Santiago expressed with surprise that his students sometimes could not recognise endemic species and other immediate ecosystems beyond the urban landscape (Intermediate interview, turn 34). Santiago's ideas suggested a direct link between learning about the environment and gaining environmental awareness:

> Firstly, environmental education is being familiar with your own environment; and, not just with your own environment but also to broaden your panorama to other environments (…) talking about environmental education is EVERYTHING related to the environment. In our case, we teach students about the purpose of, for instance, rivers, skies, mountains, plants and animals. They [i.e. rivers, etc.] all have a function to fulfil and, when students become aware of that, it keeps them from damaging this animal or that ecosystem. They will not

> pollute or upset them because they know what everything is for or what is the importance of them being there. (Final interview, turn 108, capitals: interviewee's emphasis)

The ideas and models endorsed in the Scientific current, as a few of Santiago's ideas shown above suggest, mainly conceptualises the environment as an object of study. Besides the 'scientific ways' of talking about the environment, Santiago also described the environment as a place/construct in which ownership (i.e. 'your own environment'), identity (i.e. 'being familiar'), personal growth (i.e. 'broaden your panorama'), purpose (i.e. 'all have a function to fulfil') and pro-environmental behaviour (i.e. 'it keeps them from damaging this animal or that ecosystem') are involved. These other ideas largely reflect the full and partial associations we identified with the Naturalistic, Conservationist/Resourcist, Bioregionalist, and Ethnographic currents.

Santiago's EE conception includes the possibility of appreciating and caring for the biodiversity of the city landscape that surrounded School B: 'maybe there are only a few animals [in the metropolitan area], but we must care for them and respect them.' (Initial interview, turn 42). Values of respect and care permeated Santiago's views of teaching EE, hence, the partial association with the Value-centred current was recurrent in our analysis: 'even if it is an urban area, I think there are many chances to care for the environment' (Initial interview, turn 42).

We noticed a mismatch between Santiago's ideas on EE teaching and his practice. His ideas on ideal EE teaching included discovery and immersion activities in natural settings or digital exploration of different world realities and environmentally friendly practices across other cultures (Intermediate interview, 28). Yet, the observation records describe lecture-format teaching, a small number of teacher-students class discussions, and students reading the Natural Sciences textbook out loud. According to our conversations with Santiago, he lacked financial and learning resources at his school, for instance, to take children on a field trip (Intermediate interview, 32); he blamed 'the government' for not providing the necessary resources to fulfil current teaching demands.

Isabela–School E

Isabela was a mid-career teacher with 12 years of experience in teaching. She had an in-depth knowledge of the Year Six programme and had received awards for some of her teaching activities related to EE. Throughout the interviews of this study, Isabela exhibited a keen interest and multiple ideas in relation to EE (Table 5). Isabela's conception of EE was identified in connection to her environmental concerns and the 'ecological culture' in her school—as members of this school called it. Isabela commented that the liking of School E's Head Teacher for 'all that stuff about ecology' triggered her interest in themes related to EE (Initial interview, turn 181).

[Insert Table 5 around here]

School E was distinctive for being one of the first schools to pilot and permanently adopt a full-time curriculum in Nuevo Leon. This had the potential to positively impact on the time available for teachers in School E to run projects, although in practice they were overloaded with multiple extra-curricular and timetabled activities. School E's culture supported and valued teacher professional development, goal and student-oriented teaching, and promoted 'taking care of ecology'. The latter was

self-evident from the awards they had received, the many training events that Isabela and her colleague, Rori, had attended, and evidenced further by comments such as the following:

> (…) we think hard about how to work on [EE] in exams and in class. It'd be super easy to just say to them: "Read from here to here, highlight there, and make a list of concepts (…) and that's it: Next topic!" But in this way, children don't understand, become aware, or act. To achieve [environmental] awareness in children, you have to look for something that has an impact on them (…) something they are experiencing. (Initial interview, turn 103)

In various parts of her interviews, as in the excerpt above, Isabela stated her desire to see her students 'act', recalling the essence of the Praxic current in Sauvé's EE typology. This is because Isabela considered that hands-on and action-oriented learning helped in the pursuit of reflection and environmental awareness (Initial interview, turns 107 to133). The same orientation was given to the 'ecology club' in School E. The club fostered autonomy and leadership in its members by taking part—and often winning—in local contests organised by the private industry sector, running recycling campaigns and local community engagement activities, and using their resources to improve the infrastructure the school and surrounding areas.

Most of the contests by private enterprises in which the members of the 'ecology club' took part were organised by a well-known transnational beverage company. The focus of these contests had a clear influence in the 3Rs campaigns (i.e. reducing, reusing, and recycling) of the ecology club. Although, according to Isabela, after years of being involved in the club her students had reached a point in which environmental action was the main target, rather than prizes (Initial interview, turn 161). Eventually, Rori, Isabela's colleague, influenced the club's community to replace the 3Rs model (reducing, reusing, and recycling) to a 5Rs model, which added 'revalorisation' and 'rejection' in their practice (Final interview, turn 238). The Sustainable Development current was also identified in Isabela's descriptions of EE and the club's aims:

> This [teaching EE-related topics] is to make children reflect on how to take care of their environment (...) This is to 'put' a bit more in children's heads that they have an ecological footprint and that they have to take care of the planet, otherwise the planet will not be the same in future generations. (Initial interview, turns 49-51)

At the time Isabela was interviewed she was not directing the 'ecological club' as she had done before. Nevertheless, Isabela was guiding her students, under the advice of the Head Teacher, to take part in a local sustainability contest (Initial interview, turn 155). Isabela stated that all of her students voluntarily agreed to participate in this contest. Her students presented projects framed in the 5Rs model, supporting the sustainable and local management of water, air, energy, and household waste (Initial interview, turns 143 to 155). Eventually we noticed in School E's social media that Isabela's students had won two places out of the three teams that were awarded in the contest.

The influence of the ecology club's activities and the general emphasis of School E's community on environmental matters seem to have influenced Isabela's ideas that fully associated with the Conservationist/Resourcist current. Isabela often mentioned teaching and learning activities that conceptualised the environment as a 'pool of resources' or from a mostly anthropocentric viewpoint (Sauvé, 2005a, 14). In addition, she often mentioned the 3Rs and 5Rs models. Although, Isabela's ideas about EE were not limited to the full association with the Praxic and Conservationist/Resourcist currents; we identified partial associations with seven other currents within Sauvé's typology. Some of these partial associations capture Isabela's notions on the affective and axiological dimensions, which are core elements of the Value-centred and Feminist currents:

> Environmental education is to make, we as teachers, that students feel love and care for their environment. Let them know that they have to take care of where they live and how they are going to do it. Search or even raise awareness among their families to take care of the area where they are. Sometimes they feel embarrassed if they see someone littering; they must overcome feeling awkward and call them on it: "hey, pick up the wrap" (…) (Initial interview, turn 111)

The partial association with the Feminist current is reflected in Isabela's description of the environment as an 'object of solicitude' a place and social construct in need of love and care from us: "that students feel love and care for their environment" as it is mentioned above. This reflects the Feminist current where "…emphasis is placed on solicitude: taking care of other humans and those other than human, with sustained and affectionate attention" (Sauvé, 2005a, 25). This is tightly connected to the Value-centred current because Isabela points to responsibility and care as values of environmentally aware people. In parallel, the Value-centred current stresses the adoption of these and other pertinent values to foster eco-civic behaviours, an aspect that Isabela suggested when she mentioned: 'they must overcome feeling awkward and call them on it'. We did not find indications that Isabela understood the environment as a 'field of values' (Sauvé, 2005a, 33), but our observation records evidence a class in which she raised various moral debates regarding local environmental issues in class.

Repeatedly within Isabela's depiction of EE place-based experiences with local communities were often mentioned. This shows that Isabela was interested in the improvement and sustainability of the local environment even though her notions about sustainability were mainly framed in global and future terms, which might be a suggestion of the phrase 'Think globally, act locally'. Such notions about local action were the multiple cues that justified a partial association with the Bioregionalist current. Finally, we found a partial association with the Scientific current, because Isabela discussed the environmental knowledge that students were meant to obtain from the Natural Sciences classes in relation to her depictions of EE.

Crucial Decisions in Representing Conceptions of Environmental Education

Typologies are effective for turning the complexity of a concept or the breadth of a field into manageable data, for example, by using reduction principles (Bailey, 1994, 28). Typologies are less

effective in representing a person's views because of the syntheses and artificial separations they are based upon. Multiple meanings, connections, and the influences of social dynamics might escape the categories in a typology. Reading and using a typology in a less traditional way, allowing types to partially tell us something about someone, allows us to combine breadth and complexity in our analysis. Effectively using Sauvé's (2005a) EE typology to represent people's conceptions of EE will depend on the critical assessment, the rigour and the methodological decisions made by the researcher.

Using Sauvé's (2005a) EE typology in the last round of the thematic analysis involved making crucial decisions. These decisions led to an alternative approach for the use of the typology and increased the rigour of the research in terms of the 'verification strategies' that were used (Morse, 2018). The crucial decisions were a) deselecting or selecting a parameter; b) interpreting what each parameter means; c) considering full and partial associations between the data and the information in the typology. In general, using the notions of full and partial associations together increased the depth of the results when compared to the results of only reporting 'homogenous' or full associations with the EE currents.

The 60 cells in Sauvé's (2005a) EE typology make it complex to use in qualitative research analysis. To deal with the size of a large typology—and improve the success of applying it to qualitative data —Bailey (1994) describes two strategies: a) the Lazarsfeld's reduction principle, which involves the recreation of entire typologies with fewer cells; and b) the partial reproduction of a typology by carefully selecting a portion of it. Reducing the extent of a typology is a plausible operation for working the Sauvé's (2005a) EE typology. As we mentioned earlier in this article, Calafell-Subirà and Bonil-Gargallo (2014) partially applied the EE typology of Sauvé (2005a) by only studying the parameter 'Conception of Environment'. Similarly, we deselected the 'Dominant Approaches' parameter of the typology as a potential analytical category. Sauvé described this parameter (2005a) as 'main approaches and strategies' of sensorial, cognitive, affective, experiential nature; she does not provide further information regarding her interpretation of such approaches and strategies. The lack of information made it difficult to interpret the 'Dominant Approaches' parameter and, therefore, to use it in the analysis. Reductions depend on the purpose of the research, the need to manage the analytical complexity, or to reduce the risk of misinterpreting an aspect of the typology that was not sufficiently described in the original text.

Our difficulty to interpret the 'Dominant Approaches' in the typology was part of a theory-driven exercise for the thematic analysis strategy we used. Interpreting and describing categories is a necessary step in many forms of qualitative content analysis, including thematic analysis (Kuckartz, 2014). The interpretation and description of analytical categories mainly depend on the aims of the research. However, creating analytical categories from Sauvé's EE typology is a process that is bound to the content and essence of the typology as well as to the purpose of the research. In such a case, we must make efforts to create a 'dialogue' between what the author of the typology attempts to communicate and the researchers who are using this tool to understand their data. It is important to make an insightful and explicit interpretation of any categories used that were influenced by Sauvé's EE typology. If made available, describing how the categories were interpreted can be a valuable piece of information for readers and other users of the typology.

The relationship of the EE currents and the typology's parameters is, in technical terms, of a 'linear' or traditional kind. The matrix format of the typology does not make it easy for readers to

visualise the overlaps and connections of its content. There are other ways to design the layout of typologies; we find a less traditional example in Ukanyezi Lee (2017) and her activity-based typology for eco-clubs. The format of the typology can be a problem, because the visual design can influence the way we read and interpret its information. We are not suggesting the matrix structure of the typology is unworkable, we are saying we need to be flexible when reading and interpreting it.

A typical 'read' of Sauvé's (2005a) EE typology could be 'to identify an EE current we must recognise specific values and traits in relation to four parameters (i.e. the conception of environment; aims of environmental education; dominant approaches; and examples of strategies). For example, if we were to identify all the specific values and traits of an EE current in someone's data, we would then be prompted to think X current is fully characterised. However, such linear reading of the typology might obscure nuanced but significant aspects of someone's EE conceptions. Instead of a linear reading of the typology's matrix, we suggest searching for full and partial associations. Besides adding to the representation of participants, to consider partial associations help to identify ecologically minded teachers and target professional development accordingly. As our results suggest, the teachers who had a larger number of partial associations fit the profile of ecologically minded teachers, for whom multiple meanings, perspectives, and diversity in teaching are important elements (Morrison, 2018).

The studies of Steele (2014) and Viteri et al. (2012) prioritise a linear reading of the typology by considering the full association of currents and parameters. In terms of partial associations, Steele (2014) and Viteri et al. (2012) present little or no information. This means that there is little information in the studies of Steele (2014) and Viteri et al. (2012) about the data that did not match the condition 'if all the specific values and traits of a current are suggested in someone's data then we can say that X current is displayed in their ideas'. Perhaps the research aims of Steele (2014) and Viteri et al. (2012) did not intend to capture such nuances but, in such cases, we would argue that this decision should be explicit. To contextualise within our results, reporting that 'Santiago had a Conservationist/Resourcist and Bioregional approach to EE' would mean we missed many other significant aspects that the partial associations highlight. In such a case, the flexibility that was originally intended for the typology by Sauvé can be lost in 'methodological translation'.

The Environmental and the Cultural in Representing Conceptions of EE

Diversity is both a biological and cultural consequence of even the most seemingly homogeneous groups (Greenwood and Levin, 2007). As a cultural product, diversity is found in knowledge, beliefs, experiences, and capabilities. The EE typology of Sauvé (2005a) was a helpful tool to identify diversity, mostly as a cultural product, in our participants' conceptions of EE. We designed this study under the initial assumption that teachers are likely to frame EE in a particular light, endorsing specific ideologies through their conceptions and teaching practices. However, rather than finding a 'particular light' in the EE conception of each teacher, our findings identify various 'lights' linked to their contexts, such as the school cultures and places—see Santiago's and Isabela's cases described earlier. Culture plays a role in shaping individual and group knowledge, including people's perceptions of environmental issues (Saul, 2000, 7). The larger context of the cultures in schools and the personal and professional background of teachers regarding EE were major references in our data.

The diversity of meanings in the EE conceptions of the teachers is our interpretation of those various 'lights'. This finding resonates with Corbett (2006), who observed that 'what many people lump

together as environmentalism is more accurately a diverse spectrum of beliefs' (56). Similarly to pluralistic and emancipatory approaches to EE, if teachers considered the range of meanings in their EE conceptions for teaching perhaps there would be consequences for the learning activities and the content choices they make in relation to EE (Lijmbach, Margadant-Van-Arcken, Van Koppen, and Wals, 2002). Along a similar line of argument, Cole (2007) recommended that EE-related lessons include diversity in terms of place, history, race, class, gender, and justice to engage students meaningfully, stressing the impracticality of trying to blend these aspects in an 'homogeneous' approach to EE. The findings in this article and the ideas of Corbett (2006) and Cole (2007) suggest that forcing a homogeneous approach to EE is unrealistic because teachers' EE conceptions and teaching are likely to be multidimensional, polysemic, and bound to a specific context and period. Similarly, to study teachers' EE conceptions by searching for 'the homogeneous' in their ideas might not be conducive to adequately represent the multidimensional, polysemic, and context-dependant features of these.

The participants' EE conceptions were also framed in a larger cultural and social context that was characterised by recycling activities and environmental management campaigns in schools. From our participants' accounts we noticed that five out of the six schools participating in the study displayed EE practices that were often linked to cleanliness and the 3Rs model. In such cases, putting the 3Rs model into practice mostly involved collecting plastic bottles. Hursh, Henderson, and Greenwood (2015) observed that 'how one interprets the famous "reduce-reuse-recycle triangle" [i.e. the 3Rs] depends upon the sociocultural context within which they exist' (308). We confirmed the latter in School E's case, where the application of the 3Rs model was replaced or expanded by the 5Rs model (i.e. revalorisation, rejection, reduce, reuse, and recycle) when core members of the 'ecology-club' realised that overconsumption has negative consequences for the environment.

Besides the influence of the EE culture (or lack of it) in schools and teachers' background, we noticed that other factors, such as professional training opportunities, policies and practices in school, the broader education system, also influenced the EE conceptions of the teachers (Osborn and Broadfoot, 1993). For instance, the current National Curriculum and primary school programmes include EE mostly through environmental sciences content and vaguely promotes an education for the environment approach (Benavides-Lahnstein, 2017; Paredes-Chi and Viga-de Alba, 2017). Accordingly, our participants used some of the subjects' content, especially the Natural Sciences content, to explain EE and without making clear suggestions to education for the environment. This last finding has potential for further exploration by using, for example, the work of McCrohon and Thi Tran (2019) on positioning theory to strengthen the search for influences behind teachers' conceptions of EE.

Final Thoughts

Our central aim in this article was to present an alternative route to using Sauvé's EE typology as an analytical framework. We focused on explaining how this alternative route improves how we might represent teachers' (or people's) conceptions of EE in research. The need to understand teachers' conceptions about EE continues to exist and expand. Understanding how teachers regard EE can a powerful aid to foster in-depth study of environmental issues in class (Stevenson, 1997), especially in places such as Mexico where EE is behind when compared to the progress made in developed economies. More importantly, we hope others consider this alternative route and adapted it to teachers' professional development activities. The need for teachers to recognise their own EE

conceptions and critically analyse what these mean in their teaching practice is crucial (Hart, 2003; Robottom, 2012).

The alternative route we followed in using Sauvé's (2005a) EE typology is an attempt to partially answer these needs from a research standpoint. We have argued that this way of working with Sauvé's EE typology strengthens its application as an analytical framework and increases the rigour of the research. The notion of full and partial associations can help the representation of research participants and their EE conceptions, even for research designs with larger samples. We also recognise that the typology in and of itself is not enough to understand teachers' EE conceptions; other frameworks and methods can complement our exercises to critically analyse EE in schools. Hence, linking the diversity of meanings within teachers' conceptions of EE to the cultural and social contexts makes the representation of the findings more significant.

We learned that Sauvé's (2005a) EE typology can still be a useful analytical tool and source of generative debate so long as we keep a critical position when considering its contents, structure, and the messages we plan to deliver by using it. Furthermore, typologies are created in a specific period of social, political, and economic circumstances; if we were to redesign and update the typology, how would it look today? Perhaps we would add a political dimension to include the different implications for citizenship (Sauvé, 2014) or we would add a parameter connected to health education (Dillon, 2012) since the bonds with science and technology have already been taken into account (Sauvé, 2010). If the typology is further revised and grows, we can always rely on the strategies argued for here to manage its complexity. Finally, we hope that our recommendations remind its users that 'any story of the history of environmental education research depends on who is doing the telling' (Stevenson and Evans, 2011, 24).

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Table. 1 Primary Aims of the Environmental Education Currents in Sauvé's (2005a) Typology

Of a longer tradition in EE	1. Naturalistic	Reconstruct a link with nature.
	2. Conservationist/ Resourcist	Adopt behaviours compatible with conservation and develop skills related to environmental management.
	3. Problem-solving	Develop problem-solving skills: from diagnosis to action.
	4. Systemic	Develop systemic thinking: analysis and synthesis (sic.), toward a global vision.
	5. Scientific	Acquire knowledge in environmental sciences and develop skills related to the scientific method.
	6. Humanistic /Mesological	Develop a sense of belonging. Know and appreciate one's milieu of life to better know oneself in relation to this living milieu.
	7. Value-centred	Adopt ecocivic behaviours and develop a system of ethics.
Of a recent tradition in EE (back in 2005)	8. Holistic	Develop the many dimensions of one's being in interaction with all aspects of the environment.
	9. Bioregionalist	Develop competencies in/for local or regional community ecodevelopment.
	10. Praxic	Learn and develop reflexive skills in, by, and for environmental action.
	11. Socially critical	Deconstruct socio-environmental realities in view of transforming them and transforming people in this process.
	12. Feminist	Integrate feminist values into the human-environment relationship.
	13. Ethnographic	Recognise the close link between nature and culture to valorise the cultural dimension of one's relationship with the environment.
	14. Eco-education	Experience the environment to experience oneself and to develop in and through it.
	15. Sustainable development /Sustainability	Promote economic development that takes care of social equity and ecological sustainability.

Table 2. Summary of School Features and Teacher Background

Schools (A to F)	Type of school	All school were regulated by the local Secretariat of Education; Five schools worked part time (~900 hours per school year); and one school was a full-time school (~1400 hours per school year).
	Average student population	Three schools had between 450 and 650 students; the other three schools had between 200 and 300 students.
	Awards	Two schools had won the 'School Merit Award', an acknowledgement based on students' test results and academic practices in schools. One school had won the 'National Quality Award', a managerial effectiveness acknowledgement.
	Environmental education activities	Three schools had one or two school-level activities; one had adopted EE fully in their ethos and the other two had no special interest in EE.
Teachers (11 participants)	Qualifications	Nine teachers had a bachelor's degree in Primary Education; three teachers had a teaching diploma (or equivalent) for primary education; four teachers had a masters' degree; and one teacher had two masters' degrees.
	Years of teaching	Two teachers had over 8 years of teaching experience; five teachers had over ten years; four teachers had over 20 years (with one having more than 30).
	Professional development	On average, all teachers had at least a diploma and a course on a specific area of teaching; within School E one teacher had attended at least 7, and the other one over 20, training events.
	Teaching awards	Two teachers (from different schools) had a state-level teaching award—these were not the teachers of School E.
	Native language	Spanish was the native language of all teachers.

Table 3. (F) Full and (P) Partial Associations between Teachers' Conceptions and Sauvé's (2005a) Environmental Education Typology

Environmental Education Currents	Luz	Morelos	Marley	Santiago	Adela	José	Betty	Esteban	Isabela	Rori	Mario	Total:
1. Naturalistic		P	P	P		P			P	P	P	7P
2. Conservationist /Resourcist	**F**	P	P	**F**	P	P	P	**F**	**F**	P	P	7P/4F
3. Problem-solving					P	P						2P
4. Systemic			P		P						P	3P
5. Scientific	P	P	**F**	P		P	P	P	P	P	**F**	8P/2F
6. Humanistic /Mesological		P									P	2P
7. Value-centred	P	P	P	P	P		P		P	P	P	9P
8. Holistic												0P/F
9. Bioregionalist	P	**F**	P	**F**	**F**	P	**F**		P	P	P	6P/4F
10. Praxic	P					P			**F**	P	P	4P/1F
11. Socially critical										P		1P
12. Feminist									P			1P
13. Ethnographic	P	P	P	P	P		P	P	P		P	9P
14. Eco-education											P	1P
15. Sustainable development /Sustainability	P					P	P	P	P	**F**	P	6P/1F
Total	6P/ 1F	6P/ 1F	6P/ 1F	4P/ 2F	5P/ 1F	7P	5P/ 1F	3P/ 1F	7P/ 2F	7P/ 1F	10P/ 1F	

Table 4. Associations between Santiago's Conception of Environmental Education and Sauvé's (2005a) Environmental Education Typology

Environmental education currents	Conception of environment	Aims of environmental education	Examples of teaching and learning activities
Naturalistic	Suggested		Suggested
Conservationist/Resourcist	Suggested	Suggested	Suggested
Scientific		Suggested	
Value-centred		Suggested	Suggested
Bioregionalist	Suggested	Suggested	Suggested
Ethnographic	Suggested		Suggested

Table 5. Associations between Isabela's Conception of Environmental Education and Sauvé's (2005a) Environmental Education Typology

Environmental education currents	Conception of environment	Aims of environmental education	Examples of teaching and learning activities
Naturalistic		Suggested	
Conservationist/Resourcist	Suggested	Suggested	Suggested
Scientific		Suggested	
Value-centred		Suggested	Suggested
Bioregionalist	Suggested		Suggested
Praxic	Suggested	Suggested	Suggested
Feminist	Suggested		
Ethnographic	Suggested		Suggested
Sustainable development/ Sustainability	Suggested		Suggested