Dialogue based strategies in the teaching of environmental education in Baja California Sur, Mexico

Mildred Adriana Arizpe Vicencio

Doctor of Philosophy in Educational Studies

University of York

Department of Education

-September 2012-

Abstract

The Mexican Ministry of Education (SEP) recognizes that teachers in general possess no training in environmental education or in strategies that facilitate participation amongst students. However, following the Mexican government approval of the Law of Environmental Education, in 2005, the inclusion of environment education in the elementary school curricula of Baja California Sur, Mexico, has become a priority. This study approaches this shortfall to consider the use of dialogic teaching as a strategy for increasing environmental awareness, whether if it can support children's own sense of agency and whether it can successfully be incorporated into the permanent curriculum of Baja California Sur classrooms.

The study takes a sociocultural approach drawing on the works of Vygotsky (1962, 1981), Barnes (1976, 2008) and more recently, Alexander (2008) and Mercer (2004, 2008). In particular, the study adapts the work of Mercer's Thinking Together programme (2008) which was used to create a programme of work piloted in 7 schools, and as a theoretical foundation for the analysis of children's' recorded oral interchanges and written narratives.

The research was conducted using a mixed methods approach to acquire and analyse qualitative and quantitative data. Its main focus is on the narratives produced by the children in the study as markers of improved environmental knowledge and awareness. The study also used reflexive researcher narratives following Clough (2002) and Denzin (2008) in which the researcher enters and acknowledges his own impact in the research environment, and explains this interaction to the reader through a narrative.

The results were separated as quantitative and qualitative results. Quantitative data records significant gains in environmental knowledge indicators and in the count of dialogic and environmental keywords. Qualitative analysis records improvements in several aspects of the dialogue dynamics within the classroom, and in all the measured indicators.

Contents

List of Figures and Tables

Acknowledgments

I would like to express my gratitude to my supervisor, Dr. John Issitt, whose understanding and vision added considerably to this work and to my graduate experience. I would also like to thank Professor Frank Hardman, whose contribution to this work proved to be invaluable.

This thesis could have never been completed without the funding and support of the National Council of Science and Technology (CONACYT), and without the help and contribution of all the involved headmasters, teachers and children that participated in the study.

I would also like to thank my parents for the support and encouragement they provided me through my entire life.

To my brother, my little cousin, Gaviota, and my aunt, Maricela, thank you for believing in me, and understanding that I really had to do this.

To my entire family, thank you for everything.

To my friends in York, Marcelo Romero, Edith Valencia and Lorena Lopez, thank you for being there.

To my friends in Veracruz, especially to Berenice Barrios, Diana Vargas, and Ricardo Barrios, thank you for supporting me through the last months of my writing up, and not letting me forget about living.

And finally, all my gratitude goes to you, Jose Alberto Rodriguez Ojeda. You know why, and you have known for 15 years.

Author Declaration

This thesis has not been previously accepted in substance for any degree and is not being concurrently submitted for any degree other than Doctor of Philosophy of the University of York. This thesis is the result of my own investigation, except where otherwise stated. Other sources are acknowledged by explicit references.

I hereby give consent for my thesis, if accepted, to be made available for photocopying and for inter-library loan, and for the title and summary to be made available to outside organisations.

Chapter 1

Introduction

In recent decades, increased concern about the environment has been paralleled by a growth in environmental education, which, as it has developed, has required the clarification of its aims and purposes (Sterling, 1995). According to Novo (2010) even when environmental concern is not obvious within society, it can still be perceived through the surge of activities related to environment conservation or restoration, though the growing concern of the global community for the use and conservation of natural resources, and the increasing interest in the acquisition and transmission of environmental knowledge. However, there exists a considerable debate on the extent to which the acquisition of knowledge and understanding of environmental issues necessarily leads to more positive attitudes towards natural environment. This argument was recognised as early as Moyer (1975) who pointed out that 'cognitive understanding does not automatically lead to strong attitudes about an issue'. This is a continuing problem, and a number of authors (Kollmuss, and Agyeman, 2002; Kenis and Mathijs, 2012.) Still perceive that there exists a gap between the level of awareness of environmental problems and the creation of concrete strategies, or citizen action towards its solution.

   Environmental Education (EE) in Mexico had a late development, when compared to other countries in North America and Europe, but this advance has maintained a steady pace, especially during the last 15 years. According to Gonzalez- Gaudiano (2010) the field is in a period of consolidation while continuing to address deficiencies and distortions in the short term. Great efforts have been made to incorporate environmental education on the national curricula, especially since the educational reform of 1993 (Barraza and Walford 2002).

   In the state of Baja California Sur, Mexico, a new Law on Environmental Education was passed by the Ministry of Environment and Natural Resources

(SEMARNAT) in 2005. Many different groups and stakeholders contributed to its design and articulation, including Non-Governmental Organizations, (NGOs) and different academic sectors gathered by SEMARNAT. Even interested citizens were among the participants in its elaboration and design. However, the Mexican Ministry of Education (SEP) recognizes that teachers in general have little understanding of environmental issues and no training at all, not only in environmental education strategies, but on techniques that encourage participation and interchange of ideas. This lack of established strategies in the teaching of environmental education in the context of the Mexican primary school classroom is the problem to which this study applies itself.

Dialogue based education highlights the importance of the participation of the students, which often leads to a switch in the ´power balance ´ of a group, making the dialogue dynamics of a group (between students and teachers, and even between students themselves) more *symmetrical* and democratic (Mercer and Dawes, 2008). This change often helps students to foster a sense of *agency of knowledge*, as discussed by Bruner (1996) and Alexander (2008) as an awareness of their control in their mental activity, not only in within their classroom, but on the society as a whole.

One of the initial assumptions of this work was that this gained sense of agency would help students to reach a true, *significant* knowledge, and that as such, dialogue based strategies would constitute the ideal pedagogical base to engage in the ´integral environmental education´ (Novo, 2010. p.17) that aims to form ´informed, active citizens´ that see themselves as integral part of their community and become ´agents of change´ (Freire, 1978), one of the main objectives that environmental authors point out as of *central* concern to environmental education as a discipline in the near future. (Palmer, 1998; Leif, 2006)

The aim of this work is to assess whether or not dialogue based strategies facilitate environmental education learning, whether these strategies also serve

the purpose of generating a sense of participation and agency of knowledge regarding environmental matters in children and if these strategies can be successfully incorporated in the permanent curriculum of the Baja California Sur classrooms.

The design of the strategies was a challenging process, due to the lack of previous studies that included both environmental and dialogue- based components conducted in Mexico. However, valuable resources were found in previous work by Barraza (2002, 2005), Mercer and Rojas-Drummond (2004), both developed in Mexico, and in the work by Ausubel (1968), Mercer and Dawes (2008) and Alexander (2008), regarding the use of dialogue based strategies in classrooms around the world. The study takes its main theoretical base in the sociocultural approach drawing on the works of Vygotsky (1962, 1981), Barnes (1976, 2008) and more recently, Alexander (2008) and Mercer (2004, 2008), all of whom point to the importance of generating a sense of agency of knowledge in their analyses. The combined elements of this analysis resulted in the creation of the teaching strategies that were tested in 7 Mexican primary school classrooms during the main study stage of the research.

One of the challenges of the study was how to generate a fine grain of the reality of each of these schools, and how to allow the reader access to the interpretative framework of the research. In order to achieve this, the study adopted Peter Clough´s (2002) methodology of using researcher interpretative narratives, as also discussed by Denzin and Lincoln (2008). Each account of the programme as it was deployed in the 7 schools opens with a very short interpretative narrative of the experience in said particular school.

In order to better present the work, it was organized in the following way:

In the Literature Review, we will present the theoretical framework of the study, trying to keep a balance between the two different aspects that compose the base of the work, environmental education and the main different educational theories that form the ground of the dialogue- based strategies

elaborated in this research. At the same time, we will present the main links found between this seemingly very different theoretical background, the similar views and objectives that were found between their main authors (both environmental educators and dialogue-based authors) have in regard to education, and how these views were used to conform the strategies elaborated and proposed by this study and locate the main indicators to be taken into account during the study.

In the Methods chapter of this thesis we will elaborate on the origins of this research and present the research questions, and provide a brief description of Baja California Sur, and its demographic context. A description of the methodology used during the pilot study, both quantitative and qualitative, will be provided as well as a justification for its selection, or adaptation for the main study stage of the research. Other elements that had an effect on the study, and ultimately shaped the course of the research, will also be briefly addressed and described.

In the following chapters, we present the main findings of this thesis. It was decided to present Quantitative and Qualitative results separately, to allow the reader to better understand and analyse the obtained results.

In the Quantitative Analysis Chapter we will describe the main results quantitative results obtained through the analysis of questionnaires applied before and after the research period, where significant gains were found in the increment of environmental knowledge indicators and in the count of dialogic keywords in the participant classrooms, (i.e. in the presence of the environmental knowledge indicators, and in the count of dialogic keywords). In this chapter we will also describe and summarize the most important findings and patterns detected during this stage of the analysis, in a way that facilitates the comparison of the obtained results in each school.

In the Qualitative Analysis Chapter, we will describe, through the use of descriptive narratives (the use of descriptive narratives in this section is further

justified and explained in the *Methodology* section) the setting, context and particularities of each one of the 7 participant schools, in separate sections, in order to better represent the unique conditions of each school, and how these conditions could have an effect on the study. Qualitative analysis of narratives and audio recordings of oral interchanges record improvements in different aspects of the dialogue dynamics within the classroom, as well as a general improvement in learning across the curriculum. In this section, representative examples of the narratives written by students during the research period will be given. We will also analyse the most significant changes in the different aspects of the dialogue dynamics within each of the participant classrooms.

In the Observations and Discussion Chapters we will identify and comment on what were considered as the main findings and patterns that emerged during the analysis of results, both quantitative and qualitative, their correlations and significance to the objectives of the research. We will also address some of the possible limitations of these results and the unexpected findings of this work, and how they could have affected the research.

In the Conclusions chapter we will identify to what degree dialogue based strategies proved an adequate base for the teaching of environmental education in the particular context of Baja California Sur primary schools, and to what extent other research questions were answered. We will also address the possible considerations that this study presents for future research in the subject

Chapter 2

Literature Review

2.1 Environmental Education: A Brief Background.

2.1.1 Environment and Sustainable Development: Concepts in constant construction.

From a *Scientific* point of view, *Environment* is most commonly used to describe the ´natural´ environment, and is used to refer to the sum of all living and non-living things that surround an organism, or group of organisms. According to Johnson et al (1997, pp. 581-589) *Environment* includes all elements, factors, and conditions that have some impact on growth and development of certain organism, in a defined space and time. Environment includes both biotic (living) and a-biotic (non-living, e.g. geographic) factors that have influence on said observed organism. A-biotic factors such as light, temperature, water, atmospheric gases combined with biotic factors (all surrounding living species), and these interactions serve to mould and shape the *Environment.*

Although this is to date one of the most widely accepted concepts on environment, it presents to us an incomplete model, as the notion of environment, as a whole, is a multi-dimensional one that encloses biological, geographical, and also human, economic and social dimensions. (Sauvé 2005). For the purposes of this work, we must also highlight that the *natural* environment does not exist in a different plane from the *human* environment, and that both interact with and affect each other.

Sustainable Development, another of the concepts that will be often addressed in this work, has been defined by a variety of authors as ´meeting the needs of the present without compromising the ability of future generations to develop´. (Our Common Future published by the UN World Commission on Environment and Development, p.43). However, it has proved to be another

difficult concept, and to reach a consensus about its true nature has proved a complicated task, as there is as yet no ´commonly accepted´ definition of the term, and ´development´ can be interpreted in very different ways by diverse countries. According to Taylor (2003) Sustainable Development has become obscured by conflicting world views, the expansionist and the ecological, each one reflecting different world realities.

So, understanding this lack of consensus regarding these basic terms, when addressing the field of *Environmental Education*, or Education for Sustainable Development, Sustainable Development being reliant upon three fundamental perspectives, those of economy, ecology, and society (van Dam-Mieras et al, 2008). One can better understand that despite its common concern for the Environment and recognizing the central role of education in improving the relationship with the latter, different authors (researchers, teachers, educators, entertainers, partnerships and organizations) adopt different discourses about Environmental Education and propose various, and often very different ways of conceiving and practicing educational activities in this field, and in turn propose different visions, programs and methods for addressing it (Sauvé, 2004, p.2). According to Neal and Palmer (1994, p. 1) as Environmental Education has increased in importance, its development ´may be regarded not so much as the development of a new subject area but [also] as the development of a philosophy and an approach´.

This change of perspective is consistent with significant educational trends that have emerged in this period, such as an increasing interest in environmental studies and in an interdisciplinary, transversal approach to education in general (Neal and Palmer, 1994; Feng, 2012). According to Gough and Scott (2005, p. 1) Environmental Education is ´an important and timely educational policy response if we are to be able to face up to the social and environmental challenges that lie ahead'.

It is assumed that to generate a real, permanent and continuous change of attitude in an individual, they must first fully understand the reasoning behind

said change in attitude, or, as stated, we must first *educate* said individual. Neal and Palmer (1994, p.5) state that: ´Environmental Education can be considered as an enlightening experience that is able to deeply change the lifestyle of the members of a community, since by applying its principles it can create new behaviour patterns in individuals, groups, and the society as a whole´. The term Environmental Education is often used to imply education within the school system (in this case referring to formal environmental education), also, it is seen as a critical tool in the transformation towards sustainability, as government and policy-makers tend to suppose that engaging in Environmental Education will facilitate the way towards Sustainable Development, so Environmental Education and Education for Sustainable Development have become almost interchangeable terms.

On this, some authors (Max-Neef 2005; Blewitt 2004) suggest that Sustainable Development, and its interdisciplinary approach, methods and objectives should be added to existing environmental education goals. Other prevalent view is that sustainable development should be the ultimate goal of environmental education, an approach known as *environmental education for sustainable development*. (UNESCO, 2012) Some find this to be problematic, because one of the ultimate goals for education is to teach students to think critically for themselves, and not be ´for´ any particular perspective. Yet McKeown (2000) argues that the ´for´ in education for sustainable development indicates a purpose – to make the world more liveable for the present and future generations – and gives students the necessary knowledge and skills to find their own creative solutions for environmental, economic, and social issues existing from local to global levels.

2.1.2 Environmental Education: An International Background.

Environmental Education is defined by the UNESCO (Tbilisi Declaration, 1978) as ´a learning process that increases people's *knowledge and awareness about the environment and associated challenges*. To develop the necessary skills and expertise to address the challenges, and foster attitudes, motivations, and commitments to make informed decisions and take responsible action´. UNESCO, the leading agency that promotes the Education for Sustainable Development (UNDESD, 2005–2014), emphasizes, however, that 'there is an urgent need to re-examine the nature and structure of schooling in a more critical way to address Environmental Education' (UNESCO, 2005, p. 59).

Environmental Education is also seen as a learning process that increases people's knowledge and awareness about the Environment, its interactions, relations and associated challenges, and helps developing the necessary skills and expertise to address these challenges, as well as fostering attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1978).

This perspective has not been stationary, as it has been adapted through the course of the years, in order to better adjust it to the evolving concept of environment and changes in perspectives regarding environmental concerns including those about the purposes of education. In order to better establish a socio-historical context, that will later help us to frame the changes in the educational curriculum (especially in the UK) we will highlight the most important international revisions to the concept of environmental education.

Over the course of almost four decades, the main modifications in its definition and purpose have taken place during the meetings in Stockholm (1972), Belgrade (1975) and Tbilisi (1977). In 2007, The Tibilisiplus30 or the Fourth International Conference on Environmental Education was held at the Centre for Environment Education, Ahmadabad, India between November 24, 2007 and November 28, 2007, at the same time commemorating the latest

meeting, and further adding to the transformation of the field. The most significant changes over time have been:

The Stockholm Declaration signed in the Stockholm Conference, which took place between June 5, and 16, 1972. It is officially known as the United Nations Declaration of the Conference on the Human Environment. The final document was made up of 7 proclamations and 26 principles, and the purpose of Environmental Education was marked as ´to inspire and guide the people of the world in the preservation and enhancement of the human environment´.

The Belgrade Charter formulated and signed on October 13–22, 1975. - The Belgrade Charter was the outcome of the International Workshop on Environmental Education held in Belgrade, Yugoslavia. The Belgrade Charter was built upon the Stockholm Declaration and it adds goals, objectives, and guiding principles of environmental education programs. It further defines an audience for environmental education, which includes the general public, and states that the environmental concerns should transcend the scientific community.

The Tbilisi Declaration formulated and signed on October 14–26, 1977, during the Intergovernmental Conference on Environmental Education in Tbilisi, Georgia (former USSR). It emphasized the role of Environmental Education in preserving and improving the global environment and sought to provide the framework and guidelines for environmental education. The Tbilisi Declaration ´states the unanimous accord in the important role of environmental education in the preservation and improvement of the world's environment, as well as in the sound and balanced development of the world's communities´. The Tbilisi Declaration updated and clarified The Stockholm Declaration and The Belgrade Charter by including new goals, objectives, characteristics, and guiding principles of environmental education.

The ´Tibilisi-plus30´ or the **´Fourth International Conference on Environmental Education´** was held at the Centre for Environment Education, Ahmadabad, India between November 24, 2007 and November 28, 2007. The conference was the fourth in the series of Conferences on environmental education held since the first international conference in Tbilisi. The second conference was organised in 1977 in Moscow; and the third conference was held in Thessaloniki in 1997.

This conference underlined the key role of education to achieving sustainable development. The participants and delegates from countries across the globe came together to examine the development of environmental education since the first conference, thirty years ago, and set a global agenda for Environmental Education. This was intended to ´serve as a platform to unity and share practices and ideas in initiatives for environmental education throughout the world´. (UNESCO, 2007)

The Rio 2012 Conference on Sustainable Development. In this conference it is recognised that in the 20 years since the United Nations Conference on Environment and Development in 1992, Environmental Education programs have seen uneven progress. (Report of the United Nations Conference on Sustainable Development, 2012, p.5). It is also recognised the need to progress in closing development gaps between developed and developing countries, and to seize and create opportunities to achieve sustainable development through economic growth and diversification, social development and environmental protection.

During this conference, a more holistic and integrated approach to sustainable development is proposed, ´in the hope that will guide humanity to live in harmony with nature and lead to efforts to restore the health and integrity of the Earth's ecosystem´ (*ibid*, p 7), and the natural and cultural diversity of the world is acknowledged, at the same time that it is recognised that all cultures and civilizations can contribute to sustainable development.

In the matter of Environmental Education, it is resolved during this conference to promote education for sustainable development and to integrate sustainable development more actively into education beyond the United Nations Decade of Education for Sustainable Development. The purposes of Education for Sustainable Development are: "to integrate the principles, values, and practices of sustainable development into all aspects of education and learning" (UNESCO, Education, The Decade of Sustainable Development, p. 4). To this end, it is proposed that educators find creative means through which to involve students, recognizing that they are seeking new approaches toward engaging with their local communities and toward fostering relationships which can expand and develop in new and meaningful ways. (Report of the United Nations Conference on Sustainable Development, 2012, p.44).

It is notable that one of the main objectives of all of these conferences was the ´unification´ of practices and ideas, as in fact, not only the concept, but the paradigms and approaches to Environmental Education also have changed over the course of the years, and differs from author to author. This is a persistent problem, and it goes beyond a discussion of practices or methods. Even when an important number of authors (Bishop et al. 2000; Kollmuss and Agyeman 2002; Erdogan et al. 2009; Tsevreni 2011; Mudda et al, 2011; Feng 2012) agree that the Environmental Education is a composite area of knowledge, integrated by social, economic and environmental components, there is no unique way of addressing this multifaceted discipline.

To further exemplify the diversity and controversy that exists in the Environmental Education field, In 2005, Lucie Sauvé reviewed 30 years of Environmental Education literature and identified the 15 main 'currents' or ´paradigms´ that in her opinion illustrate the panorama of Environmental Education in the past 3 decades. This ´cartography´ offers points of reference for critical analysis of discourses and practices in this educational field. It spreads out a wide diversity of sources, methods, strategies and even

perspectives on the environment. (See: Table A: *Fifteen Currents of Environmental Education* in Appendices I, p. 313-314*)*

This overview of the literature in the field of Environmental Education shows that, despite their shared concern for the environment and their recognition of the central role of education in enhancing human-environment relationships, various authors (researchers, professors, educators, facilitators, associations, organizations, etc.) adopt widely differing discourses on environmental education, and propose diverse ways of practicing educative activity in this field. Each advocates his own vision, and considers his approach ´the right approach´ (Sauvé, 2005. p 11)

In offering a brief landscape of the various currents, it is not pretended to *simplify or minimize* the importance of each one on the Environmental Education background, but to ease their analysis, and to being able to contrast each other, in all their diversity and similarities. We must also understand that the context in which Environmental Education ´takes place´ greatly determines the paradigm the educator adopts. (e.g. *Socially Critical* or *Feminist* paradigms usually are not employed in the teaching of Environmental Education of young children; as it is assumed that in that stage, children should be introduced to the concept of Environment through positive experiences with nature, as Wilson 1996; Nikoaleva, 1998; and Sobel 1996, 2004, maintain.)

There exist three recognized methods of *delivering* or *teaching* environmental education recognized by the UNESCO (Gaudiano, 2009). These were first defined by Castro and Balzaretti (2007, p. 34) as Informal, Non-Formal and Formal.

Informal Environmental Education, which is defined as the day-to-day environmental information that the individual gets from its surroundings, (which can be either positive or negative) is entirely spontaneous, neither planned nor structured.

Non-formal Environmental Education is the structured education that the individual gets *outside* an institution. (An example of this could be the environmental campaigns endorsed by the government, promoting recycling and waste-reduction).

Formal Environmental Education concerns organised academic and scholar-based education. This is the Environmental Education that takes places in schools and that employs established programmes, and pedagogical strategies and techniques. It is often included in governmental schemes, and it aims to shape a similar educational background in all the students. According to Gonzalez-Gaudiano (2009) Formal Education often mirrors both the social and economic contexts of the society, and the ´official´ perspective of the government of the country that carries it out. It is crucial to understand the history and context in which environmental education develops, and to recognize that ´each country´s perspective towards sustainable development is affected by its own political, social, and economic framework´. (Barraza and Walford, 2002 p. 184) We can then comprehend the marked differences that Environmental Policies often have in different countries, as each country has a different agenda and approach towards sustainable development, (and in fact, as we have previously seen, can interpret *sustainable development* from a totally different perspective).

  For the purposes of this work, we will mostly address formal environmental education in the early stages of primary education. In the next section, we will discuss how two countries –both relevant to this work – have developed a particular approach towards its teaching, each showing their own strengths, challenges and historical and cultural contexts in the processes.

2.1.3 Historical Background of Formal Environment Education in México and England: A Comparative Analysis

In this section, we seek to analyse the historical background of Formal (scholar-based) Environmental Education processes in Mexico, in order to later compare them with similar processes that have taken place in England. This will serve to compare and clarify the very different conditions regarding the subject in both countries. We will consider how Environmental Education is transmitted at primary level in two countries with significant educational and political differences, and its effect on children's environmental knowledge, perceptions and attitudes. We will also reflect on the role of national policy and the classroom practices typical to each country.

Environmental education, and its incorporation to the school curriculum, has only become a priority fairly recently; especially in the case of developing countries, where in fact, sustainable development as a whole is only just becoming a priority. In Mexico, for example, we can establish a link between the increased but somewhat late concern about the environment and sustainable development in the country and the interest in environmental education. (Gonzalez-Gaudiano, 2004).

Schools play an important role in the formation of positive attitudes towards the environment in young children. They can improve their environmental performance by working with all members of the school community, but we must remember that regularly, education is formed and shaped in a given political context, often by the dominant political class. The way students are taught and what they are taught serves a political agenda. (Freiré, 1994) Teachers, themselves, have political –and in this case, environmental - notions and they bring to the classroom. (Kincheloe, 2008) The educational curriculum is therefore shaped by the ´official´ perspective on the matter.

This will serve to establish a clearer perspective when we compare the differences between the processes and schemes that Environmental Education has adopted in México and the UK.

2.1.4 Environment Education and the National Curriculum in Mexico

According to UNESCO, sustainable development is the ´ultimate goal of the Man-environment relationship´; thus, the whole educational process (in all countries) should be ´reshaped for sustainable development´. (UNESCO-UNEP, 1978, pp. 26-27)

Carmona Lara (2000) argues that, in countries where natural resources are abundant and overpopulation has not been an issue until recent decades (such as México), economic growth and development have been seen as a priority over quality of life, resource management, sustainability and the need for Environmental Education.

The history of the legislation on environmental legislation in Mexico can be traced back to the beginning of the 1982–1988 governmental term, when a major educational reform was announced in Mexico. It involved the restructuration of the curriculum in different areas. For the first time environmental education was mentioned as an important topic, and there was an initiative to include it in the basic curriculum. In practice, however, this did not happen mainly because it was not considered as a ´priority´, and there was not a specific strategy to effect it. (Barraza and Walford, 2002).

In 1983 the Mexican government created the Secretaría de Desarrollo Urbano y Ecología (SEDUE—Ministry of Urban Development and Ecology). The functions of this agency included, among several others, the promotion of Environmental Education. This is considered as a crucial step, which publicly emphasized the importance of developing environmental education policies and strategies at all educational levels in the country.

At the beginning of 1986 a presidential decree was announced. The decree mentioned that the National Ministry of Public Education (Secretaría de Educación Pública, SEP) should establish the methodological basis in order to

initiate an ecological approach in formal education throughout the country (De Alba *et al*., 1988). This granted an important opportunity for schools to start incorporating Environmental Education policies into their practice. As a response to this, some schools started promoting environmental conservation policies, as beginning a compulsory school transportation program, in order to reduce air pollution and traffic. (Barraza and Walford, 2002). In practice, however, there was still not a unified, official program that pointed to a defined educational strategy, in a national -or even regional- level.

By 1987 the National Environmental Education Programme (PRONEA) was created by SEDUE, together with SEP and the Secretaría de Salubridad y Asistencia (SSA—Ministry of Public Health). This programme was mainly oriented to primary level schoolteachers. One of its major goals was to offer conceptual guidelines and suggest different methodologies related to Environmental Education for their training. As a result of this, a programme manual was shortly published after that.

In 1990, an important educational–political reform took place in the country. As a consequence of this, the process of incorporating the environmental dimension into primary education had its ´real and great´ beginning. (Barraza and Walford, 2002) This incorporation into the curriculum was aimed to cover two main areas: (1) knowledge; and (2) the formation of values and attitudes. The teaching and learning process would allow students to understand the origin and the development of environmental problems as well as the different levels of individual and collective responsibility and participation in the search for a new relationship between society and nature.

In 1993 as part of the governmental project ´Improving the quality of primary education´, SEP initiated a renewal programme for all primary level textbooks. The new textbooks started operating during the academic year of 1995–1996. We should notice that even though Environmental Education was not included as an independent topic in the National Curriculum, environmental issues –at last- were strongly represented in the Natural and Social Sciences textbooks (Barraza, 2001a). In 1999, the National Academy of Environmental

Educators was founded in order to promote and facilitate the development of the theory and practice of Environmental Education in the country.

In spite of these changes, environmental legislation in Mexico, especially the one that addresses Environmental Education, has a number of deficiencies and challenges. This is also true when we refer to Environmental Education in the National Curriculum of Education, as there are a number of international agreements that are still not implemented, (Gonzalez-Gaudiano, 2009) and most of the proposed policies for this area are still not carried on completely. The lack of coordination between government and educational sectors, and a severe lack of knowledge and training in these subjects by part of the teachers are signalled the most common causes for this (Carmona Lara, 2000, 2012).

National educational systems reflect not only the work of national organizations, but often also those of international organizations, and other countries. For some countries, the influence of external pressures has often been paramount. (Lee and Williams, 2009, p. 25). In the context of this work, the impacts of the United Kingdom (more especially England) on education in another countries (especially so, in México) are very important. With increasing globalisation of communication, innovative ideas may be readily transferred across frontiers and the interchange of knowledge and techniques have been accelerated and enhanced by increasingly complicated transnational and inter-continental networks and webs. Many countries, including England, now have curriculum policies, frameworks or guidelines that try to legitimate ´sustainable development´ as an educational goal.

2.1.5 Environment Education and the National Curriculum in England

According to Neil and Palmer (1994) Environmental Education has been long discussed as an *idea* to be incorporated within the programmed curriculum of schools in England. Nevertheless, according to Stables (2007) in the United Kingdom, ´…neither environmental nor sustainable development education has ever been a formal part of the school curriculum´.

Whilst it is true that the incorporation (or lack, thereof) of Environmental Education in the school curriculum has been given more importance in the last decades, its history in Europe goes back as far as almost 500 years ago. John Comenius (1592-1670), pointed out that ´education should be universal, focusing on family as well as schooling´. Comenius ideas of a ´authentic curriculum´ contained many references to learning outside the classroom, and learning from environment-based and nature-based experiences.

A century later, the French philosopher Jean-Jacques Rousseau, in *Emile* (1762) wrote about the value of experiential approach to teaching and learning and its importance to the development of the individual. Much of his advice on teaching drew strongly on examples based on nature and outside contexts.

The important contribution that the outdoors can make to the learning environment of young children influenced British Primary Education and school design in the early part of the 20th Century. Maria Montessori and later the McMillan Sisters in London both promoted the inclusion of experiences in outdoor spaces such as gardening, eating and even sleeping out-doors as an essential component of schooling for the young (Braund and Reiss, 2004, p.4)

In Victorian times, learning about the latest scientific and technological discoveries was popular in the UK. A great tradition of mass, public interest in science and its applications developed. After the Second World War, a tradition of fieldwork including the use of residential centres developed and blossomed as part of national trends in conservation and environmental education. (Braund and Reiss, 2004, p.4) We must also note that, at the time, the UK was a major centre of industrial development and scientific advance.

Furthermore, according to Hale (1990, 1993) Environmental Education was traditionally included in English schools in most programs of study, identified as Nature Study, Rural Studies, and Field Studies, and remained a component both in Geography and Biology by the greatest part of the 20th Century.

In the early 1950´s the idea of conservation education was first introduced into the formal education debate by the Nature Conservancy Council, seeking to promote an understanding and appreciation of the environment by encouraging teachers to include in their work the use and limitations of natural resources. However, Environmental Education still lacked any ´formal´ structure in schools, and still was not perceived as a subject by itself.

The 1960´s were crucial years for the evolution of environmental education in England. It was only in the mid- and late 1960´s that the concept of formal environmental education made its first ´real impact´ on the teacher's discernment. In 1967 The Plowden Report, ´Children and their Primary Schools´ confirmed the great value of using the environment as a didactic tool to enrich children's environmental knowledge. (Palmer, 1998).

The National Council for Environmental Education (CEE) was established as an educational charity in 1968 in order to:

1. Facilitate the development of the theory and practice of Environmental Education.
2. Promote the concept of environmental education and facilitate its application in all spheres of education.
3. Monitor the progress of environmental education and assess its effectiveness.

In the early 1970s, environmental concerns, and debate had a relevant surge on the public agenda (Sterling, 1992). We can link the foundation of The National Association for Environmental Education (NAEE) in 1970 to this. At about the same time the Department of the Environment, (DoE) was set up and it became the chief agency through which government made a contribution to the progress of environmental education (Sterling, 1992).

From the early 1980´s a new direction in environmental education began. The new objective was to encourage children through an approach to understanding nature and ecological principles, based on the direct experience of nature, which engaged their feelings and sensory faculties. The practice of 'nature games', introduced by Cornell (1989), was a pedagogical tool in the promotion of this kind of approach. The project entitled 'Learning through Landscapes' identifies the benefits of the development of school grounds and surroundings to use as outdoor classrooms. Schools also began to provide and develop new projects based on the need for a global, interdisciplinary and holistic perspective, as a new emphasis was also given to multiculturalism and world studies.

The promotion of land use projects was also encouraged as part of the curricula, and by the end of the 1990´s, the Geographical Association organised a major national survey of land use carried out by schools all over the UK; during the survey environmental issues were investigated, as were the views and opinions of the young surveyors, whom usually possessed an unusual degree of understanding in the subject.

Barraza and Walford (2002, p.174) point out to three major government initiatives established in the 1990´s that were an aid to the development of environmental education in the UK during the 1990´s:

1) The publication of a Government White paper 'This Common Inheritance'. The document highlights the importance of having environmental education both in schools and in lifelong learning, and the importance of encouraging public participation in environmental matters (DoE, 1990).

2) The publication of curriculum guidance for teachers in environmental topics. The publication of *Curriculum Guidance 7* by The National Curriculum Council (NCC, 1990) was followed by a revised and expanded version of the document re-titled *Teaching Environmental Matters through the National Curriculum* produced by NCC's

successors The School Curriculum and Assessment Authority (SCAA, 1996).

3) Reviews of the National Curriculum (most recently in 1999 for implementation in 2000) which emphasised Environmental topics in both the sciences and geography curricula.

However, and despite the National Curriculum being revised in 1991, and again in 1996, during that period most 11-16 science teachers tended to be ´too busy teaching the key scientific facts and concepts´ to spend long hours exploring the links and interactions between the ´real´ science, ´current´ events and the ´real´ world. (Liversidge *et al.* 2009, p. 2).

In turn, the National Curriculum of Science placed greater emphasis on the way scientists and how the body of knowledge that can be loosely labelled as ´science´ work. It also provides direct guidelines on what pupils should be taught about the applications and implications of science.

a) About the use of contemporary scientific and technological developments and their benefits, drawbacks and risks.

b) To consider how and why decisions about science and technology are made, including those that raise ethical issues, and about the social, economic, and *environmental* effects of such decisions.

c) How uncertainties in scientific knowledge and scientific ideas change over time and about the role of scientific community in validating this changes. (DfES,2004b p.37)

The revision of the National Curriculum during 2007 showed continuity in the main themes, but with one major change: the specificity –and division of subjects- was gone, showing a more ´transversal´ approach to the major themes, which were marked as:

1. Scientific Thinking (developing models to test phenomena and theories).

2. Application and implications of science (link between science and technology).

3. Cultural understanding (as science is rooted in all societies and draws on a variety of approaches).

4. Collaboration (or how developments are shared across the scientific community). (Liversidge et al, 2009, p. 3)

The old divisions that labelled scientific knowledge as chemistry, biology and physics, were abandoned in favour of a new breadth of subjects that teachers should draw on as very loosely defined. The National Curriculum for Key Stage 3 for implementation in 2008 seeks to use science education to develop a well-informed, globally aware, confident, critical audience. It also takes into account that they need good communication skills to express this awareness and criticality.

´It recognizes the skills intrinsic in the scientists but throws an increasing emphasis on risk assessment, group working and using secondary resources, and asks pupils to communicate by way of presentations and discussions again mirroring how scientists work´. (Liversidge et al, 2009, p. 4)

The development of a new approach to environmental and science education, where the interdisciplinary and critical approach, and a verbal ability needed to reach a real comprehension –and further discussion- of these areas, are recognized in the same way that new pedagogical paradigms and approaches are incorporated. A similar phenomenon can be observed when we briefly analyse the integration of pedagogical theories and paradigms by part of environmental educators that aim, in this way, to create an integrated, holistic approach to Environmental Education.

2.1.6. Environment Education: An Integrated Approach.

For the purposes of this work, we will further refer to *formal* Environmental Education, which concerns organised academic and scholar-based education. This is the Environmental Education that takes places in schools and that employs established programmes, and pedagogical strategies and techniques. (Gonzalez-Gaudiano, 2009)

Most Environmental Education authors consider that *Environmental Pedagogy* is ´under construction´. Contribution and proposals are currently being made to define and establish an integrated, universal and international approach to the subject (Novo, 2006, p.10)

We can refer to the first ways in which environmental education was conceived from its starting point in the 1960's and 1970's. It should be noted – as previously commented-that form it beginning, for a majority of academics, Environmental Education referred mainly to the study of environment and natural sciences, while the importance of human interactions and the subtle dynamic that have been established throughout history between society and nature, or the political or economic aspects are poorly represented and often overlooked. (Tsevreni 2011; Feng 2012)

Most of the teaching of formal Environmental Education can be sub-divided in two categories: **Preservationist,** which focuses on the study of the natural ecosystem and their preservation (e.g. The *Naturalist*, *Conservationist*, and *Scientific* currents, identified by Sauvé, 2005), and the **Socio-environmental**, which focuses on the study of the interaction of human society with its environment. (That would correspond to the *Holistic, Bio-rationalistic* and *Socially Critical* currents, in the same conceptual map by Sauvé.)

The *Preservationist* current is represented by the wide majority of the environmentalist- scientific community and has no specific curriculum design, as it is clear that its main objective is the preservation of nature. This current is organized around natural sciences (as biology, geography and ecology) knowledge constructs and schemes, while all the other areas of study (as economy or history) are interpreted around them. One of its main purposes is to

train of the individual in the ethics of environment, towards achieving a harmonious coexistence with nature, and it is usually structured around thematic units that often combine media information with extracurricular activities and campaigns, with emphasis on the latter´. (Novo, 2006, p. 23) When incorporated in schools, it often uses elements of the immediate environment, such as recognition of ecosystems, creation of ecological plots, visits to parks and nature reserves, eco museums, school gardens, tree planting and garbage collection and identification of species and habitats by part of the children.

The *Socio-Environmental* perspective, on the contrary, is being developed by authors extracted from a variety of knowledge areas, who try to use a more interdisciplinary outlook in the teaching of formal Environmental Education. (see: Bishop et al, 2000; Stables and Scott, 2002; Stables, 2007; Kenis and Mathijs, 2011; Tsevereni, 2011; Feng, 2012).

This current which seeks ´to promote integrated and inclusive education, to reach and develop all cognitive and affective skills, thus granting the generation of a responsible and ethical scope of the individual, which in turn can be transformed into a social agent committed to improving the quality of life´. (Novo, 2005, p.23) From this, it is clear that students should have not only the latest available data regarding environmental issues around the world, but be able to situate themselves in their historical and social context, (Freire, 1978, 1994) thus being able to look and act in a prospective way, regarding egalitarian and *sustainable* distribution and consumption of environmental (and human) resources. In order to achieve this,

the content and methodology of the formal (or institutional) environmental education should be organized to present a variety of curricular offerings, and should create a content focused not only on the understanding of the dynamic interrelations of ecosystems, but to also one which ´considers the complex relations between natural and social systems´. (Palmer, 1998, pp. 26-27)

By trying to give an equal emphasis to the environmental, historical and social analysis, the greatest majority of scopes and perspectives (and its possible

solutions) are considered. For instance, this approach should offer students the analytical tools for scientific education for understanding and finding solutions to environmental problems; it should also take into account the characteristics and the level of cognitive development of the student.

It is considered that Environment Education strategies should provide opportunities for collaboration and dialogue through group work, enabling the development of critical perception and responsibility in the student groups. It should seek to work through projects, methods and topics that focus on a range of issues, which enables the observation and understanding of the intricate social and natural interrelationships, considering inter-discipline as a goal to be reached by the educational process, as well as the incorporation of different pedagogical methods on the teachers´ and student´s behalf.

The introduction of Environmental Education *dimensions* in the curriculum should trigger awareness regarding environmental issues, through planned activities that permit a progressive integration of its contents into the classroom discussion. It must respond and reflect the particular interests and the student's motivations, facilitating the acquisition of technical and scientific knowledge to participate in an effective way to manage the developmental processes in their community.

Maria Novo (2005, p.24) arguments that Environmental Education should trigger: a process of awareness appointment in the initial years, an understanding of simple environmental relationships, interrelationships and concepts, from 5 to 8 years of primary school, and finally, in middle school, in a period in which the student is at a stage of cognitive development in which he comes to and understanding of various levels of relationships, to deepen these concepts, in order to reach a full understanding that can serve as a base to build a permanent change in attitude, that reflects on their future behaviour as citizens.

There exist a growing number of studies that propose an alternative approach to Environmental Education, with a focus on children's ideas, attitudes and action rather than *scientific* knowledge. e.g. Bishop et al. 2000 project, "The

Development of Environmental Awareness through Literature and Media Education," that attempted to ´expand and explore Environmental Education by making use of processes and knowledge bases associated with arts education and by converging on issues associated with environmental ethics and aesthetics´ (ibid. p. 269) in the UK and Portugal; or more recently, Tsevreni (2011), that used drama, narratives and discussion groups to develop a critical approach on Environmental Education in a school in Athens, Greece.

Children should be encouraged to be involved by expressing and communicating their experiences, ideas and emotions about their environment and their everyday life (Barratt-Hacking, Barratt, and Scott 2007). It is expected that by addressing this issues in an interdisciplinary manner, and working in collaborative groups, children will identify relevant issues of social and community interest, which will encourage students and teachers to continue using dialogue processes. By becoming familiar with local environmental issues, they will eventually begin to participate in the analysis of international policies and more complex environmental topics. (Simovska and Jensen 2009, p. 7).

Formal Environmental Education by definition, ´…aims to reach an understanding of both the problems and their possible solutions. It postulates the creation of the school as a place of challenges and confrontations designed for community intervention: a non-authoritarian relationship between teacher and student together in cooperation and collaboration to the mutual growth, ´Without forgetting the cognitive differences nor losing the initiative by the teacher in his role as a mentor, coach and organizer of educational activities.´ (Palmer, 1998, pp. 39-40).

The current of Environmental Education known in Latin America as ´Environmental Pedagogy´ (as proposed by the UNESCO and authors as Medina, Gonzalez-Gaudiano, Barraza and Novo), is proposed as a complex educational alternative that is being put into practice in order to verify its real potential in improving public education, and is being constructed while trying to incorporate a diversity of pedagogical approaches. It has an equivalent in the

´Environmental Literacy´ movement, (As discussed by Simons, 1995; Volk and McBeth, 1997; Bishop, Reid et al, 2008; Stables and Bishop 2001; Sterling, 2004 and Stables, 2007).

Environmental Literacy is considered an evolving concept in the developing Environmnental Education literature (Erdogan et al. 2009). Environmental Literacy is defined as a "basic functional education for all people," (UNESCO, 1989). One of Environmental Literacy´s main premises is that the ultimate goal of environmental education is to form an environmentally literate citizen. This purpose was documented by the UNESCO as early as 1976.

> *"The goal of environmental education is to develop a world population that is aware of, and concerned about, the total environment and its associated problems, and which has the knowledge, attitudes, skills, motivation, and commitment to work individually and collectively toward solutions of current problems and the prevention of new ones"* (UNESCO-UNEP, 1976, p.1-4).

Environmental Literacy, as a whole, tries to comprise the elements of environmental culture, consciousness and behaviour. It is assumed by the majority of authors that Environmental Literacy has six main components (Erdogan et al. 2009, p. 16):

- *Ecological knowledge* that refers to knowledge and understanding not only of natural systems, but also to how they interact with social systems.
- *Socio-political knowledge* that refers to an understanding of the relationships between beliefs, political systems and environmental values of various cultures.
- *Knowledge of environmental issues* that refers to an understanding of the main environmental problems and how these are caused as a result of human interaction with the environment.

- *Affect* that refers to the capacity of establishing an interaction at an interpersonal level, expressed as an intention to act.
- *Responsible Environmental Behaviour* that refers to a locus of control and the assumption of personal responsibility.
- *Cognitive Skills* that refers to the abilities required to analyse, synthesize and evaluate information about environmental problems/issues on the basis of evidence and personal values.

A Socio-Environmental perspective of Environmental Education has been established as the grounds for the analysis of this work, as this study is proposed within an interdisciplinary construction of environmental knowledge. It is understood that for achieving this, we will try to reconcile and incorporate very different pedagogical approaches; however, this is nor the first attempt to do so nor an isolated effort; as stated by Novo (2006, p.28)

> ´Environmental Education should be centrally grounded in three theoretical currents: Critical Pedagogy, Constructivism, and Sociocultural Theory, as it pretends to constitute an integrated approach that aims for the establishment of fair and ethical community interaction, for cultural and social diversity, and the respect towards human rights and environment as a whole.´

In the next section, we will further discuss how formal Environmental Education links to these different educational perspectives and approaches, and how some of these pedagogical theories have been employed in the teaching of Environmental Education.

2.2 The Need for an Integrated Pedagogical Approach.

As we have seen, Environmental Education demands not only an interdisciplinary approach, but, in this case, also a multi-theoretical framework. By choosing a Socio- Environmental approach to this work we seek to combine the strengths of these different pedagogical approaches. This section explains how socio-cultural theory complies with the variety of educational theories proposed by environmental education experts.

One of the first points that we would like to establish is that the constructivist and socio-cultural approaches are currently jointly employed by a variety of authors, that define themselves as ´socio-constructivist´, and a respectable body of research has been shown to ´reconcile´ the perspectives of Piaget and Vygotsky, giving their work –once thought as ´opposite´- a ´complementary´ scope.

From 1984 to 1987, Michael Shayer and Philip Adley directed The Cognitive Acceleration through Science Education (CASE), a project funded by the British Economic and Social Research Council. This was one of the first educational experiments that drew from the work of both Piaget and Vygostky. In this research, teachers are trained to deliver thirty one science related activities, also aimed at enhancing pupils´ cognitive skills and to contribute to their learning as they progressed through school. Pupils were tested before and after the CASE intervention lessons, and gains in cognitive development were measured and analysed.

Results showed that the intervention saw an increased learning ability in the majority of students, and substantial gains on the applied psychological tests, but at the same time, evidence showed substantial gains in the Key Stage 3 assessments in Science, English and Mathematics. In a paper later published by Shayer (1997), he argues that this study provides a convincing demonstration of the effectiveness of educational interventions based on cognitive developmental theory.

Shayer´s comment on the intervention (1997), demonstrates that both Piaget and Vygotsky can contribute to improve practice in normal classrooms. According to his analysis, cognitive and language development took place when a less able pupil witnessed a successful performance in another pupil and internalised it. The incomplete strategies of the less able child were ´improved´ by his or her watching the successful performance of more able peers.

In commenting on the results of his experiment, he cites Vygotsky:

´Any function in a child´s cultural development appears twice, or on two planes. First it appears on the social plane, and then on the psychological plane. First it appears between people as an interpersonal category, and then within the child as an intra-psychological category´. (Vygotsky, 1981, p.163)

More recently and further establishing the ´meeting point´ of both approaches, Geil and Moshman carried and experiment in 1994: a study of college students working in small groups on Wason´s four-card problem.

The correct solution was the consensus response for 75% of the groups, although only 9% of the individuals had given that response when assessed individually prior to the group interaction, thus showing superior inquiry and inference skills when working together than any of the group´s members did while working alone over the same period of time. Moreover, in three out of eight correctly responding groups, no individual had initially exhibited the correct response. Commenting the experiment, Deahana Kuhn (1997, p.258) notes:

> *´ The idea of knowledge as an entity beyond the individual is maintained and transmitted across generations and is of course central to Vygotsky´s thinking, and indeed to his conception of what makes development possible. (...)The process [of knowing] is one that truly works from both the inside out and the outside in, as we each become different persons through our interaction with one another.(pp. 252-258)*

Currently, development is seen by most ´socio cultural´ authors (e.g. Douglas Barnes, Neil Mercer, Robin Alexander, Karen Littleton, and Lyn Dawes) as a social process as well as a biological one. According to Alexander (2008, p. 10) ´Children construct meaning not only from the interplay of what they newly encounter and what they already know, but also from the interaction with others´. This interaction is regarded by the majority of modern educational theorist as critical, not just for children´s understanding of knowledge, but also for the development of their own identity, and their sense of self and worth.

2.2.1 The Integration of Critical Pedagogy

Critical Pedagogy, as envisioned by Paulo Freire, has also been used to address Environmental Education issues, (see: Eco-pedagogy, Critical Education), and its high relevance in establishing a theoretical base is employed by a number of Environmental Education authors (Novo, 2002; Jensen, 2004; Tsevreni 2011). But even as it would seem to provide for a more explicit understanding of the connections between the current science/technology practices and social issues, community action and empowerment, it was especially conceived for adult education, and also possesses a significant political undertone, that could undermine or represent a major bias for the content of the project, especially when it comes to consider the persistent discourse of *maternalism* that continues to influence how teaching children is conceptualised and practiced (Ailwood 2008).

Maternalism, theorised by Ailwood as the cultural aspect of motherhood, complements childhood innocence by positioning the adult in a protective and supportive role reinforcing the notion that children education should steer away from complex, and, in the case of ecological sustainability, potentially complex political issues. (Duhn, 2012) These discourses position the child as a malleable resource who carries adults' hopes and desires for a better future (Holland 2004). For teachers this often means shielding children from 'harsh realities' to guard their culturally enshrined innocence (Ashenden 2002)

However, there exist recent studies that focus on developing a *critical conscience* in children (e.g. Tsevreni 2011; Duhn 2012; Christidou et al. 2013).

Irida Tsevreni describes the shortcomings of existing environmental educational programmes in Greece based in the observations of her work experience in this area in the primary education sector. She argues that in the Greek educational system, the majority of formal environmental educational programmes are characterised by a shallow form of environmentalism, which focuses only on natural sciences and ´scientific knowledge´ (Tsevreni, 2011). In her study, she tries to contribute to the development of an alternative pedagogical proposition for environmental education inspired by critical education.

Tsevreni aimed to propose an action model that emerged from a one-year qualitative, participatory research in a primary school in Athens, with groups of children aged from 9 to 12.

In her conclusions, she writes:

> *The core of this proposition is placing children's ideas in the centre of interest, the development of a communication and interaction framework, and an emphasis on action. There is a strong need for an alternative approach to environmental education which focuses on children's participation and action.* (p.64)

There exists a growing preoccupation about the dominant perception of Environmental Education, and how its emphasis on scientific knowledge limits critical thought and a constructive dialogue in children. (Tsevreni, 2011). In Freire´s work, precisely, we find a description of his view on the *ideal* relationship –between teacher and learner, and the powerful emphasis it makes in the importance of dialogue between both. In Freire´s words:

> *´In the dialectical unity between teaching and learning, the saying ´Whoever knows, teaches the one who doesn´t´ takes on a revolutionary*

meaning. When the one who knows understands first that the process by which he learned is social and second, that in teaching something to another he is also learning something that he did not know already, then both are changed.´ (1978, p.54)

It is important to note that in this work we will not go as far as to conclude that Freire was a socio-constructivist himself, but we will instead try to signal important theoretical links between critical pedagogy and the socio-cultural ideas that sustain Dialogic Teaching and Socio-Environmental, which   form the pedagogical approach that provides a theoretical framework to this work.

Furthermore, Freire apparently *did* have a ´constructivist´ approach towards education, at least in his early career, while working in Brazil, before his writing ´Pedagogy of the Oppressed, and his eventual exile. In ´Pedagogy of Hope´, he recalls a presentation he gave to an audience in an impoverished zone in Northern Brazil:

´Basing my presentation in an excellent study of Piaget on the child´s moral code, his and her mental representation of punishment, the proportion between the probable cause of punishment and the punishment itself, I spoke at length. I quoted Piaget Himself on the subject, and argued for a dialogical, loving relationship between parents and children in place of violent punishments. [In this he is referring to Piaget: ´The moral judgment of the Child´] (...)My mistake was not citing Piaget (...) but my actual mistake was, first, in my use of language, my syntax, without more effort to get out to the language and syntax of my audience, and second, in my all but oblivion of the hard reality of the huge audience seated before me.´(1992, pp. 23-25)

This quote not only provides a good perspective on our last statement, but also touches on another important point: Freire understands (or at least acknowledges in this) that the social context determines to a great extent the use of language of an individual and the manner in which they assimilate

knowledge. Thus, a notable link can be established with another prominent theorist, Basil Bernstein, who as an educator, became interested in accounting for the relatively poor performance of working-class students in language-based subjects, whilst they displayed much more competitively, (achieving scores as high as their middle-class, and high-class counterparts) on mathematical topics. In his theory, Bernstein later asserted a direct relationship between social class and language. He writes, in Class, Codes and Control (1971, p. 76), ´*Forms of spoken language in the process of their learning initiate, generalize and reinforce special types of relationship with the environment and thus create for the individual particular forms of significance*´

That is to say that the way language is used within a particular social class affects the way people assign significance and meaning about the things about which they are speaking. Littlejohn (2002, p. 178) agrees and states, ´People learn their place in the world by virtue of the language codes they employ´. The code that a person uses thus symbolizes their social identity (Bernstein, 1971).

This notion was re-addressed in a study by Hart and Risley (1996) in which they show how by the age of 4 in the United States the child of professional parents will have had nearly as twice as many words addressed to it as to the working class child, and over four times as many as the child on welfare. Freire addresses this significant difference as ´class knowledge´, and argues that respect for popular knowledge necessarily implies respect for cultural context (1994, p.85) he adds to this:

> ´*Indeed, this is a basic theme of ethno-science today: how to avoid a dichotomy between the knowledges, the popular and the erudite, or how to understand and experience the dialectic between what Snyder's calls ´primary culture´ and ´developed culture´. (...) A respect for both kinds of knowledge's, with a view to getting beyond them must never mean, (...) that the educator must stick with the knowledge of living experience.*´

This preoccupation of Critical Pedagogy (the dichotomy between respect for the social context of the pupil and the knowledge the teacher must transmit) has been also addressed, from a different perspective, by Douglas Barnes, who states that:

> ´How teachers (…) receive and use their pupils´ written and spoken contributions are crucial in shaping how pupils will set about learning and therefore what they will learn. The teacher in this way validates (or fails to validate) the pupils´ attempt to join in the teaching.´ (2008, p.8)

The inequality of circumstances in which most of the talk that occurs in a classroom takes place has also been addressed by other socio-constructivist authors. Mercer and Dawes, (2008) for example, note that most of the Teacher-Pupil talk tends to be asymmetrical, and that ´this often means that one of the participants (usually the teacher) leads the interaction and has the privilege, and responsibility of being in control´. Usually, one of the results of this unequal distribution in the power of Teacher-Pupil interactions is the loss of ´agency ´ - understood by Bruner (1996) as the control of their own mental activity- by part of the students. In 1976, Barnes identified a ´performance climate´ in many classrooms (1976 p.111) which detracted from such agency, creating a disempowering dynamic that prevented pupils from reflecting on their own thinking and pre-existing knowledge in order to relate new to old, thus failing to achieve this sense of *agency of knowledge* within the students.

  This closely relates to what Freire refers to as the creation of ´banking of knowledge´, that was totally opposed to how his envisioned ´true´ education.

> ´Education (…) seen in the perspective of liberation, is a creative act. It can never be reduced to a mechanical matter, in which the so-called [teacher] deposits his/her own word in the learners, as though their conscious bodies were simply empty, waiting to be filled by that word. Such a technique is mechanical and relies on memorizing; the learners are made to repeat again and again, all together, a monotonous chant

which implies above all a false conception of the act of knowing. ´Repeat, repeat, in order that you may learn´ is one of the principles of this false understanding of the act of knowing. From a liberation perspective, (…) education is (…) a formidable struggle in which people together conquer their word.´ (1978, pp.71-72)

He also quite clearly exposes his views on the agency of knowledge by students (in this case referred to as ´people´). Yet another point in which Freire´s preoccupations in pedagogic terms closely relate to those of socio-constructivist are also depicted here, where he criticises the effects of a ´bureaucratised transmission of knowledge´ warning that ´...bureaucracy (of knowledge) annihilates creativity and transforms people into mere repeaters of clichés´. (1978, p.12)

On the socio-constructivist side, Edwards and Mercer (1987, 1995) note that the power imbalance between teachers and pupils and the pressure of school performance often lead to the sacrifice of discussion, and that this eventually results in pupils frequently spending more effort in ´guessing´ what teachers want them to say in pursuit of providing them with ´final draft´ answers, rather than reflecting upon their own ideas and genuinely engaging with the teacher´s expertise. Edwards and Mercer (1987, 1995) suggest that the former may result in the acquisition of ´ritual knowledge´, understanding which is ´embedded in the paraphernalia of the lesson´ (1987 p. 99) rather than an understanding of the key principles, or, as Freire would write: 'The more bureaucratised they become, the more likely they are to become alienated adherents of daily routine, from which they can never stand apart in order to understand their reason for being.´ (1978, p. 14)

Socio Cultural theory, Critical Education and Freire´s perspective also relates in their shared views on knowledge facilitation. For Freire, the figure of the teacher should be almost like one of a ´critical guide´, whose duty is one of support and find the best possible path for the pupil, without ´blindfolding´ the pupil so he does not notice other ways. In fact, he states:

´The educator must constantly discover and rediscover these paths that make it easier for the learner to see the object to be revealed. (...) The educator´s task is not to use these means and these paths to uncover the object himself and to offer it, paternalistically, to the learner, thus denying him the effort of searching that is so indispensable to the act of knowing. Rather, in the connection between the educator and the learner, mediated by the object to be revealed, the most important factor is the development of a critical attitude in relation to the object and not a discourse by the educator about the object. ´ (1978, pp.10-11)

Sociocultural theorists including Douglas Barnes and Courtney Cazden have highlighted in different studies the importance of the before mentioned *´agency of knowledge´*, that can only be gained by the student once he participates in the creation of said knowledge, thus appropriating it within himself. Particularly for Douglas Barnes, this very much resembles his ´Working on Understanding´ concept, which refers to the re-shaping of old knowledge in the light of new ways of seeing things. (Barnes, 2008 p.5). He further adds:

´Only pupils can work on understanding: teachers can encourage and support but cannot do it for them. In this reshaping, pupils' ´old´ knowledge is as important as the new experiences that are to challenge it. It is this challenge that provides the dynamic for the accommodation, the changing of previous ways of understanding for new ones. Adults and children alike are not always ready to make such adjustments and sometimes cling to views of the world that are familiar but are also ineffective or even untrue. It can be uncomfortable to have to change our ideas about how things are or how we should behave or interpret the world about us´.

Barnes also points out that there exist various ways of working on understanding, and that each one of them can be appropriate for different kinds of learning. However, he also signals one particular way of working on

understanding, which is central to this work: language, and more specifically, *exploratory talk.*

The need of participation, the exploration of ideas vs the ´reception of pre-made-knowledge´ in a classroom environment when dialogue can be established within an equality of circumstances, and the fostering of a ownership of knowledge (or agency of knowledge), find common ground with several Socio-Environmental Education authors, as Robottom and Hart (1993), Hart and Risley (1996) and Liversidge (2009).

In the next section, we will further discuss the concept of *exploratory talk*, and its essential importance within the pedagogical approach known as ´Dialogic Teaching´, that was determined after this analysis as the optimal pedagogical approach to adopt for the purposes of this project.

2.3. Environment Education and Dialogic Teaching.

We have argued how Dialogic Teaching synthesises and upholds the values of socio-environmental education and the preoccupations noted by Palmer, Novo, Gonzalez-Gaudiano and Barraza, and the majority of the principles of the key pedagogic currents that are pointed out by these authors as their ´theoretical base´. It also complies with UNESCO´s main aims and objectives for Environmental Education. We will dedicate the next part of this discussion to provide further arguments regarding the suitability of the use of this pedagogical approach in this particular study. For this, we will elaborate an outline that shows that how Dialogic Teaching constitutes an integration of the work of several scholars that draw from a variety of disciplines and research to sustain this ´emerging pedagogical current´.

2.3.1 Dialogic Teaching as a teaching method.

Language-based methods have been proved to ´ease´ the access of children to difficult scientific, mathematic, theoretical and moral concepts. They have also been found to provide an adequate ground for the discussion of complex moral and ethical issues.

> This can come as a surprise, but as Alexander (2008, p.8) notes:
>
> *Talk has always been one of the essential tools of teaching, (...) but talk is much more than an aid to effective teaching. Children, we know, need to talk, and to experience a rich diet of spoken language in order to think and learn. Reading, Writing and Number, may be acknowledged curriculum ´basics´, but talk is arguably the true foundation of learning.*

However, as he continues, as spoken word leaves ´no tangible trace´ of its existence, so it is much easier to focus on the written word. As a result, in most classrooms, the most common scenery is to witness how teachers ´impart´ their classes almost in a ´behaviouristic´ fashion: learners are asked to repeat and

sometimes recite stock answers to well-worn questions. The pupils learn through seeing examples, doing test questions, considering answers to questions and learning the required responses 'parrot fashion'. (Liversidge et al 2009, p.72).

We have already discussed how ´traditional´ teaching methods pretty much deliver pre-made knowledge for pupils to ´memorize´, instead of integrating them to the ´creation´ of their own knowledge, and we could argue that this lack of real integration could be one of the main reasons children seem to ´forget´ knowledge right after they have passed the test, after the only real utility that said knowledge had fulfilled its purpose. As Barnes (2008, p.14) states, ´knowledge that answers a question that has not yet asked –as is, again, the case of most of the knowledge we are ´imparted´ through traditional methods in a traditional context- will soon be forgotten´.

Ausubel (1963) notes that learning should ideally engage the student in making connections between every day and scientific views, raising their awareness of any similarities and differences between the two perspectives. This engaging is expected to give a more complex, complete meaning to the learning process for the student. As Scott *et al* (2009, p.19) observe, this kind of meaningful learning stands in contrast with ´rote´ learning, where the scientific view is committed to memory but is not integrated with existing ideas.

This makes us to return to Barnes and his ´working on understanding´ concept, as he points out the main differences between the talk that is involved in the ´traditional´ teaching methods, which he calls *presentational talk* and *exploratory talk* which is the kind of talk that is typically present in the new stages of the approach to new ideas. Barnes argues that the much of the talk that takes place in the classroom -as encouraged by teachers- is presentational in nature, and that they should be more aware of the function and nature of exploratory talk. He further adds:

´In teaching both adolescents and adults I made much use of small-group discussion as an element in an overall pattern of learning, partly because it makes it more likely that a larger proportion of a class will be actively involved in [exploratory talk or] thinking aloud.´ (2008, p.7)

This emphasis on the interaction of learners through talk is central to the principal Dialogic Teaching theorists, and it dates back to the concept of ´cognitive scaffolding´, a term first used in 1972 by Wood, Bruner and Ross, and that clearly relates to what Vygotsky called the ´Zone of Proximal Development´, a concept that refers to the gap between the child´s existing knowledge and the understanding which can be attained only with the guidance of the teacher or a ´more capable peer´. (Vygotsky, L.S. 1962)

The preferred working method of ´Dialogical´ pedagogues involves two or more children interacting through talk, and the majority of authors consider that learning can be successfully attained by students in different organisational settings i.e. whole class teaching, small groups, plenary, dyads, and individuals. ´Dialogue (...) can take place in *any* organisational context.´ (Alexander, 2008, p.20). They also highlight that interaction through talk (especially among pupils) is an excellent way not only of achieving the acquisition of knowledge, but to make the children more aware of *the process* of said acquisition. To this respect, Driver *et al.* (1994) state that ´interaction between individuals is crucial in allowing children to 'bounce ' ideas around, which will enable them as individuals to begin to make sense of the information or process´.

Of course, not all the talk in which children engage is productive, or automatically leads to a deeper understanding. One cannot expect to leave children alone by their own means, working in groups, and come back to find what they have learned by themselves. The type of talk that is more likely to happen in this context is *social talk*, the kind of talk that takes place in social settings. But even this type of talk is not a ´waste´. In fact, a study by Pierce and Gilles (2008), points out that students who feel confident with one another, feel more at ease when sharing ideas, and engaging in *exploratory talk.* Barnes

also acknowledges that exploratory talk is more likely to ´occur´ when learners ´feel relatively at ease, free from the danger of being aggressively contradicted or made fun of´ (2008, p.6).

However, the role of the teacher transcends that of a knowledge facilitator. Without advocating for a return to ´traditional´ pedagogies, the majority of authors (e.g. Mercer, Alexander, Dawes) agree that, in order to encourage exploratory talk and learning, teachers have to strike a delicate balance between both, and almost as importantly, re-evaluate their practice, knowing that ´their central task is to set up situations and challenges that will encourage their pupils to relate new ideas and ways of thinking´. (Barnes, 2008, p.4).

It is recognised that how teachers engage in their lessons can alter the learning experience of students to a considerable degree. A variety of studies have shown that how teachers receive and use their pupils´ written and spoken contributions is crucial in shaping how pupils will feel about learning, the subject they are being imparted, their sense of competence and agency and to a great extent what they will learn. (Black, 2007, Barnes and Sheeran, 1992, Cazden, 2001, Mercer et al., 2001). For Braund and Reiss, (2004, p. 9) it is apparent that teachers and other adults can effectively stimulate pupils´ interactions and discussions and in this way develop co-operative learning. There also appears to be an important degree of consensus when different authors point out the conditions that are necessary in order to promote learning through dialogue.

According to Alexander (2010, pp.4-5) teaching is more likely to be ´Dialogic´ if it is *collective*, which implies that participants should address learning tasks together, *reciprocal*, that points to the establishment of groups dynamics in which the participants listen to each other, share ideas and consider alternative viewpoints, *supportive, a* condition that is noted when pupils feel that they can express their ideas freely, without fear of embarrassment over ´wrong´ answers, and help each other to reach common understandings, *cumulative,* meaning that participants build on answers and other oral

contributions and chain them into coherent lines of thinking and understanding and *purposeful* that refers to the character of the classroom talk, that though open and dialogic, should also be planned and structured with specific learning goals in view.

   In the next section, we will discuss how Dialogic Teaching enhances the learning process of children in a variety of subjects, and how this can contribute to the teaching of Environment Education.

2.3.2. Dialogic Teaching and Environment Education: Gaining Environmental Knowledge through Dialogue.

In 2002, Laura Barraza and Rex Walford carried out an experiment on students' perceptions and the environment both in the UK and Mexico. They wanted to assess whether or not the different ´social surroundings´ and schooling style made a significant difference in pupils´ environmental knowledge. They examined the level of familiarity and understanding that English and Mexican school children had in relation to 10 ecological concepts. This was measured by counting how many of these concepts they could identify as ´familiar´ and to which level they really understood the meaning of these concepts.

  Pupils' perceptions and attitudes towards environmental themes, on the other hand, were measured using drawings, poems and interviews as qualitative indicators. The obtained results were highly consistent with the hypothesis: social surroundings, school, upbringing, and even nationality can help to determine not only children's knowledge on a subject, but also their main perspectives, concerns and attitudes. They also found that children's environmental knowledge varies according to the school ethos, the teacher, and their access to information through books, media such as television, computer games, and other social activities, further highlighting the importance of school at establishing this knowledge. ´School´ was the most frequent answer given

when children were asked to select the source of information from which they had heard the environmental words.

Irida Tsevreni´s study in Athens, Greece (2011) presents a more recent alternative approach to environmental education, which also focuses on children's ideas, participation and action rather than scientific knowledge. The approach of her study is based on children's willingness and ability to act and participate in their community and environment.

Her study was carried in a primary school in Athens, with the active engagement of children, aged 9 to 12, through participative and critical dialogue. According to her: *The study describes a path from denial of action to willingness for action. [The model] can be used to encourage children to become involved in their environment and community and to feel strong and confident to act´*. (p. 3)

Although Barraza and Walford ´s (2002) And Tsevereni´s (2011) studies were not explicitly carried out within a ´Dialogic Teaching´ framework, they both take into account one of this theoretical approach principal preoccupations: the effect that society as a whole has on children´s environmental knowledge and perceptions and the effect of dialogue in their environmental views, awareness and perceived power.

For several Environmental Education authors, ´true awareness´ can only be achieved through information. Johnson (2004, p.79) points out that to make up any valid decision that affect the natural environment requires knowledge and understanding. Braund, (2004, p. 44) adds to this that good progression in ecological understanding requires a steady build-up in ecological knowledge and its applications. However, he also notes that ´Environmental Education represents a much broader curriculum area than the study of ecology alone´. *(ibid.)*

In earlier sections, we have addressed the complexity of teaching environmental related subjects, as they are usually a compound of several types

of knowledge, as geography, biology, and even history, and each one provides an important perspective to its interdisciplinary dimension. Fortunately, science curriculum in the majority of countries is becoming more open towards a multi-disciplinary approach of education. A good example of cross-curricular work is reported in Creative Space (Cape UK, 2005). This project, which took place in primary and secondary schools in Leeds and Manchester between 2003 and 2004, involved collaborative work between teachers from different disciplines, artists, scientific researchers and pupils working in science projects. According to Liversidge, (2008, pp. 164-5) the project findings highlight the usefulness of interdisciplinary work and teaching strategies that cost nothing in financial terms. Among these strategies, Liversidge mentions the usefulness of drawing and three dimensional (3D) modelling as an aid to understanding; the value of allowing time to ´play´ and experimentation, and particularly:

> *´...the importance of pupil-teacher and pupil dialogue and conversation; the need to give pupils more responsibility for asking and answering questions and the motivating effect of having to explain and demonstrate ideas to other people´.* (2008, pp.164-165)

The importance in the use of dialogue in the learning process is also highlighted by Mercer and Hodgkinson, who go as far as to state that ´[classroom talk]is the most important educational tool for guiding the development of understanding and for jointly constructing knowledge´(2008, p.xi). One of the first studies in this area that provided clear evidence of improvement in the learning process as a result of teacher-pupil dialogue was carried out and reported by Brown and Palincsar in the 1980s and was called ´Reciprocal Teaching´. The intervention involved the use of specific dialogic strategies questioning, clarifying, summarizing and predicting to promote a dialogue structure between both teachers and pupils, with one of its principal objectives being to encourage longer and more sophisticated contributions on the children´s behalf. It clearly helped primary school children to make

significant improvements in reading comprehension, and in the understanding of complex concepts.

Another study, this time carried out in Mexico by Sylvia Rojas-Drummond, Neil Mercer and colleagues in 2004, began with a comparison between two groups of teachers in state schools in Mexico City: those whose pupils had been found to develop particularly well in reading comprehension and mathematical problem solving; and teachers in similar schools whose pupils had not made any such significant achievements. Video recordings of classroom interactions, were used to attempt whether or not there were significant differences in teacher strategies for teacher-group interaction. Mercer (2008, p.6) comments that the ´Vygotskian´ hypothesis was that the teachers who achieved better results in their lessons would use dialogue to provide more effective scaffolding for their pupils' learning.

In fact, the analysis of these recordings showed that the teachers whose pupils achieved the better outcomes could be distinguished by the following characteristics, signalled by Mercer (*ibid*.):

´*They used question-and-answer sequences not just to test knowledge, but also to guide the development of understanding, they taught not just 'subject content', but also procedures for solving problems and making sense of the learning experience* [where] t*hey treated learning as a social, communicative process*´.

These particular dialogue techniques have also been described by several authors, such as Cazden (2001), Mortimer & Scott (2004), Alexander (2006, 2008), and Pierce and Gilles (2008), and are also starting to be assimilated and used by science teachers, who find this approach both effective and inspiring. Wellington and Osborne (2001, p.6) argue that as well as being a hands-on experience, learning science should be a minds-on activity that ´requires pupils to practice the discourse of science using scientific vocabulary in its correct scientific sense´. They liken the learning of science to the learning of a foreign

language and say that no/one would dream of teaching a foreign language without giving students the opportunity to talk and use it. This is especially important if we take into account that Environmental Education, from a Socio-Environmental perspective cannot be perceived from a purely ´scientific´ viewpoint, and dialogue becomes the best way in which children can express and communicate their experiences, ideas and emotions about their environment and their everyday life -a very important goal, according to Barratt Hacking, Barratt, and Scott (2007).

Liversidge (2009, p. 165) also suggests the use of techniques often used in Dialogic Teaching, as Meta-talk, or ´to make talk visible´ (as explained by Pierce and Gilles, 2008, pp.43-4), and suggested by Alexander (2008):

> ´As they suggest explanations to phenomena, it is worth informing them that they are theorizing. In this way, Monk (2006) suggests, you are keeping a conversation going with pupils, helping, for instance, to strengthen the teaching of 'how science works'´ (Liversidge, 2009, p.165)

Or, to promote ´exploratory talk´ in students:

> ´Perhaps you should also use some question prompts such as 'Some people think that it is a good/not a good idea because…' 'Having looked at the arguments for and against I think…' to help pupils to structure their reasoning and decision making.´ (Liversidge, 2009, p.182)

Solomon and Black (2008) note that the use of constructive feedback between teacher and pupil and between children themselves is particularly important in experimental work, where pupils need to talk over their results to receive confirmation of their accuracy from others. Driver *et al.* (1994) also notice that interaction between individuals is crucial in allowing children to 'bounce' ideas around which will enable them as individuals to begin to make sense of the information or process.

On this, Liversidge et al, (2009, pp.78-9) make a brief comment regarding traditional teaching methods in science against a more ´dialogic´ approach:

> *´In the past 20 years we have been trying as science teachers to push abstract concept after abstract concept to all children in the hope that they will simply acquire the higher-level cognitive thinking that the curriculum demands. (...) Children and adults will not learn if they do not listen and participate´.*

There is a strong need for an alternative approach to Environmental Education which focuses on children's participation and action (Reid et al. 2008) The change of pedagogical paradigms in the classroom would not only be highly beneficial to improve the learning experience in pupils, but actually also the quality, permanence, and complexity level of what they learn. It is perceived that this would help them to establish links between said knowledge, what they already know, and the real world. This is especially important when we speak of Environmental Education, as conceived by Palmer (as early as 1992):

> *´Environmental Education must take account not only of the scientific and practical knowledge, (...) but equally of differing values and ethical implications, and a holistic understanding of natural systems and the place of human endeavour and concern within these´.* (p.186)

It has been established by a number of authors that Environmental knowledge alone could not be enough to generate a substantial change in Environmental attitude and pro-environmental behaviour. (Kollmuss and Agyeman, 2010; Kenis and Mathijs, 2011). Barraza and Walford (2002, p.171) point out to a ´considerable debate on the extent to which the acquisition of knowledge and understanding of environmental issues necessarily leads to more positive attitudes towards the natural environment´. One if the main problems perceived by Environmental Education authors is the lack of ´real´ involvement of citizens in environmental campaigns. Moyer (1975) has pointed out that 'cognitive understanding does not automatically lead to strong attitudes, about

an issue'. It has also been found that communities, even after being ´given´ new environmental knowledge, often feel disempowered upon taking action to operate a ´real´ change. A variety of studies point out how children engaged in Dialogic Teaching actually feel more ´empowered´ to express their ideas and in acting upon them after their involvement in studies that use this educational approach.

Children often have an intricate knowledge of their local community and consider the quality of their local environment to be of great importance 'It is apparent that the children involved in environmental projects often experience high levels of frustration about the state of the local environment and they feel powerless to effect any change in it.' (Barratt & Barratt Hacking, 2003, p. 31) Barraza and Walford (2002, p. 175), also point out that in their study it became apparent that children from both countries (UK and Mexico) had high level of concern about the world and the environmental situation. They also revealed a great sense of concern in the way they perceived world problems. Children are clearly worried about their future; over half of them have a pessimistic perspective. Participant students in Laura Barraza´s 2002 study believed that in 50 years' time the world will be much worse, and children in Irida Tseverni´s study in 2011 do not possess a more optimist outlook.

However, children's knowledge of their local community and ideas to improve their environment do not feature strongly in the school curriculum in Mexico or the UK. However, children feel strongly that their schools should support them or provide alternatives for achieving their goals.

Barratt Hacking et al (2007) have found that children have difficulty taking action to achieve what they want for their local environment because they do not know how to go about it. After their participatory research project, which took place in an urban community on the edge of a large conurbation in southwest England between 2004 and 2005, they report that when backed by their school, families and community, children felt more able to take an active

part in decisions relating to improvements in their local environment, and they gained a sense of pride in their local community.

This also led to significant gains in terms of personal development, growing in confidence and increasing their self-esteem. Part of this, as discussed by the research team, was attributable to the responsibility and trust they had been given to make decisions and implement them. In her book on effective environmental education Joy Palmer (1998, 143-149) describes how children need to acquire knowledge and understanding about the environment but then need to be given opportunities to use this information to critically evaluate issues. According to her, ´If children felt empowered, the knowledge gained, would lead to the promotion of positive values and attitudes towards the environment´. *(ibid)*

Classroom talk can generate –or weaken- a sense of empowerment in children. More than thirty years ago, in the book ´From communication to curriculum´ (1976) Douglas Barnes elaborated a concise report of the kinds of classroom talk he observed in a Leeds secondary school. He noted most of the talk that took place in the classroom was often too rigid and formalised, a situation that detracted from a freer and more open manner of speech. In ´Interpretation and Transmission´ (Barnes and Schemilt, 1974) he further found that the way teachers interact with their pupils is closely related to their preconceptions about the nature of the knowledge that they teach. If they see their role as simply the transmission of authoritative knowledge they are less likely to give students the opportunity to explore new ideas, much less to ´participate´ on their own learning, by talking or in any other way.

According to Alexander, (2008, p. 34) the role of dialogue in enabling student voice to be accessed and legitimated should be addressed. Being attentive to what students say about their learning experience should be of outmost importance for the dialogic teacher. He argues that the emphasis should not be only placed on what students say about the subject-matter on hand – in this case environmental issues- because doing *just that* would not take

us ´much beyond the conventional focus of classroom interaction´. For him, and seemingly for the majority of socio-cultural –and dialogic- theorists, there is also a great importance on *how* they view the process of engaging with the subject matter. This stronger sense of ´voice´ then, is about empowerment.

However, classroom-talk is very rarely structured in order to achieve these outcomes. In fact, studies by Mercer and Dawes (2008) suggest very little has changed in the communication patterns between teachers and pupils since Barnes´ studies, and more usually, the exact opposite happens: most of the students' experiences regarding dialogue are fairly discouraging. Mercer and Dawes (*ibid.*) note that in average classrooms, teacher-pupil talk tends to be asymmetrical, which means that the teacher usually leads and controls most of the interactions in the class. They argue that:

> *´We know from observational research that in many classrooms most of the talk is not only asymmetrical, [but] it has a particular structure: teachers ask closed questions children provide brief answers on which the teacher then makes evaluative comments. (…) This represents an unsatisfactory, limited use of the powerful educational tool of language´.* (2008, p.57)

Their analysis also points to what they call ´Implicit ground rules of classroom interaction´, or conventions that control most of the classroom talk in the average classroom, and that mostly refer to pupils´ expected behaviour regarding participations. (Edwards and Mercer, 1987)

- *Only a teacher may nominate who should speak*
- *Only a teacher may ask a question without asking permission*
- *Only a teacher can evaluate a comment made by a participant*
- *Pupils should try to provide an answer to teachers´ questions which are as relevant and brief as possible.*
- *Pupils´ should not speak freely when a teacher asks a question, but should raise their hand and wait to be nominated.*

The consequences a student can face if he breaks a ´rule´ are diverse, and often discouraging: *e.g.* ´Pupils who call out an answer without being asked are breaking a rule, and their contribution may thus be treated as ´invisible´ until they have been formally asked to speak´. (Mercer and Dawes, 2008, p.58)

These patterns often become deeply established in pupils´ minds. Alexander (2008, p.19) notes that the language experienced by two children of different socio-economic level is not only different in type and variety, but qualitatively different, too. For the middle-class child in the same study, encouragement vastly outweighs discouragement, but for the child on welfare the ratio is reversed and the climate of adult reaction is an overwhelmingly discouraging one. The talk that children experience in school, can then be the only type of access they have to a more equal and positive contact with the world outside their homes. Wells and Ball (2008) note that for some children, school may provide their only real opportunity for learning how to engage in focused, reasoned discussion and to develop important language and thinking skills.

For Barnes, school learning is at once social and individual. Our culture offers young learners powerful ways of understanding and influencing the world, and schools provide for pupils the opportunity of partially sharing the teachers´ perspective of it, for successful lessons build up cumulatively a set of meanings that it is the task of each pupil to make his or her own. Barnes, (2008, p. 10).

School should not only ´educate´ according to the curriculum, but also for encourage students´ to adopt a conscious, reflective, and critical attitude. According to Barnes, teachers play a fundamental role in this.

> *´ Teachers should encourage pupils to find alternative ways of looking at topics, and should help them to grasp what evidence may be used to support one or another viewpoint. The purpose is to prepare for life outside school by giving pupils the opportunity to make informed*

choices, and to prepare them as future adults to become full participants in their own lives´. (Barnes, 2008, pp.15-6)

Freire also recognises the role that formal education plays in the wider cultural setting, and highlights that the relations between the educational system and the total society are dialectic in nature and not mechanical.

´Recognizing the limits of formal education as a subsystem within a larger system, [the teacher] also recognises its fundamental role in the formation of a new mentality, coherent with the objectives of the new society to be created´ (1978, p. 20)

The teacher plays an all-important role in the process of the creation of active participation and sense of empowerment of his students, but how can they help to foster this sense of participation and cultivate a critical attitude in their classroom? Pierce and Gilles (2008) found that exploratory talk can be an effective method of enabling students towards achieving critical conversational skills, and to lead them into situation in which students engage in social and ethical issues that might affect their future actions, and mention several ways in which teachers can set up ´a talk culture´ in their classrooms.

Critical talk can be used to invite a critique of students´ own views and of contemporary society, and it is often only developed in a supportive, confident environment. Mercer and Dawes (2008) argue that teachers and teacher trainers need a clearer understanding of how talk functions in the classroom, in order to provide the best basis to improve the quality of classroom talk and the educational process in general. They also provide some practical strategies that teachers can use to improve the quality of talk in their classroom, one of this is to change the ´implicit rules of classroom talk´, to a new set of *explicit* rules, designed to lead to a more symmetrical and dialogic system:

- *Partners engage critically but constructively with each other´s ideas.*
- *Everyone should participate.*

- *Tentative ideas are treated with respect.*
- *Ideas offered for joint consideration may be challenged.*
- *Challenges are justified and alternative ideas or understanding is offered.*
- *Opinions are sought and considered before decisions are jointly made.*
- *Knowledge is made publicly accountable. (And so, the reasoning process is visible in the talk.)*

(Dawes and Mercer, 2008, p.66)

Wells and Ball (2008) have found that in ´dialogic classrooms´, there is a balance between teacher-led discussion and talk in which students exercise more control, with the dialogue as a whole being linked through joint processes of investigation and problem solving.

This often involves the generation of a more dialogic form of teaching and learning than is usually found in schools. Robin Alexander (2008) has argued that dialogic teaching can reinforce the power of talk to engage children, stimulate and extend their thinking, and advance their understanding. He argues that the quality of dialogue and discourse is central to learning in citizenship education, and that dialogue and discourse are connected with learning about shared values, human rights, and issues of justice and equality. Wells and Ball (2008) also point that transformative, dialogical, and participatory pedagogies complement and sustain achievement rather than divert attention from it.

Giving children this sense of autonomy and control over their own learning can have substantial repercussions on their participation and sense of community. In the study by Barratt Hacking et al. (2007) when children felt supported by their school, families and community to take an active part in decisions relating to improvements in their local environment, they not only gained a sense of pride in their local community, but made significant gains in terms of personal

development, growing in confidence and increasing their self-esteem. Even more, participant teachers and researchers noted that the project made a strong impact on the children's capacity to learn in school, as well as gaining insight into the nature of democratic processes.

The Qualifications and Curriculum Development Agency states that is expected that the children gain ´Knowledge and understanding of the world, with opportunities for all the children to solve problems, make decisions, experiment, predict, plan and question in a variety of contexts, as well as to explore and find out about their environment and people and places that are significant to their lives´. (QCDA, 2000 p.9), this certainly transcends the environmental of school´, and is nearer to Freire´s ideal concept of *education.* ´An education that envisages making concrete such values as solidarity, social responsibility, creativity, discipline in the service of the common good, vigilance and a critical spirit´. (1978, p.43) For Alexander (2008) in this way, dialogic teaching seems to find a place in the 21st century nexus of citizenship, and lifelong learning, for him, each of these refer to the empowerment of the individual: as a thinker, as learner and as a citizen.´

So far we have discussed the perceived advantages of promoting constructive classroom dialogue within a socio-constructivist approach in teaching environmental education, and established the positive outcomes pointed by research in the area, both from an academic and a community-based perspective.

However, we cannot end this analysis without addressing a number of ethical and practical considerations. Moral development, especially when there is an important change in the context, such as the cultural background of a country, is difficult to study. According to Margolyn, (1974 p.264), values in society are not universal. An American psychologist may thus view his subjects differently from one in France, Russia or Germany. We must also take into account that the researcher is always held to his own cultural background. Alexander (2008, p.21) warns that what is valid in this way in one country, may not apply to the

next. Freire also points out this, as he addresses the difficulties of ´translating´ an educational plan from one country to another (in his case, from Brazil, to Chile, and to Guinea Bissau):

> ´ If it was anything that we discovered in Brazil that we were able to repeat exactly in Chile, it was not to separate the act of teaching from the act of learning. We also learned not to attempt to impose on the Chilean context what we had done in different circumstances in Brazil. Experiments cannot be transplanted, they must be reinvented.´ (1978, p.9)

Fortunately, Dialogic Teaching –or more generally, socio-constructivist dialogue-based education- has been the subject of research in a variety of countries and cultural contexts in the last 30 years, if we take Douglas Barnes research as its starting point. Alexander (2001, 2008) has participated in international research that focus on the different classroom dialogue dynamics of five different countries, that shows how different the status, character, context and uses of talk are in many British (and American) classrooms in comparison to those of India, Russian, France and Germany.

Cazden (2008) discusses a study based on a particular approach to teaching science and literacy in the USA called ´Fostering a Community of Learners´, and Wells and Ball (2008), based on their analysis of primary schools in the USA explain how an inquiry approach to teaching and learning can help generate more productive dialogue and exploratory talk in the classroom. Similarly, in Africa and based in on an observational study in Kenya, Hardman (2008) argues that international research shows that it is important that teachers use classroom dialogue to encourage students´ active participation and to provide them with constructive feedback.

Rojas-Drummond and Mercer (2004) directed a ´Thinking Together´ research in both in the UK and Mexico, founded by the British Council grant for academic exchange and inspired by a socio-cultural perspective. In another

study that involved a collaboration between Mexico and the UK, this time on students´ perspectives on the environment, Barraza and Walford (2002) found that it is true that the national context shaped some of the concerns that children had on the environment, children of both countries shared environmental concerns, and were positively encouraged at the perspective of gaining environmental knowledge.

Regarding cultural differences, we must also address that for several authors, the promotion of better dialogic dynamics has a very positive effect on pupils, as it considerably shortens the gap between the vocabulary of children in the same class, but from different socio-economic background, reinforces social bonds within the class and to encourage the participation of children previously reported as ´less able´. Children that engage in positive and constructive forms of dialogue begin to develop habits as listening carefully and responsibly to others, framing and asking questions, presenting and evaluating ideas, arguing and justifying points of view all of which are among the core skills of citizenship (Alexander, 2008 p.33). Fostering these habits could not only help to reduce cultural misunderstandings, but more importantly, develop in children a sense of *respect* for cultural differences.

2.4. Narratives and Dialogue-based Teaching.

Although dialogic teaching strongly focuses on the vocabulary and quality of talk in oral interchanges, several authors point out that the emphasis on dialogue has also a positive impact on children´s individual reasoning capabilities and use of language (Mercer, 2007, p.111). In fact, a positive feedback between spoken and written language can often be observed in the quality of the texts produced by students that participate in a dialogic teaching program. According to Alexander (2003, 2008) when engaged in dialogic teaching methods:

> ´The reading and writing of all children, especially the less able, was benefiting from the greater emphasis on talk (...) frequently, this gain was most strikingly noted in the context of lessons in which the proportions of time spent on oral and written task was modified somewhat in favour of the former.´ (2008, p. 46)

Children taught using a dialogic approach not only change their vocabulary and way of speaking, but also improve their writing ability, especially when compared with students that are mainly taught by using literacy-based methods. This is also observed by authors that, even if not identified as ´socio constructivists´, also try to place an emphasis on whole class discussion and construction of ideas. For example, Haynes (2002) observes that:

> ´Through collective discussion, children learn to understand and to respond to others, (...) they learn to reflect critically. The structure of enquiry supports the structure of logical argument, which in turn supports discursive writing.´ (p.128)

The same can be applied to the group developed narratives, in which we can find more than one point of view and perception about a given theme, and the construction of meaning then becomes a collective task. In the dialogue interchanges that often appear in the developmental stages of these stories we can often find the reciprocal, supportive and cumulative talk so valued within

70

dialogic teaching. Green et al (2008, p.115) point out that ´social constructs found in students texts are a valuable way of mapping emergent ways of their thinking and negotiation of meaning´. The use of narratives as a context to explore children dialogic interactions within a group, and at the same time 'mapping´ their progress in several different aspects (as adoption of a different point of view, capacity of developing critical talk, etc.) has been used by Pierce and Giles (2008) and Green *et. al.* (2008).

Pierce and Giles, after a study that sought to lead students towards critical conversations in 2008, found that *exploratory talk* (as understood and established by Barnes, 1976, 1992) within a group ´could be a powerful way of enabling elementary school children to explore works of literature, and that this approach could be extended in order to develop ´critical conversations´ in which their students could freely and constructively discuss the social and ethical issues raised in these narratives´. (2008, p.40)

Judith Green and her collaborators helped create the research community called the Santa Barbara Group in 1990, and their investigation continued for almost 20 years (1990-2009). In this community, teachers, students, and university-based ethnographers worked collaboratively to examine the interactions that happened within a classroom and how the language and practices in the classroom were consequential for student learning of academic processes. Like Barnes (1976) and his colleagues (Barnes and Todd, 1977, 1995), their approach:

> ´is grounded in anthropological and discourse perspectives that seek to make visible what is happening in classrooms, how classroom life is socially constructed in and through the discourse-in use, and how individuals as well as the collective construct opportunities for learning, and social and academic identities´. (2008, pp 116-117 see also: Bloome et al., 2005).

This way they aim to identify how common knowledge (as established by Edwards and Mercer, 1987; and Mercer and Dawes, 2008) is constructed within a group, and how common tasks are addressed in very different ways by small groups or individuals, thus creating unique, varied and valuable opportunities for learning.

They found that the process by which the students discuss and form narratives, allows for the creation of a broad language context that can be then explored to clarify how - through the interactions between the teacher with students and students with other members of their group the class constructs patterned ways of ´knowing, being and doing´. In this way, it can be investigated about what counts as *common knowledge* in a particular classrooms and ´what type knowledge is valued, and valuated, and how this knowledge is constructed in and through the roles and relationships, norms and expectations, and rights and obligations constructed by themselves´(p.117).

Through the construction and evaluation of group narratives, the participant students in the Santa Barbara project gained a deep awareness of the situated nature of the language of their classroom, and how this language is a direct result of the learning situations constructed by members of the class. They also come to recognize how this language differs from the language they bring from other contexts and how their own learning experience could never be exactly replicated in another context or kind of circumstances.

According to Green and her collaborators (2008), the main contribution of this approach to narratives is the clarity by which it highlights how the teacher´s use of dialogue, choosing of narratives, creation of an appropriate environment and writing created opportunities for the whole group (ages 10-11) to learn the meaning of *taking a point of view* and other important (and often hard to pin down) dialogic concepts. They also highlight the importance of narratives written by children in the process of ´searching for evidence of insider knowledge of their learning process.´ (p.119)

The ability to establish a point of view different from one´s own is a difficult task, especially when working with children. However, once the teacher has achieved that students can perceive reality from a different perspective, the learning of a subsequent series of concepts (that are often linked not only to dialogic teaching, but to environmental education, such as respect -both to customs and different forms of life) and appreciation for local, foreign and global cultures and environments becomes easier to grasp.

This point is further explained in an analysis that the researchers make of an essay written by Jared, a text written in narrative style, in which the student makes clear that he is able to position himself from different points of view, thus gaining a greater perspective of an historic situation.

North Carolina Essays, Colony Project

March 1994

I am a Native American from the Cherokee living in the Southeast. When the English came, we knew they had more power than us, so we thought that maybe if we did things like them, they would let us stay. We developed out own republic. We had writing and put own newspaper. It really was our land before they came. After a long time, they wanted us to pay taxes to them, but we didn´t. Then in 1830s, the Americans came and walked my descendants from North Carolina to the plains. A lot of us died during the walk. We started out as one colony and in 1691, we divided into two colonies.

I am an Englishman who went to North Carolina. When we got there, there were Indians on our land. We ignored them for a while. Then we decided to have them as slaves and pay taxes. They didn´t want to do either. Years later, the Americans made them walk down North Carolina and Georgia to the plains. People died but they didn´t mean for anyone to die.

We settled in the Carolinas in 1652. Our King, King Charles II, later sent an army to take it over. North Carolina was founded so England could have

three expensive things: wine, silk, and olive oil. We grew rice and indigo in the Carolinas to trade and sell. When the Indians wouldn´t do the work, we brought in slaves from Africa.

Jared

(As cited in Green et al, 2008, p.127)

The authors argue that through the dialogue established between Jared and her teacher, the latter enabled Jared to make links between the current tasks and the work previously done in the class related to *point of view*, and also to explore the possibilities of using past events to construct a new meaning. Therefore, in this essay Jared also demonstrates how he used the historical web of ideas to decide how to construct his narrative, as well as what to include. It is also relevant that he presented the history of North Carolina by not using the traditional ´nation building arguments´ but rather in a way that described different historical realities and their interactions. He presented the history of the Cherokee community in relationship to colonial America and colonial North Carolina in relationship to England first settlers. In this essay he changes at least two times to a point of view much different from his own reality, and is also able to depict a variety of historical timelines. This brief analysis also provides evidence of Barnes´s argument that:

When learners ´construct´ meanings, they are manipulating what is already available to them from various sources, exploring its possibilities, and seeing what can and cannot be done with it (2008, p. 9) Green and her collaborators further note that as shown by this essay, Jared used a narrative structure that breaks with the traditional essay, and shows a much deeper, complex knowledge in that way. Also:

In creating an essay that shifts points of view in this way, he demonstrates writing processes and practices available to him in this class, and how he adapted them, manipulating them in a creative way, to accomplish his goal of

presenting different points of view in the history of what is officially called, in American History text books ´The North Carolina Colony´. (2008, p. 127)

By being able to establish a point of view different from their own, students gain a more complete understanding of the dialogical process, access to different perspectives and realities, and become more easily aware of diverse cultures, ways of thinking, and -very relevant to this work- of their environment and different forms of life.

2.4.1. Narratives and Environment Education

In his book 'Beyond Ecophobia' (1996) David Sobel argues that there is evidence that the use of ´fear appeals´ or the use of a message designed to created certain degree of anxiety, thus changing the behaviour of the individual (Stern, 2000, in McKnight, 2010, p.10) may backfire with elementary-age children, generating fear instead of interest, thus creating barriers to development of environmental empathy. Sobel further discusses several examples of situations in which educational exposure to environmental problems resulted in children feeling ´hopeless and disempowered´. He also argues that it is only a natural reaction for children to avoid continuing exposure to the painful emotions they experience when told about environmental problems that are at the same time remote, and not always fully understandable for them, such as the extinction of certain species of animals and plants or the pollution of rivers and seas, and yet completely beyond their control. So, it could be argued, to employ this strategy with elementary school children could be counter-effective, as instead of allowing for their normal initial interest to develop, it is very likely that they will avoid the environmental topic altogether in the future.

Alternative ways of avoiding this and engaging children in ecology and environmental science have been suggested by a variety of authors. (Sobel, 1996; Palmer, 2000; McKnight, 2010). One of the general agreements is that

the typical initial interest that children generally have about environment and their community should be used as a foundation for environmental education directed towards them.

McKnight (2010, p. 11) states that elementary-age children who gain an appreciation and sense of wonder for their natural environments (e.g. the stream or park near their home or school) can build upon those experiences as they mature to appreciate and understand other diverse ecosystems. Neal and Palmer (1994) argue that learning about the plants, insects, birds, and mammals present in their local environment often develop a concern for the natural world in other locations as well, as children progress from concrete to abstract reasoning, thus being able to extend their environmental awareness from a strictly local to a global setting. This approach allows for a normal development of *environmental empathy* and can be carried out, and further directed by the teacher, exploration and discovery settings are provided.

Experiences that provide a personal, solid and working understanding of ecological knowledge are recognized as central to the first phase of environmental education (Hungerford 2006; Farmer et al. 2007). However, as Duhn (2012) notes, childhood is often culturally understood as a time of innocence which can mean that issues such as ecological sustainability are considered too problematic or politically ´charged´ for early childhood practice. There exists a tendency to ´protect´ children from these subjects; to ´shield´ them from the ´Ecophobia´ described by Sobel, and Environmental Education programs usually shy away from critical engagement with the child/nature intersection and its implications for education for sustainability (Pramling Samuelsson and Kaga 2008). On this, Tsevereni (2011) argues that this type of ´sheltered´ approach prevents children from developing their critical thought, their action competence (Jensen 2004; Jensen and Schnack 2006) and their willingness to participate. Particularly: "*children are unable to express their perceptions, experiences and emotions, and they cannot develop a strong relationship with their environment and community.*" (p.3)

It is perceived that when talking about environmental surroundings, as McKnight (2010, p. 11) argues, there also exists the risk of being too abstract, for example, by focusing on complex climate-change issues that may not be meaningful or even understandable to elementary- age children. This highlights the necessity of establishing a *real* connection with the environment. Stables (2007) argues:

> *"...The more connections drawn between daily living and scientific theory—not as abstracted connections, but through lived experience—the better the consequences for enrichment of each. In many instances relating to education for sustainable development, the potential benefits are clearly social as well as personal."* (p. 63)

Rising sea levels and loss of the Arctic ice cover may be too conceptually abstract for a child who has never seen the ocean. Neal and Palmer (1994) and Tseverni (2011) discuss how the use of narratives is helpful in this case, as they tend to involve children in a way that a simple and often abstract explanation could never do. At the same time, they possess the advantage of illustrating in a more vivid manner said abstract concepts, making them more attractive, and even approachable. Environmental narratives and narratives in which the local environment features are highlighted in a prominent way have also been noted by these authors as an original way to help foster environmental empathy, especially during the elementary school years.

 According to Palmer (2004) and Tsevreni (2011), when children write environmental narratives, the local community often becomes the default location of these stories. This initial interest and involvement in the local environment is a desirable one, but with time, it is expected to generate an interest in environments, places, forms of life and cultural contexts different from those already known by the child. According to Sanger (1998) the learning process should have strong foundations within the local environment and context known by the students, but should aim to eventually *develop* to construct a wider environmental scope.

According to McKnight (2010, p.11), one original approach to address this challenge is to combine a traditional medium, such as a picture book, with a narrative that fosters environmental empathy and scientific understanding in young children. She gives several examples of the use of narratives in environmental education, among them the "Schoolyard Book" series:

> ´In the context of avoiding ecophobia, the Schoolyard Book series focuses on the interpretive narrative and does not raise an alarm about an environmental disaster or advocate any particular point of view or environmental action. Authors strive to make the books engaging, pleasurable, and accessible by creating a storyline that connects the reader to a character, animal, or situation.´ (p.13)

The storyline in these books has a beginning and an end, and is based on real environmental relationships or an actual incident or situation; according to Snow (2010, p. 451) this provides a framework for the presentation of concepts and for acquisition of an academic language to learn about environmental science.

According to McKnight, the particular use of Environmental Narrative increases the potential for going beyond planned or intentional Environmental Education activities. According to her, although books with narrative may be effective in encouraging children to appreciate a nearby (local) natural environment, they may also provide a gateway to appreciating remote environments. Stimulating imagination through narratives may encourage children to learn about animals and habitats that they may not have the opportunity to see or visit. (McKnight, 2010, p. 12)

The use of narratives has also been found to improve the assimilation of very complex concepts, and to facilitate the identification of children with the environment, since it ´gives´ environment as a whole set of qualities that are not perceived by children in a regular basis, as research has shown that pupils struggle to understand many ecological concepts.

2.4.2. Environmental Narratives; Understanding Anthropomorphism, Point of View and Agency.

A 1998 study by Gabriella Paprotna found that children as young as 5 years frequently understand and define more easily the most complicated ecological concepts by story-telling. It makes sense then to use the child's natural way of thinking to convey, understand and express the more complex ideas about the environment.

One of the most complex aspects of Environmental Studies is Environmental Ethics, which is defined as the moral relationship between humans and the natural environment. It is an area of environmental philosophy that faces a lot of conflict due to the various subdivisions in terms of ethical perceptions. The idea of a human-centred nature, or anthropocentrism, implies that humans are the sole bearers of intrinsic value and all other living things exist to sustain humanity's existence (MacKinnon 2007, p. 331).

Even when it is difficult to find children that use purely anthropocentric views, (Palmer, 2004) young pupils often use anthropomorphic reasoning. According to Tunnicliffe (2004, p.56) *Anthropomorphism* is the term used to describe the interpretation of the structure and behaviour of other animals in human terms, and both children (and adults) frequently use anthropomorphic explanations. It is usual that they explain the behaviour of certain species using this kind of logic, for example, the they might say that a caddis fly larva lives under a stone because 'it likes to live there'. Anthropomorphism, in this aspect, is related egocentric thinking. Shauna Adams (2004) defines *Egocentrism* as the inability, by part of the child, to simultaneously take into account his or her own view of things and the perspective of someone else. Egocentrism leads children to project their own thoughts and wishes onto others.

On anthropomorphism, Tunnicliffe (2004) adds that another common misconception concerns interrelationships between organisms. Pupils may say, for example, that there are greater numbers of small organisms such as insects'

larvae than there are fish so that fish have enough food to eat. Several authors (Such as Leach et al, 1996) call this 'teleological reasoning', which is based on the argument of the existence of a creator based on perceived evidence of order, purpose, design, or direction — or some combination of these — in nature. Teleology is the supposition that there is purpose or directive principle in the works and processes of nature. Returning to the previous example, when children explain in this way the population proportions between larvae and fish, they are pointing to a utilitarian reasoning: humans, to the knowledge of the majority of children, raise cattle for the very same reasons. Thus, teleological reasoning is an extension of anthropomorphic reasoning.

Anthropomorphism in the classroom can be both a positive and a negative indicator. First, it points to an only partial understanding of the animals or plants, hopefully only in the initial stages of the construction of knowledge by the students.

In a more positive aspect, it also points out the identification of the child´s perspective with that of the animal, and to environmental empathy. One desirable outcome is that the student reaches a full comprehension of the life form, and an effective way of facilitating this is by incorporating of comments and narratives elaborated by children themselves. This inclusion can also serve the purpose of demonstrating to scientists and educators what detailed aspects in the construction of environmental knowledge need reinforcement; as well as which ones have been already appropriately understood by the students.

Neal and Palmer (1994) give a good example of such narratives.

> *I am a minnow. I have an enemy he is the pike. He gets the minnows and I hide under a rock. He cannot get me. He cannot get in the gap. When it is safe I come out and sometimes people do net dipping and one caught me and I pretended that I was dead. They put me in the River Perry. I swam the opposite way and they went. The pike was caught he could find nowhere to hide. I lived for another adventure.*

Nathan. (As included in Neal and Palmer, 1990, p. 177

This narrative features anthropomorphic reasoning (e.g., calling the Pike an enemy, instead of a predator, the first having a more "human-like" emotional charge). Nathan also displays certain knowledge of the habitat, and other aspects of the natural life.

It could be argued that, much like narratives have been found to foster the ability to perceive reality from a point of view different from one´s own, (see: Green et al, 2008; discussed previously), the use of environmental narratives can help to detect and diminish anthropomorphic reasoning in students, and allows for a more complete perspective of the ideas, conceptions (and misconceptions) that they may have had about environment in general, and to place these in a wider context the context of the stories that they create.

An example of this can be illustrated by the studies of Sue Dale Tunnicliffe, who through analysis of dialogue and narratives of her students finds their baseline knowledge and interest in a specific environmental topic or area. She notes that teachers can use this information to develop and construct meaningful work, including science observations and enquiry. (2004, p.95)

Another example of the use of narratives in teaching Environmental Education is given by the ´Story Sacks´ project (English and Machin, 2005, pp. 9-13) This project provided many of the opportunities for an alternative approach towards children environmental learning: the sharing of history, the interaction the students had through the use of the puppets and a story mat and the reflecting and decision making that is required as they play related board games. The researchers found that after using the Story Sacks, which possess an important narrative element in their program, 75% percent of the children improved their baseline knowledge and general attitudes towards environment.

According to some environmental authors (Sobel, 1996; Kollmus and Agyeman, 2002; Tsevreni 2011) another way of avoiding *Ecophobia,* is to foster a sense of *Agency* in children, a complex, composite concept that often is

hard to explain, but is more easily represented or perceived with the help of narratives.

The conception of *Agency* used in this work was constructed using a variety of ideas from different literature, all relevant to this work. First, it is grounded in the *Agency of knowledge* as described by Barnes (2008) in which he perceives the sense of agency as central in the learning and meaning-making process by part of the student. Second, it also contains an empowerment component, as discussed by Freire, (1978, 1992) who argued that a sense of empowerment will lead the learner towards the creation of his own knowledge.

This sense of empowerment is described as opposite to the *Ecophobia* described by Sobel (1996) and in turn complementary to the Locus of Control used by Kollmuss and Agyeman (2002) to represent an individual's perception of whether he or she has the ability to bring about change through his or her own behaviour. They add that people with a strong internal locus of control believe that their actions can bring about change, and they use this indicator to predict environmental engagement by part of the citizen.

In this way, within the ´Agency of Knowledge´ concept we find not only the perception that the student has of its own involvement and perceived power in this own learning process, but his perception of power in transforming his reality, both immediate (represented by his learning process) and his environmental reality, local and global.

The use of alternative (and narrative) approaches to children environmental education has been also promoted by Neal and Palmer (1994), and the use of narrative techniques could be part of what Palmer (1998 p.143) calls a "coherent and progressive program of work". Adding to this point, English and Machin conclude that:

> *´The environmental Story Sacks, with their interactive and narrative approach towards environmental learning, could, at the very least, be an important tool in the development of an environmental curriculum*

for young children and also have an impact on parental attitudes towards waste management ´. (2005, p.13)

They also point out that this project could also be easily adapted to be used through the primary stage as children learn through their citizenship and geography curricula the importance of environmental issues. They conclude that, as part of a well-planned curriculum program, these narrative approaches could play an important part in taking young children´s environmental understanding "beyond simply tidying up and leaving the refuse collectors to take care of the waste" (ibid.).

2.4.3. Environmental Narratives and the construction of meaning.

Analysing children´s stories permits us to explore not only complex language development and its use in school-aged children, but also the relationship of language development to other cognitive and affective abilities. As Reilly et al (2004, p. 230) point out, ´given their frequency and ´everyday´ nature, narratives provide an excellent quasi-naturalistic measure of children´s spontaneous language´, and reflect distinctive structural and linguistic changes through childhood and adolescence.

Researchers agree that children are generally proficient with the majority of the structures of their language by age 5 (e.g., Brown, 1973; Slobin, 1985). However, they continue to develop their understanding of how and when to use these structures fluently and flexibly until well into adolescence. Thus, narratives provide a rich context for evaluating multiple aspects of linguistic development in school-aged children. Indeed, numerous studies (e.g., Bamberg, 1987; Bamberg & Reilly, 1996; Berman & Slobin, 1994; Peterson & McCabe, 1983; Reilly, 1992), have used narratives as an alternative teaching and learning method, and to both gain a different approach to the learning process, and obtain a clearer focus of the language or concepts as they are handled by children.

In the case of the narrative analysis of children stories it permits, in a way that only very few other methods allow, for us to outline the development of the child, and how the student receives and appropriates the scheme, language and knowledge received in class. Also, it allows an enhanced access to the child's perspective on certain issues, in particular rich ways, even more complex than other quantitative assessment.

The requisite skills to produce a good narrative involve complex, linguistic, cognitive, and affective/ social abilities. Linguistically, children must encode information about the characters and events of the story using the appropriate linguistic devices to articulate the sequence of events and their temporal relations. Cognitively, children must infer the motivation in the character´s performed actions, the logical relations between events and story plot. Finally, telling a story is a social activity, and an additional type of evaluation concerns the relationship between narrator and the audience.

According to McCabe (1996), the process of narration, or the ability to make stories forms the basis of our social, literacy, cognitive, and discourse functioning. Oral (and later, written) narrative skills play a major role in children´s academic achievement and communicative functioning. Several authors argue that narration is a precursor of literacy development and that later literacy achievement can be predicted by the ability to tell a coherent story. (Bishop & Edmunson, 1987; Dickinson & McCabe, 1991; Feagans, 1982)

Solomon (2004, p. 256) argues that the ´interpretive framework used in narrative analysis fundamentally affords a different view on perspective-taking, that allows for a deeper understanding of other individual´s point of view´ According to Krauss, (2005, p.763) the most fundamental aspect of a human social setting is that of meanings. These are the linguistic categories that make up an individual's view of reality and by which actions are defined. Meanings are also referred to by social analysts as culture, norms, understandings, social reality, and definitions of the situation, typifications, ideology, beliefs, worldview, perspective or stereotypes. Analytical categories such as these share

a common focus with humanly constructed ideas that are consciously singled out as important aspects of reality. ´Meanings are trans-behavioural in the sense that they do more than describe behaviour – they define, justify, and otherwise serve to interpret it as well´ (Krauss, 2005, p.763).

Meaning and meaning making have many implications for learning. One key implication emerges through the notion of perspective transformation (Mezirow, 1981, 1991, 1994), in which "learning is defined as the social process of constructing and appropriating a new or revised interpretation of the meaning of one's experience as a guide to action" (Mezirow, 1994, pp. 222-223). What gives this significance is that learning is suggested as a mechanism for finding or, as some propose, meaning making in life (Merriam & Heuer, 1996). Learning can inform or challenge existing conceptions of meaning and, in the process, provide an opportunity for acquiring new meaning or confirming currently held views.

A narrative, in this sense, can be considered a map of the individual's meaning making at the time when they write the story, as narrative tasks require the assignation of meaning to each one of the components in the narrative, while characters, situations, environmental components and even use of time are constructed from the individual's perspective, thus deeply rooted in its subjectivity, or own phenomenological world, the analyst can pursue the whole meaning making process through the study of these narratives.

The construction of narratives, at the same time, requires the use of various language skills that include but are not limited to organization, sequencing, establishing the main idea, and perspective taking (Hutson-Nechkash, 2001, p.1). A narrative also showcases the personal use of language in a given moment in the life of the individual. The creation of ´characters´ and their development in the story, and the dialogue patterns between them is also an interesting example of the patterns of dialogue recorded in the student's conceptual frame.

Usually, when constructing narratives in the school context, children recreate familiar situations or create stories or characters somehow related to their own reality and perspective. As Reilly et al (2004, p. 230) point out, narratives include both information about the characters and events of the story, i.e., the plot or physical references, as well as comments that relate the narrator´s perspective on their significance to the story, the evaluative aspect of narratives. In fact, Bliss et al (2001, p. 134) claim that children usually use frequent references to family members in their narratives, and that this may be used as a means of orienting a listener into their time, space or cultural context. Küntay & Ervin-Tripp (2000, p. 6) argue that storytelling is always culturally structured, and Reilly et al (2004) observe that narratives continue to serve as a means to convey culturally significant information. This could be in part due to their pervasiveness, in which narratives, as a discourse form, are accessible to even the youngest in society: children have some notion of ''what a story is'' by age 3 (Appleby, 1978).

Irida Tsevreni study in Athens (2011) constitutes a relevant example of the use of narratives written by children in the fostering of a critical view of local environmental issues. According to McNaugthon (2004) storytelling is a method that helps in the exploration of issues, in the development of communication and decision- making skills and in increasing children's sensitivity to others. Tsevreni concludes that almost all of the children that participated in this study reported a gained sense of confidence, an increased ability to see local environmental problems from a different perspective and a new scope on their own role in the environmental decisions within their community. According to her:

"The knowledge that children obtained is very different to that conveyed through traditional environmental education in Greek schools, which is based on scientific knowledge. Their knowledge for action was created through a totally different path: expression and communication, critical reflection and action." (2011, p.13)

One of the key assumptions of this thesis is that narratives are social, ´because the talk in which they appear draws on commonly held, already existing discursive resources (including narratives) and because talk in itself is a form of social action´, as Taylor (2010, p.36) argues. Narratives are to be approached as both a resource for talk and a construction of speech. So the concept of narrative encompasses the narrative or story as belonging to a particular culture and society, told and retold, with variations but also recognizable aspects. By studying children's narratives we seek to illustrate in this dissertation the possible changes of perception operated in pupils during this research around the major themes of this work: environment, dialogue, agency and children participation within their classroom and community.

Chapter 3

Methods

3.1 Study´s Background.

3.1.1 The origins of this study

This study began in 2004, while working on a project regarding environmental communication strategies concerning the involvement of the population in coastal management programs. During that study, it was found that one of the main reasons for the low participation rates of the population was a general feeling of disempowerment and a lack of effective communication strategies by the responsible authorities.

In the same year, I also participated in the ´Alternative Futures´ project. This joint study by faculty and researchers from Harvard University, Universidad Autónoma de Baja California Sur (UABCS) University of Arizona, and Centro Interdisciplinario de Ciencias Marinas (CICIMAR) was designed to assist regional leaders in assessing alternative futures for the development and conservation of the La Paz region. The study looked at a range of scenarios to investigate how economic performance, demographic changes, private and public investments, and public policy choices could influence urban growth, quality of life and land use changes over the next 20 years.

In these studies the uniqueness of the region of La Paz was explored by an interdisciplinary team, and what was evident among other things was:

- The great interest that the population had in the preservation of the local environment (Steinitz et al. 2006)
- The level of public participation and community cohesion, which in these regions was noted as ´very high´ by researchers. (Steinitz et al. 2006)

One of the principal conclusions of this study was the great necessity of promoting Education and Civic Participation within the community of La Paz. According to the authors:

> *´Enacting effective public policy requires not only the hard work and good judgment of government leaders but also an active and well-informed public. Policy formulation and debate will be more productive if accompanied by a well-designed program that includes educational strategies for involving civic and private organizations in the planning and consideration of the different options. To augment the work of the government, civic institutions have an important role to play in educating the public on the consequences of different policy approaches´. (p.86)*

In the same time period (from 2004 to 2006) I participated in a series of workshops convoked by SEMARNAT (the National Ministry of Environment and Natural Resources in México) that aimed to elaborate the Law of Environmental Education for the State. The process was considered a great success, as it was an example of the successful participation of several sectors. Among the participants were several governmental and non-governmental agencies, academics from the University of Baja California Sur (UABCS), and even concerned citizens. The Law was elaborated successfully, being the first Law of Environmental Education to be approved in the country. One of its principal objectives was to introduce environmental education as part of the elementary school curricula in the state. (SEMARNAT, 2008)

However, the Mexican Ministry of Education (SEP) and most primary school teachers that participated during the workshop claimed that they did not possess the proper background knowledge in environmental education or the training to incorporate these important changes into the regular curricular program. Mostly because of this the Law has not been fully applied yet. One of the agreements that were reached concerning this issue was the need for a ´manual´

that contained suitable strategies that could be used by teachers to guide their practice in environmental education.

After these experiences, the need of elaborating pertinent environmental education strategies that promoted a sense of empowerment and participation in children became evident. It is expected that these strategies will help to create the base for their future involvement in the environmental decisions that the community of Baja California Sur will face in the near future. This research focuses on developing educational strategies for increasing understanding of environmental issues that can be reproduced in the context of the regular Mexican classroom.

3.1.2. Research questions

Do dialogue based strategies facilitate Environmental Education learning?

- Can these strategies serve the purpose of generating a sense of empowerment and agency of knowledge in children? How effectively?
- Can these strategies be successfully incorporated into the permanent curriculum of the Baja California Sur classrooms?

3.2. Area of Study: The State of Baja California Sur

The Area of study is situated in the city of La Paz, capital city of the state of Baja California Sur. The site was chosen because it is the main population point in the state, and according to the National Institute of Statistic and Geography (INEGI) it has the highest concentration of primary schools in the region.

Baja California Sur is one of the 31 states which together with the Federal District comprise the 32 Federal Entities, or states of Mexico. Before becoming a state on October 8, 1974, the area was known as the South Territory of Baja California. It has an area of 73,475 km2 (28,369 sq mi), or 3.57% of the land

mass of Mexico and comprises the southern half of the Baja California peninsula, south of the 28th parallel. It is bordered to the north by the state of Baja California, to the west by the Pacific Ocean, and to the east by the Gulf of California. In 2005, in the last census carried by the INEGI, the population was 512,170 inhabitants. (INEGI, 2006) The largest city, demographic centre and capital of the state is La Paz.

Baja California Sur is characterized by deserts, mountains and coastal flatlands. The climate is desert-like in most parts of the state, but parallel to the coast lays the Sierra de la Giganta, with pine and oak forests. To the west, the coastline flatlands form beautiful plains, so the climate is diverse even within the region.

The Biosphere Natural Reserve of El Vizcaino, in Baja California Sur, which is 2,500,000 hectares (6,177,635 acres), is the largest natural reserve in Latin America. The state is mainly known for its natural features. The Vizcaíno Desert and small coastal lakes San Ignacio and Ojo de Liebre in the north are protected by the federal government, and more than the 20% of the total territory of the state is under some type of ecological protection, due to its great environmental importance. (SEMARNAT, 2006)

This *uniqueness* also extends to the demographic aspects of the state. According to the number of inhabitants per state, Baja California South ranks last in the country at the 32nd place. It also has the lowest population density in Mexico: only 6 persons per km2. The state population is very young- more than half of it is under 29 years old. (INEGI, 2006).

3.2.1. The region of La Paz

La Paz is the capital city of Baja California Sur, and its main demographic centre. The city had a 2005 census population of 189,176 people, but its metropolitan population reaches roughly 200,000 people because of surrounding towns like el Centenario, el Zacatal and San Pedro. Its surrounding municipality is the fourth-largest in Mexico in geographical size, reported a population of 219,596 people which live on a land area of 20,275 km2 (7,828 sq mi). (INEGI, 2006)

Despite its direct access to the sea, demographic growth in the southern peninsula has been slow because it is relatively remote location. The completion of the trans-peninsular highway in 1973 created a road link between southern Baja and points north, providing better access to the southern peninsula. The Airport expansion and improvements in air service reduced the effective distance from major urban centres and markets, spurring further growth. The growth of the government and the academic sector in La Paz has contributed as well to the expansion of the area's economy and population. Another reason for the recent demographic growth in this region is the high standards of living and quality of life. In Mexico (INEGI 2006) the average wage in this zone is $27 USD per day, whereas the minimum wages all over the country stand closer to $4.25 USD per day.

The economy of the city still depends on the health of the natural ecosystems and landscapes, and the availability of natural resources. As La Paz moves into the future, it is important to understand that the consequences of these changes are much more than a question of aesthetics – these resources are critical for the economic livelihood in the region. (Steinitz et al, 2006)

La Paz has an arid climate. The climate of La Paz is typically dry, warm and sunny with a year average temperature of between 23C-25C (75F-77F). Summer months (June-September) are often in the 30C's (90F's) and can be humid. The winter months (December-February) are the coldest with temperatures dropping below 15C (60F), but mostly in the low 20'sC (68-75F).

Breezes from Bahía de La Paz keep the temperature mild. The bay also acts as a barrier against seasonal storms in the Sea of Cortez. Rainfall is minimal, although infrequent downpours can bring heavy rains. La Paz averages over 300 days annual sunshine, and there is an average of only 7 inches rainfall each year with much of the region's water coming from hurricanes, which have historically hit the region once every two years.(Steinitz et al. 2006)

Eco-tourism is by far the major source of tourism income in La Paz as people come to enjoy its marine wonders, as well as its diverse and often unique terrestrial species found only in the region. There are 900 islands and inlets in the Gulf of California with 244 now under UNESCO protection as World Heritage Bio-Reserves since July 14, 2005. (UNESCO, 2006).

Industries in the region include silver mining, agriculture, fishing and pearl farming. Tourism is also an important source of employment for this coastal community.

Despite its growing size, the incidence of modern urban problems such as crime, drugs, congestion, and pollution is still quite low. The level of social cohesion for a city of this size is remarkable and a source of pride for Paceños (the residents of La Paz). On most accounts, the quality of life in La Paz is very high. La Paz has a well-diversified economy, supported by commerce, services, real estate, tourism, education, agriculture, industry, and government services.

According to the ´Alternative Futures´ project, (Steinitz et al, 2006) if La Paz is to grow rapidly in the coming decades, this would be almost certainly due to external sources of growth. In particular, tourism and real estate markets stand out as catalysts for future growth. An interesting alternate source of future growth could be research, information and knowledge-based sectors of the economy that do not suffer from the competitive disadvantages associated with the geography of Baja California Sur, and are greatly supported by the state´s location and environment.

3.2.2. Main Environmental Problems in the Region.

Supplying sufficient quantity and quality of water to its residents has been a challenge for La Paz since its foundation (SEMARNAT, 2012). The city now relies upon only one natural aquifer deposit for all of its water, with 23 deep wells drawing out more than 30 million water cubic meters per year. This water is shared between agricultural and urban uses. In 2003, piped water reached 90% of the population while the remainder relied upon trucks to bring in water. However, only 60% of users could count on water 24 hours a day – the remaining 40% receive water 12 hours a day or less. Improving this situation will be difficult for underfunded water agency (Sistema de Agua Potable y Alcantarillado, or SAPA), as it spends too much of its time trying to patch together aging infrastructure and catch up with prior growth. There are approximately 1,400 significant leaks per month and only 44% of the almost 60,000 water users have a meter.

There are other serious problem in La Paz' aquifer. Water from the ocean has started to flow into the aquifer as water is pumped out, contaminating the fresh water with salt water. Treating household, commercial and industrial wastewater is another critical challenge for regional water system managers. The failure to do so results in water pollution, a decline in the health of marine ecosystems, and the spread of disease. Evidence of these problems were apparent in the lagoon of La Paz in the 1980's and early 1990's when dangerously high levels of coli form bacteria were reported, indicating the presence of untreated human waste (SEMARNAT, 2012).

The research done by Steinitz et al. explained that an additional 1150 litres sewage treatment capacity per second will be required by the year 2020.

> *"Unless additional sewage treatment can be installed, the levels of water pollution are likely to rise again with the demands of increasing population and water use, thereby putting human health and economic productivity at risk".(2006, p.19)*

Solid waste disposal is another unresolved issue for the region. La Paz generates over 300 tons of solid waste per day. Once La Paz had two landfills, nut the closing of one landfill and the imminent closing of the second will soon leave La Paz without any sanitary landfills. The growing piles of refused dumped waste that spread indiscriminately across the landscape are a threat to public health and degrade the character of the city. Furthermore, La Paz does not have a hazardous waste collection and final disposal system, which to date, according to SEMARNAT (2012) constitutes a threat to public health.

3.2.3 Enforced Environmental Policies

Studies by Steinitz et al. (2006), pointed towards a few key policies to be implemented in the La Paz in order to minimize the possible environmental damage and avoid a drop in the quality of life. Amongst the proposed policies are: improving the management and distribution of the water system; expanding protected areas; planning for solid waste management; strengthening air quality management; and, of particular importance to this work, to strengthen the participation and education processes in the community, in order to incorporate the majority of public sectors in to the decision making processes.

3.2.4 Educational system of the state.

Baja California Sur has the lowest illiteracy levels in the country (3.6%). It also has the greatest number of universities per inhabitant, and the highest number of university graduates per habitant in México. (CONAPO, 2010) The environment has had a marked effect in the education of the state: La Paz is the home of the three leading Marine Biology institutes in Latin America (UABCS, CIBNOR & CICIMAR), largely because it sits on the Gulf of California which, according to several authors, is the most bio-diverse body of water in the world. It also supports several other university level institutes of learning.

Amongst the institutions of higher education in the state are: Universidad Autónoma de Baja California Sur (UABCS), Instituto Tecnológico de La Paz (ITLP), Centro de investigaciones biológicas del noroeste (CIBNOR), Centro Interdisciplinario de Ciencias Marinas (CICIMAR), Universidad Pedagógica Nacional (UPN), Universidad Internacional de la Paz (UNIPAZ), Instituto Tecnológico Superior de Ciudad Constitución (ITSCC). All of these institutions have been recognised and approved by the National Ministry of Education.

3.2.4.1 Primary Education

The curriculum is designed by the National Ministry of Education (SEP), and then distributed and adapted by the state offices of the SEP for its application in the different states. There are 32 state offices in México; each one regulates all the basic education activity –primary schools, from year 1 to year 6-, secondary basic education –secondary schools, from year 7 to year 10- and middle superior education.

The primary curriculum is composed by core sciences, natural sciences and social sciences.

Spanish and Mathematics are the core sciences, and are considered the most important part the basic education. These are taught on a daily basis in all schools. Social sciences are History, and Civic Education; Natural Sciences are comprised by Natural Sciences and Geography which has recently adopted curricular elements of Social and Natural Sciences. The curriculum also contains Artistic Education and Physical Education, although these are considered as subsidiary classes.

Each school usually has a library and access to computers, however these are often limited to be used in the last three grades fourth, fifth, and sixth grades, equivalent to year 4, 5 and 6 in Great Britain.

Since the basic curriculum is mandatory for all schools even private schools have to enforce it in their classrooms. Private schools can have somewhat different curricula, and different working schedules, but they have to teach the subjects and topics marked as relevant by the SEP. Private schools often include more subsidiary subjects that can reflect the type and ideology of the school. For example, Catholic schools will often include moral education or readings of the bible, while Montessori private schools will include lessons on English, Music or Yoga. Private schools often have bigger libraries and computer rooms, but this is not always the case.

A typical day in a public primary school in La Paz starts at 7.30 in the morning and ends at 12.30. Private schools can have different schedules, as they often adapt to comply with the parents' schedule. The typical classroom in Baja California Sur usually has around 30, or 35 pupils. Private schools classrooms often have smaller groups.

3.3. Methodology

According to Mercer, a methodology represents "the interface between theory and particular research questions and the use of particular methods and procedures in an investigation which represents a methodology in action". As such, it determines "not only how data is analysed but what kind of data is gathered". (Mercer, 2004, p.138)

When creating a research strategy, the researcher also directs the general orientation, and goals of his research. Many writers on methodological issues find it helpful to distinguish between quantitative and qualitative research. Although there is a predisposition among researchers to base the quantitative/qualitative distinction on the fact that quantitative researchers employ measurements and qualitative researchers do not, differences between quantitative and qualitative research are deeper than the presence or absence of quantification. According to Bryman, (2008) Quantitative and Qualitative research have become two separate clusters of research strategy, each one possessing significant differences in the connection between theory and research, epistemological considerations, and ontological considerations.

Figure 1: Organisation of the Research.
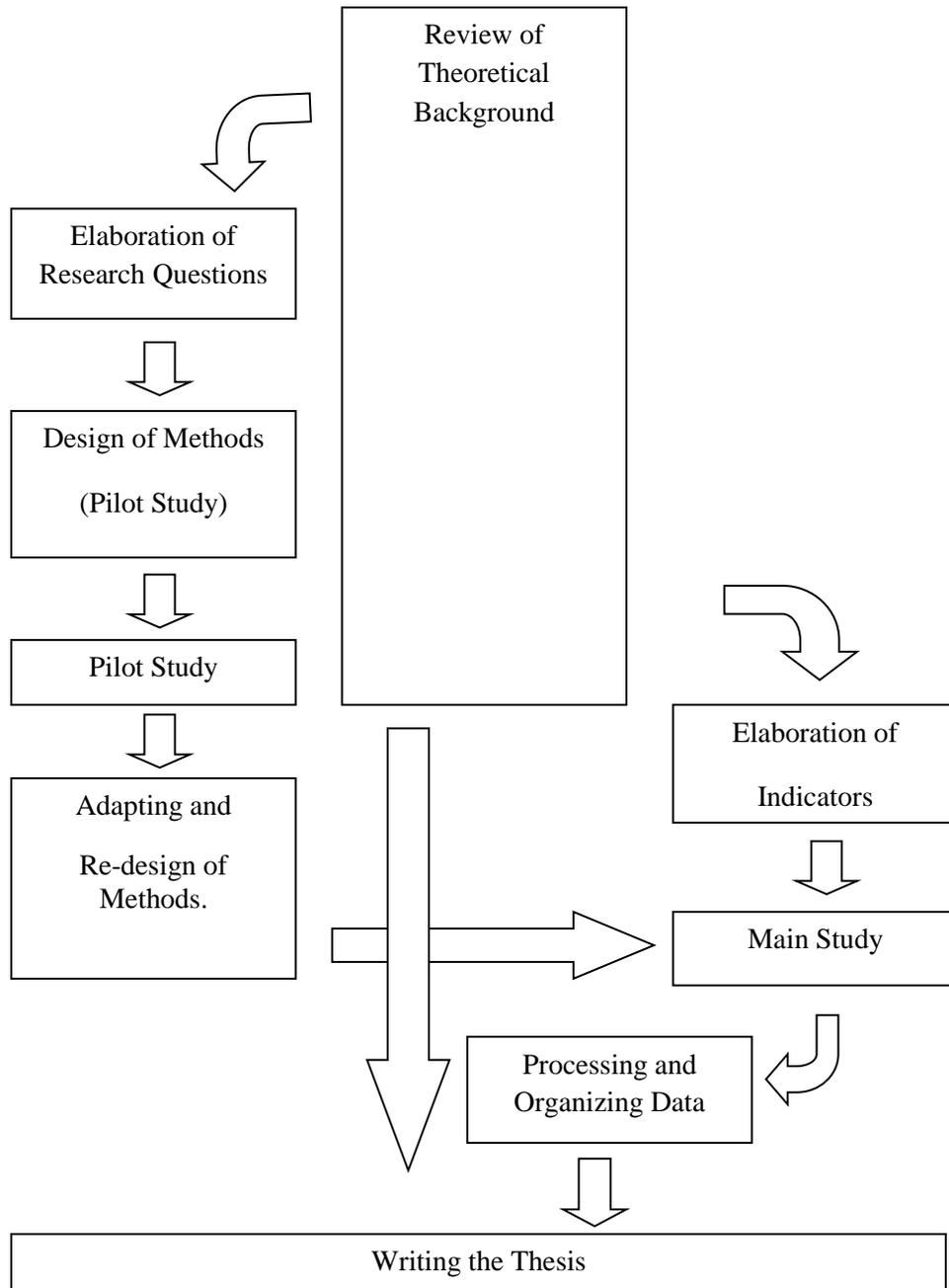
Figure. 1 Organisation of the Research.

3.3.1 The complementary use of qualitative and quantitative methods

3.3.1.1 Quantitative Paradigms

Quantitative research can be construed as a research strategy that emphasizes quantification in the collection and analysis of data and that:

1. Entails a deductive approach to the relationship between theory and research, in which the accent is placed on the testing of theories;
2. Has incorporated the practices and norms of the natural scientific model and of positivism in particular; and
3. Embodies a view of social reality as an external, objective reality. (Bryman, 2008 p.22)

3.3.1.2. Qualitative Paradigms

Qualitative research can be construed as a research strategy that usually emphasizes words rather than quantification in the collection and analysis of data and that:

1. Predominantly emphasizes an inductive approach to the relationship between theory and research, in which the emphasis is placed in the generation of theories,
2. Has rejected the practices and norms of the natural scientific model and of positivism in particular in preference for an emphasis on the ways in which individuals interpret their social world; and
3. Embodies a view of social reality as constantly shifting emergent property of individual´s creation. (Bryman 2008, p.22)

According to Mercer *et al.* (2004)

> ´Within the social sciences, a common distinction which is made between research studies and, indeed, between researchers, is whether they use qualitative or quantitative methods. The choice between these types of methods often seems to be ideological as much as methodological, with quantitative researchers claiming the more

´scientific´, ´rigorous´, approach, and qualitative researchers claiming the more ´human´ interpretative stance. (p.142)

However, according to Bryman (2008) the distinction between them is often not so clear, and in different studies it is common that even when a qualitative approach has been adopted, the study also possesses quantitative characteristics, and vice versa. Furthermore ´many writers argue that the two can be combined within an overall research project, [this possibility residing in mixed methods]. This term is widely used nowadays to refer to research that combines methods associated with both quantitative and qualitative research´. (Bryman, 2008; p.23)

According to several authors, trying to enforce these limits is often an obstacle to sensible research design, limiting to a great extent the range of options available for a deep analysis. According to Mercer (2004, p.142) "Different kinds of methods enable different kinds of research questions to be addressed and different kinds of evidence to be obtained". This highlights the need of choosing appropriate research strategies, disregarding possible preconceptions, but always taking into account which method could better serve to solve the possible questions that arise in the research process.

3.3.1.3. Case Study as a Research Strategy

One of the first decisions that have to be taken concerns the type of approach that the research will adopt. In this case we decided to develop the study as a case studies; more specifically, a case study with embedded units. A case study could be defined as a research strategy, an empirical inquiry that investigates a phenomenon within its real-life context. Case studies do not exclusively use qualitative research, and they can be based on any mix of quantitative and qualitative evidence. According to Lamnek, (2005): "The case study is a research approach, situated between concrete data retrieving techniques and methodological paradigms."

One of the most important emphases of the case study is given to the examination of the context setting. Although there is a tendency towards the identification of case studies in qualitative research, according to Bryman, (2008, p. 53) such identification is not always appropriate. While ´it is certainly true that exponents of the case study design often favour qualitative methods, (...) these methods are viewed as particularly helpful in the generation of an intensive, detailed examination of a case; case studies frequently both quantitative and qualitative research.

According to Baxter et al (2008, p. 544), the qualitative case study is an approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources. This ensures that the issue is not explored through one lens, but rather a variety of lenses which allows for multiple facets of the phenomenon to be revealed and understood.

Rather than using samples and following a rigid protocol (strict set of rules) to examine a limited number of variables, case study methods involve an in-depth examination of a single instance or event: a case. They provide a systematic way of looking at events, collecting data, analysing information, and reporting the results. As a result the researcher may gain a sharpened understanding of the process and circumstances involved in the case, and visualize more clearly what might become important to look at more extensively in future research.

Although almost any type of research can be constructed as a case study (Bryman 2008, p.54), one of the reasons to choose a case study is the emphasis and attention to detail that this type of research gives to the case, its conditions and particular context during the research.

The exceptionality of the conditions in which the study would develop (the uniqueness of La Paz and the particular circumstances of each school) became apparent from an early stage of the study. Due to the importance of reporting

these special conditions for better framing the results of the research, the case study approach was adopted.

3. 3. 2. Reliability, replicability and validity of the study.

While designing the research approach, it became apparent that due to the particular context in which it took place, some issues could arise regarding the replicability of this study. While the uniqueness of the La Paz region was known from the beginning, especially regarding the environmental situation, the demographic data obtained during the study further highlighted this. This particular research can be categorised as a unique or extreme case study (Yin, 2003). The unique or extreme case is, as Yin observes, a common focus in clinical studies, and it serves to depict a situation or condition perceived as unique by the researcher. A well-known example of this type of social sciences research was Margaret Mead´s (1928) study of growing up in Samoa that seems to have been motivated by her belief that the culture of the country represented a unique case. As such, we could not expect that the results of this research could be faithfully replicated, as the context and conditions of the research area are rather particular to it.

This research has been further framed as a ´Single Case Study with Embedded Units´ (Baxter *et al.* 2008). It was perceived that this type of study would enable us to explore the case while considering the influence of the various factors that could influence or alter the process. One of the reasons for doing so was that it was understood that the different school contexts in which the study would take place could produce very different outcomes.

A ´single case study with embedded units´ analysis greatly enriches the general perspective that can be reached through the research. However, one has to be careful when elaborating this type of research, as one can become deeply engaged in the analysis at the individual subunit level and then fail to return to the global issue that was initially addressed. (Yin, 2009).

As such, it was decided that portraying the particular characteristics in each school would be critical to better support and validate the outcomes and results of the research. It also became apparent, taking into account the singularity of the research area, that that this case could present generalisation issues. Even when it is stated in the research outcomes that the main objective is to test the suitability of sociocultural strategies in the context of Baja California Sur classrooms, and so the generalisation of the results of this work is not regarded as essential, as it is considered that it might yield significant findings that can be applied more generally to the educational context of the state.

3.4. The Pilot Study.

While designing the pilot study, several considerations were taken into account.

The main purpose of the pilot study was to test the suitability of the proposed strategies and methods before carrying the main study, as a way to ensure that the methods used in this later stage of the research would be appropriate and already adapted to the reality of the research area.

This stage of the research took place during the period between March 24 and April 24 of 2009, and was conducted in three classrooms of 5th grade (year five, in the UK equivalent) of the "Miguel Hidalgo y Costilla" primary school, in La Paz. The average time spent per classroom per week was of 6 hours, giving a total of 54 hours between the three classrooms in the three weeks of the pilot study.

In this stage of the project we sought:

> • To obtain data that confirmed whether or not the strategies developed through the review of literature were suitable for the study area.
> • To test the suitability of the content of our programme age group that we would target in the research.

- To assess the practicality and suitability of our proposed teaching methods.
- To test the suitability of our data retrieving methods how we could record our findings to provide us with the best possible quality of data.
- The most appropriate ways of testing the general understanding of our programme by teachers and children.

Our programme was constructed using sociocultural strategies found in the literature, and had an important base in the ´Thinking Together´ programme and the ´Dialogic Teaching´ approach, as proposed by Neil Mercer and Robin Alexander, respectively. The content of the lessons was constructed using the Law of Environmental Education of the State, and made an especial emphasis on the areas that were considered of ´Great Priority´ for its incorporation to in the curriculum, as sustainable use of water, endemic species of the state, etc.

Once we had determined both the content and the methods we would use, a set of 8 lessons was designed, trying to adapt both the content and employed strategies as faithfully as possible to the context of Mexican classrooms.

It is worth mentioning that due to the 2009 outbreak of ´swine flu´, the Government cancelled all elementary school classes for an extended period of time. Mostly because of this, only half of the lessons that composed our programme could take place according to plan. However, the data and the findings obtained during that period, even if incomplete, were valuable indicators of the constraints, shortcomings, and adjustments that needed to be addressed.

The Pilot study included and tested most of the methods that would be later used in the main study stage, at a greater scale. During this stage of the project we also aimed to establish a baseline within the following areas:

1. How comfortable the students were with the employed methods, and how quickly would they adapt to strategies proposed by the programme.
2. General knowledge of basic concepts regarding environmental education and sustainability.

3. Perception of students about the environment, their involvement on environmental decisions and their perceived sense of agency within the community.

It was also intended to incorporate the perspective of participant teachers at this early stage, in order to address some of the preconceptions, doubts or biases that the teachers could have when presented with the methodology, and which could represent an obstacle during this later stage. The teachers were interviewed at length, before and after the lesson programme, and their doubts regarding the methodology employed were addressed at the end of each lesson.

3.4.2. Methods used during the pilot study.

During this stage of the project and in order to test the suitability and effectiveness of each one in the context of the classrooms, the widest variety of methods available was employed. The majority of methods applied were later further adapted before their implementation in the main study stage.

3.4.2.1 Quantitative Methods:

The methods we sought to incorporate during the pilot study for the purpose of quantitative analysis were:

- Audio and Videotape recording of the oral interchanges and interactions between participant children, (prior permission of the parents, teachers and involved authorities).
- Self-completing questionnaires directed to children before and after the study. These questionnaires contained most of the information and the categories that would be later employed by the questionnaires in the main study; however, one characteristic that was unique to this set of questionnaires was a section regarding the general perception that children had about the program. A translated example of these Questionnaires can be found in the *Appendices* section, p. 316

3.4.2.2. Qualitative Methods:

The methods we sought to incorporate during the pilot study for the purpose of qualitative analysis were:

- Pictures and videos of the school, its installations and the classroom were taken (prior permission of the school and teachers).
- The video tape and audio recordings were also employed to better analyse the development of the classroom activities from a qualitative point of view.
- A series of semi-structured interviews were directed to the participant teachers and the majority of students. These interviews aimed to further incorporate the perceptions and points of view that students and teachers had about the programme.
- Art based Inquiry Methods. In order to gain a deeper appreciation of the learning process from a different perspective, art creativity was encouraged in the children, through drawings, narratives and poems. This approach has been adopted before to promote environmental literacy in children by Tsevreni (2008, 2011) and was supported in the work of a variety of authors, both for environmental education and from sociocultural pedagogy. (Neal and Palmer, 1994, Green et al, 2008).

3.4.3. Adapting the Methods after the Pilot.

At the end of the pilot study, it became apparent that for varied reasons (of ethical, technical and logistical nature) some of the methods could not be incorporated in the same manner in all the schools that would participate in the research at its Main Study stage. After the pilot, the majority of methods used during the Pilot went through a process of evaluation, taking into account their potential viability and reliability in other schools. After that, they were adapted for their inclusion in the Main Study stage.

3.4.3.1. Quantitative Methods:

The major adaptations that the Quantitative methods underwent after their evaluation were:

Audio and Videotape recording

Although Audio and Videotape recording were carried out as intended mainly due to the positive perception that the school headmaster and the parents had of the programme, it was made clear by the Ministry of Education that this would not be the case in every school, as each school had different internal policies regarding student security. An informed consent form was signed by the head master and each teacher during the pilot. (See: Appendices IV *Informed Consent Form, p.* 317) these forms were elaborated following Baja California Sur´s Ministry of Education guidelines.

Despite a considerable number of precautions, the recordings obtained during this period were of inconsistent quality. Frequent disruptions and poor sound quality were frequent, and in a large number of recordings, some of the dialogues could not be clearly listened. Even if the necessity of establishing another method as our primary source of analysis became apparent, we could not discard all of the obtained audio and video recordings, as they provided valuable analysis elements, and confirmed the findings of Mercer (2004) and Rojas Drummond and Mercer (2004) about the evolution of dialogue structures found in classrooms were dialogue based strategies were employed.

Questionnaires

Questionnaires used during the Pilot study were carefully designed in order to be clearly understood by children and to accurately assess their level of environmental knowledge. After the pilot study they were modified in their general structure, presentation and wording, to make them easier to understand and answer.

Following a deeper understanding of children Environmental knowledge and use of language, a section of the questionnaire that tried to measure children´s interaction habits in class was included in order to assess the typical use of dialogue in the classroom, and to locate the possible ´implicit rules´ (Mercer and Dawes, 2008) or ´dialogue patterns´ in the classroom before the study took place.

3.4.3.2. Qualitative Methods:

The major adaptations that the Quantitative methods underwent after their evaluation were:

The Role of Teachers

The role of teachers and the possibility of assessing their role in the classroom proved a challenge. The methodology used by Mercer 2004, and Mercer and Rojas Drummond makes a strong emphasis on the way teachers encourage dialogue (see also Alexander, 2006, 2008). Sociocultural theory highlights the central role of teachers in guiding the development of dialogue in class. However, during the pilot it became apparent that it would be almost impossible mostly due to the lack of time to include a session devoted to assessing the teaching habits of teachers, not to mention the possibility of them not behaving as they would normally do, or answer in a more or less biased way in the case of questionnaires directed to them in this area. On the other hand, directly questioning children about their classroom habits appeared to be

a direct and more reliable approach to gain an understanding of the regular way in which dialogue within the classroom was regularly directed.

Pictures and videos of the school.

Much like in the case of audio recordings, it was made apparent during the pilot study that videotaping sessions and taking photographs would not be possible in every school during the main study. The Ministry of Education prohibited that the study incorporated any photograph that included an under-age student, and required a signed consent of both the headmaster and each teacher to allow for video recordings or photographs in the school premises. Even so, the data obtained by this medium was considered relevant and valuable to the analysis of classroom interaction. A translated example of the informed consent forms is included in the *Appendices* section (p. 317)

Semi-structured interviews

Semi- structured Interviews were successfully carried out and provided valuable data regarding student and teacher perceptions in the study. In the particular case of this school, all interviews could be audio-recorded, but it was informed that this could not be possible in every school, not only because of the security or privacy policies aimed to protect students, but also because some teachers would not be comfortable being recorded when giving their opinions on controversial topics regarding education and established educational policies in the state. This was taken into account, and caution was exercised while speaking about themes that could be uncomfortable for some teachers, like their practice, control of their group or lack of training in certain areas.

Construction of written narratives.

The evaluation of the narratives elaborated by students showed important patterns: almost all group narratives increased in complexity with every session, and an improvement in the dialogue patterns, similar to those found in oral interchanges were found. These findings lead to a re-review of the literature, as

the use of narratives provided a valuable alternative to the use of audio recordings as the main assessment method.

It was found that the use of written work as an evaluation method for dialogue based strategies was supported by a variety of authors. (Green et al, 2008; and Alexander, 2008). The resulting analysis served to sustain the significant decision of making the analysis of narratives one of the main analysis methods of this research, during its main study stage.

3.5. The Main Study

The main study took place between the months of September of 2009 and January 2010. A total of 7 schools were included at this stage of the project, and the average time spent in each school was 2 weeks. In order to ensure the anonymity of the participants (teachers, students and headmasters) the name of the schools is not used in this work. Instead, schools are referred to by the order in which they participated in the study. The timeline of this study can be found in Table B *Timeline of the Main Study´* in Appendices II, p. 315.

3.5.1. Time Line of the Lesson Programme

Another set of 5 lessons was planned for the main study. All the lessons incorporated into the pilot study were kept after some minor adaptations. Another addition was an introductory manual that integrated the main concerns and perspectives of the teachers that participated in the pilot study. This manual was distributed in advance amongst the teachers, alongside the informed consent form, so they could be informed about the methods prior to the intervention. The lessons, in this case, were adapted from the content of the sixth grade natural sciences programme (year 6).

The lesson plans consisted in seven lessons, preceded by an introductory session, in which I would establish the ´ground rules´ based in sociocultural

pedagogy, and adapted according to each classroom. This ground rules would be kept in the form of a poster at the front of the classroom for all to see for the rest of the lessons.

According to Mercer (2004), suitable ground rules are:

- 1. Group members should seek agreement before making decisions.
- 2. Group members should ask each other for their ideas and opinions ('what do you think?').
- 3. Group members should give reasons about their views and be asked for them if appropriate ('why do you think that?'). (p.152)

These can vary, as every classroom needs to ´re-formulate´ these ground rules according to their own perspective, but these should be the grounds for the constructions of said rules. Each session had the double purpose of presenting the group a new aspect of environmental knowledge for children to construct and appropriate one upon, and helping them towards doing so, framing this process through this socio-cultural base.

After establishing the ground rules, questionnaires would be completed and working groups would be formed. The first narrative would be written by the newly formed groups.

The seven following lessons were chosen beforehand in conjunction with the teacher, who would often choose those lessons that were considered more "appropriate" taking his or her own curricular programme as base for this. Lessons would be then sorted out by complexity level, aiming to introduce new concepts gradually, making an emphasis on those aspects in which the group had apparently less knowledge (as indicated by the questionnaires) .

The lesson program for each school consisted of 7 lessons (of 50- 55 minutes) which followed this organizational scheme:

- A brief whole class introduction of the subject was given (e.g. The Water Cycle)
- This was followed by an activity in which children would be organized in groups, and invited to draw their own conclusions and perspectives about the subject after completing the activity.
- A whole class session served to share the new perspectives elaborated in the groups, and
- At the end, children were invited to annotate these new perspectives around the subject of the class.

In most classrooms, as previously discussed, the first and last lessons were mainly used for 2 purposes. The first was used as an introduction, and to establish the rules beforehand as well as the class methods. The last was used to offer a closure to the lesson cycle. The interviews, both for students and teachers, were also mainly carried out during the first and last sessions, to offer a better insight on their expectation, and alter, on their views and perspectives about the study.

3.5.2. Methods

As previously discussed, the case study research hallmark is the use of multiple data sources, a strategy which also enhances data reliability. (Patton, 1990; Yin, 2009). According to Baxter *et al.* (2008, p. 542) ´Unique in comparison to other qualitative approaches, within case study research, investigators can collect and integrate quantitative survey data, which facilitates reaching a holistic understanding of the phenomenon being studied´. The data obtained by the multiple available sources can be then used to create a solid framework in the analysis process. Following this rationale, each data source can be viewed as one piece of the ´puzzle´, ´with each piece contributing to the researcher's understanding of the whole phenomenon´. (Baxter *et al,* 2008, pp. 546).

3.5.2.1. Quantitative Methods.

The following section includes the Quantitative Methods employed during the Main Study stage of the research, and its main characteristics.

3.5.2.1.1. Demographic aspects of each school

The incorporation of demographic aspects of each school was considered relevant for a number of reasons. It has been previously discussed how this research could be categorised as a case study with embedded units, and as such, a priority was made of portraying the reality of each one of our units of study as clearly and completely as possible. As such, the inclusion of Demographic aspects of each school would help to:

- Establish each school´s and each group particular demographic and socio-economic background as clearly as possible.
- Better outline the context of each school regarding environmental involvement and knowledge in a later stage of the research.

3.5.2.1.2. Questionnaires

Self-completing questionnaires were applied in an individual way, before and after the programme. Questionnaires were modified after the pilot as the use of language was simplified, and categories were more clearly delimited in order to facilitate the subsequent analysis. A translated example of the Questionnaires can be found in the *Appendices* section (p. 316)

The use of questionnaires served, at first, to determine the ´base line´ of a classroom regarding environmental knowledge, and so to better assess the real impact of the programme on the student's environmental awareness and interest, later in the study, when a second questionnaire was completed by children.

The main categories in the questionnaires were:

- Indicators of average level of environmental knowledge
- Indicators of average interaction habits in the classroom

The questionnaires applied after the lesson programme contained the same categories, but the wording/tasks were different.

3.5.2.1.3. Keyword Count in Narratives

Sociocultural Discourse Analysis is centrally based on a sociocultural perspective on the nature and functions of language, thinking and social interaction. According to Mercer *et al,* (2004) from this perspective ´ language is regarded as a cultural and psychological tool for getting things done´. (p.138) The methodology has been used to analyse teacher-student and student-student interactions, though we will only employ it to analyse interactions between students, both through oral interchanges and in written works; in this particular case, in narratives written by students.

Mercer notes that although a wide range of methods of analysing talk are now available (as discussed, for example, in Edwards & Westgate, 1992; Mercer, Littleton & Wegerif, 2004), no methods can be judged as intrinsically better or worse for analysing talk, at least in abstract terms: "any method can only be judged by how well it serves the investigation interests of a researcher, how adequately it embodies the researchers' theoretical conception or model of language in use and their beliefs about what constitutes valid empirical evidence"(p.139).

The count of ´Key Words´ is an important quantitative aspect of sociocultural discourse analysis, and has been previously used in México by Professor Mercer and Dr. Sylvia Rojas-Drummond, to investigate the relationship between the ways that teachers talk with students and the learning that students can subsequently demonstrate. This methodology, composed by a set of methodological tools, both quantitative and qualitative, was expressly created and implemented for the analysis of talk as a social mode of thinking. According to Mercer (2004), the nature of the methodology reflects both:

´(i) a particular perspective on the nature and functions of language and its relationship to individual and collective intellectual activity and

(ii) a particular set of research questions about how language is used to enable joint intellectual activity and carry out the process of teaching-and learning in school.´ (p.166)

Mercer further illustrates the procedures of sociocultural discourse analysis, using data extracts from research in which it was employed to show how it can reveal ways that language is used for thinking collectively by children in educational settings. The methodology can be used to assess the quality of students´ interactions, to study how the quality of interactions may change over time and – an important feature – to make quantitative assessments of those changes and of the outcomes (in terms of learning and problem-solving) of engagement in different types of dialogue.

The methodology proposed by Mercer and his collaborators enables ´the processes of communication to be related to thinking processes and to learning outcomes´ (p.146). This methodology was employed not only to measure the frequency of "key words" that indicate exploratory talk, but also followed its qualitative approach, as it also measures the level of children's dialogic interchanges: their quality and development.

Some of the keywords that according to the authors are indicative of exploratory talk are ´I agree, I don´t think so, what I think is...´. The same methodology was used for identifying ´environmental key words´ or ´constructions´, this time regarding environmental knowledge and use language that indicated an enhanced comprehension of environmental processes. For example, words or phrases that link or point towards an understanding on the topic (i.e. ´scarcity´, ´endemic´ and the names of particular species –as ´Cimarron´) were counted for this purpose. More ´universally used´ words like ´cloud´, and ´water´ were not generally included in the count, as their use in the every-day language is so wide-spread that it was considered that the use of these words in a conversation or text, according to Barraza and Cuarón (2004) rarely points towards a high level of Environmental Knowledge.

Mercer notes how often and how readily aspects of recently-created common knowledge become evident in the group's talk, and in their use of language. He establishes strong links between this ´almost immediate´ accommodation and attributes this to the way in which children are constructing knowledge, in his own words ´how the children's joint intellectual activity depends crucially on the foundations of earlier talk in the whole-class session and group´. (Mercer *et al*, 2004, p.141)

Although it was aimed to apply the methodology proposed by Mercer and his collaborators (2004) as faithfully as feasible, this was not always a possibility, as recording children's conversations was not always a possibility, due to several factors: the irregular quality of the resulting audio recordings, not

having access to facilities where better audio recordings could be achieved, and in some cases, the refusal by part of the head masters or teachers to allow their lessons, and children conversations, to be recorded. It should be noted that, as an ethical consideration, and by request of the Ministry of Education, the informed consent form allowed for the refusal. (see: Appendices) Taking this into account, and understanding that written narratives were our most reliable and constant source of analysis, and that audio recordings were not always a possibility due to technical and ethical considerations, and their quality was not always constant; it was decided to adapt this methodology to the analysis of written narratives.

Support for this adaptation was found in Alexander´s (2008) and Mercer *et al.* (2004) arguments about the effect of the sociocultural approach in the children´s thinking, spoken dialogue and in their written work. During the research, a consistent support to these statements was found when comparing the incidence of keywords in dialogue interchanges and narratives written by children before and after the lesson programme in early stages of both the Pilot Study and the Main Study periods.

3.5.2.2. Qualitative Methods.

The following section includes the Quantitative Methods employed during the Main Study stage of the research, and its central characteristics.

3.5.2.2.1. Narrative analysis.

Narrative analysis has been used by a considerable variety of authors, and the possible interpretation angles of analysis in each single narrative could be almost infinite. Therefore, there was a need to establish a limit of categories from the very early stage, in order to delimit the analysis to those categories that were perceived as more relevant and appropriate to the purposes of the study.

Sociocultural discourse analysis, as proposed by Neil Mercer (2004) was used for this purpose, and was adapted to evaluate narratives, taking into account several considerations:

- Narratives can be seen as a form of ´presentational talk´ (Barnes, 2004). If exploratory talk is considered ´the readiest way of working on understanding ´ (p.5), mostly due to the flexibility of the speech and the easiness in which it is possible to mould one owns speech, Barnes makes a clear distinction between this kind of talk and presentational talk.

For him, *Presentational* talk is more concerned on adjusting the language, content and manner to the needs of the audience, and in exploratory talk the speaker is more concerned with sorting his or her thoughts´ (p.5). Presentational talk, in this way, is more concerned on presenting one´s own ideas in an acceptable ´format´.

The focus that the child makes on presenting his or her own ideas in said format, could detract from the meaning making process if, again citing Barnes, the teachers move from exploratory to presentational talk too soon. However, he recognises the importance of both types of talk in the learning process, and

119

highlights how important it is for teachers to ´be sensitive to the differences between them and use them appropriately´(p.7).

In fact, we could find in the rest of the literature cases that both exploratory and presentational talk had been successfully combined. An example of this is found in the work of Pierce and Gilles (2004), in which the inclusion of different ´sign systems´ such as art and narratives, and encouraging children to present their ideas to a larger audience are both seen as valuable additions to the class repertoire for encouraging exploratory talk.

According to them, the use of presentational talk, when used to share new understanding with others, helps students to "reflect on what they have learned, and consider the audience for their representations. They can view learning from a new perspective. [This way] Sharing with other students stimulates reflection on their learning". (p.51). This argument further reinforces what we explored in the previous section regarding the use of narratives by both environmental educators and sociocultural pedagogues, and serves us to support the use of Mercer's proposed methodology, using both quantitative and qualitative aspects.

3.5.2.2.2. Analysed Categories

The next 5 main categories were taken into account for the analysis of children narratives. As stated before, the need of establishing a limit of categories to facilitate the analysis was noted from the beginning of the study. These categories were delimited after a careful review of socio-environmental and sociocultural literature. Their relevance was based in their importance not only for environmental education, but for language development as proposed by sociocultural pedagogy. The first three categories, Narrative structure, Dialogue between Characters and Point of View were considered as relevant indicators of language development and the last ones, Agency and presence and type of Anthropomorphism, were considered relevant indicators not only of

Environmental Knowledge, but of possible future Environmental Involvement.
(Barraza and Cuarón, 2004: Tsevreni 2011.)

- **Narrative structure**

The narratives created before the interventions were simple, and often composed by a limited number of sentences. It was expected that the complexity level and quality of narratives would develop after the intervention, as Alexander (2008), notes that the abilities a child develop while engaging in dialogic teaching. Amongst these capacities he highlights the enhanced capacity of developing a narrative. (p.37)

Resolution of conflict, if any, is also part of the narrative structure. Conflict in the first set of narratives was usually resolved in a negative way, or could not be resolved by the main characters at all. This also links to the poor- perception of feelings of empowerment (or agency) by part of the children at the beginning of the programme.

- **Dialogue between characters:**

The dialogue structure between characters in a narrative written by children is expected to replicate the dialogue structure more common to the child´s known dialogue patterns. It was expected that after the intervention, the newly learned dialogue structures would be reflected on the narratives written by students.

Mercer (2004) points to three archetypical forms in which dialogue occurs within children´s talk.

Disputational talk, which is characterised by disagreement and individualised decision making. (p.146) This type of dialogue is characterised because there contains little or no attempts to reach consensus, to offer constructive criticism or make suggestions. According to Mercer, Disputational talk has clear

indicators: ´short exchanges consisting of assertions and challenges or counter assertions´ ('Yes, it is.' 'No it's not!'). (p.146)

Cumulative talk, in which speakers build positively but uncritically on what the others have said. Cumulative discourse is characterised by repetitions, confirmations and elaborations. (p.146) Although this type of dialogue is considered more useful to the meaning making process, the lack of critical perspective could lead to the ´error by consensus´ approach.

Exploratory talk, in which partners engage critically but constructively with each other's ideas. Statements and suggestions are offered for joint consideration. Partners all actively participate and opinions are sought and considered before decisions are jointly made. Compared with the other two types, in exploratory talk knowledge is made more publicly accountable and reasoning is more visible in the talk. (p.146). This type of talk strongly relates to Barnes´ (2008) conception of exploratory talk. It was expected that the dialogue patterns, much as the narrative structure, would change to reflect the emphasis on exploratory talk done in the classroom, and that characters, much like children, would develop exploratory-talk patterns to expose their views and reach a reasoned consensus.

- **Point of view**

The ability to establish a point of view different from one´s own is central for both developing constructive patterns of dialogue and to locate the children in an environmental reality different from the one that he or she might perceive. The importance of point of view has been discussed in the literature, and its presence in the narratives reflects the changes Alexander (2008) perceives in a ´dialogic classroom´: when discussing, children were listening more carefully and respectfully to each other, and were talking collectively to a common end, rather than at or past each other (p.37). This increase in the respect for the opinion of other children can be linked to the perception of point of view: as each child becomes aware of its own individuality and agency of knowledge in

the meaning making process that happens within the classroom, they gain a natural sense of respect towards other´s individuality and agency.

- **Agency of Knowledge indicators**

Sobel (2004) has linked a general feeling of *disempowerment* towards environmental issues to *ecophobia feelings* in children and later on, when these sentiments of lack of agency persist, he discusses how often they translate into a lack of sensibility and active participation in adults.

Through the literature, the opposite was also true: as signalled by an important number of authors, (Barnes, 1976, 2008; Bruner, 1996; Alexander, 2008; Mercer and Dawes, 2008; Cazden, 2008) it was perceived that the gained sense of agency in their own learning would result in a stronger feeling of empowerment and confidence in children, and that this would be reflected on the narratives written at the end of the lesson programme and their attitude towards environmental action, measured by the questionnaires .

- **Presence (and type) of anthropomorphism**

Anthropomorphism has been linked by several authors to a lack of profound understanding of animal or plant communities. In the literature, a link could be established between anthropomorphism and the inability of relating to environmental situations, not being able to change from point of view regarding environmental or social processes. This was categorised as ´negative anthropomorphism´ and has been linked by authors as Shauna Addams (2004) to Egocentrism, or the inability to simultaneously take into account his or her own view of things and the perspective of someone else. Egocentrism, in her opinion, leads children to project their own thoughts and wishes onto others, and this makes that children, that are usually taught Natural Sciences from an anthropocentric point of view, use Anthropocentric reasoning to visualize nature. (Tunnicliffe, 2004, p.56)

On the other hand, positive anthropomorphism was present when children gave human-like qualities to animals: wisdom, courage, and of particular relevant to this study, capacity of reasoning, dialogue and teamwork. (...) It is considered this points to a ´granting a voice process´ or a ´granting of agency´ in the mind of the children to animals, plants, and forces of nature, reflecting Alexander's (2008) views on dialogic teaching indicators: talking in the classroom becoming more inclusive, and resulting in a greater involvement of less able children. (p.37)

3.5.2.2.3. Research Diary: Narratives written from the researcher´s point of view.

Seven different research diaries –one for each school- were kept during the research, the aim was to capture as many details as possible about each experience linked to the study. This material was later used to recreate the development of the research in each school and its timeline. The research diary also proved a valuable tool in analysing the context of each school and classrooms, and revisiting stages of the research that could be useful for later revisions of the research process.

During the later stages of the research, it was perceived that narratives, written by the researcher, and that depicted the research from a subjective point of view, could serve as a valuable representation tool. Although relatively novel, the use of narratives and fictions in research, as a representation tool has been documented and exemplified by Clough (2002) and Denzin (2008). Other authors have also done narrative research, and have experimented with various ways of presenting their research, Freire, in Letters to Guinea Bissau, (1978) uses narratives to explain the context and perspective of the reality he encounters (and that -as he acknowledges- is modifying): he uses similes, metaphors, and analogies that serve the reader to relate to his examples. He also describes and sometimes writes down the dialogues he sustains with the people he encounters.

One of the critiques that the narrative report has encountered is that it can be subjective, and lack objectivity; however, in this case, narrative report written by the researcher were used as a framing method and used to describe the particular context of each school, a reality that is often composed by non-quantifiable data. Even when it was evident from the beginning that the narratives created by the researcher in this way would portray the study almost entirely from a subjective perspective, it was expected that the reader would gain an understanding of the particular environment and background of each school that could not be reached through quantitative data alone. It was also expected that, by being able to establish a point of view different from their own, readers would gain a more complete understanding of the research process, access to different perspectives and realities, and become more easily aware of a classroom culture very different from that of Great Britain classrooms.

3.5.3. Support methods:

The methods described in the following section could not be applied in all the groups, so data obtained by them was not available for all the schools that participated in the study. This presented the difficult decision of whether or not to include them in the analysis: to include them in the main body of data could represent an unbalance in the analysis. However, discarding these data would also have meant forsaking valuable analysis tools to reach a deeper level of the intervention outcomes.

Taking this into account, I decided to include this data as a ´supporting material´ in order to better frame the research process and further delimit the effect of the intervention when this was possible.

3.5.3.1 Quantitative data support methods:

Grades of the group before and after the lesson programme, versus control groups.

One of the initial concerns of participant teachers was that the grades of children in other subjects other than natural sciences would drop during the research period as a result of spending more time learning about the environment, or employing teaching methods very different from those regularly used by the teachers within their classrooms. About this concern, Alexander argues (2008) that ´process and process-product research show that cognitively enriching talk engages pupils attention and motivation, increases time on task and produces measurable learning gains in *all subjects*´. (p.37). The effect that a sociocultural approach has on children´s science and mathematics learning has also been discussed by Scott (2008) and Cazden (2008).

Although the possibility of some degree of bias due to the Hawthorne effect cannot be discarded, we included the average grades of groups before and after the intervention, and compared them with groups that did not participate in the programme and were in the same school. This was mostly done to document the possible effect of the research in the participant groups, and assess whether there was a negative change or not in the grades of children in subjects different from Natural Sciences.

3.5.3.2. Qualitative Methods support methods.

Semi-structured interviews to teachers and students

Semi structured interviews were considered the best available method to gain a deeper appreciation of the perspective that teachers and children had of the programme both at the beginning and in the end of the intervention. As opposed to questionnaires or structured interviews, semi-structured interviews

are more flexible and allow for the expression of the interviewee, so they can help the researcher to reach a better understanding of the interviewee´s point of view, (Bryman, 2008) and can better depict emotions, feelings and overall impressions, all of this which will later help the researcher to obtain valuable qualitative data on the opinions of students about the study, how comfortable they felt about it, how happy were they with the methods employed, and, in the case of teachers, whether or not they feel that these methods can be used by them in class, and whether or not they regard them as effective. Although the coding and processing of the information would not be as easily managed, the objectives of the research called for a deep analysis of the opinions of the teachers and children involved.

Teachers would always have the option of refusing to participate in the interview, and many of them declined. Some of them would offer explanations, as that they held "certain apprehension to being associated with ideas that are not supported by the majority of Mexican teachers", or be seen as "at odds" with the Ministry of Education. All the initial letters used to identify teachers that *did* decide to take part in interviews (or in narratives) have been switched to preserve their confidentiality and anonymity.

In the case of children, it was necessary to preserve confidentiality due to their underage status, and interviews could only take place and be recorded in classrooms were the teacher and headmaster have had agreed to participate in the research and signed the informed consent form, (*Appendices,* p. 317) and always in the presence of an adult. All the names used to identify children that decided to take part in interviews or the names of children in recorded dialogue interchanges have been changed as well, to preserve their confidentiality and anonymity.

The categories in the interviews were:

For teachers:

1. **Before the Study**
- Initial perception of the study.
- Initial perception of the methods and strategies proposed.
- Initial perception of environmental education.

2. **After the Study**
- Perceptions of the study.
- Perceptions of the importance of environmental education.
- Perceptions of the methods and strategies proposed.
- Perceived changes in the classroom/ were they positive or negative?
- Whether or not they felt they could apply these methods and strategies in their classroom.
- Whether or not they would consider incorporating environmental education in their classroom with the help of a manual.
- Whether or not would they be willing to apply these methods and strategies in their classroom.

For children:

1. **Before the Study**
- Initial perception of the methods and strategies proposed/ what was their general opinion on working with an emphasis on dialogue?

2. **After the Study**
- Perceptions of the methods
- Perceived changes in their own learning processes/ how did they feel whilst working through dialogue?

- Perceived changes in the classroom/ were they positive or negative? Was their classroom a better place to learn now?

- Whether or not they felt they could continue working with these methods.

- Whether or not would they be willing or would enjoy continuing working with these methods and strategies in their classroom.

Qualitative analysis of oral interchanges as used by Mercer 2004

The qualitative analysis of oral interchanges as proposed by Neil Mercer contains elements of ethnography, sociolinguistic analysis and conversation analysis. The process, as presented, relies on a close, detailed and careful appraisal of the transcribed oral interchanges. One of the advantages of this qualitative approach is that it respects the collective and complex character of dialogue as it is constructed. Unlike the quantitative approach –that separates segments of the dialogue in order to better categorise them- the qualitative part of the analysis does not decompose the interchange of ideas or disconnects them: the dialogue remains as a whole unit through the analysis, and so the meaning making process can be evaluated in all its aspects. This allows for tracing the ´origin´ of ideas, and even for perceiving the moment, context and exact circumstances where this happened. However, as Mercer notes, it is difficult to analyse large set of data in this way, especially for a single researcher.

> ´ ...qualitative methods are difficult to use with large sets of data, because the analysis is so time-consuming. (It is commonly estimated that transcribing and analysing one hour of talk using such methods will take between 5 and 12 hours of research time.) As a result, datasets are often small and so it is difficult to use such analyses to make convincing generalisations´. (p.147).

This particular point, for the most part valid when taking in consideration the large amounts of data that Mercer´s research managed, was not an issue for this particular research due to the limited amounts of recorded interchanges that we could retrieve. Mostly because of this, the amount of time spent transcribing and analysing the recordings was not particularly extensive.

Transcription and Analysis of Data

According to Baxter (2008) one of the risks that is often associated with the analysis phase of a case study is that each data source would be treated independently and the findings reported separately. We must not forget that one of the desired outcomes of the case study research is to ensure that the data depicts a complete landscape of the research and for this purpose an effort towards the integration of the different parts of the case must be undertaken.

  We must recognise that one of the most delicate stages in this process was that of translation and analysis of the narratives. It was necessary to remain as faithful as possible not only to their meaning and context, but to preserve their structure and portraying the real language use of children; not only the phrases linguistic meaning, but also the complexity and process of narrative; as most of the narratives grew in complexity as the research advanced.

   Even when a translation was already made, the original recording in Spanish was kept in case clarification was needed. In the particular case of idiomatic expressions, a literal translation was made and then the closest possible expression in English was used to clarify. According to Mercer (2004):

> ´ For all kinds of discourse analysis, it is important that the transcription of speech is a faithful representation of what is actually said, to the extent that speakers' utterances are not misrepresented and as much information relevant to the analysis is included as is practically possible´ (p.147).

Annotations for pauses, giggles, laughs and disruptions originated by children were also made, as it was perceived that the interchanges were affected by these, and so would benefit from this inclusion. Following the examples shown

by the literature, (*ibid.*) any comments about other talk features and non-verbal aspects of the encounter judged as relevant to the analysis are recorded in a third column.

Non-verbal utterances (aah.../mmmh...) are also included in the transcriptions. Emphasis is marked in italics, and a high or sudden change in the tone of voice is marked in capitals. Simultaneous speech is shown by the use of brackets ([ ) preceding each utterance. Where the accurate transcription of a word is in doubt, it is followed by a question mark in parentheses (?). Utterances which cannot be understood are marked [unintelligible]. In almost all these aspects the format was based in the standard transcription annotation, and standard punctuation is used to represent the grammatical organisation of the speech as interpreted by the researcher.

Once we had the transcriptions, we could use them for making both quantitative and qualitative analyses and finally, to locate correlations, trends and constants between both analysis

Chapter 4

Quantitative Data

In the next section we will present the main findings obtained through the analysis of the Quantitative Data at the end of the study. This stage of the project commenced under the assumption that sociocultural theory based strategies would prove a valuable resource in facilitating the teaching of environmental education, a premise elaborated during the revision of literature. It was expected that the use of quantitative methods in the collection and organising of the resulting data would provide a consistent and comparable summary of information that supported generalisations about the phenomenon under study i.e. the performance of this particular teaching methodology in the Baja California Sur Primary school classrooms, thus verifying the validity of our hypothesis.

The use of numerical based standards facilitates the replication of the research, which can be then analysed and compared with similar studies. Kruger (2003, p.16) confirms that 'quantitative methods allow us to summarize vast sources of information and facilitate comparisons across categories and over time'. Comparisons in educational research are ´necessary to evaluate improvement, a critical criterion for community interventions´. (p.16)

The data obtained through the quantitative analysis of the research will be addressed in the following order:

1. Demographic data of participant schools.
2. Analysis of student questionnaires.
2.1 Baseline indicators for classroom interaction prior to the study.
2.2 Average level of general environmental interest before and after the study.
2.3 Average level of local environmental awareness before and after the study.
2.4 Average level of student empowerment perception into the making of environmental decisions before and after the study.
2.5 Average level of student involvement with environmental issues before and after the study.
3. Analysis of teacher perceptions regarding the study.
4. Analysis of keyword incidence in narratives written by the students before and after the study.

Quantitative Data Obtained Through Support Methods

Herein is presented the analysis of data that could not be obtained from the totality of our data sources.

5. Perceived effect of the program in other aspects of school life.

4.1. Demographic data of participant schools.

The access to the general demographic data of the school serves to create an operational framework for the general classroom conditions during the intervention. The following data was considered of direct relevance to the study. The categories used for establishing the demographic background of this research were:

- Whether the school was a private or a public school.
- The total school population.
- The number of participant groups.
- The quantity of control groups in the school, if any.
- The average number of students per class in the school.
- The number of teachers that worked with the target groups.
- Whether or not there was an available library in the school.
- Whether or not there were available computing facilities, and if they were available to the class.
- The perceived average income of students' families.
- The perceived academic level for the school, when assessable.

The following are the codes that are shown in the next tables in order to facilitate the comparison between the demographic data of different schools.

- **P/O** Private or Official (Public) School.
- **SP** School Population (Total).
- **NPG** Number of Participant Groups.
- **CG** Control Groups.
- **NSPG** Number of Students per Group.
- **NTG** Number of Teachers per Group.
- **AL** Available Library (Y/N)
- **ACF** Available Computer Facilities (Y/N)

- **AISF** Average Income of Student´s Families. (H/A/L) (High/Average/Low)
- **CLD** Children with Learning Disorders in the Group
- **PAL** Perceived Academic Level for the school. (H/A-H/A/L)(High/Average-High/Average/Low)

Results

	P/O	SP	NPG	CG	NSPG	NTG	AL	ACF	AISF	CLD	PAL
First School	P	150	1	0	40	5	Y	Y	H	Y/1	H
Second School	O	530	2	1	30	3	Y	Y	A	Y/2	A/H
Third School	O	360	2	0	30	1	Y	N	A	Y/1	A
Fourth School	O	370	2	0	31	1	Y	N	A	N	A
Fifth School	O	550	2	1	32	1	Y	N	L	Y/1	A/L
Sixth School *	O	550	2	1	30	1	Y	Y	A	Y/1	A/H
Seventh School	O	330	2	0	30	1	Y	N	A	N	A

Table 1. Demographic Data of Participant Schools

4.2. Analysis of student questionnaires.

4.2.1 Baseline indicators for classroom interaction prior to the study.

An important part of the methodology previously proposed by most of the authors in the literature (see: Alexander, 2008; Mercer, 2004, 2008; Barnes, 2008: and Green et al, 2008) highlights the important role of the teacher in determining the level and type of dialogue that takes place in the classroom. However, due to several types of constraints regarding school´s safety regulations, time limitations, and more importantly, the consent of teachers, it was not possible during the intervention to effectively measure the interactions between teacher and group, by any of the methods proposed by these authors.

Asking students directly was, in fact, suggested by teachers during the pilot study, and effectively, proved to be a more reliable indicator of the baseline level of classroom interaction before the intervention than the teacher's perspective regarding the interaction habits of the group. In order to determine the average level of classroom interaction at the beginning of the study, we administered a questionnaire that sought to identify whether the students were used to working in groups and whether they felt competent or comfortable participating during regular lessons.

In order to determine these indicators the questionnaires included the following sections:

- **Are you used to working in Groups? (yes) (no)**

    This is a question that seeks to assess how comfortable the student is with the idea of working in groups, and the preferred working method during research. This was also the first component in determining the level of classroom interaction that could be expected from students in said school.   Being a Yes/No question, the values assigned were 10 and 0, respectively.

- **Are you used to participate during lessons? (yes) (no)**

  This question is directed towards gaining further knowledge of the student´s usual behaviour in class. The ability to participate in a consistent and constructive manner during the lessons, as perceived by the student, was also used to assess how easily the students could adapt themselves to the methods of the programme. The values assigned were also 10 and 0.

Once obtained, these values were used to obtain a mean to assign a representative numerical value to quality the baseline indicators of classroom interaction prior to the study.

Results

	Working in Groups	Participation During Class	Expected Level of Classroom Interactions
First School	9	9	**9** (Very High)
Second School	6	7	**6.5** (Above average)
Third School	5	5	**5** (Average)
Fourth School	5	5	**5** (Average)
Fifth School	4	4	**4** (Below average)
Sixth School*	6	6	**6** (Above Average)
Seventh School	6	5	**5.5** (Average)

Table 2. Interaction Habits Before the Intervention.

A later analysis confirmed that the baseline interaction habits in a classroom proved to be a relevant marker, which could predict (but only to a certain extent) the impact of the lesson programme in a given classroom. If we look at Table 2, and compare the average level of Classroom Interactions of the Fifth

School, it can be assessed that it presents the lowest average level of all participant schools.

Environmental Indicators in the Questionnaire

4.2.2 Average level of global environmental interest before and after the study.

The level of environmental awareness was measured before and after the study through the responses given by students in the next questionnaire´s sections. The questions used in this section of the questionnaire were adapted from a questionnaire used by Dr. Laura Barraza and Rex Walford in a 2002 research regarding the environmental perspectives of children in the UK and Mexico. The values in these questionnaires were expected to increase after the intervention, when a new questionnaire was applied.

- **Do you like Animals? (yes) (no)**

According to Barraza and Cuarón, (2004) this question is based in the assumption that animals are regularly are more appealing to children than any other environmental theme, as they often appeal to their affective domain (feelings and emotions) (pp. 18-23). The presence of a negative answer to this question would be a strong indicator of several possible negative phenomena, e.g. Ecophobia, as addressed by Sobel (2004) or a negative previous experience with the environment. All of this could point to the presence of a strong, negative bias in that particular group. This question was used to determine the level of environmental awareness by part of students in the school. The values assigned to answers were 10, to ´Yes´ and 0, to a ´No´. Groups in the table are labelled ´A´, ´B´, ´C´, as those are the names of these groups in Mexican Primary schools.

Results

	Environmental Interest Before Study			Environmental Interest After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	9			10			**+1**		
Second School	9	9	9	10	10		+1	+1	0
Third School	9	9		10	10		+1	+1	
Fourth School	9	9		10	10		+1	+1	
Fifth School	9	9	9	9.5	9.5	9	+.5	+.5	0
Sixth School *	9	9.5	9	10	10	9	+1	+.5	0
Seventh School	9	9		9.5	10		+.5	+1	

Table 3. Environmental Interest Before and After the Programme

Even when this particular question had one of the highest initial averages in the study, which was expected as indicated by the literature, this indicator increased after the intervention in all the participant groups, pointing to a overcoming of negative bias by part of the students regarding environmental topics.

4.2.3. Average level of local environmental awareness before and after the study.

The level of *local* environmental awareness has been found by some authors (Barraza, 2004, Maria Novo, 2006, Gonzalez- Gaudiano, 2002) to differ sometimes from the *global* level of environmental awareness. This is relevant to this study, as the level of local environmental awareness often determines environmental actions, as individuals' environmental actions and decisions are often situated in their community. We used a different set of questions to assess the starting average level of local environmental awareness for each school, and to identify possible changes in this standard at the end of the research period.

- **Do you know some of the animals that live in the state? (yes) (no)**

The majority of children would answer ´yes´, to this, thus determining the level of environmental knowledge as perceived by them. This was compared with average resulting of the next question to determine a possible gap between how informed the students thought they were, and the perceived level of accurate local environmental information they possessed. The values assigned were 10 and 0.

- **If you answered "yes", please mention two of them.**

This question composed the first part of the ´perceived level of local environmental information´ baseline. As discussed above, the majority of children would have answered ´yes´ to the previous question, only to give very common or not accurate examples of animals. Thus, a value of zero was assigned to blank responses, a value of to 5 to very common animals (cats, dogs), or animals not related to the state (polar bears, zebras), and of 10 for endemic, highly representative animals (dolphin, mountain lion, ´Cimarron´ sheep).

- **Of the following options, choose the one that you think is more representative of the water situation in the state:**

Scarcity/Too much rain/we don´t have water problems.

As water shortage constitutes the main local environmental problem in the state, (the water-supply in the state is even inferior to that of the Israel dessert), this question was also used to determine the level of knowledge about local environmental problems on the student's behalf. A value of 10 was assigned to "scarcity", 5 to "we don´t have water problems" and 0 to "there is too much rain".

- **From the following options, choose the one that depicts an animal that doesn´t live in the state:** Camel/Geeko/Dolphin/Shrimp (Prawn)/Mountain Lion

140

The only animal that doesn´t live in the state was the camel. It is a common mistake to think that camels live in all desserts, and so this question was used to check the general knowledge of children about the animals in the state (the mountain lion and even the dolphin were pointed out as non-endemic) a value of 10 was awarded to marking the camel in this question, and pointing to any other animal would give a negative value of -2.

- **From the following options, choose the one that is more representative of your opinion of the state landscape.** I like it very much/ I like it/I don´t care/I don´t like it/I don´t like it at all.

This question helped to construct the last part of this multipart indicator, and its purpose was to establish a possible co-relation to environmental knowledge and environmental interest in the students. (Barraza, 2000). It has been recognised that children tend to more readily value information in a subject that they already find interesting; (Barnes, 2008) this indicator also serves to mark an ´interest´ baseline in the subject on the students´ behalf. The assigned value points were 10/8/5/3/1

The last five responses resulting averages would serve to construct the indicator of Local Environmental Awareness for each school. (Table 4.)

Results

	Local Environmental Awareness Before Study			Local Environmental Awareness After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	9			10			**+1.0**		
Second School	8	7.5	8	9.5	9.5	8	+1.5	+2.0	0
Third School	8	8		9	9		+1.0	+1.0	
Fourth School	8.5	8		9.5	9		+1.0	+1.0	
Fifth School	7.5	7	7	8.5	8	7	+1.0	+1.0	0
Sixth School*	9	8.5	8	10	9.5	8	+1.0	+1.0	0
Seventh School	8	7.5		9.5	8.5		+1.5	+1.0	

Table 4. Local Environmental Awareness Level Before and After the Intervention.

There were indicators of a greater level of environmental awareness for all participant classrooms after the research period. Even in the cases where the starting average level was particularly high, an increase in this indicator could be attained. This is illustrated in Table 4. In the particular cases of the First and Sixth schools, these schools had one of the highest starting averages, and still presented a significant increase in this indicator.

4.2.4. Average level of student perceived agency regarding environmental decision-making before and after the study.

According to a variety of authors, the level of perceived *empowerment* of an individual regarding a particular subject can be accurately used as a predictor to whether or not said individual will try to take part on actions or decisions concerning said subject. Although in the literature this often exemplifies the sense of agency a person has on his own knowledge or citizenship (see, for

example: Barnes, 2008, Freire, 1971, Alexander, 2004, 2008) this also can be extended to environmental decisions. This perceived sense of agency of knowledge presents special relevance for the objectives of this study, as one of the main aims of this research is to develop educational strategies that will not only give children environmental knowledge, but also a sense of participation that will eventually lead to their active involvement in environmental decisions concerning their community.

- **From the following options choose the one that you think explains what you can do for the state´s environment.** A lot/some things/Not so much/ nothing

It is noteworthy that the starting perceived sense of agency in children had no relation with the starting baseline level of environmental knowledge, as even in schools where said indicator was well above the average, this particular indicator showed an average behaviour. The assigned value points for this question would be 10/6/4/0. Due to its characteristics, this question was also later addressed as part of the qualitative assessment of the effects of the intervention.

Results

	Perceived Agency Before Study			Perceived Agency After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	7			8.5			+1.5		
Second School	7	7	7	8.5	8.5	6.5	+1.5	+1.5	-.5
Third School	6	6.5		7	7.5		+1.0	+1.0	
Fourth School	6	6		7	7		+1.0	+1.0	
Fifth School	5	5.5	5	6	7	4.5	+1.0	+1.5	-.5
Sixth School*	7	7	7	8	8	7	+1.0	+1.0	0
Seventh School	6	6		7.5	7		+1.5	+1.0	

Table 5. Perceived Agency Before and After the Study

The numerical indicators for perceived agency of knowledge by part of children had one of the lowest starting averages of this study and even when after the lesson programme it remained one of the lowest indicators. It should be noted that a correlation was found between the agency of knowledge perception by children and the interaction habits indicators. In the schools where the starting averages of classroom interaction were above average, for example (The First, Second and Sixth schools), the initial sense of agency level was also slightly higher. In the case of the Fifth School, the opposite was true: it had both the lowest interaction levels and the lowest perceived agency sense levels of the study.

4.2.5. Average level of student involvement in environmental issues before and after the study.

The level of perceived environmental involvement can also be used as a predictor to whether or not an individual will try to change its current environmental habits. Barraza and Walford (2002) make a distinction between empowerment and involvement, especially in children, as one individual can be strongly confident about the perceived power of his actions, but in turn choosing not to act –and vice versa. This indicator was also obtained from the questionnaire applied at the beginning of the research period, and later compared with the results of the reformulated, post-intervention questionnaire.

- **From the following options choose the one that you think explains what you are willing to do for the state´s environment.** A lot/some things/Not so much/ nothing

This question was asked in order to establish a potential co-relation to knowledge about the environment, the perceived sense of agency that children felt in order to make environmental decisions, and whether the students were willing to assume said environmental responsibility, if they were presented with

the possibility of doing so. (Barraza and Walford, 2002). The assigned value points were 10/6/4/0.

Results

	Level of Involvement Before Study			Level of Involvement After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	8			9.5			**+1.5**		
Second School	8	8	8	9.5	9.5	7.5	+1.5	+1.5	-.5
Third School	7	7.5		8	8.5		+1.0	+1.0	
Fourth School	7	7		8	8		+1.0	+1.0	
Fifth School	7	7	6.5	8	7.5	6	+1.0	+.5	-.5
Sixth School*	8	8	8	9	9	8	+1.0	+1.0	0
Seventh School	7	7		8.5	8		+1.5	+1.0	

Table 6. Environmental Involvement Before and After the Study**.**

The initial average level of involvement before the study also improved after the intervention. The highest increase could be observed in classrooms in which the starting levels of classroom interaction were above average, and the lowest increase was observed in a group in the Fifth School, which as previously discussed, possessed one of the lowest classroom interaction starting averages. However, in this case the relation between these indicators was not as marked as in the previous cases.

4.3 Questionnaire´s General Results.

The overall effect of the intervention over the mean level of all the measured indicators was a positive one. Questionnaires applied to all participant groups before the lesson programme observed significant gains in the global and local environmental knowledge, perceived agency, and involvement levels of the groups.

These increments were not found in the questionnaires applied to the control groups, where minor diminishments on said indicators were found in some cases.

One of the most important results observed in the analysis of questionnaires was the relation that the starting average of interaction habits levels had with several other indicators. This could point out the great importance of the starting point of classroom dialogue in several aspects of the learning processes.

However positive, these trends did not show constant trends, and it was perceived, from a very early stage of the quantitative analysis, that a deeper understanding of the full impact of the lesson programme could only be reached through the joint analysis of quantitative and qualitative data. As Mercer (2004) notes, limiting the analysis to this strictly quantitative method could not reflect the active nature of talk as it happens in the classroom, and the meaning making process that takes place in the classroom could never be accurately reflected in the resulting analysis.

Even so, it was perceived that the results helped to confirm –even if partially- the suitability of dialogue based strategies to teach environmental education in the context of Mexican primary school classrooms.

4.4. Analysis of Teacher Perceptions of the study.

One of the principal objectives of the research was to test the effectiveness of dialogue based strategies in the teaching of environmentalism in the context of Baja California Sur primary school classrooms. It was understood, form an early stage of the research, that the point of view that each of the participant teachers had about the study, and the effect of the research in their students was of significant relevance. During the study, we tried our best to incorporate the teachers' points of view and recommendations regarding their own groups and different aspects of the study in general.

To facilitate this we explained to the teachers all the methods, strategies and procedures that we intended to employ in their classroom beforehand, and copies and explanations of our lesson plans were given alongside the informed consent form (see: *Appendices,* p. 317). Teachers were also invited to stay in each one of the lessons, whether they chose to participate in it, or just watch the development of the class.

At the closing stage of the program, semi-structured interviews were directed towards the teachers in target groups. Not all teachers chose to participate in the interviewing process of the research, so the available data is limited to the teachers that were willing to participate in the interview. The semi-structured interviews produced two sets of data. The results that could be coded were organised and analysed quantitatively. The more qualitative aspects of the interviews are going to be re-addressed in the next section.

The coded data was separated into two categories:

- Teacher´s perceptions towards the study and its perceived effects
- Perceived level of replicability of the program by part of teachers.

4.4.1 Teacher´s perceptions of the study and its effects.

Most of the questions for this category were arranged in a Likert scale fashion to facilitate allocation and interpretation of data. It has to be noted that the use of a numerical scale was proposed by participant teachers during the pilot, because according to them the use of this scale would facilitate for them to give a ´rating´ to the development of the research. 1 would be assigned to the lowest value or the most negative perception and 5 would be assigned the highest value, or the most positive perception. After that, the teachers were allowed to further clarify their perspectives in order to complement their point of view. These perspectives were used for the qualitative analysis of their perceptions of the study. The structure of the interviews was composed by the following questions.

In a Likert scale, being ´1´ very low and ´5´ very high…

1. How would you rate the lessons´ development in these two weeks?
2. How would you rate the researcher preparation?
3. How would you rate the lessons´ contents?
4. How would you rate the programme methods?
5. Did you perceived a change in the group´s conduct during the research?
6. If so, please qualify whether the change was negative or positive in a Likert scale.
7. Did you perceived a behavioural change in the group´s participation during the research?
8. If so, please qualify whether the change was negative or positive in a Likert scale.

Results

	First School	**Second School**	**Fifth School**	**Sixth School***
Class Development	5	4/5	4/4	5/5
Researcher´s Preparation	5	4/5	5/5	4/5
Lesson Contents	5	4/5	5/5	5/4
Lesson Methods	5	4/4	4/4	4/5
Group´s Conduct	N	Y3/Y4	Y4/Y5	Y5/Y5
Group´s Participation	N	Y4/Y5	Y5/Y5	Y5/Y5

Table 7. Teacher´s Perceptions on the Study and its Effects.

The average response of teachers towards the study was fairly positive, but there was not a link between the progress made through the program in a particular classroom and the perception of the teacher towards the study. Apparently, the development of the programme was only one aspect of the general perception that teachers had regarding the study. This will be later addressed in the qualitative data section.

4.4.2 Perceived level of replicability of the methods and strategies used through the lesson programme by part of teachers.

The questions in this category were formulated in order to assess to which point teachers would feel confident to replicate the sociocultural strategies and methods used during the intervention in their classroom by themselves. These questions were also given Likert-scale values in order to facilitate the collection and comparison of data. As with the last question, teachers were also able to later explain their perspectives in depth, and said perspectives were taken into account from a qualitative point of view.

In a Likert scale, being ´1´ of no importance and ´5´ of high importance…

1. Do you think that environmental education incorporation to the regular curriculum is important?
2. Do you think that you could give a class on environmental education if you had to?
3. Do you think that a manual on environmental education could facilitate for you teaching this class?
4. Do you think that the methods shown during the lessons are replicable?
5. Do you think that the methodology presented during the research could be useful for other subjects?
6. Do you think that you could apply this methodology?

Results

	First School	Second School	Fifth School	Sixth School*
Importance of Environmental education incorporation to the regular curriculum.	5	3/4	4/3	4/4
Capacity for giving a class on environmental education.	5	4/4	4/4	4/4
Usefulness of environmental education manual.	5	4/5	5/4	5/5
Replicability of Lessons.	5	¾	4/4	4/5
Usefulness of Methods in other subjects.	Y5	Y2/Y4	Y3/Y4	Y5/Y5
Capacity for Applying Methods	Y5	Y3/Y4	N/N	Y4/Y4

Table 8. Perceived Level of Replicability According to Participant Teachers

Although it was linked to more subjective perceptions than the last indicator, the level of replicability was fairly positive. The divergence between the results of the programme and the teachers´ perception of the study was further marked, and highlighted the need of addressing these perspectives from a qualitative and particular, case-by-case approach.

4.5. Analysis of keyword incidence in written narratives before and after the study.

Narratives, produced at the beginning and at the end of the set of lessons, were examined for keywords in order to identify any changes in vocabulary structure and use of language on students´ behalf. This method was originally presented by Neil Mercer in 2002 as part of a methodology to measure audio recordings of classroom interactions, and was adapted to be used on the analysis of written narratives in this research. As previously discussed, the incidence of words and constructions that indicate exploratory talk is expected to be lower in written works when compared to oral interchanges, as this represents a change between exploratory and presentational talk (Barnes, 2008). However, also according to the literature, an improvement in the quality of written work could still be considered a good indicator of the complexity of thought, dialogue and language used in the development stages of their works. (Alexander, 2008; Mercer, 2008). Two categories for keywords were established:

4.5.1. Environmental keywords.

These are words or linguistic constructions that reveal environmental knowledge and understanding. They could be names of animals, actions (for example to clean or protect), or phenomena (for example pollution or scarcity). Not all the words used to describe nature were allocated into the environmental key words category. The analysis looked for words that served as certain indicators of real environmental understanding. Some words were not considered in this category, due to their generality and frequent use in the basic

vocabulary. Some examples of animal names that were not counted when present in the dialogues or narratives of students were: ´Cat´, ´Dog´ and ´Fish´; examples of environmental phenomena that were not incorporated being ´Rain´, ´Sunset´, ´Sea´ and similar words. This rationale, as well as the ´Environmental Keywords´ concept, was used by Dr. Laura Barraza and Rex Walford (2002) and again in Barraza and Cuarón (2004) in a series of studies in Mexico and the UK concerning environmental perceptions and concerns in children.

4.5.2. Exploratory Talk Key Words and Constructions.

The methodology originally designed and applied by Neil Mercer, (2004, pp.163-164), proposed the use of a computer based concordance to analyse (by counting) the relative incidence of keywords associated with exploratory talk in oral interchanges. The definition used by this study regarding Keywords and Constructions that point to exploratory talk includes any word that indicates *"narrative, explanations, instructions, building of answers, analysis and solution of problems, discussion, arguing, reasoning and justifications, and negotiations."* (Alexander, 2004, p. 44). Some examples of these words are: "if" "because" "I think" and "agree", (Mercer, 2004, p: 164) in their Spanish equivalents (´Yo pienso´, ´yo creo´, ´porque´, ´de acuerdo´).

Keywords Examples.

Individual Story (Boy, age 11)

There was a {dolphin} that was best best friends with a {sea lion}, who knew a very fat fish named Dordo. One day a fisherman came and captured Dordo, who woke up to be the main menu in a Sushi restaurant.

{}: Environmental Key Words. In this case, ´fish´ does not count as a key word and neither does the descrition of the actions of the fisherman. These are considered as too gerenal to indicate environmental understanding for the

purposes of the study: The mention of a fish´s species, (marlin, tuna) or a description of the way the fisherman captured it (using a net, using a cane), would have counted as keyword, as these would point to an specific, more situated type of language use and knowledge by the student .

Group Story after the study (Boys and Girls, ages 10-11)

Once upon a time, there were a hunter and a woodsman that went to the forest to look for animals and big trees, and a little bunny that lived in the roots of a very big tree was very sad. A wolf came, he was his friend. He told the little rabbit:

[Run, little bunny, run, as a hunter and a woodsman are coming.] (1)

[I will not leave the forest, said the rabbit. I will not leave my home, for finding it was very difficult.](2)

Then, the hunter and the woodsman came and the little bunny pleaded to them:

[Please, mr. hunter and mr woodsman, don´t destroy my home or the homes of my friends. We love our forest and our plants, and trees.](3)

[Well, then, said the hunter. The pay is bad, anyway. We will leave and find another thing to do. To destroy homes is not a very good job.](4)

[]: Key Words and constructions indicative of Exploratory Thinking*. As the point to (1) reason, (2) reason, argumentation and justification (3) explanations (4) concession of points –and negotiating with the self-

Environmental Keywords

	Environmental Key Words Before Study			Environmental Key Words After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	10			13			+3.0		
Second School	6	5	5	10	8	5	+4.0	+3.0	0.0
Third School	5	6		8	8		+3.0	+2.0	
Fourth School	6	6		7	8		+1.0	+2.0	
Fifth School	3	5	4	6	8	3.5	+3.0	+3.0	-0.5
Sixth School *	5.5	4.5	4	7	7.5	4	+1.5	+3.0	
Seventh School	6	5		7	7		+1.0	+2.0	

Table 9. Environmental Keywords Before and After the Intervention

Exploratory Talk Keywords

	ET Keywords Before Study			ET Keywords After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	2			4			**+2.0**		
Second School	0	0.2	0	2	2	0	+2.0	+1.8	0.0
Third School	0	0		1.5	2		+1.5	+2.0	
Fourth School	0	0.5		1	1.5		+1.0	+1.0	
Fifth School	0	0	0	1	1.5	0	+1.0	+1.5	
Sixth School *	2	2	0	3	3	0	+1.0	+1.0	
Seventh School	0	0		1.5	2		+1.5	+2.0	

Table 10. Exploratory Talk Keywords Before and After the Intervention

A significant increment in the incidence of keywords in the written narratives occurred in all of the participant groups. This increment, however, was neither constant, nor was it present an in an observable, predictable trend. The First and Sixth Schools presented the highest increments in their respective keyword

count, but the rest of the schools behaved in a non-consistent pattern. For example, the Fifth School presented the third highest rise in environmental keyword incidence, surpassing the Sixth School, which had been consistently presenting higher averages in the questionnaire results.

4.6. Quantitative Data Obtained Through Support Methods: Perceived effect of the programme in other aspects of school life.

As previously discussed, one of the main apprehensions that the teachers in Baja California Sur have against the incorporation of environmental education is that it could prove prejudicial to the learning of other subjects. (A concern at first held by teachers that participated in the first meetings held by SEMARNAT (2004, 2005), and again, in the interviews held at the beginning of this study).

The average scores of Spanish, Mathematics and Natural Sciences were recorded in order to document the possible effect that the lesson programme had in these subjects in the participant groups and whether or not there was a significant change in the average scores of other subjects -both negative or positive- and to assess whether or not the lessons were having the positive effect described by the majority of authors (see: Alexander, 2008; Mercer, 2007) on language, reading and writing skills as well as in cognitive functions that are present when an emphasis is placed in the quality of dialogue in a classroom.

Results

Natural Sciences Grades

	Average Grades Before Study			Average Grades After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	9.5			9.8			+0.3		
Second School	8.5	8.3	8.3	9.8	8.7	8.4	+1.3	+.4	+.1
Third School									
Fourth School	8.7	9		9	9.2		+.3	+.2	
Fifth School	8	8.3	8	8.5	8.8	8.1	+.2	+.5	+.1
Sixth School *	8.3	8	8.2	8.7	8.8	8.3	+.4	+.8	+.1
Seventh School									

Table 11. Natural Sciences Grades Before and After the Study.

Spanish Grades

	Average Grades Before Study			Average Grades After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	9.8			10.0			+0.2		
Second School	9.2	8.5	8.5	9.5	8.5	8.6	+.3	+.5	+.1
Third School									
Fourth School	9.2	8.5		9.5	9		+.3	+.5	
Fifth School	8	8.5	8.3	8.2	8.8	8	+.2	+.3	-.3
Sixth School *	8.2	8	8	8.5	9	7.9	+.3	+1.00	-.1
Seventh School									

Table 12. Spanish Grades Before and After the Study.

Mathematics Grades

	Average Grades Before Study			Average Grades After Study			Frequency Changes		
	A	B	C	A	B	C	A	B	C
First School	9			9.2			+0.2		
Second School	8	8	8	8.5	8.5	8	+.5	+.5	+0
Third School									
Fourth School	8.2	8.5		8.5	9.1		+.3	+.6	
Fifth School	7.8	8.5	8.3	8	8.7	8	+.2	+.2	-.3
Sixth School *	8.2	8	8	8.5	8.5	7.9	+.3	+.5	-.1
Seventh School									

Table 13. Mathematics Grades Before and After the Study.

The grades of participant groups in Natural Sciences, Mathematics and Spanish did not reflect the concerns initially exposed by teachers; however, they did confirm Alexander´s and Mercer´s arguments regarding the effect of a dialogue based approach to education: The grades of all target groups in which this data was available increased, even in the cases where the grades of control groups decreased, which shows that the study had not the negative effect on the grades of students that some of the teachers expected and expressed in interviews previous to the study.

   This, however, was not found to be proportional with other indicators, e.g. an increment in the incidence in the use of keywords, average level of classroom interactions, and other aspects. It should also be noted that due to the reduced period of the intervention, to link this improvement to the intervention alone could not be strongly grounded, and should be discouraged. However at the very least, these results could help to disprove the assumption made by a

number of teachers at the beginning of the study by showing that employing dialogue based strategies cannot -by itself- be detrimental to the educational standard of the state.

Chapter 5

Qualitative Analysis

In the next section we will present the main findings of the qualitative analysis of the research. In the same way as the Quantitative Analysis, this stage of the project commenced under the assumption that dialogue based strategies would prove a valuable resource in facilitating the teaching of environmental education. However, when analysing this stage of the research using Qualitative methods we expected to offer a broader panorama of *how* and *why* these methods worked–or did not- in different classroom environments of Mexican schools.

Qualitative research involves the analysis and interpretation of data that is not easily reduced to numbers or to simple causal relations. These data relate more closely to the social and personal world and the behaviour and perceptions of people within it, which cannot be explained or predicted using numerical patterns or indicators.

From the beginning of the study, it was understood that each school possessed unique characteristics and that portraying these particular features would be an important part of the project.

By *telling the story* of how the research took place in each of the schools using narrative inquiry, we aim not only to better understand *how* and *why* we could have achieved different outcomes in each group; but we also seek to better frame the process of the study from a descriptive and qualitative point of view. In this way we seek to assess the possible effect that the investigation had in each one of these schools, and in the participant children.

5.1 First School.

I enter the school: It has probably been a house until recently; it is small, but very well designed, evidently with children in mind. Some of the plants of the lively patio have small shovels and tiny buckets around them: I think that they have been recently planted by children. I play with an analogy in my head: the constructivist approach that the school has established as its pedagogic framework has only until very recently entered the landscape of Mexican classrooms.

The school also has some ´pets´: is very rare that schools in Mexico keep animals, since it implies a lot of responsibility. However, the headmaster is a man that takes a non ´typical´ approach to his job: as he shows me the school with pride, I notice that he is explaining every little detail that he thinks is important. And to him, everything is. From the tomatoes that were planted by the children just yesterday, to the fact that he thinks has done his best to provide suitable pets for the development of children.

I find him interested in the general wellbeing of the children, not only in their academic development. That is reflected on the diverse curricula of the school: They have the standard subjects as considered by the Ministry of Education, plus Research Methods, Art, Music, English and Yoga, once a week.

The Teacher, (´M´), is called by the headmaster and she greets me. She is a lively woman on her late twenties or early thirties that has an evident interest in the children. She also shows a marked concern with the research. M also tells me she is doing her Master degree in Education at a local university. Teachers with postgraduate studies are not ´common´ by Mexican standards.

She shows me the classroom facilities, as the children continue with their activity in a ´cooperative silence´ they are talking within the groups, but doing so in order and containing their voice when they speak to other group members.

-They are working in an individual activity right now- M. tells me, when I ask her. - A little while ago they were working in a joint research project, in groups. But right now they are writing an individual report about their personal observations-.

She shows me the little library, full of well-kept books, the little aquarium, with four fishes, and a garden composed of potted plants. Some are bearing tomatoes, all are kept in decorated pots, and some have their name (even scientific name!) scribbled in the handwriting of a child. The image of the classroom, as I see it, is very consistent with the constructivist pedagogic approach of the school.

5.1.1. School Background.

The school operates on a mixed-aged system and there are only 3 groups in total. The headmaster escorts me into the largest room, the classroom of fourth, fifth and sixth graders. ´We did not think necessary to separate them´, he says. ´In this way, sixth graders help in the teaching of the youngest, and they all learn more and better in this way. Furthermore, the groups are very small, even without separating them´. He is right. There are 35 children in the group, counting all the grades. That is more or less the average group in a Mexican classroom.

The unusual classroom culture in this classroom is confirmed in the first sessions: Children in this classroom are used to working in groups, and expressing themselves. They speak clearly and articulately, they are used to giving their opinions and reasoning aloud. When I tell them that we are going to work in groups, they are not surprised; it is the only way in which they work. When I show them pictures of two light bulbs, a regular and an energy-saving one, one of the children asks what the round, bulb-shaped thing is. He has not seen a ´regular´ light bulb in his whole life, or at least, has not noticed.

Still, I perceive that the research can still provide some progress over their already good classroom culture: I initially thought that speaking about our ground rules in the first session would bore them, but they become excited and sometimes say things like: ´Hey that makes sense now. M. tells us we must speak one by one all the time, but now I see why.´ Thus, making the talk visible (Pierce and Gilles, 2008) provides a reason for them, which constitutes a strong grounding for subsequent work.

5.1.2. Qualitative analysis: audio recordings of oral interchanges.

The methodology for analysis of classroom dialogue proposed by Mercer (2004) was followed as closely as possible when evaluating the quality and type of dialogue that took place in the classroom.

According to Mercer´s classification, (2004, p.10) classroom talk can be divided into three categories:

- **Disputational talk**, which is characterised by disagreement and individualised decision making.
- **Cumulative talk**, in which speakers build positively but uncritically on what the others have said.
- and
- **Exploratory talk**, in which partners engage critically but constructively with each other's ideas.

Compared with the other two types, in exploratory talk knowledge is made more publicly accountable and reasoning is more visible in the talk. (ibid. p.10)

Even when this school possessed the most solid classroom dialogue grounding to be found in any of the participant schools, audio recordings showed a traceable improvement from the first (before the programme) to the last (after the lesson programme) recordings. Audio recordings that took place during the first days of the research showed that the majority of classroom talk was

163

cumulative. These patterns were also found in the narratives when depicting character dialogues. While it was true that children were used to participating and working in groups, and in fact did so much more than children in other classrooms, they worked on exploratory talk much less frequently than expected.

This pattern was apparently established due to the mixed ages in the working groups, or at least M thought so: It was usual that when older children suggested something, younger children would usually limit their own interventions to comply with the point of view or instructions of their older peers.

Jonathan (11 years): I think we should write down this.

Melissa (9 years): Yes, we should. My handwriting is ugly, though.

Daniel (11 years): Well, since we are giving the most ideas, let him do it.

Juan Carlos (9 years): ...Ok. (Long Pause)

Juan Carlos: Ok, I got my pencil. What are we doing to do now?

Jonathan: (To Daniel, in a lower voice): What do you think? What will be the story be about?

Melissa: (in a not so whispering voice, not really complaining) I cannot hear.

Juan Carlos: I think they are thinking first.

This was not reciprocal, as when a young children presented an idea they could (and often were) simply ignored. It is important to note that when this happened, it usually did so without Disputational Talk being evident. Although the dialogue patterns encouraged by the teacher were particularly *dialogical*

and interactive by regular standards (Mortimer and Scott, 2003; Scott, 2008) dialogue patterns between pupils often showed an *asymmetrical* (Barnes and Todd, 1977; Mercer and Dawes, 2008,) configuration.

Silvana (11): What is the story going to be about?

Sylvia(9 years): I would like it to be about a bunny.

Laura (11 years): I do not know. A whale...?

Silvana: Dolphins are prettier. And smarter.

Sylvia: ...

Laura: Ok then, a dolphin.

5.1.3. Meta-cognition: Making Talk visible.

Dialogue is a truly flexible learning tool. According to Alexander, it can take place in any organisational context´ (2008, p.20 emphasis in the original). Dialogue also an excellent way not only of achieving the acquisition of knowledge, but to make the children more aware of the process of said acquisition. This awareness or *Meta-cognition* is often an objective on its own for many sociocultural authors. (See, for example, Agency of Knowledge in Barnes, 2008, or *Making Talk Visible* in Pierce and Gilles, p.43)

  In this particular classroom, a unique opportunity presented itself for children to gain insight in their own learning process. As M requested to hear the tapes, she became aware of the asymmetrical dialogues patterns within the classroom. This ´hierarchy´ was surprising for everyone, including her and all of the children, who also listened to some of the recordings, again, at M´s request. Once shown and addressed, this situation quickly improved; again, the solid culture of dialogue within the classroom and the cooperative environment were

a decisive factor in operating a change. The results of this development had a perceptible effect on the classroom culture and dialogue patterns.

Raul (11): I think I would be very upset in his place, but is difficult to be angry with your father.

Nayelli (9): Let him be angry at the net. His dad was all right until he started using the net.

Lilia (10): Is not like it is magic or something, Nayelli.

Raul: No, but she is right. Sometimes we get mad with things. Like when you hit yourself with a chair.

Lilia: Is true.

Carlos (11): And it is easier, I suppose, to be angry at a thing than it is to be angry with your dad.

Raul (11): Well thought then.

Nayelli: (happy) Wii!

We could observe how cumulative talk, when dominant in a classroom, can mask asymmetrical dialogue patterns. However, when correctly addressed, and with the help of strategies proposed in the literature (Pierce and Gilles, 2008; Mercer and Dawes, 2008) this situation can be overcome with positive results.

   We must note that this strategy could not be used in *any given* classroom, or in a regular context. For Meta-cognition to be reached in given setting, participants should be willing and able to critic their own dialogue patterns and habits, thus exposing themselves to critique. In ´From exploratory Talk to Critical Conversations, Pierce and Gilles (2008) note how a culture of dialogue

and confidence in a classroom helps to develop the adequate environment to promote this kind of growth. In the majority of classrooms, however, where asymmetrical dialogue patterns between teacher and students are still the standard; this is one of the many valuable resources that remain –sadly- unexplored.

5.1.4. Teacher interviews prior to the programme.

M´s initial perception of the study was strongly positive.

> ´They [SEMARNAT and the SEP] are not only trying to introduce a very important subject in the curricula, a subject in which most of us teachers have no specific training, unless you count sciences. No, not only that. (...) The methods, also, seem designed to promote a change. It is an advance even in constructivism as I see it. It is more focused on team work, right? ´

Also, environmental education seemed like a strong priority to her. Most students´ families were scientifically literate, which offered opportunities of developing an unusually high environmental awareness. However, she felt that the materials available to her were not always enough for keeping the high standards her pupils possessed on scientific subjects.

> ´The textbook is somewhat limited, as environmental education is somewhat regarded as ´only an aspect´ of natural sciences, and there is a lack of material regarding environmental education that can be used for the classroom, at least in Spanish, even in the Internet (...) And that is very sad, because it seems to me like environmental education is important not only for natural sciences. It is about many other things... ´

Interviews to students were carried after this. They were willing to participate, and apparently were also used to collaborating in interviews.

5.1.5. Student interviews prior to the programme.

In this particular school children seemed comfortable discussing their habits in class and the emphasis that is going to be given to participation. They also welcome the clarification about the group rules from the beginning.

In fact, they have different habits and perspectives regarding participation in this school, and they are aware of this. They are also more articulate and clear at expressing their thoughts than most children of their age.

> ´I think it will be fine. We talk all the time, and that is good. I know that in other schools teachers ask you to be quiet, to not speak, and of course you should not speak in class, or when he does not say that you can talk.
>
> I do not think that is fair. I think I like working with M, and that I am going to like working with you. It will be simple, and great fun (...) at least I think that.´

5.1.6. Teacher interviews after the programme.

M´s general perception of the study after the research was rather positive; she commented on how interested her students were, and upon receiving a copy of the rest of the lesson plans, told me that she would try to make up some lessons herself with mine as a working base. She commented on how natural it seemed to have established the ground rules and their reason for being from the very beginning:

> ´They seemed so keen on reminding each other to follow the rules once they understood the why behind them. I suppose I will leave the poster there. It sure has helped them to understand better the reasons behind our usual way of working. In fact, it seems like a natural extension of the work we do here; it helps them to think, to find a structure of doing things... ´

She was pleased upon confirmation (again, with the use of recorded evidence) that some of the issues that were made evident with the use of audio recordings (the evidence of some not-very-positive dialogue patterns, between children as will be discussed below) were being solved.

> ´That technique was useful. Very useful. I would probably never have discovered that for myself. In a way, I think it was in part the use of written rules. And the recordings. I am also glad I heard them, and that the children also heard them. It was good for everybody´.

5.1.7. Student interviews after the programme.

The group´s general reaction to the programme is very positive.   After the research ended they seemed willing to keep the materials, and actively try to encourage M to continue working using the methods –and provide them with environmental information- on a daily basis. Children in this school also were very articulate on voicing how they thought the research programme changed the classroom. One of the girls (that in the previous year had been a student in another, more traditional, school) expressed:

> We speak a lot in this school. And I really like it; it is very different from the other school in which I studied. But after this (…) I really think we speak better. Even when sometimes we do not agree, it is fine. Everybody thinks in a different way.

And on environmental education:

> I have always liked nature, but never thought why whales were hunted, or dolphins killed in nets. Now I understand more of this, and it makes me feel that is not worth it. No it is not. If the reason is that somebody is making money, is not reason enough. But knowing the reasons, even if they are wrong reasons, is good.

They did not note substantial changes in their classroom environment, but they did note a difference in how they talked.

> *´I feel more listened now. And I did not realise that until we worked the last time. I feel smarter. M is always telling us that we are all smart, but recently I feel more so. When the older kids listen to you, you feel smarter. When an older kid writes down what you just said you feel smarter.´*

5.1.8. Analysis of Narratives.

Analysing stories written by children was not an easy task. Much like analysing a conversation, we could not restrict the analysis to the categorisation of structures alone because of the risk of losing the meaning of the story, or the understanding its significance for the children could be reduced.

Categories were not mutually exclusive, and it was often found that in fact a growing in the complexity of one would result in a similar growth in other categories. (e.g. an enhanced ability to locate a point of view different from one´s own would often result in a diminishment in anthropomorphism indicators, and an increased complexity in narrative structure would often reflect a more complex dialogue between characters.)

Analysed categories were:

- **Narrative Structure** Were stories complex? /well structured?
- **Dialogue between characters** What type of dialogue occurred within the story?
- **Point of view** Could children transcend their role as omniscient narrators and tell a story from a *real* different perspective?
- **Agency Elements** Were they present on the story? Did the characters face important decisions, or became aware of their own sense of agency?

- **Presence and Type of Anthropomorphism** How were animals treated as characters in the story? Did they behaved like animals or their behaviour was seen and measured on a human basis? Or, in the other hand, did they become the embodiment of positive attributes that transcended human characteristics? (Positive anthropomorphism)

The next narrative –written before the programme- contains an example of all these categories.

> ´Once upon a time there were two brothers, called Lisa and Javier. One day they were playing with their pet fish when someone knocked at the door.
>
> It was an old lady with a map that had a lot of drawings and a lot of marks. They decided they wanted to go to all the places that were marked in the map.
>
> They went to the forest and found a hunter chasing a rabbit, a lot of exotic plants and a deer.
>
> Then they went to the sea and were surprised, as they did not knew the sea and it had a lot of water.
>
> A fisherman arrived and gave the children a free ride. They saw a sea lion and dived alongside it. Then they saw a dolphin and the dolphin could speak. The dolphin took them to a hidden treasure. They were very happy, they returned to their home and took the dolphin with them and they installed an aquarium. ´

The structure of this story is not very complex, the development is linear, and its length is also typical for the age span of the children in the group. It is a representative example of the type of stories written in this school before the programme.

The absence of explicit dialogue within the narrative is very telling: even when other characters appear, they do not engage in dialogue with the characters, or at least this is not portrayed by the children. There is no location of point of view: the children write the narrative as omniscient narrators, as not even the protagonists of the history explain their thoughts, motivations or goals.

Although some agency indicators are present, (children gain a map, follow a quest and in the process gain knowledge, a friend and fortune), these are not elaborated upon. Children in the narrative do not have to face decisions, reflect on their agency as protectors of nature, or even make a significant effort to justify the outcomes of their adventure. The map is presented to them, the same as the ´free ride´ the fisherman offers, and the location of the dolphin, that is guided by the sea lion.

Anthropomorphism is present, too, when the sea lion, very uncharacteristically, guides them to the dolphin´s cove. The dolphin speaks, and he guides them to a hidden treasure. This perspective assumes that for dolphins, it is natural to speak (the narrative does not indicate whether or not the brothers where surprised) and a treasure has a similar value for a dolphin than for a human. To finalize the story, the children take the dolphin from the cove to their aquarium, but nothing is explained about the family of the dolphin, whether or not the dolphin resented this, etc. It is assumed by the children (and the brother and sister in the story) that the dolphin is going to be happy with its new condition. The dolphin´s perspective, as we can see, is not taken into account. All of these point to Anthropomorphism, which according to Tunnicliffe (2004, p.56) is the term used to describe the interpretation of the structure and behaviour of other animals in human terms.

The same categories were used to analyse the development of narratives that were written by the groups after the programme. In all the cases, save for one, groups would cho0se to develop a different narrative, but in the particular case of the following story, the group of children that wrote ´Lisa and Javier story´ decided to revisit the very same story told in their initial narrative. This

particular story serves as a strong point of comparison between narratives constructed before and after the intervention, but it represents a unique case amongst all the narratives developed by this school.

'In La Paz, Baja California Sur, lived two brothers, called Lisa and Javier. They were the children of a marine biologist, and his father travelled a lot. They knew a lot about the environment, but often hoped that his father would take them in one of his travels, as they had never had the chance of seeing the world by themselves.

One day they were playing with their pet fish when someone knocked at the door. It was an old lady, who presented herself as Marina. She presented them with a map that had a lot of drawings and a lot of marks.

-Why are there so many marks? Why are you giving us this? –

-You will have to find that for yourself, but I think that you wanted to see the world, perhaps this is a good opportunity to do so.- Marina told her, and then she disappeared.

They decided that they wanted to go to all the places that were marked in the map. They told their mother they were going away and she was happy to make them company in their trip.

They first stopped at the Sierra de la Laguna forest, where they saw big trees and they climbed the mountains. They saw a lot of plants that they did not know that lived in the state, as pines and other threes. They saw a river, and a cascade, and were surprised because they did not know all those things existed in their state.

Then they went to the sea and were a little disappointed, because in the map the next mark was located on an island, and they did not had a boat. Their mother asked for the help of a friendly fisherman named Pedro, who gave the children a free ride to la Lobera, where the sea

lions lived. They were very happy, as they had never climbed on a boat before. They saw the sea lions and a lot of dolphins, and were very amazed to look at how well they behaved with each other. They realised that animals were peaceful and loved being with their families.

However, the greatest surprise of all was to see their father diving there. Everything, from the very beginning was part of a surprise, and as he climbed to the boat he told them that he would be happy to take them along with him in his trips more often.

They were very happy, and they returned to their home with their parents, and spent the rest of the summer travelling with them to all the points that were marked in the map.

The most evident changes are found in the internal structure and coherence of the narrative has improved, and has grown in complexity. At the same time, the story is more plausible, and there are more characters. There is also at least an example of explicit dialogue (between the children and Marina) and two examples of implicit dialogue: The mother convinces Pedro, the Fisherman, and the children talk with their father. At the same time, the motivations of the characters are better explained: in fact, the plan of the father in this case is what gives the story its logical, sequential structure. Though the story does not follow the plot proposed by the first story, which involved a treasure and a talking dolphin, we understand better the motives and goals of all the characters. The story is still written by omniscient narrators, but the characters are better explored and secondary characters and places are named, which indicates a notion of location.

The element s that suggest character´s Agency in this story are less evident than in other stories written in this school in this stage of the research, but at the same time, is apparent that the brothers, in this revisited version, obtain knowledge in a more concrete, substantial way than in the first story – and in

fact, the discovery of the different climate regions in the state mirrors what the narrators learned during the research -. Thus, children in this group ´abandoned´ the initial plot about a treasure hunt in favour of a concrete depiction of an acquisition of knowledge about the state and a deeper connection between characters. However, there are still no strong indicators of a gained sense of agency. Even when the children in the narrative decide to follow the map and explore it, they still do not have to face strong moral decisions. (We will later return to this point in a following narrative).

Anthropomorphic elements are reduced. It is the father who shows them the Lobera and the Dolphin Cove, and they gain awareness of how marine mammals often live: in this version, they do not take a dolphin as a ´talking souvenir´ in their way back home. They perceive the animals as a community, and even when they do not talk, they are a cause of wonder to them, even more so than in the first version, where children grant them *super-natural* characteristics.

5.1.9. Most Relevant Observations by Categories.

The most significant findings in the analysis processes for each category are presented as follows.

- **Narrative structure**

Narrative structure was well developed by regular standards in this particular group before the intervention. Children were used to write and tell stories, and to articulate their thoughts. Participation and group work was considered an integral part of the curricular organisation. As a result, the starting narrative structure was by far the more complex and better developed of all schools researched.

Even when the starting level of the classroom was exceptionally good, a real progress was observed after the intervention. The average length of the

constructed narratives certainly increased, but the most significant changes were observed in the internal structure and quality of narratives after the study period. In all cases the grade of complexity that these written stories achieved after the research was clearly more careful, detailed and multifaceted. The improvement in the quality of dialogue that was made in the classroom reflected Mercer´s (2007) and Alexander´s (2003, 2008) observations regarding the relation between the oral and written use of language in the classroom. Alexander, more specifically, notes that ´the reading and writing of all children (...) benefits from the emphasis on talk (2008, p.46) ´.

- **Dialogue between characters:**

The predominant type of talk between characters before the research was mostly cumulative. Characters were presented without much background and then ´added´ into the story. Conflict, if present, was left unsolved or solved out of the narrative, and a similar thing happened with dialogue. Characters often gave advice or recommendations, but these were never questioned, contended or built upon in an exploratory manner by other characters. Dialogue is implied; very rarely any verbal interaction was taking place within the story. The next story exemplifies this treatment of a dialogue before the programme.

> *´Once upon a time, there was an elephant named Stampi, who had a little daughter called Melina. Melina was a very curious little elephant, who spent all day exploring the forest in the company of her best friend, Cerdy, a little pink pig. They had a little collection of dung scarabs, and all the animals of the forest were their friends.*
>
> *One day, a hunter came to the forest and stole Cerdy. He wanted to make bacon, ham and sausages out of Cerdy. Melina tried to save her, but her mom stopped her, telling that doing that was very dangerous. Melina was very sad, and the animals of the forest helped her find Cerdy the very next day. Melina and the animals waited for the hunter*

to go to sleep and they stole Cerdy back, leaving a bowl full of lentils on Cerdy´s place. They returned to the forest and were very happy.´

Haynes (2002), Green et al. (2008) and Pierce and Giles (2008) found that using a dialogic approach not only helped children to master their use of vocabulary and their way of speaking, but also to improve their writing ability, especially when compared with students that are mainly taught by using traditional literacy-based methods. Haynes (2002) points put that:

> *´Through collective discussion, children learn to understand and to respond to others, (…) they learn to reflect critically. The structure of enquiry supports the structure of logical argument that in turn supports discursive writing.´* (p.128)

The stronger emphasis that the children made in constructing dialogue between characters also confirmed the observations made by these authors. Almost all stories written after the lessons programme contain dialogue between characters, even if briefly. This was a great improvement from the initial treatment that dialogue between characters received in the first group narratives.

- **Point of view**

Children often take the role of omniscient narrators in the majority of narratives they construct. Usually, their stories are constructed like a movie script; children never assumed (in the case of narratives constructed before the programme) the ´point of view´ or perspective of these characters. They were just writing a story about someone else´s experience. Characters are often under developed, as well as, their inner thoughts, motives and aspirations which are also unexplored in the narrative.

177

This saw an important change after the programme: the following narrative tells the story about a boy and his father, who make a life out of fishing. This story points towards a clearly defined point of view and towards strong empowerment indicators. A more developed use of dialogue and treatment of conflict resolution between characters can also be perceived.

Although the story portrays only a moment in the life of both characters and the development of this is somewhat limited, it represents a considerable improvement from narratives created before the programme. It is also noteworthy how the story is, in fact narrated entirely from a first-person point of view.

> ´My dad is a fisherman and we are poor, but we are happy. I live near the sea, and the sea is blue and beautiful. I go to the school and know that not everyone is as lucky as I am. Because of the sea, I eat well, because of the sea; my dad can sell fishes and buy other things. He uses an old, artisanal net, and throws it at the sea. The net almost always comes back loaded with fish.
>
> I do not think we need much more.
>
> The day when my father arrived with some different, nasty nets, I got angry, but said nothing. These new nets captured more fishes that is true, but also caught many other things. I had to clean the new nets every night, and saw all kinds of things that we would not eat and could not sell trapped in the nets. Sea stars, little crabs, and many other things. But my dad was happy with the new nets, and he said he was making much more money because of it.
>
> One day he caught a dolphin. I was very angry and I yelled at him. He was angry, too, and he yelled back at me. I did not help him with the net that day. I cried a lot.

One day I cut myself with the net. I remembered the dolphin and again started to cry. I had to do something; nobody else would do anything if everything continued like that. I handled a sharp knife and destroyed the net. My dad got angry, he almost hit me. But then I told him:

´´That could have been me! ´´ if I lived IN the sea, you could have killed me! ´´

He said nothing more but tried to repair the net. He could not repair it.

The next day, some inspectors came. Somebody had told them that my father used nets that were forbidden by the government. All they could find was the destroyed net and they left the house without my father.

My father was very scared and never again used that kind of net again. ´

One of the things that are also worth considering about the last story is how a group of children (boys and girls) from middle to high income families can situate themselves in the point of view of a poor boy, and portray his conscience struggles. The ability of assuming a point of view different form one´s own is also assumed by the main character: The boy, upon being wounded while cleaning the nets of his father, feels more ´clearly´ the death of the dolphin. -´That could have been me! ´- he reasons ´if I lived in the sea´.

   The ability to assume a point of view different from one´s own -as observed by Green et al, 2008- is considered of crucial importance for both reaching a comprehension of different realities, and for acquiring a deeper environmental awareness. The majority of narratives written in the last stage of the research allow us to see how the focus on dialogue helped children in this group to locate themselves in different perspectives, even when these were much different from their usual sociocultural frameworks.

This follows Green et al observations regarding the process in which the students discuss and form narratives, which in this case allowed for the creation of a more ample language context that could be then explored in order to clarify how through interactions framed by the research the class constructed patterned ways of ´knowing, being and doing´. (2008, p.117)

- **Agency indicators**

One of the aims of this research was to grant a sense of agency to children in order to avoid the feeling of ´ecophobia´ signalled by Sobel (1996) in which the author fears that, due to the inability of taking action upon environmental issues, children will ´detach´ themselves from them, in order to confront the feelings of hopelessness and disempowerment. Said detachment is seen by the author as a natural reaction (a *distancing technique*, in the original), developed as a protection to ´avoid continuing exposure to the painful emotions they experience when told about environmental problems that are at the same time remote and not always fully understandable for them´ (p.2).

For this reason fostering of a sense of agency of knowledge was seen as crucial for the purposes of this research. The last narrative represents the best example of the development of a sense of agency of knowledge in this particular group.

Whereas in the majority of the narratives written in the first stage of the research things simply ´happen´ to the character (as exemplified in *Cerdy´s Story*) consecutively and with little or no opposition by part of the majority of characters, in the last story the Boy adopts an active role and even risks punishment for his actions, assuming his role as an agent of change. This sense of agency, as Barnes (2008), Solomon and Black (2008) and Freire (1978) recognise, associated with the acquisition of knowledge, but also with the attainment of a true citizenship identity, (Alexander, 2008) is shown when the boy makes a decision and strongly defends it, even as it implies a confrontation with his father.

The actions of the boy, happily, have a good outcome, and his father finally sees the reason behind his actions. Children in this team spent considerably more time writing the last story than their first one, and had a series of discussions about whether the actions of the boy were justified or not, and how they would react if they were his father. At the end they all agreed on the happy ending, but this was one of the most conflicted and controversial stories –both in their developing process and within the narrative - in the entire programme.

- **Presence (and type) of anthropomorphism**

In almost all stories at the beginning of the programme, animals featured prominently: however, a deeper analysis revealed that they often were portrayed outside of their habitat, and displayed characteristics and behaviours strongly linked to anthropomorphism. In fact, as can be seen in the first narrative, they are acting as charismatic human substitutes, not as animals. The story about Elphi could be the story about the kidnapping of a little human girl, and noting would have to be changed for making sense of that story.

This follows Tunnicliffe´s (2004, p.56) previously discussed observations on anthropomorphism and children, in respect of how common it is for them to explain certain species behaviour using *human* logic. Cerdy´s Story also portrays relationships between animals which could not happen in a *real* context, (i.e. a relationship between a Pig and an Elephant, even when the pig did indeed lived in the jungle, would be highly improbable). This also reflects Brown´s (2004, p. 51) remarks on the common portrayal of interrelationships between organisms amongst children, which is another form of negative anthropomorphism, acting as an obstacle to reach a true understanding on environmental relationships on the children´s behalf.

In this group´s case, Anthropomorphism after the programme, at least the inclusion of animals as ´human substitutes´, and the portrayal of non-realistic relationships between animals and humans and animals, was strongly diminished. In fact, almost all of the narratives constructed after the programme

were centred on humans, and how their decisions affected the lives of those close to them and their community and environment.

5.2. Second School.

The school is composed by three large buildings and three small ones. It was the first primary school to operate in Baja California Sur. It is very different from the First School school; even if both are just across the street. When I walk along the street, I can see the two schools, one in front of the other. This makes me think about the current reality of Mexican education, where very different theoretical frameworks co-exist at the same time, in the same country, and even -sometimes- within the very same classrooms.

The headmaster greets me as I enter his office and I present myself. We have only talked over the phone tree times, but apparently he remembers my voice, and all about my project. He seems excited at the idea of hosting a study on environmental education at his school, and asks me a lot of details. He takes a brief but careful look at all my lesson plans and I show him the materials I have prepared for the classes. He also recognises the constructivist approach in some of these materials.

He tells me that his teachers strongly need to gain this kind of focus, and that he wishes he had a way of making them take more courses on new theoretical frameworks, new teaching methodologies and subjects that are being taken more seriously, as arts and environmental education.

I sense a kind of restlessness about him. He shows me the school, but he does not seem proud about it. Not proud about the gardens, nor about the recycling bins that he has got installed recently. The children do not seem to know how to use them, and even as we speak, I notice that all kinds of waste are mixed in them. He notices that, too, with mixed feelings. He tells me that he really expects they will learn over time.

5.2.1 School Background

There are 35 children in each group of this school. They have the ENCICLOMEDIA installation –a computer, complete with a projector and an interactive white board in the front. - According to recent educational laws that seek to modernise the didactic processes in Mexico, an ENCICLOMEDIA system has to be installed in every Mexican public-school-classroom.

I know, however, that this is far from being a reality in all the schools. Surely, in order to have the installation made, the headmaster had to fill a lot of paperwork. This tells me that this particular headmaster is willing to make an extra effort for his school.

He speaks to me in great detail about the teachers in these groups. Apparently, he gets along very well with Mr. P, and tells me that even when he is very quiet, he is a good teacher and truly cares about his students.

He does not talk about the teacher in the other group. I am not sure as to why, but I believe that he does not hold her in a high regard. This is not uncommon. Due to some particularities in the Mexican educational system, teachers who have tenure are untouchable in a way, even for the headmasters in their own schools. So even if the headmaster does not get along with her, even if he disapproves of her methods, there is very little he can do about it.

He introduces me with Mr. P. He is quiet that is the very first thing I notice about him. He also seems calm, and he leaves his group to greet me in a similar fashion. He catches his student's attention with a hand movement, and then points to the door. They understand and continue working, only a few looking above their classmates towards me.

I have to make an extra effort to interview Mr. P. Unlike M and most of the First School' school students; he does not seem eager to disclose his opinion. However, he has a very well defined –and positive- opinion about this study: both the subject (environmental education) and the proposed approach. He

smiles when I tell him there is going to be a lot of talking going on in the classroom, and says nothing.

Mrs. A, the teacher in group "A" in the same school, is quite different from him. She is very verbal about her distrust in the study, and sceptical, at the very best, about ´allowing her students to talk´. ´You do not know them´ she says. ´They will jump at your throat´.

5.2.2. Audio recordings of oral interchanges.

The methodology for the analysis of classroom dialogue proposed by Mercer (2004) was again used in both of this school groups. Indicators of Disputational, Cumulative and Exploratory talk were recorded, identified and measured, and the most important patterns in children´s classroom talk habits were addressed. Fewer recordings were available for analysis in this school than in the First School. These recordings were also of a lower quality than those of the previous school, due to the very different surroundings and environment in both schools.

Both groups in this school possessed very different classroom talk habits to those in the previous school. Children in both groups were less confident when talking in groups than children in the First School, in very different ways, and for different reasons. Children in group A had poor talking habits. Talk amongst them was mostly cumulative, but once a new idea emerged, interchanges could rapidly change to Disputational talk instead.

Laura: I do not think we can write a lot about plants.

Oscar: No, they are not very interesting.

Laura: Yes, they all look the same, and do nothing special.

Carlos: You are right; she tells us that we are going to talk about animals in the next classes.

185

Oscar: We should write something. Maybe about roses, or some plants that ARE interesting.

Carlos: Oh, I do not think so.

Laura: (Aggressively) Why do not YOU write something?

Questions, novel ideas and participations often found similar answers. One of the most remarkable things is that the control of the group or the struggle for imposing one´s opinion was very rarely the focus of these Disputational interchanges. It was like children were trying to maintain the cumulative nature of their interchanges, to always follow the same pace of work and to essentially drown any sign of Exploratory talk. When analysing these patterns, it was found, that those attitudes often mimicked the approach of their own teacher towards them. We cannot assess to what extent the teacher´s attitude determined the dialogue patterns within her group, but we found support to this idea in Alexander´s (2008) observations about how the teacher´s dialogue patterns greatly determine those of his own students.

   Sadly, in this group´s case, the teacher was never as willing to participate and as open to self-criticism as M -the teacher in the First school- was. Therefore, the use of Meta-cognition tools in this classroom was not an option. Still, even without the teachers´ participation, some improvement could be made to enhance classroom talk patterns. As extra emphasis was being put on the value of participation and the sense of agency of the group developed, a change of dialogue patterns could be perceived at the end of the programme.

Sandra: I have a question, maybe she could tell me something.

Rubén: What is it? Tell us first.

Sandra: Oh. (Pause) She gave us some ideas for helping, but I think I could add some other things.

Maria: Oh, Ruben is right. We should discuss that first. But I think it should be fine. You often have nice ideas.

Sandra: Oh, thanks.

Group B´s dialogue patterns were more constructive from the beginning. Although most talk was cumulative, children in the classroom had a more favourable view towards participation and new ideas. Dialogue patterns were closer to those of the First School than to patterns found in group A in this school.

Mario: So, what do you think? It was not hard.

Adriana: It is fine. It seems fine.

Gabriel: So I think we should write it.

Mario: Ok. Yes.

Dialogue patterns grew in complexity and length as sessions passed. This development was comparable to that of the A group, and the quantity and quality of the oral interchanges of both groups could be considered as similar after the programme. This is consistent with the quantitative data for both classrooms.

Luis: Let's discuss it first.

Maria: I think we all think the same.

Carlos: Luis is right, we should discuss it. Is that ending right?

Maria: I think it is right. I believe that could happen.

Luis: Yes, you are right. It could happen. But is that how we want the story to end?

Carlos: I think it could be better. We can do it better.

5.2.3. Teacher interviews prior to the programme.

During the interviews, most of the opinions expressed by both teachers were quite contradictory between them, and only after a later analysis, I could realise how these opinions strongly reflected their own views of their pedagogic practice, and how these views greatly determined the conditions, environment, and dialogue dynamics in their classrooms before the study.

Ms. A showed a negative reaction about the possibility of integrating environmental education into the school curricula:

> *"I do not see the point of it, to be honest. I think it is just a "fashionable topic" right now, and with all the ads on television and in the radio, I think that is more than enough for children to understand (…) I do not think that discussions about this subject have any place in the classroom".*

She proved to be a participative interviewee, and expressed her opinions willingly and easily, but also admitted to have a negative bias on her attitudes towards the proposed methods, and non-traditional teaching methods in general.

> *´We have been doing things like this for so long for a reason. It is what really works. You cannot let children take control, it would be chaos.*

You cannot let them speak in class, what would they talk about? The teacher has to have control. (…) Us, teachers, will always know better, we know what is good for them, we know the program, and we know the world.´

In contrast, the teacher of the ´B´ group, (Mr. P) is harder to interview as he does not talk so easily, and needs encouragement to do. He also takes a long time to formulate his opinions. However, he seems to approve dialogue-based methods.

´ Even when we very rarely work with creative writing, at least, I let them express themselves. The program encourages us to find new ways of making the class more interesting, and even we do not work in teams so much, I guess we could try.´

At the same time, he was more open about incorporating not only environmental education, but other subjects into the curriculum.

´I guess we could talk about everything. The school is for many children, the first place where they learn about the world. I think that (environmental education) could be one of the themes we can discuss in class, especially if we have a manual. It can also be helpful for natural sciences, I think. ´

There are marked contrasts between the opinions and arguments of both teachers. These differences show me how within the same context –the context of the official and public primary education in Mexico- two teachers can hold totally different perspectives and points of view, regarding pedagogic methods and themes relevant to their classes.

5.2.4 Student interviews prior to the programme.

It was evident that students in neither group were used to engage in dialogue, especially during class. However, each set of students held very different opinions and concerns about the possibility of incorporating dialogue into their classrooms in a regular basis, and receiving lessons on environmental education.

On a very basic level, Mr. P´s students were excited at the prospect of having environmental education. They also seemed optimistic about working in groups and talking as a primary way of work. They did not have trouble expressing this when being interviewed. However, Mrs. A´s students were different. Most of the children looked towards her teacher a lot during the interviews, some of them anxiously or hesitantly so.

> *"Are you sure Ms. A is going to let us talk? She certainly does not like it when we talk in class, or when we have a different opinion from her, even it appears to be supported by the text book."*

Another student view was more optimistic:

> *"I think I will like talking in groups. It is going to be very different to the way we usually work. Ms. A always says that we should remain silent during class."*

Nevertheless, children seemed happy at the prospect of working in a new way, and the possibility that became open to them; they also showed a lot of curiosity regarding environmental themes.

In group "B" children did not have more experience talking amongst themselves, but their perception of their classroom environment was less restrictive.

> *"Mr. P. encourages us to talk, and to read, even if he does not talk a lot. He is very patient and sympathetic to us. He is quiet but he knows how to listen".*

Even when interviews were mostly composed of questions about children´s own dialogue patterns in the classroom, these kinds of assessments were common in this group. It was perceived that children felt encouraged and supported by their teacher, even when quantitative classroom talk indicators were not as high of those found in the First school. These feelings became apparent during the interviews.

> *"We sometimes discuss news that appear on television. He mostly listens to us, hears our opinions, and only from time to time he tells us what he thinks. It seems to me that he likes to listen to us. "*

How children perceived their teacher´s attitude towards their own learning reflected on how confidently they participated in the interviews, first sessions of lessons. For example, children in group A seemed very anxious of talking in the first session, especially when in front of their teacher. I have to admit I felt relieved when she decided that my class was a ´waste of her time´ and that she ´could spend the fifty minutes I was with her group in the teacher´s room´. This proved to be the best for everyone involved. Children started to participate more actively on session two, and began to actively take part of the class.

In Group B, the most difficult thing was to get them talking and writing narrative texts. Mr. P was in the class at the same time as them, and he smiled when some of the children blamed him and his quietness -jokingly- for their classroom talk habits. Willingness made the lessons more fluid, and the advance more consistent, and ´tangible´. At the same time, everyone´s efforts seemed more promising as they were supported by the teacher.

5.2.5. Teacher interviews after the programme.

Even when he did not participate as actively as M, the teacher in the First school, Mr. P. showed interest in keeping the manual and the materials, and even asked for advice on his usual practice.

   At the end of the lesson program, he also kept the poster with the "Talking Rules" elaborated by the group, and during the final interview, he manifested his purpose of being more active in trying to develop a *dialogue-friendly-environment* within the classroom.

   This teacher also made emphasis on how useful the methods were in helping to promote constructive dialogue, and noted that children were now more active and participative during class.

> ´And I wanted to do that, I wanted to allow them to talk, but now I think that in fact my own personality was undermining my efforts. Now I realise that in fact children would speak more and be more encouraged to talk if only I would speak more, and in this new, different way. ´

When asked about the level of replicability he perceived in the methods, and if the methods were in fact useful to promote learning he answered:

> ´I do believe that children are more open now to all kinds of learning. I think environmental education is a very complex subject, a composite if various topics, so that helps. But I think this approach would also help with history, geography, and other subjects that need to be discussed in order to be better understood. (…) I can see me working with these methods. It would be difficult, at first, but the many improvements in the dynamics and environment of the classroom would make it a worthwhile effort.´

The positive perspective that Mr. P had about the study and the effects that it had in the group was not shared by Ms. A, who had a very different opinion about it.

´I do not see the point of changing the usual way a lesson is given. As I told you, we have been doing this for so long for a reason. (…) Children were harder to control every time you left the classroom. They still wanted to talk, and I wasted a lot of classroom time calming them down so I could give my lessons. ´

She highlighted that the proposed methods did not comply with her usual approach, and argued that using them was not only difficult, but also lacked all purpose.

´Why would you want to encourage children to talk when what you really want is for them to be quiet and listen to you so you can really give your class?´

5.2.6. Student interviews after the programme.

Children in group B were more open to talk about their classroom dynamics after the lesson programme. More children were willing to participate in the interviews, and almost all of them commented on the improvements of the classroom environment.

´Mr. P. has always been a good teacher, but now he tries to talk more. You can tell he tries hard, but looking at his effort makes me want to try and participate more, and being a better student.´

Another student also commented in the new environment in the classroom.

´I now feel more confident when speaking, because everybody talks. You can talk and nobody will look at you as if you were breaking the silence or something.´

Children in group A commented on how different this new way of working was to the usual way lessons were given in their classroom.

'To tell you the truth, I feel smarter during your lessons. We would not write anything, just talk, and in the end we learned a lot. (…) I think we wanted to know so much about everything. We had so much to learn, and we learned a lot in the end.'

Another student expressed her feelings when working with the new methodology.

´it was very different, it was easier talking with you, because you wanted us to talk, but I also felt that you really wanted us to learn. Like you were happy talking with us´.

Almost all children expressed how they perceived themselves as more able and confident in making choices and expressing opinions, reflecting Alexander´s (2008) and Barnes´s (2008) previously discussed views on how methods open to dialogue help foster a stronger sense of agency of knowledge and confidence that more *authoritative* methods cannot develop.

Even when most of the time children in this group worked in conditions that were very different in essence to the environment and dynamics that our methodology aimed to foster, a healthy sense of agency, apparently, had been originated within the group.

5.2.7. Analysis of narratives.

While the same categories of analysis were used in the Second and First primary schools, both showed very different narrative patterns, and furthermore, these patterns varied slightly from group to group within the same school. The following narratives have represented typical examples of each group of children in the Second School.

I am afraid of the dark. My mom sometimes tells me that I should turn off the light. But I do not think that a lamp causes pollution, because it is not fire and it does not cause smoke. Even so, I have to turn off the light.

This story is written in first person, and it clearly is about some anecdotic experience. During its construction there was no apparent team work in this group. What did happen was this: a child got tired of talking with other group members, wrote this and presented the finished work to his team. Since it was already finished, the team agreed to present this text as the work of the team.

It was evident that for most children in this group, working in teams posed a challenge, for a variety of reasons. They often felt discomfort when expressing their ideas, or stating their points of view. Even after I told them that I expected them to talk, they usually avoided dialogue, even within their own working group. In the first sessions, they also looked at me, and continuously asked if they were speaking too loud or were saying something wrong.

The following narrative is representative of those elaborated in group ´B´ during the first session.

We must take care of animals, especially those that live with us, and cows and chickens, because they help us, and we have to be grateful with them.

Even when children in this group were more used to working in teams, and almost all the written work was the result of the joint collaboration between all students, children in this group presented conclusions of their joint reflecting, not narratives. They later justified this, explaining that for them, writing a narrative was harder than writing a conclusion, especially when working in teams.

The structure of both these short texts is not complex, the development is linear in both, and their lengths, even if very below the average when compared to the written narratives of the First school, are also typical for the age of the

children in the groups. They constitute a representative example of the type of stories written in this school –and in these groups- before the lesson programme.

In both texts, as with all the texts written before the programme in this school, there is no explicit dialogue, as there was no dialogue in the First school. Even more worrisome was the lack of ´defined characters´ within the texts written in this school. Without said characters, the location of dialogue, point of view and agency indicators becomes even more difficult.

Agency indicators are even more scarce in this school, and here (especially when talking of group A) we could point to some indicators of the contrary: children in this group, write stories that show a lack of agency. For example, in the first story shown above, the student's estates that he has to turn-off the light anyway. There is no explanation to him or choice as to why does he have to do this, or if he can chose a different course of action.

As with the First school, the same categories were used to analyse the development of narratives written after the lesson programme. In all the cases groups would choose to develop a different narrative. This makes the comparison of stories more difficult, but it was tried that all the compared stories had similar elements of analysis so relations amongst them could be better established.

The same categories were used to analyse the development of the following narratives, written at the end of the lesson programme.

> ´There was a lady who always wasted too much water when taking care of her plants. Even when watering plants is important, after she watered her garden, water would flow into the street and that was a huge waste, and would not let children play on the street because of the water. The children tried to tell her that she wasted too much water, but she would not listen to them. Only after the children told their parents the problem was solved, because they got together to talk with her as she listened´.

196

Analysis

The narratives shown at the end of the lesson programme in this group showed a great development in their coherence, complexity and structure. Dialogue and negotiation are implicit, but present, and the location in which the story takes place and the resolution of the problem are also clear; children have to ask for help from other adults, but at the end, all work together towards a solution, so a stronger sense of empowerment and co-operation are also found in this narrative. All these elements indicate a substantial development when compared to the text written by the same group of children in group A, at the beginning of the lesson program.

   The following narrative shows an example of the development of narratives in group B at the end of the lesson programme.

> ´There was a child that was very cruel to animals, and he usually would kick dogs, pull cats by the tail, and throw stones to little birdies. One day, a fairy appeared and told him he should not do that, but the kid would not listen. ´It is not right that you treat animals' badly´. She told him. ´I do not care´ said the boy ´Nobody will punish me and I do not have to listen´. However, at night the fairy came to the boy and he had a magical dream. He dreamt that he was a little dog and that a mean child ran after him to kick him. After that, he was a cat, and the same boy grabbed him and pulled his tail. But the worst was being a bird, and being stoned as he flew. The boy woke up and he was very sad and afraid. He promised to be good, and never to be cruel with animals ever again.´

Analysis:

As discussed above, Group B in this school had problems when it came to creative writing. This team, however, transformed their initial text (a jointly drawn conclusion on why we should protect animals) into a narrative at the end of the lesson programme.

Characters, although not greatly developed, present particular characteristics, and even engage in explicit dialogue, in which they give arguments and reason their actions. The story, written and structured like a fable, is also is more complex than the initial text written by this team. A sense of point of view is also given, as the child in the story, who at first does not have a problem with treating animals badly, experiments trough a dream what animals feel when being the subject of his mistreatment, and changes his course of action based in this insight.

5.2.8. Most Relevant Observations by Categories.

The most significant findings in the analysis processes for each category for all of the narratives are presented next.

- **Narrative structure**

When compared to regular standards, narrative structure was not very developed in either of these groups. Children were neither used to write and tell stories, nor to articulate their thoughts. Participation and group work were not considered an integral part of the curricular organisation in group A, and in although they were considered more importantly in Group B; they were neither of central importance to the teacher. As a result, the starting narrative structure of both groups was less complex and developed than that of previous school, where all these aspects were encouraged by the groups´ teacher and programme.

Taking into account the different starting level of the classroom, after the intervention a real progress was observed. The average length of the constructed narratives increased significantly in both groups, as did the internal structure and quality of narratives after the study period. In the case of both groups, the grade of complexity that these written stories achieved after the programme increased. The stories were more carefully constructed, detailed and multifaceted. As with the First school, the emphasis placed on the quality of dialogue that took place in the classroom reflected Mercer´s (2007) and Alexander´s (2003, 2008) observations regarding the relation between the oral and written use of language in the classroom.

- **Dialogue between characters:**

In group A, at the beginning of the lesson programme, children did not present explicit dialogue in any of their stories. If any representation of ideas took place within the text, it was often in the form of a figure (a character or characters) that imposed their way of thinking. In group B, dialogue was also absent from the written work of children in this group. This was especially evident as they presented their ideas in the form of conclusions, rather than narratives.

In the case of group A, conflict, if present, was left unsolved or solved out of the narrative, often by imposition of the point of view of the dominant character in the story. Dialogue is implied, very rarely any verbal interaction taking place within the story.

At the end of the lesson programme, the stronger emphasis that the children made in constructing dialogue between characters also confirmed the observations made by Haynes (2002), Green et al. (2008) and Pierce and Giles (2008), about the value of a dialogic approach in encouraging collective thinking and discussion, and how this has a significant impact on the children's writing skill. (This was also previously discussed in the First school section). Almost all stories written after the lessons programme involve a form of dialogue or ideas interchange. This was seen as a great improvement from the

initial treatment that dialogue between characters received in the first set of texts written by both groups.

- **Point of view**

Almost all the stories written by Children in group A had only one located point of view: that of the narrator. Children in this group showed many difficulties locating point of view, within or outside the narratives they constructed. During the lesson programme, children in group B could locate or define the "point of view" concept more easily than children in group A. However they wrote joint conclusions and not narratives, and during the analysis of written narratives in this group, the point of view could not be located within their texts.

At the end, stories that had one or more possible points of view appeared in both groups. One particularly interesting example of this is the following story, written in group B, in which two different points of view are narrated.

> *The little tree was planted by a young boy. The grandfather of the young boy told him that the tree would be forever grateful to him. The young boy grew up and had children, and as he grew up, and his children grew up, he liked to think that the tree was also growing, and felt good about it. At the same time, the tree saw the man and his children, thinking that he was as much a part of the man, as them, as he was alive because of him, too.´*

Even when in the story there is not explicit dialogue, we see the man looking at the tree, thinking about how the tree feels, and in turn, the tree is thinking about the man and himself, and the relationship they share. Even when plants usually do not display opinions or take actions in stories, children in this team could see themselves (and their environmental efforts) from the point of view of the tree.

This was consistent with the results obtained in the First school, and with the previously discussed authors, that observe that the process in which the students

discuss and form narratives, allows for the creation of a more ample language context. (Green et al, 2008).

- **Agency indicators**

During the study, children in group A had more difficulties acquiring consciousness of their own agency with regard to their own learning process. It is difficult to assess to what extent this reflected the daily struggle they encountered within their own classroom. In their stories even those written at the end of the lesson programme, agency, if acquired at all, had to be negotiated, ´fought´ for, or acquired with the help of another character, that would help the main characters to achieve their goals (One example of this is one of the previous stories, in which the adults in a neighbourhood help children to be heard by the lady that wasted too much water).

Children in group B had less trouble assessing said agency. Again, it is difficult to determine the role of their teacher in this, but Alexander´s (2008) observations about how the teacher´s dialogue patterns greatly determine those of his own students, and how the children in this group expressed about their ´supportive´ teacher, (Mr. P) during the interviews (versus the more anxious, uncomfortable reaction that children in group A showed around their teacher) seem to support the validity of these observations.

The following story, written in group B, depicts the acquisition of agency as a central theme.

> ´Alberto was a farmer and his family suffered a lot because of the lack of water in their field. Since he was a boy, he saw how his father and grandfather lost many of their crops to the dry weather. There would never be enough water, he thought. One day, he told to his father, ´I think there could be a better way´ his father looked at him. Even when he was very young, Alberto was very smart. ´I am listening´ said his father ´Tell me.´ Alberto then showed his father to make a simple hydroponic plantation. ´They taught me this at school´ said Alberto. His father was very happy. ´I

never went to school, and I am very happy you have. I want to hear more of what you have learned me from now on´. They started cultivating like that, and they wasted less water, and had no losses in their fields.´

This story depicts to a great extent several of the previous points. In group B, the characters did not have to deal with confrontation with others to obtain agency: it was often obtained through dialogue and recognition. In this story, even when Alberto is young and describes something new to his father (hydroponic methods were explained during the lesson about ´water´ and water scarcity during our programme) he listens to him, and resolves to include him more frequently in his own decision making processes.

- **Presence (and type) of anthropomorphism**

Animals were not very prominently featured in the narratives written by both groups in this school at the beginning of the lesson programme. When present in the story, they were often portrayed outside of their habitat, and displayed characteristics and behaviours strongly linked to anthropomorphism, as in the case of the First school.

The following narrative shows how this views were modified after the programme in group A, but can be seen as representative of both groups, as both shared similar views and perceptions regarding anthropomorphism before and after the lesson programme.

´Silvia liked her garden very much, as it was pretty much like a little forest, and also liked to hear the birds signing in her garden. She sometimes thought the birds were happy and that they sang for her. Her dad once cut some of the branches of the trees. ´I am doing this so the trees grow better´ he told her. However, Silvia was sad, and she noticed that there were fewer birds now. At first, she thought that the birds were angry, but then, when they came back as the garden turned in to a little forest again, she realised that the birds loved the trees and flowers as much as she did.´

In this narrative, children offer an insight in the point of view of Silvia, who realises that the birds do not sing for her. Also, at first she confers very human emotions to the birds (happiness and anger), but she realises that they just like being more in a "little forest" than in a well-kept garden. The process in which Silvia gains insight from the bird´s behaviour the follows Tunnicliffe (2004) previously discussed observations on anthropomorphism and children, and how they can gain a new sense of understanding of animal life through dialogue based teaching.

5.3. Third School.

This is the school where I got my primary Education. As I walk down the halls and classrooms with the headmaster, I realise how little things have changed in almost 17 years. He takes me to the inner patio of the school, where children are playing. It has changed very little. It is still as I remember: Dirt and dust, and I know it gets terrible muddy when it rains. Children love it, of course. There are plenty of trees, and I think that at least one of them is over a century old. Children call this tree Tata Tamarindo (Grandfather Tamarind) because everyone that has ever set foot on this school knows this tree has been here longer than the building.

He also shows me that the school has recently put in separate waste containers. As in the Second School, children are still learning to use them, but he seems more optimistic about it, and less worried about the mixed waste than the headmaster in the previous school

The Headmaster introduces me to Ms. T and Ms. V, the teachers of the 6th grade groups, A and B, respectively. Both are young, and apparently they have been working with both groups only for a short time. They seem happy to participate in the study; however, they decline to participate in the interview, and are also against allowing their students to be interviewed.

I do not insist on the subject, and instead I try to gather as much information as I can about how pedagogical practice and environmental education are seen in this school. According to them, and to the headmaster, environmental education is well inserted within this school curriculum. Teachers in both groups have made arrangements to take children to the beach and to a ranch earlier in the year.

But when the talk returns to classroom dynamics and pedagogical practice, they start to give motives as to why they do not want to participate in an interview about their teaching methods. Apparently their main reason to do so is that they feel not experienced enough, and mostly under-prepared to talk

about teaching methods, and they would feel uncomfortable discussing their pedagogical practice with me, especially since their opinions would be recorded and used in the project.

Even when I assure them that the interview, and all their views and opinions would be handled in a confidential manner, and that their names or their students´ identities not be disclosed, they refuse to participate in this aspect of the study.

5.3.1. School background.

Each of them introduces me to their groups. Both groups have very similar classroom dynamics, and both teachers have similar teaching approaches. In fact, they often share their lesson plans and often design dynamics that include both groups.

In the Second School there were noticeable differences amongst group A and group B, but in this school both groups are very similar, and when I apply the starting questionnaires. I notice that the only difference between them is a slightly higher sense of agency in group B. This difference is not reflected in the first lessons, or in the starting narratives of each group.

Dialogue does not happen naturally in the classroom context. There seems to be a very fine line between Cumulative and Disputational talk, children are not used to construct ideas collectively. However, once exploratory talk occurred, even once, or twice, it became also a part of their dialogue programme, at least within their working groups.

It would be ideal that children could carry this "dialogue programme" with them, and use it in most of their dialogue interchanges. However, I know that establishing constructive dialogue patterns with people who are not instructed in dialogic teaching can be a challenge.

Also teachers in the group, after noting the improvements in certain aspects of the group behaviour, noted how difficult it is for them to direct an

exploratory talk-based dialogue in order to foster learning. In turn, children often verbalize how easy it appears to establish constructive dialogue and how difficult it can really be.

One of the most recurring patterns in both of these groups is how introverted children are and often the ones who have difficulties presenting their thoughts to the group. As in the First school group, dominant children often are not aware of the effect they have on their peers. However, and like in that school, once extroverted children notice how important they are to the group´s dynamics, and how valuable they are for their peers´ learning process, they consciously try to encourage their peers to participate in class, especially when working in small groups. When doing this, they can, in fact become active promoters of their peers´ participation.

Unlike the First school group, and because it was not possible to record audio in neither group in this school, it is not always possible to show them how this process takes place. Children in both groups reacted favourably towards the methods and the approach.

Despite their initial concerns, both teachers kept the lesson programmes and the poster with the ´Talking Rules´ constructed by each group, and even when they still did not wish to be recorded or allow for interviews to take place in the classroom, they recognised the value of dialogue and how children in the classroom appeared to be more confident now in exposing their doubts and ideas, not only in the natural science classes, but in all the subjects.

This puts Alexander´s ideas (2008) into focus: the traditional Mexican education system is of the "authoritative systems" he describes, where the focus in the regular lesson in often placed on literacy and arithmetic. However, since dialogue based methods place and emphasis on the interchange of knowledge, and developing not only a strong external but also internal dialogue, children through these methods often gain confidence and a clearer insight in how ideas are shaped and constructed, not only socially, but within their own minds. This

insight enables them to shape more carefully and accurately constructed ideas, not only in a social context, but by themselves.

When children learn the proper terms for some of the concepts they have already created, and learn where these concepts fit, a particular type of knowledge takes place. They have constructed said knowledge, and already socialized it, thus it becomes theirs, and at the same time, part of the groups. It is clearer, more memorable, more tangible, and more real.

Laura Barraza´s (2010) observations about environmental education in Mexico are correct. She argues that it is difficult, in the mind of the Mexican child, to imagine the absence of natural resources. That is true, at least in the schools were I have worked so far. Children cannot visualize the absence of a blue sea, and a clear sky, because they have always known them, and they see them every day. And I do not want to substitute this image. I want to talk with them about how to protect all what they know, and let them know that they can make a change.

5.3.2. Analysis of Narratives.

The same categories of analysis used in the previous schools were used again in this school. The narratives created in this school were similar in their narrative structure, and comparable in length to those elaborated in the Second School. However, unlike groups A and B in the previous school, which had very distinctive interaction habits and dialogue dynamics, both groups in this school shared similar patterns between them.

The following narratives represent typical examples of narratives constructed by children in group ´A´

> *´There is a big tree in the school. It is older than the school itself. You could not take down that tree. The school would never be the same.´*

207

´The desert was dry because of the lack of water. A family started pouring water in the desert, and little by little, they turned the desert into a forest again.´

The following narratives are representative of those elaborated in group ´B´ during the first session.

´In the past month, we went to a ranch near san Pedro. All was green and very beautiful. We think that maybe the city is so full of people that plants cannot grow properly and that is the reason the city is drier than San Pedro´.

´We should take care of trees. Big trees, like Tata Tamarindo, attract butterflies and birds´

Children in both groups had almost identical classroom interaction habits. Almost all the written work was the result of the joint collaboration between all students, but in a similar way to that of group B in the Second School, children in this school did not possess a lot of experience at narrative construction or creative writing. The structure of these representative texts is not complex; their development is linear and their lengths, even if very below the average when compared to the written narratives of the First school, are typical for the age of the children in the groups.

In all the texts written before the programme in this school, there is no explicit dialogue. As in the Second School, there is a lack of ´defined characters´ within the texts written in this school. There are references to ´a family´ and ´a tree´, but without constructed, acting characters, and as noted in

the previous section, the location of dialogue, point of view and agency indicators are clearly diminished.

As with the First and Second schools, the same categories were used to analyse the development of narratives written after the lesson programme. In this school, children would often create their second narrative taking elements from the first one. Also, some central themes appeared: Children in this school were mostly concerned about the desert, and also about trees, and the figure of a ´Big Tree´ often appeared in their stories. Sometimes this figure would even take the name of ´Tata Tamarindo´, central to the life of this school. All the compared stories had similar elements of analysis so relations amongst them could be better established.

The following narratives were written by the children in group A after the lesson programme.

> ´Tata Tamarindo is a very old tree. If it was a human, it would probably have many children and grandchildren and know a lot of things. He probably would know more than any of our teachers, and even the headmaster. If they say we have to respect our elder, we have to respect and protect nature, too, because it is older than us´

> ´A People often think the desert is dry and dead. So people were not worried when they started cutting cacti to make a mine. When the last biznaga was cut, they realised their mistake. But it was too late. Now everything in the desert was really dead´

The following narratives were written by children in group B after the lesson programme.

´There was a land where there was only one tree left. People noticed how birds and butterflies and other animals gathered around the tree, and tried to feed from it, or to protect themselves in its shade. "We should have been more careful" they said. They tried to take care of the tree the best they could, but they realised the best they could do was to plant more trees, or the poor, lonely, big tree would die.´

´Elisa thought that the desert was dry and lacked life. ´I do not like the desert´ she told to her grandfather. Her grandfather knew many things. He took her to the desert, and in the evening, she could see how the flowers bloomed and little animals ran everywhere.

´Do you still think that the desert has no life? ´

´No, grandfather.´ she told him´

Narrative structure, coherence, complexity and story length all showed a significant improvement after the lesson programme. Although the presence of explicit dialogue was still rare, there were examples of it in the narratives, as there were also more indicators of constructed characters, point of view, and agency, and fewer indicators of anthropomorphism in the texts.

3.3.3. Most Relevant Observations by Categories.

- **Narrative structure**

When compared to regular standards, and in a similar manner to the Second School, narrative structure was not very developed in either of these groups. Children were not used to read works of fiction, or speak or write creatively, or speaking between themselves to construct an idea collectively. Participation and group work were not considered integral parts of the curricular organisation in either group. As a result, the starting narrative structure of both groups was less complex and developed than that of the First school, and more similar to the one found in the Second School.

As with the First and Second schools, the emphasis placed on the construction and transmission of ideas through dialogue in the classroom reflected Mercer´s (2007) and Alexander´s (2003, 2008) observations regarding the relation between the oral and written use of language in the classroom. At the end of the lesson programme, the average length of the constructed narratives increased significantly in both groups, as did the internal structure and quality of narratives after the study period. In the case of both groups, the grade of complexity that these written stories achieved after the programme had increased.

- **Dialogue between characters**

In both groups at the beginning of the lesson programme, children did not represent explicit dialogue in any of their stories. They also repeated the pattern of group B of the Second schools, and often presented their ideas in the form of conclusions, rather than narratives. Dialogue, at the very best, was implied, and very only very rarely any verbal interaction took place, even implicitly within the story.

Almost all stories written after the lessons programme imply a form of dialogue or interchange of ideas. This was seen as a great improvement from the initial treatment that dialogue between characters received in the first set of

texts written by both groups, and reflected improvement in the use of vocabulary and depictions of dialogue structures, and discursive writing discussed in the previous chapters.

´Irma was the daughter of a marine biologist. His father wanted to take her with him in his trips, but Irma told him that she was afraid of the fishes in the sea.

´I wish there was not a single fish in the sea´ ´Why do you think so? ´ His father asked her ´How do you think the sea would be without fishes? ´

Irma thought about it and realised that a lot of bad things would happen if the sea had no fishes.

´I understand now´ said Irma. I guess I can make an effort to like them more´

- **Point of view**

Almost all the stories written by children in both groups had only one located point of view: that of the narrator. Children in this school presented many difficulties locating point of view, within or outside the narratives they constructed. At the end of the lesson programme, children could locate a point of view different from that of their own, and in some stories, the constructed characters narrated in first person, as in the following story, written in first person, and in which we can clearly locate a point of view different from that of the children.

I am an Iguana. I live in the desert. People think maybe I am dumb, but I have learned to live in the desert, and I like it here. I walk in a special way, so the hot sand cannot burn me, and I have a special skin, full of scales, so the sun cannot burn me. The desert is full of food for animals like me, and for me, it is a great home.

This story presents elements of both anthropomorphism and point of view. Children in this group made their constructed character, an iguana, to talk in first person, and so located themselves from the point of the iguana to write about its life in the desert. Even when this narrative mostly depicts the living conditions of the character in its environment, it is worth noticing how children in this team could see themselves as inhabitants of the desert –the same desert they saw as ´dry and dead´ at the beginning of the lesson programme.

- **Agency indicators**

During the study, children in both groups shown an agency sense only very briefly, and neither group could define or express agency at the beginning of the lesson programme. At the end of the lesson programme, however, some agency indicators were depicted in their narratives. The following story, written by group A, does not depict the acquisition of agency, but how a character shows that she already possesses a sense of said agency.

Omar´s older sister made piñatas out of old newspapers. He told her once how worried he was about pollution. She told him not to be so worried, and that he could learn to make piñatas with her instead worrying so much. Omar became very angry and told her why she was so calm about it.

´I use newspapers to make the piñatas, so in a way, I think I am helping.´ Omar understood how his sister was so calm and he was also happy to know she was helping.

213

As previously stated, one of the aims of the research was to empower children in order to avoid the feeling of ´ecophobia´ signalled by Sobel (1996). In this narrative, Omar´s sister calmly responds that she is, in fact, playing a part in the protection of her environment, and he, in turn, understands her agency. She is calm, and no feelings of the ´hopelessness´ described by Sobel can change how she feels about her role at taking care of her immediate environment. This simple depiction of agency and the fostering of a sense of empowerment is seen by Alexander (2008) as a true seed of citizenship identity and action, and it was seen as crucial for the purposes of this research.

- **Presence (and type) of anthropomorphism**

Anthropomorphism featured prominently in the stories written before the lesson programme. In the particular case of this school, this view was not only focused on animals and plants, but it also was used to explain the behaviour and nature of environmental phenomena. Some examples of this were the different views and misconceptions children held about the desert, and how it was perceived by them.

These anthropomorphic conceptions changed at the end of the lesson programme. Children no longer extracted conclusions based on their particular perception, and were more aware of their own role as ´humans contemplating nature´.

In one of the previously depicted narratives, the story of the Iguana- we see an example of anthropomorphism after the lesson programme. Anthropomorphism is present (as Tunnicliffe 2004, points out) when children think that the Iguana has developed ´scales and a special way of walking´ so it can live in the desert, as children think that this transformation was an intentional transformation. This reasoning still marks an advance when compared to the initial point of anthropomorphic reasoning in the group, and a different, more developed and sophisticated interpretation of evolution would be difficult to achieve in such a short time, by children of this age.

5.4. Fourth School.

This school has recently won an award for environmental achievement. The hallways are clean, and I notice that the waste bins are neater and more organised than those of the Second and Third schools. Children also have little pots with plants outside their classrooms.

The headmaster explains to me that they have not "proper environmental education lessons" -that is, to say, environmental education is not inserted yet into the curriculum- teachers include practical information, activities and advice about environment in their natural sciences lessons.

He introduces me to Mr. O and Ms. R during the lunch break. Both have been teachers for at least 15 years, but seem willing to acquire more information on environmental education: both seem motivated by the recent award and mention it more than once.

However, they both refuse to participate in the interviews, or to allow their students to participate in the process. Whilst Teachers in the Third school said that they were not experienced enough to participate, both teachers in this school had a considerable experience in the field of teaching. One of them admits that it is uncomfortable to openly discuss her practice and teaching methods in an interview.

5.4.1. School Background.

While they do not defend the long-established authoritative approach to education in the way Ms. A. (at the Second School) did, I notice that their methods are very similar: consciously or not, they are applying this traditional and widespread approach.

Mr O is more serious and stern and he speaks a lot about the accomplishments children in his classroom have achieved since the beginning of the year. He presents himself as a teacher that follows the established programme as best as

he can. He applies an authoritative approach to teaching, and sees himself as the group "leader". He describes children in his group as quiet, calm and "well disciplined".

Ms R is very different in her approach and methods. She is more relaxed and willing to participate in the study from the beginning. Even when both teachers declined to participate in the interview, she is more willing to offer her own opinions and indicate me whether or not I can cite certain bits of information. She tells me that in her classroom ´[her students] talk all the time, maybe even a little too much... we are perhaps a little too cheerful!´. She seems more preoccupied with maintaining a social and friendly environment in her classroom than academic achievement. About that, she says that she thinks that primary school is for learning, yes, but also for having fun and learning to make friends.

These differences in their approach mark some differences in their classrooms, but not precisely of the kind that they expected in the first place. The results of the initial questionnaires reveal that children in group A are not used to talk during class, rarely work in teams and have less confidence speaking amongst them.

Children in group B had stronger sense of agency, more confidence in expressing their own ideas and more experience working in groups. They also displayed a higher level of environmental knowledge and awareness, which surprised both teachers, as this group had been labelled as ´difficult ´ by everyone in the school except for their teacher, who thought that they were ´mostly good natured and happy´.

Teachers in both groups reacted in very different ways to the methods and approach of the study. Ms. R kept the poster with the ´Talking Rules´ and the lesson programme. She also manifested her intentions of following a dialogue-based approach during her lessons. She commented on the advantages of a class constructed around dialogue and participation.

Mr. O's final comments were not as positive. He neither had a favourable view about the study, nor about dialogue based methods. To him, these methods were "distracting and lacked focus" and were not attuned with the academic reality of the classroom. This was not surprising, as authoritative teaching methods generally focus on the results teachers' obtain from their students.

According to Tulis and Fulmer (2011) one of the drawbacks that this achievement-focused teaching has is that this type of learning favours the ´gathering and memorization of data ´ and does not give much importance to ´learning to speak and developing and responding to social cues´ (2011, p.41). These abilities will become very important on their life, and are mainly developed in these stages of growth.

So, according to these authors, Ms. R´s beliefs about primary school are right: it is important that children play and interact. However, in an authoritative learning environment, mostly dominated by the aim of achieving results, and accelerating the learning process, these perceptions are difficult to find. Even more worryingly, when children learn what is expected of them, and act to conform to this expectation, they deny themselves the opportunity of participating in their own learning process. In the case of this particular classroom, some of the children actively opposed to engaging in dialogue, even when these methods were designed to grant them more agency and participation in the construction of their own knowledge.

Edwards and Mercer (1987) note that the power imbalance between teachers and pupils and the pressure of school performance often results in pupils frequently spending more effort in ´guessing´ what teachers want them to say in pursuit if providing them with ´final draft´ answers, rather than reflecting upon their own ideas. Working in this way can become a comfortable, predictable pattern, and as Barnes (2008, p.5), reflects:

> ´Adults and children alike are not always ready to make such
> adjustments and sometimes cling to views of the world that are familiar

but are also ineffective or even untrue. It can be uncomfortable to have to change our ideas about how things are or how we should behave or interpret the world about us´.

5.4.2. Analysis of narratives.

Classroom dynamic in both groups were reflected in the narratives they wrote; Narratives in group were written as statements like those of group B in the Second School and most starting narratives in the Third School. These statements were slightly different: they were written as if children were trying to display their environmental knowledge –that in fact was not always very accurate.

Children in group B wrote longer and more complex narratives at the beginning of the programme. It was evident that children in this group also had more experience in creative writing.

The following narratives represent typical examples of narratives created by children in group ´A´

> *Plankton lives in the sea, so that whales can eat it. Blue Whales are the biggest mammals on earth.*
>
> *****
>
> *Dolphins are the smartest animals in the planet. They also swim pretty fast.*

The following narratives are representative of those created in group ´B´ during the first session.

> *The school recently won an award for environmental education. We all worked very hard for obtaining it. We learned to separate trash, and we planted a lot of trees. The school looks nicer now, and we are happy we won.*

Recently we have learned how to make recycled paper and piñatas with used paper. It was very fun, and we learned a lot. We think we have saved about 30 trees, because we also planted trees.

In this school, children from different groups had very different classroom interaction habits. These interaction habits were reflected in the narratives constructed within each group.

Narratives written in group A at the beginning of the programme were structured like short statements. These statements were linear, not very complex, and lacked defined characters, a clear point of view, and either implicit or explicit dialogue. Furthermore, unlike texts of this type found in the Second or Third schools, these statements were written as if to "display" the environmental knowledge of the working teams; they were written in an authoritative language. These texts also had strong indicators of anthropomorphism. It was apparent that children in this group not only had little experience with creative writing or working in teams, they were in fact the only group that verbally expressed their unhappiness about having to work this way.

Children in group B worked well in teams, and had more experience with creative writing and expression. Their narratives were often anecdotal. They often told stories about their hands-on experiences with the environment. This also allowed for the detection of a strong sense of agency within this group. Their stories were more complex and longer than those of group A in this school. However, explicit dialogue was absent in these stories.

The following narratives were written by the children in group A after the lesson programme.

´Ducks and Monarch butterflies often fly together because teamwork makes them stronger. Humans also live in communities because of that.´

* *

´Monkeys often work in teams. They have a leader, the strongest, wisest monkey in each pack. This monkey usually has a silver back, and punches his chest to tell the other monkeys: Look, I am a strong leader! So that the other monkeys feel good following him´

The following narratives were written by the children in group B after the lesson programme.

´There was a community in a very poor city that had a lot of trash. The school children needed some money for a trip, so they gathered bottles and cans and took them to the recycling plant for money. Other people looked at this, and tried to steal the trash from them when they were going to the plant for the second time. However, a little girl said to them: ´there is enough trash for everyone, pick your own. That way the city will be clean, and we will have more money´. The people agreed, and at the end, the city was very clean, and everyone was happy´

´A group of children wanted to make a play, but they only had very little money to construct the scenario. That is okay, said Carlos. We can use cardboard boxes and paint them, instead of buying new cardboard.

And we can use old sheets for the backstage, said Nora

And we can use old plastic bags, too, said Liliana.

That is all a good idea, said the teacher.

220

They worked a lot, but they had a very pretty stage at the end, and their homes were also cleaner.´

Most narratives written by children in group A were still shaped like statements at the end of the lesson programme. Also, most of all of their stories had a ´team-work´ theme. Apparently, when finding that collaborative work and dialogue were important to the study, they tried to feature it in their stories, while only very few of them really changed the structure, and composition of these narratives, or how they elaborated them within the team. Even when recording their dialogue interchanges was not possible, most of the team-work done in this group consisted on annotating the ideas of the ´most intelligent´ child, that was often named the leader, and did most of the speaking within the group.

In group B narratives had at least one defined character and most of them displayed some form of dialogue at the end of the lesson programme. Narratives also grew in complexity, and children, their sense of agency and problem-solving capacity continued to be a constant them in these stories.

5.4.3. Most Relevant Observations by Categories.

- **Narrative structure**

Narratives in both groups grew in complexity and narrative structure. The most significant changes were perceived in group B, where despite having the same themes (teamwork, community and environment) the stories were more developed, and displayed dialogue, structured characters, and a much stronger narrative core.

Narratives in group A did show an improvement at the end of the lesson programme, but it was not as significant. Children kept using their ´statement´ format –Unlike the Second and Third schools groups, which modified this

pattern in their narratives. Some of the texts displayed implicit dialogue, and a recurring ´team work´ theme: most texts written at the end of the programme spoke about teamwork examples in the animal kingdom.

- **Dialogue between characters**

One of the drawbacks of working with statement-like texts, is that they tend to under-represent characters, and dialogue interchanges are mostly absent from this type of texts. Despite the continuous effort towards helping children in this particular group to construct narratives, they kept producing statement-like texts at the end of the lesson programme. This was the only group in the study with no examples of explicit dialogue by the end of the research period; this was also the only group that insisted on elaborating this type of texts at the end of the programme. Most importantly, this was a conscious decision made by the majority of children in the group. ´There is no use in talking to obtain a result when you already have the right answer.´ told me a boy in this group, his point of view supported by the majority of his classmates.

When implicit dialogue did appear in the narratives written by this group, it was in the form of asymmetrical dialogue (Mercer and Dawes, 2008). Like in the previous story of the Gorilla (Monkey) pack, for children in this classroom dialogue was perceived as unnecessary, and an authoritative form of expression was considered ´the fastest to give the right answer´.

On the contrary, children in group B showed examples of collaborative work and implicit dialogue since the beginning of the lesson programme, and showed explicit dialogue in almost all of their narratives at the end of the study. In some of these stories dialogue was the most prominent feature of the narrative, and the narrative in itself was mostly about how the characters spoke: Dialogue was the preferred way of reaching for a conclusion, or a joint resolution of a problem.

Some school children won a prize, and they wanted to spend the prize in their classroom. Ana thought the best way to spend the money would be buying big trees and plants for the patio in front of their classroom.

Trees are good because they give us oxygen.

I think we could buy more recycling containers, said Maria, so that the place will always be clean.

David thought that buying new pots for plants was more important.

It is good we are discussing what we think, said their teacher. I think there is enough money for all of this, and you will see that we will have a better classroom, and help our environment.

- **Point of view**

It was hard to locate an established point of view when first examining the narratives of both groups, but for different reasons: as previously discussed, children in group A seldom wrote narratives, and characters in them (when any) did not expose their point of view: Narrators were omniscient and detached themselves from the events they were narrating, the point of view in these texts was more related to the ´scientific point of view´ than a personal, narrative one.

  Children in group B wrote narratives that spoke of collective groups: ´A community...´ ´A group of children...´ ´Some school children...´ When further examined, these narratives revealed composite points of view: characters could separate themselves from the ´whole´ to give their own opinion and point of view: children showed, in this way, that they recognized the value of the individual amongst the contribution of the many.

- **Agency indicators**

The absence of characters in the statement-like texts written by children in group A also made difficult to locate a sense of agency within their stories. There were no characters that confronted problems, or that realised something,

or learned something through experience, like in all previous groups. The previously shown text about the Gorilla (Monkey) Pack was the closest this group of children got to elaborating a narrative. In it, weaker or less-able gorillas accepted their leader for its natural, perceivable qualities, and ´felt good about following him´.

Does this absence of a located sense of agency follow the asymmetrical and passive patterns of distribution of power in this classroom? (Mercer and Dawes, 2008). If children in the Second School (group A) perceived the asymmetries in the distribution of power within their classroom, and their stories often depicted tales of regained or conquered agency, were children in this classroom ´content´ with the distribution of power in their classroom? Did they ´feel good about following´ the authoritative figure in their classroom (their teacher), because it was the strongest leader available? Just as in the Second School, the short time available spent in the group makes this inference uncertain at best, but a theoretical support on this point can be found in Alexander (2008) Mercer and Dawes (2008) and Barnes (2008).

Conversely, children in group B were conscious of their own agency, at least as reflected in their narratives-. Even stories written before the programme portray children as strong, independent figures: yes, they are a part of a community, but they can express their individual point of view through dialogue and they do so naturally. In their narratives, a little girl can tell some abusive crowd to ´get their own trash´, a teacher listens to her students carefully. This group was clearly comfortable with their own sense of agency, and even before the lesson programme, they felt capable of making decisions concerning their own learning, mostly due to the inclusive and open classroom environment before the study.

- **Presence (and type) of anthropomorphism**

Despite having a relatively high environmental knowledge, anthropomorphism featured prominently in the stories written by group A before the lesson

programme. More worryingly, it was also present in the texts written after the study. Children in this group frequently applied human logic and values to their explanations of animal behaviour. In the previous text about the Gorilla (Monkey) Pack, the pack accepts the leadership of the "strong, wise" male, because they "feel good following him". This view differs from how an actual pack of gorillas behaves when "choosing" a leader. The group of children that wrote this text were inquiring about this, in order to determine if this depiction was due to lack of knowledge about this process or an indicator of anthropomorphism they answered that "this was the way it should be".

In their effort to reflect that they had understood the importance of teamwork and collaborative effort, and at the same time displayed their perceived environmental knowledge, children in group A often portrayed animals working in teams, explaining their behaviour using anthropomorphic reasoning, and further emphasising their views on leadership and (lack of) agency. The next two texts further illustrate these points:

> *Ants work in teams in their colonies. They are directed by a queen that rules the colony and decides what will the working ants pick and carry to the colony in order to better survive the winter.*

> *Bees obey the queen. There cannot be a colony of bees without a queen. The queen decides what type of flowers are good for producing honey, and she gives instructions to the team of working bees to gather from these flowers.*

Both texts present strong indicators of anthropomorphic reasoning by part of this group and a lack of profound understanding on the manner a colony of ants (or bees) work. While it is true that there cannot be a colony without a queen, the position of leadership and the functions that the queens have in these texts are exaggerated at best.

Anthropomorphic indicators were difficult to locate in group B, because most of the narratives written in this group were about human communities and groups. The next story, however, reflects how humans and animals interact in a community in the eyes of children in this group.

> *Caroline had a dog and the little dog did not behave well. She thought that she did not like the dog anymore, so she decided to abandon the dog to the street. Her sister told her to take the dog back:*

> *You have to think that dogs do not think like us, and they depend on us to survive. If you take the dog to school, maybe it will behave better later, but if you throw it to the street, it will suffer.*

> *Caroline decided to take her dog to the pet school and the little dog grew and learned to behave in a better way. Caroline learned a lot too and she loved her dog very much all her life.*

Even if animals did not feature prominently in the narratives of this group and this story was the only one that featured animal and human interaction in group B, it provides a good example of how children in this group perceive their own relationship with animals: Caroline´s sister tells her ´animals do not think like us, and they depend on us to survive´, indicating to an ability to have different point of view from her own, especially when explaining animal behaviour. Caroline´s dog learns to behave in the school, and she, by the end of the story has ´learned a lot too´, pointing to a behavioural change by part of the main character of the story.

5.5. Fifth School.

This school is markedly different from the previous schools. Most of the personnel in the school are friendly; however, the surroundings are the bleakest and most badly kept I have seen in a primary school. The library floor is full of torn books, most trees have razor and knife marks on them, and there are no recycling deposits; the big, metallic trash bins are rusty and a lot of them are turned down and their contents spilled on the floor. I am not carrying any equipment as I enter in the first day: The director let me know that it would be much better not to do so. ´Most of them have never seen a personal computer´. He says, referring to his students. ´It would be better to avoid that kind of attention to you´.

The headmaster introduces me to Mr. R and Mr. E. Both are young and seem willing to participate in the study. They seem to have developed a similar strategy as Ms. T and Ms. V in the Third School, they do a lot of activities together, and they seem to know each other´s group very well. They showed a steady support of the study from the very beginning, and their constant aid, and backing up to the methods really made a significant difference in the outcome of the intervention.

5.5.1. School Background.

Both groups have very low scores for dialogue indicators, the lowest so far. One group in particular shows a particular aversion towards talking in groups and participating in class work. This is group B and has been labelled ´The Trash Bin´ by some of the teachers and students from this school. The students in this group are aware of the name. According to the head master, this is the group where ´the worst elements´ of the school are placed, in order to minimise the impact of their misbehaviour on the rest in the school. In order to ´share the load´ of this group, Mr. E and Mr. R often work together.

The views expressed by the majority of the school´s staff regarding these students, strongly relate to Bernstein's (1971) views in class and the use of language. For him, the way language is used within a particular social class affects the way people assign significance and meaning to the things which they are speaking about; thus, greatly influencing and forming their view of the world. Hart and Risley (1996) argue that by the age of 4 in the United States the child of professional parents will have had nearly as twice as many words addressed to it as the working class child, and over four times as many as the child on welfare.

The opinions of the staff and the quantitative indicators obtained during the first session let me know that the development of the study in this school will be different from other schools. In previous schools, the initial dialogue indicators have been higher and the prospects that the personnel held on their own pupils have been at least more confident.

Teachers in both groups supported the methods in the classroom during the lessons, and in a non-typical way, tried to use them in their own schedule. The "Talking Rules" posters stayed in the front of the classrooms during the whole study duration, and both teachers decided to use them in their regular classes along with the programmes and the manuals.

Despite the initial resistance to the working methods, both groups eventually adopted a different and more cooperative approach, and gradually started to develop more constructive talking habits. However, the first 2 sessions were difficult, especially in group B, where some of the students presented stronger opposition to the methods, often trying to interrupt the class, or refusing to work in groups, and verbally discouraging students in the group to work this way.

Children would eventually overcome this opposition, and by the end of the programme, much more symmetrical (Mercer and Dawes, 2008) dialogue

patterns had been established in both groups, generating a more equalitarian environment within the classroom.

5.5.2. Audio Recordings of oral interchanges.

Very few audio recordings were available for an analysis in this school, as the general environment generated poor conditions for audio recording. However, the few available recordings of the school showed that most of the classroom talk in this school was Disputational (Mercer, 2004), and a dialogue was not a natural occurrence in neither of these classrooms. Disputational talk was prominent and dominant in both groups, especially in group B. Even in the cases where the initial interchange was dominated by cumulative talk, Disputational talk would eventually emerge and prevailed in most dialogue interchanges.

> Maria-I don't want to work on this.
>
> Daniel-Me neither
>
> Laura-It is really weird, working like this.
>
> Rodrigo-(Shouting at his group mates): No, I will not work at this, it is pointless!

It was evident that dialogue in this school would easily oscillate between Disputational and Cummulative talk. Sometimes, Disputational talk would emerge even if there was not an apparent reason to oppose anything.

Students would raise their tone of voice to claim attention much more frequently than in other classrooms. This also diminished the quality of audio

recordings, which often were intelligible at some point due to the resultant cacophony.

Rafael -Not doing this. To me, this is silly.

Cristina-I don´t see the point of it. Why does she need a story for?

Rafael - (Shouting) No, no!

Estela -Shut up! No, what?

During the recordings, patterns of *asymmetrical* distribution of power within the classroom also emerged. Some of the students in the classroom apparently held more ´power´- the power to speak first, decide, and nominate speakers, also observed by Mercer, and Dawes (2008) - the kind of power usually associated with teachers that uses traditional methods in their classrooms.

Alex-We should write the story, I guess.

Jose -No we will not. I will not.

Barely-We have to, is written in the black board.

Jose -I do not want to. And we will not do so.

In the First school, older children often held this type of talking privileges to a lesser extent, a power that their younger peers did not have. However, this was unconscious. In this school some students -who were used to have a certain amount of control over the group and its dynamics- very consciously tried to control the dialogue type, pace and flow within their classroom. It was only

after the programme ended that the asymmetrical patterns became less evident, and the incidence of exploratory talk indicators increased.

Maria-Okay, that sounds good.

Daniel -Yes it does.

Laura -Do you think that it *has to be* a story?

Rodrigo -What do you mean?

Laura-Oh, it is only that I am listening to the other group. Never mind.

In this interchange, children are discussing the possibility of writing a text that is not necessarily a narrative. They also comment that they are hearing another working group in their classroom. Both of these things would have been almost impossible in the conditions in which they worked during the first sessions.

Mafer-I think this could be interesting.

Oscar-Yes it is but...

Diego-I think she wants us to be creative.

Mafer-But the story has to be about the environment, right?

Diego -Yes, but she will understand. And she told us that we are part of the environment, so it will be fine.

In this interchange, another group discusses whether or not they will include environmental elements in their story. Although Diego interrupts Oscar he does so to offer an insight on what he thinks the teacher (I, in this case) wants of the

group. Also, this is not seen as a confrontation. Mafer questions Diego´s argument and Diego finish his reasoning as a response. In the previous conditions of this classroom, these interchange of ideas would have not taken place. Most of the students were more open and eager to collaborate at the end of the programme. They were also more relaxed, participative and open to their peers' participation and observations.

Jose -No, I do not think so.

Arely -You are doing it again.

Jose -What? What am I doing?

Alex-Say why don´t you think so.

Jose -Oh, yes. Okay. Thanks.

5.5.3. Teacher interviews prior to the programme.

The initial opinions of both teachers regarding their students were, as described above, not very optimistic. Both spoke of their continuous efforts in improving the classroom conditions of their students despite the multiple disadvantages of their environment. Mr. R talked about his experience as a teacher in this school.

´It is difficult to work with these kids. Everyone has already marked them. Even their parents and they know it. You cannot work against that.´

´There was a slight improvement in their behaviour when I started working with them at the beginning of the year. I tried new methods. I tried hard. But they reverted to their usual behaviour little by little.´

´Of course they do not talk. If they do not talk properly in their homes, how are they going to know how to communicate properly? I am not

trying to avoid responsibility, but I am only with them around 5 out of 24 hours. ´

Mr. E. agreed with this perspective.

´This is a very difficult neighbourhood. This is probably one of the worst schools in the city. As a teacher, you cannot choose your school, when you are starting. We both know that group ´B´ was the hardest. So to determine who would get it, we tossed a coin. I won, so I got the other group.´

Most of the parents do not care about what happens within the school. They do not attend the meetings; they only come to complain when something really bad happens.

We have tried to ´share the load´, to work in new ways, and sometimes they respond to that, but this response is short lived. It is really frustrating´.

About the talking habits of both groups, he expressed:

´They talk a lot, all the time, but not in a proper way. They talk at the same time, they swear, they yell. And even when you don´t want to yell, or ignore them, or exclude them, you end up doing that. It is the way they talk in their homes, I think. They have not been talked in another way, so, it is the only way that they know, and, outside school, for most of them it works.

The parents of different families often send their children to other schools. Schools in the city centre, better schools. A lot of children only attend in their first year, and when their parents realise the environment of the school, they change schools. So if a child attends this school for the six years of primary school, it often means that his parents don´t care about his education´.

5.5.4. Student interviews prior to the programme.

Only few of the children are willing to participate in the interviews. Most of them avoid me, and they look at me with a mix of curiosity and suspicion. But some of them want to speak. Those who do tell me that they are more worried about the reaction that their classmates may have than about the reaction of their teacher, in fact, they feel supported by their teachers to be interviewed. A girl of group A expressed what she felt about the classroom culture in her group.

> *´It is very hard to talk when everybody else is talking. And if you say something related to the class, or when you are right when everybody else is wrong, or otherwise, they make fun of you. It is really tough.*
>
> *You stop trying to talk in class, it is better to talk with the teacher when nobody calls you names. ´*

Another boy had similar thoughts on participating in these groups.

> *´We cannot work in teams talking between us, it is really difficult. If the teacher sets you up with people you like, you cannot work because all you do is have fun. And, if he sets you up with people you do not like, well, that makes it worse. Probably you will not work at all because you will never agree on anything.´*

Participation and dialogue were not seen in a more favourable view in group B. Students verbalized how difficult it was to talk about subjects that could allow for different opinions and points of view. (As civic education, history, etc.)

> *´When we do not think the same, things get ugly. There is a lot of screaming, even swearing and name-calling´.*

Another girl in the classroom was no more favourable:

´The teacher does not ask what we think anymore after a fight that there was in the classroom a while ago. He is now very careful about what he asks. I think he know asks less questions than at the beginning of the year. He mostly writes in the chalkboard for us to copy.´

5.5.5. Teacher interviews at the end of the programme.

Teachers in both groups were satisfied with the results achieved during the programme, and their opinions during the interviews reflected that. Mr. R expressed how he felt about the emphasis on the quality of dialogue during the lessons.

´We have worked with these kids a long time, trying to do just this.... Perhaps not such a long time, but more than two weeks, for sure. And it turns out it not only depends on the time and effort you put into it, but also on the how. If you had told me that the solution for the shouting, bullying, and general disorder in the classroom would be allowing them to talk more, about three weeks ago, I would have thought you were crazy. [...] But I am so pleased at all of these results. And I understand how this makes all the difference.´

Both teachers also were positive about keeping the programme, developing more lesson plans centred in dialogue dynamics, and keeping the materials used and generated during the programme.

Mr. E. talked about this.

´Kids have responded so well to this. We wanted to achieve this kind of environment for a long time ago now, and using these materials, doing things like this, have proved so effective in creating a change. [...] I know I cannot take down that poster [with the talking rules]. And I do not want to. I like how the classroom has changed. They not only talk more, but do it so confidently. They participate more I am sure this

[school] year will be good for many of them because of what we did. I am sure they will want to keep working like this, and I hope they would remember what they learnt well after primary school.´

5.5.6. Student interviews at the end of the programme.

Students in both groups were also mostly positive about their experience during the study. Many students volunteered to participate in the interviews after the programme, as opposed to their initial discomfort reaction, shown at the beginning of the study.

Most of them talked about a gaining confidence. A student in group A expressed this new confidence in this way:

> *´Before we started [with the lessons] I was never sure if it was the right time to talk, so I avoided talking in class. Now I know that I have the right to talk, and that if I raise my hand, the teacher will be happy to hear me, and probably, that what I have to say will make others understand the class better. ´*

Students in group B shared these views on their perceived confidence, and also talked about a greater sense of equality in their classroom.

In a particularly relevant way, one of the students who opposed verbally at first to the use of methods and tried to diminish the participation of his peers, decided to participate in the interviews. His views reflect how much the environment in his classroom changed

> *´I guess I thought I did not want to be here. So I did not see the purpose of any of the things you were doing. I wanted everyone to just shut up [...] because I did not want to hear, I did not want to talk. Now I understand, that what I have to say is important, and of course, what everyone has to say is important too. I do not have to shout to be listened anymore. I just have to listen first. ´*

5.5.7. Analysis of Written Narratives.

When joined in groups, most of the students would refuse to cooperate, some groups even refusing to write narratives or participate in the class. As a result, there was a smaller number of starting narratives when compared with other schools in the study, and this school also had the lowest levels of narrative structure, complexity, and length for all the schools, as it is recorded in the quantitative data section. It was not only the problem perceived in the Second School, or group A in the Fourth School, in which children had no experience with creative expression and writing. In this school children had a significant disadvantage in the use and management of language and vocabulary.

   This further reflects Bernstein´s (1971), Littlejohn´s (2006) and Hart´s and Risley (1996) views on the use of language and cultural disadvantages amongst children of low-cultural level, seen above. In this school, many of the starting narratives had also a very bleak perspective: some pointed to Ecophobia (Sobel), some to a lack of interest. In some others, the lack of a ´community´ approach or collaboration was a constant issue.

   The following texts are representative of the texts written at the beginning of the programme by children in group A

> *´Nobody cares about the trash in the street´.*

> *´There are too many dogs on the street some of them can bite you´.*

The following texts are representative of the texts written at the beginning of the programme by children in group B

´Everybody wastes water because nobody cares if it will end someday´.

´A dog bite my brother. They took it to the dog house and they killed it´.

As discussed before, the average length of these texts was considered below-average when compared to the initial work of other schools in the study. A lot of the narratives consisted in short statements which often displayed a poor management of language and used words considered as offensive. These narratives often portrayed some kind of negative confrontation behaviour and rather pessimistic views of life in the neighbourhood in general.

All the indicators associated with characters, their behaviour and the narratives portrayal (point of view, use of dialogue, agency) were notably absent in the first set of narratives. Negative Anthropomorphism was also present in this group, and more worryingly, in this school animals often adopted aggressive behaviours, or were the receptors of aggression.

5.5.8. Most relevant observations by category.

- **Narrative structure.**

The narratives created at the end of the programme were more developed in almost all of these aspects. At the same time, all the working groups presented a written narrative at the end of the study. Narratives grew in complexity and length, and the narrative structure was also more developed and coherent.

The context of these narratives was also more optimistic and had more defined elements. It has to be said that this was the group where the teachers made the greatest effort in implementing the methods, for the whole duration of

the study period. As a result, the time these two groups worked following the proposed methods was perhaps the longest of all the participant schools.

Narratives in this school often focused on community and teamwork and some of them did not even discuss environmental issues. Even when the lessons were the same, and the children seemed to integrate environmental knowledge into their schemes (as the Quantitative data results on this school suggests). Also, they placed a strong focus of their attention to the dialogue dynamics and community work).

Also, in this school children not only wrote narratives at the end of the programme. They also wrote short ´reflective´ texts, and in some of them children ponder and reveal how they *felt* about the change in their dialogue patterns and perspectives after the lessons ended.

The following text is representative of those elaborated in group A after the programme

> ´Cynthia was very angry because the park was very dirty. She and her brother could not play in the park, and nobody seemed to care. She tried to fix the problem by herself, but there was too much trash, and people would laugh at her when they looked at her, trying to gather up all the trash.
>
> So she gave up.
>
> Weeks later, she saw a young boy picking up trash. She also saw other people making fun of him, and in that moment Cynthia knew she had to help him. Her brothers also came to help her this time, and eventually, more people, without saying a word, came to help, too. At the end, the park was clean again.
>
> ´Thank you' said the young boy to Cynthia.

´You are welcome´ she said. And she felt very happy. For the park, for herself, and because people in her neighbourhood had finally done the right thing.´

The following text is representative of those created in group B after the programme.

´We all got together in order to write a story. At first we didn´t write it really together, so it was a sad, incomplete story, because we did not know how much we could help each other; both in the story and in the real world. But now we know, and the stories we write with the help of each other are better, and happier.´

- **Dialogue between characters.**

Children did not represent explicit dialogue in any of the stories written at the beginning of the programme. If any representation of ideas took place within the text, it was often in the form of a figure that imposed their way of thinking, much like in group A of the Second School. In the case of both groups conflict, that was often present, was left unsolved or solved out of the narrative, often by imposition of the point of view of the dominant character in the story. Dialogue is implied, with very rarely any verbal interaction taking place within the story.

At the end of the programme, the stronger emphasis that the children made on constructing dialogue between characters confirmed the observations made by Haynes (2002), Green et al. (2008) and Pierce and Giles (2008), about the value of a dialogic approach to encouraging collective thinking and discussion, and how this has a significant impact on children, and in their writing's skills, previously discussed in the First school section. Almost all stories written after the lessons programme imply a form of dialogue or interchange of ideas, and in those that do not depict implicit or explicit dialogue (for example, in the

240

reflective texts written by some groups of students), the use of the word ´we´ does imply a form of interchange of ideas during the construction of the text. This was seen as a great improvement from the initial treatment that dialogue between characters received in the first set of texts written by both groups.

- **Point of view**

Almost all the stories written in this school lacked of a defined point of view. Children in this school showed many difficulties locating point of view in the first week of the programme, within or outside the narratives they constructed. After the first week passed, children in both groups could locate or define "point of view" more easily.

At the end, stories that had one or more possible points of view appeared in both groups.

> ´When Sylvia´s grandmother was young; she could not speak in front of older people, and had to remain quiet most of the time. So when Sylvia tried to speak, she usually tried to quiet her down. Sylvia confronted her one day:
>
> -How do you think I feel when you try to shut me up? Do you think I deserve that?-
>
> The old lady felt ashamed. She apologized to Sylvia and from that day on, she tried to support her whenever she could.´

- **Agency Indicators**

As in group A of the Second school, in the narratives written in this school there were strong characters within the narratives, and agency, when acquired, had often to be fought for. Also, like in group A in said school, agency if acquired at all, had to be ´fought´ for, or acquired with the help of another character, that would help the main characters to achieve their goals.

241

This changed greatly at the end of the programme, as children became much more confident in expressing their points of view and developed a more positive view of their own role in their learning. Children reflected how they felt about this gained sense of agency in various forms. The following ´Reflective´ text points to this introspection by part of children in this school.

> ´We do not know what will happen tomorrow. You say that if we learn how to speak, people will be more ready to listen to us.
>
> Not everybody listens. But what you say can be true. Maybe if we stopped shouting, people will see the reason in our words. Maybe if we work together, we are more than ´just kids´. Maybe if we talk, all together, maybe people will listen then.
>
> Maybe the right words are strong words. They do not have to be shouted out´.

- **Presence and Type of Anthropomorphism**

At the beginning of the programme, strong indicators of negative anthropomorphism emerged in the texts written by students. In many of their texts, animals were shown as aggressive or were the receptors of aggression. These changed greatly in the stories created at the end of the programme, and animal the presence of animals as aggressors or victims disappeared completely in later stories.

> ´Carlos feared dogs. He had been bitten by a dog when he was young, and now he hated them. When his grandfather gave him a little dog in his birthday, Carlos was very angry and treated the dog very badly.
>
> His grandfather talked to him: This little dog has nothing to do with the dog that bit you. But if you keep treating him like this, he will learn to be

aggressive, and will be just like that dog. Animals do not see the world as we do, and they do not reason like us. If you want to have a good pet, teach him to be good.

Carlos understood what his grandfather meant and from that day on, he was good to his dog, who became his best friend over time.´

5.6. Sixth School.

This was the school where the pilot study took place, 6 months ago. Children that participated in the pilot were in their 5th year, they are now on their 6th and final of their year of primary education.

The school is very similar to the Second School. It is a large, public school, in a large and old but well-kept building, surrounded by trees.

The headmaster greets me warmly. He is a busy man, who takes his work very seriously, and has been interested in the study from the very beginning. That was one of the reasons he supported the pilot from the start.

He calls the teachers and tells me: ´They are going to be happy to see you´. We talk while we wait for them, about the study, and about the project in general. It is evident that his views on the pilot were favourable. He mentions what a great improvement he has seen in both classrooms, both in the general working environment in the classrooms and in the overall scores of the participant students and he states that ´while the time you were with them was a short one; it had a positive effect for the rest of the year´.

Mr. C and Ms. S arrive as we are talking. They are the same teachers these groups had the previous year, during the pilot. This is not uncommon, as some of the teachers in Mexico work with their groups for two or three consecutive years.

Their experience about the pilot is very helpful, as they can reflect about what occurred in their classrooms during the pilot study a year ago, the impact that the study had, and their expectations of the project this time around.

5.6.1. Audio recordings of oral interchanges.

The predominant type of talk that occurred within these classrooms was cumulative (Mercer, 2004), and the students tended to participate in the

conversation only to make positive remarks about a previously stated idea. Even so, some examples of exploratory talk did happen during the recordings, and they were recognised and well received by other students.

> Melissa: I think we need to talk about our story before writing it.
>
> Alberto: Yes, that would be fine.
>
> Gibran: We need to find a subject.
>
> Melissa: Yes, we need.
>
> Gibran: What about writing something different? It can be about the environment but we can also focus on other things.
>
> Alberto: I think that would be right. I think you´ve just got a good idea.
>
> Melissa: Yes, you did.

In this interchange, Gibran suggests writing something different. Until that point, the conversation between the students had been mostly cumulative. After Gibran proposes something different, Alberto recognizes that his classmate just presented an idea.

One pattern was found, however, during the recording analysis: children mentioned the talking rules explicitly in their conversations, and referred to them, in many of their dialogues.

In the next conversation a student (Carlos) explicitly refers to one of the ´Talking Rules´ established within the group. (You have to state the reasons behind your opinions).

Esteban: ...And then everything would be fine.

Elisa: I don´t like that ending.

Carlos: That is not good. You have to say why.

Maria: Yes, it is one of the rules, it says ´you have to express your reasons´.

Elisa: Ok, I do not like it because…

Audio recordings after the lesson programme, showed how talk amongst students became more fluid, and how children engaged in exploratory talk more easily and naturally, using reflective questioning and other strategies in their conversations without referring to them explicitly, perhaps showing a higher degree of internalisation with this.

Alberto: It is more difficult to think of how he would react.

Gibran: We could think of what we could do.

Melissa: Why?

Gibran: He is 12 years in the story, he is about our age.

Melissa: That is a good reason.

Alberto: But every person thinks differently.

Melissa: That is true, too, but I think he could think like us.

Gibran: He lives in the city; he is a kid about our age. He could.

Another emerging pattern analysed in these recordings was that children talked about what a person, animal or plant could feel or communicate, and how their characters could behave or react. There were also indicators of meta-cognitive talk between students, as they started to reflect on how they thought about ideas, and how their own participation changed their dialogue interchanges.

Elisa: I do not think that a whale could do that.

Esteban: How do you know?

Elisa: Whales do not think like us. They do not eat the same things we eat, they do not think of fish as food.

Carlos: That *IS* true. I like that you know about animals, because you can think of those things.

Maria: I do think that Elisa´s contribution is very helpful, especially in the stories about animals. And she always explains us the reasons behind what she thinks. That is also good.

5.6.2. Teacher interviews directed prior to the programme.

Both teachers were willing to participate in the interview. I have worked with them both before and am more familiar with their particular approach to education than I am with other teachers. Both are traditionalist, but very open-minded teachers, and during the pilot, they were very cooperative

Mr. C is the first to speak:

´At first, I really had my doubts. To focus the class on the student and how he interacts with others was a new concept to me, and to be honest, not a very attractive idea at first. But what I saw during the lessons was really encouraging: it turned out really well, and it was not a mess, as I thought it

would be. ´Children were motivated´, ´ they kept working like that. They kept doing questions, participating, being polite and respectful to each other´s opinions.

After a while, I got a book about constructivism, and I had to say I could not finish it. But nevertheless, I could still use the ´Talking Rules´ you left, and from time to time, construct a class focused on talking. This has helped to keep the pace. It has been a good year.´

Ms. S. Views were more focused on the change of the dialogue habits of the group.

> *´Like Mr. C, I had my own opinions about allowing so much talk during the class. I really thought it would be distracting, that it would be chaos. But they enjoyed it so much, and they changed a lot during that year. They were less aggressive, they were calmer, and they were almost happy of being in the classroom. At first, just as Mr. C, I thought that it would not last, but even today, they still ask for reasons and are more respectful to each other. ´*

5.6.3. Student interviews directed prior to the programme.

Most of the children were willing to offer their views on what they thought happened during the pilot study and how it affected them. Many of them speak about the study in positive terms: How they ´felt smarter´, ´brighter´ and how the ´Talking Rules´ helped them to relate better to their teachers, peers, and (even for some of them) their parents.

> *´It was really good that Mr. C kept the poster. It helped us to sort out a lot of things. It was good to remember that if we talked that way, things would go smoothly, and everyone would work better.´*

Another student added:

> *'Even children who were not so smart or who did not talk a lot in classes before you came started to participate more, and to talk more. After a while, it was like we were one big team, even after you left'.*

Not all views were favourable, though. Some students expressed certain ´anxiety´ about the high expectations that the study left them with and how these expectations were not always compatible with the reality they had to confront.

> *'Yes, it made things here in the classroom easier to handle. But you cannot always ask for reasons and people do not always want to listen to you. So, even if it helps a little, the ´Rules´ you taught only apply sometimes, with certain people. ´*

In both groups, however, views on the study were mostly positive, even those who expressed this type of ambivalence about the effectiveness of the Talking Rules in different contexts. Most of them recognized how the use of these rules had changed their perception on their learning process and how much it had influenced their classroom culture.

5.6.4. Teacher interviews after the programme.

The opinions of both teachers at the end of the study did not change very much. Mr C expressed how he thought this new series of lessons had affected his teaching habits in general terms.

> *'It is not very easy, to get used to this. But once you get into the habit of doing these types of questions, it gets easier. ´*

> *'I am more confident now talking with them. I also needed more examples of the use of questions, and the use of dialogue. To be honest, I think I did not understand all of what you said the first time around. So*

it is good to have more lesson plans and more examples. Because it is difficult to find books about this here, [in Mexico] and the ones that you find, they are so difficult to follow! ´

Ms S. was also satisfied at the enthusiasm shown by her students. She commented mainly on the behaviour changes in her group:

´Since the pilot took place; they were more prone to participate. At first I thought I could not manage it, but eventually all fell into place, we found a good midpoint. This interest did not fade as much as I thought. I thought they would forget about the talking rules, and in reality they seemed enthusiastic about reminding each other to ´talk properly´. Even when another child came to the classroom, they wanted to incorporate that kid into their ´rules´ and introduce them to their ´classroom dynamics´.

Unfortunately, due to a series of conflicts in the schedule, it was not possible to record children´s interviews after the lesson programme.

5.6.5. Analysis of Narratives.

The following narrative was selected as a representative example of the narratives written in this school before the programme. It was written by a group of children in group A.

´A long time ago, a young teacher came to our school. She told us we could learn more on how to protect the environment. This teacher talked a lot, and she made us talk. We talked and talked, with her and amongst us. We had so much fun.

´I have to leave´ she said one day.

'It has been such a short time´ we thought. – But we realised, even after she left, we had learned a lot, about the environment and about ourselves. Even after she was gone, we understood we could keep learning that way. And we could keep protecting the environment.

This narrative clearly relates to the past experience lived by children within the group during the pilot study. There were at least five stories of this type written in the two groups.

In this story, unlike most starting stories written in other schools, dialogue appears both implicitly (´we talk, with her, and amongst us...´) and explicitly (´- I have to leave-´) even if shortly. There are also slight indicators of agency (´even after she was gone, we understood we could keep learning that way...´). Another change is that in this school there are at least two characters: the young teacher and the collective character formed by students (we...). They also show to have a (implicit and positive) interaction.

Since the story plot is more centred in the life within the classroom than in the environment outside of it, there are no indicators of anthropomorphism. When the programme ended, the same group of students in group A wrote the following text:

´Sometimes it is difficult to see how a word can change a sentence, and how our actions can affect our community.

We studied in a tiny classroom, we only talked when we were asked question. We did not think about ourselves.

We thought we were so little, that the trash we dumped did not count, and that the trees we planted were just plants.

Then a teacher came. She was not a usual teacher.

She asked questions to make us think, she told us that the trees we planted were really actions. And that the words we used reflected ideas, and they could be strong.

And because of this, because we realised those things, we decided to use these words, and to keep doing these actions.

There was no evident change in the structure and complexity of this story, when compared to the first one written by this group. Almost all stories written after the programme obeyed this pattern, and returned to their initial themes. The most significant changes are observed in the surge of reflective sentences, (a pattern observed in other schools as well, in this case the reflection blended with the narration of actions) and the further highlight in the agency indicators. (*´And because of this... we decided.´*)

The absence of explicit dialogue was also a change, but arguably in this case, children in this school started to write about their own reflections of what was being said and learned, pointing to the type of metacognitive reasoning found in previous groups. Another representative example of the narratives written in this school was written by a group of children in group B.

There was a group of children that wanted to help their environment, but did not know how. One of their teachers took them to a farm and them all planted trees. Children were kind of disappointed because the trees took too long to grow.

But the teacher told them to wait and to keep doing good things for the environment. They waited, and years later, they returned. This time they were happy to see that their trees were big and strong, and to be able to see themselves as good, strong people.

This story repeats some of the elements of the first example: The main characters are again a teacher and a conjunct of students, however this is one is more centred in environmental action, and has less reflective elements than the first.

Even if agency and point of view indicators are not the central focus, these are also found in this story. (´...*they were happy ... to see themselves as good, strong people...*´). The same group of students in group B wrote a very different story at the end of the programme.

> ´*There was a garden full of plants.*
>
> *Every plant was different, and beautiful in its own way.*
>
> *Somebody could think that each plant had nothing to do with the other, but that would not be true.*
>
> *The shade of the big tree allowed the roses to bloom. The freshness that the clinging vine provided turned the wind in the garden mellow and nice. The tomatoes and the basil plants grew together.*
>
> *Each was different, each was unique, but together, they were a beautiful garden.*
>
> *Just like us, when we speak and have ideas that may be different, but would not have formed into our minds if we had not shared our thoughts.*

This story was very different from the usual stories written by children in other schools. It is not merely a narrative, nor has the format of the usual reflective text. It is more like an allegory, or a parable, in which the children compare the

harmonious relations of the plants in a garden with the positive dialogue interactions that happen within their classroom.

This narrative also possesses elements that indicate environmental knowledge, but it does not show elements of anthropomorphism. Plants and their interactions are described realistically, also if used to exemplify qualities of human interactions.

Although there are no defined characters in this narrative (as plants are used to illustrate and describe, but lack a defined personality), there exist elements that indicate a sense of agency. Plants are described as different, unique, etc., and while they provide to the whole, represented by the garden, each retains their essence. Again, even if dialogue is not represented implicitly or explicitly, children do describe qualities of dialogue, and this constitutes, in fact, the central point of the narrative.

5.6.6. Most Relevant Observations by Categories.

The most significant findings in the analysis processes for each category are presented next.

- **Narrative structure**

Narrative structure was well developed in both groups before the lesson programme. Both groups had been used dialogue-centred-methods –although not consistently – after participating in the pilot study, and children had developed dialogue habits through the year. Thus, narrative structure and complexity at the beginning of the study were roughly comparable to that of the First school.

Although the stories that were created within the First school at the beginning of the programme were longer, the stories in this school were arguably more complex. At the end of the study, a significant improvement was observed. Children incorporated reflective elements into their stories. When narrative

elements were still present, their stories were more carefully constructed, and the groups of children spent more time and thought constructing them (as could be assessed in the audio recording s of their oral interchanges during the construction of the story). In a similar way than the First school, when the starting level of the classroom was rather good, a tangible progress was observed after the study. This again followed Alexander´s (2008) observations regarding the relation between the oral and written use of language and how the first benefits the second.

- **Dialogue between characters:**

Dialogue was present in the stories written by children in both groups at the beginning of this study, both implicitly and explicitly, as can be observed in the representative stories presented before.

Most of the dialogue interchanges that occurred during these first stories were cumulative (Mercer, 2004) However, in nature, some isolated examples of exploratory talk were also present.

In stories written after the lesson´s programme, a significant change in the treatment of dialogue was observed:

Dialogue would be treated as the core of the text the narrative would have reflective elements about dialogue and its nature; showing meta-cognitive elements, as in the previously presented representative stories, or conversely, the its treatment would be explicit, and the narrative would display extended examples of dialogue between characters, as is the case of the following story, written by a group of children in group B.

> *´Carlos wanted to have a pet. He told his mother he wanted a big, beautiful dog. Her mother tried to reason with him that they lived in a very small apartment, but he would not listen to her. He wanted to have a big German Sheppard since he saw one in a magazine.*

So she told her one day that he could not leave his room for an entire day. It was Sunday. Carlos was angry, because he thought his mother was punishing him for no reason. When she came to feed him, she asked him if he was angry.

´Of course I am angry! ´ He said. My room is too little for having fun. I have to get out! I need space!-

´Just like you need those things´ his mother said ´The type of dog you want would need a lot of space. And we live in a little apartment, where he would not have space to jump or run´.

Carlos understood. And he and his mother got a nice Beagle puppy that year.´

- **Point of view**

Children in both groups of this school presented fewer difficulties locating a point of view different from their own than children in other groups, even at the beginning of the study. The emphasis they placed in conjunct collaboration and dialogue, and the importance they gave to identity and the value of other´s ideas seems to have contributed to this. (See also *Agency*, bellow.)

Even when characters where not defined (as in the case of allegories elaborated at the end of the programme) children wrote sentences that indicated the possibility of a point of view different form their own, as *´somebody could think...´* in the previously presented ´garden´ allegory.

Another example of a clearly defined point of view can be found in the next story, written by children in group A at the end of the lesson programme.

´When I was very little, I thought I wanted to be a bird.

I thought I could fly, and live in the skies. Then I realised that there were fewer trees, and that the skies were more polluted every day.

Then I wanted to be a fish.

I thought I could swim, and live in the sea. Then I realised that the sea was greyer every day.

Then I thought I wanted to be a lion, or a jaguar. But the jungle is disappearing.

I realised I was lucky to be born as a kid. I now know I can help these animals, and that even if it is impossible to believe, I can be a bird, a fish, or a lion if I want, because I know them.

- **Agency indicators**

The emphasis made on dialogue and ´Talking Rules´ for the previous year, although arguably not constant, had a perceivable effect on the perception of agency of children in this school. They showed an unusual degree of respect not only for others and the ideas shared by another person, but they expected respect to be given to themselves and their own ideas, showing a strong sense of agency, confidence and identity.

That follows' Alexander´s (2008) observations about the value of dialogue based teaching methods in fostering a sense of agency in the students. This sense of agency, as Barnes (2008), Solomon and Black (2008) and Freire (1978) recognise, is associated to the moment when the student realises he is participating in the making and the acquisition of his own knowledge. To foster an environment of dialogue and participation is, in this way, the ideal way of helping student to attain this sense of agency.

Much like in the case of point of view indicators, children managed to introduce agency indicators into texts that lacked defined characters. In their stories, there was often a strong emphasis on the uniqueness, special qualities,

257

and the individual´s contribution to the whole, like in the garden allegory, or in the reflection of a child about being different animals, when he says: ´...*I now know I can help these animals.*´

- **Presence (and type) of anthropomorphism**

Anthropomorphic indicators were noticeably absent from the stories written at the beginning of the programme in both groups. Children did write stories that depicted animals and plants and presented a degree of environmental knowledge, but they did not employ them as characters or explained their behaviour in human terms or from a human point of view.

An example of stories depicting animals and not containing anthropomorphic elements can be found in the next story, written by a group of children in group B after the lesson programme.

> ´*A fisherman had a little boy. The little boy was afraid of whales. So one day his dad took him alongside him in his boat, while he was sleeping. When the boy woke up, they were surrounded by whales.*
>
> *-I want you to look at them-. The father said.*
>
> *The boy was scared, very scared.*
>
> *-But why? They are very big! You know I am very afraid of them!-*
>
> *-The heaven is also big, the sea is huge. But these animals won´t harm us. Just look at them-*
>
> *The boy contemplated the calm whales and their babies, and he understood, after he had calmed down and thought that they were taking care of them, just like his father with him´.*

5.7. Seventh School.

The School is very much like the official schools in which I´ve worked previously; a large building painted in neutral tones, recycling bins that students have not learned to use properly yet, ample spaces for children to play in.

The headmaster tells me that he is interested in the study from an environmental point of view; according to him, since environmental education is mandatory now, a lot of teachers are now looking for new ways to integrate it to the curriculum. He thinks that it is unfair to make one subject compulsory without providing proper materials for the teachers. He tells me that at first he thought my study had something to do with the SEP. He is not the first one who thinks so at first.

´Most of the teachers use the text book and other materials provided by the SEP to construct their classes.´ He tells me. ´Most of the teachers know very little about that subject, so how can anybody expect they give lessons on it? ´.

He is pleased when I talk to him about the objectives of the study, especially about the environmental objectives. For some reason, the part in which ´students talk´ -as he calls it- does not seem as attractive to him.

He introduces me to the teachers in the 6th. Grade. Ms. P, in group A, a calm looking woman, and Mr. D, who probably is about the same age of the teachers of the Fifth School. He also looks active and motivated.

Both manifest an interest in the study. Ms P is content at the possibility of having the lesson plans ready to use for environmental education. Mr. D is more interested in ´teaching through the dialogue´ approach. Apparently, he has done some reading on constructivism; this is rare given the regular formation of the Mexican teacher. (At least in Baja California Sur).

As I talk to them about how I usually carry the study out, the headmaster almost immediately opposes any type of audio recording or interview within the school

grounds. This opposition seems to be of security concerns. He also seems interested in seeing all the materials that result from the study before I leave. I agree on this, and he then tells us (the teachers and I) that the study can start next Monday after the meeting.

5.7.1. School Background.

In this school, we could perceive very clearly how the different teaching methods employed by teachers in this school fostered a different classroom environment. The other school where this contrast was observed was the Second School, where both teachers (Ms. A and Mr. P) generated very different dialogue dynamics within the same school.

   As previously addressed in the literature, classroom talk can generate –or weaken- a sense of empowerment in children. (1976) Barnes (1976) Alexander (2008) and Mercer and Dawes, (2008) have previously noted how the dialogue dynamics in the classroom are greatly determined by the approach the teacher has to teaching and the methods he uses.

   Whereas audio recordings and interviews were not possible in this school, the contrast between group A, where a more traditional, literacy-oriented environment was fostered by Ms. P, and group B, where a non-traditional approach had been implemented well before the beginning of the study, provided another opportunity to see how within the same school, different teaching methods had created two very different classroom environments. It is worth nothing that these differences, so tangible when addressed from a qualitative approach, were not so clearly reflected during the quantitative analysis.

5.7.2. Analysis of Written Narratives.

It was during the analysis of narratives that the differences in each group ´starting points´ could be assessed. The two groups in this school had very different classroom dynamics, apparently determined by the different teaching methods their teachers employed. (Mercer, 2008; Alexander, 2004). Herein we could observe the great influence the teacher´s approach had on determining the dialogue dynamics, and the type of dialogue that was predominant in the classroom.

   In group A, a lack of sense of agency was perceived, (without the negative, confrontational undertones as in group A of the Second School, or the Fifth school groups.) As in these schools, there was a lack of defined characters, which made the location of agency, point of view and dialogue indicators somewhat difficult. While children showed affinity to creative writing (´We make a constant effort in these aspects of the curriculum, Ms. P said) their work was not creative, complex or original. It also contained strong anthropomorphic indicators.

The following narrative is representative of those written in group A at the beginning of the lesson programme.

> ´Fishes in the sea were very happy when little children swam near them. And they were very sad when people threw garbage at the sea. When children pick up this garbage, fishes are very happy.´

At the end of the lesson programme, children in group A had developed stronger participation habits, and dialogue, agency and point of view indicators were more frequently located within the narratives written by these students.

   The following narrative is representative of those written in group A at the end of the lesson programme.

261

´Tomas thought that if he threw a little garbage, it would not make a difference at all. Then he thought that if every child on earth threw just a little garbage, the world would be full of little pieces of paper.

He decided that not doing bad things, even if they were small, was in fact, really good´

Conversely, in group B, where Mr. D had maintained a more ´dynamic´ approach in his teaching methods, and fostering participation seemingly was a priority for the teacher; the dialogue dynamics are more similar to those in group B in the Second School, where children were more used to expressing their opinion, but did not have a lot of experience constructing creative pieces of writing.

In this group, the use of non-fictional, reflective texts was more common. These texts did not implicitly describe a character; the frequent use of words as ´we´ or ´us´ expressed by the children served to locate a point of view, and sometimes an agency sense. Indicators of these were more frequent than in group A. They also had a more realistic view of the role of animals and plants, and they were not used as characters.

However, perhaps due to the children´s lack of experience at creative writing in this group, texts were roughly comparable to those written in group A regarding extension and structural complexity. The following narrative is representative of those written in group B at the beginning of the lesson programme.

´Fishes cannot take care of the sea, and trees and birds cannot take care of the skies, but we can help the earth.´

At the end of the lesson programme, students in group B wrote texts were dialogue, point of view, and agency indicators kept appearing, and at the same time, these texts also grew significantly in complexity, narrative structure and extension.

5.7.3. Most relevant observations by category.

- **Narrative Structure.**

From a structural point of view, texts written in group A reflected the great emphasis given in class to the teacher´s own acceptance of creative writing. All the groups wrote fictional narratives; however, these did not reflect remarkable features in narrative structure, extension or complexity. These were not qualitatively comparable with those texts written by groups that made an emphasis on dialogue and participation (as in the case of the First school, or the groups in the Sixth school, as observed by Alexander, 2004.)

At the end of the lesson programme, group A created more complex and diverse narratives, which were also more carefully constructed and coherent.

Reflective- type texts were written in group B, first found in group B in the Second School. Although the group did not have the same extended experience with creative writing as group A, these texts were qualitatively more complex, even if their extension was comparable with those of the previous group. These texts were, in fact, structured like arguments, which often reflected how students structured their own arguments or conclusions within the dialogues that took place in the group. Texts written in group B diversified after the lesson programme: some kept their ´reflective argument´ format, becoming more elaborated, complex arguments.

Other working groups in group B wrote very carefully constructed narratives where dialogue played a very important part. From a quantitative point of view, this was one of the groups where the incidence of keywords grew the most after the lesson programme. We could link this to the fact that the classroom already possessed a solid dialogue culture, since previously the beginning of the lesson programme. Also, to the fact that the teacher Mr. D, already had a self- instructed background on constructivist teaching, and like the teachers in the Fifth School, he made an effort to incorporate the proposed methods into his regular everyday lessons for the whole duration of the lesson programme.

The following text can be taken as a representative example of the texts written within group B at the end of the lesson programme.

´We can never be sure of how our words will affect a conversation. As we cannot be sure of how our actions will affect the world.

The best we can do is to choose them carefully, to try and think with care, like we try to make actions for the best, and be sure that we gave the best of each other, to each other, and to the world.´

- **Dialogue**

Implicit or explicit forms of dialogue were markedly absent from the narratives elaborated within group A in this school at the beginning of the lesson programme. At the end of the lesson programme, examples of implicit and explicit dialogue comparable to those of the Third school groups emerged in stories written in this group, as in the case of the following story.

´Maria travelled a lot with her family. Everywhere she went, she tried to plant a tree. That was strange for her family, but they did not say or asked anything to her until some years later.

I have a list of all the places I have visited, she said. And I know I have planted tree in all those places. So in a way, I helped making those places better. I am still at those places. ´

In opposition, Students in group B were evidently familiar with the dialogue dynamics. Texts written by these students at the beginning of the lesson programme were shaped by this even when they presented a format of ´reflective statement´, they were constructed as if they formed part of a bigger dialogue, and were not closed conclusions, (as in the case of the group B in the Second School) and some of them even featured reflective questions.

At the end of the lesson programme, children in this group wrote texts where the dialogue featured prominently, or where the dialogue, and the dynamics in the dialogue were explained from the students´ point of view, much like the ´allegories´ written by children in the Fifth and Sixth Schools.

> *´When we talk, we form a small ecosystem.*
>
> *What every person has to say is important, like every plant and every animal have a role in the balance of all. If you change the soil, some plant will die. If these plants die, animals will starve. You cannot change the words, without changing the whole meaning of the conversation.*
>
> *Like in an ecosystem, every little thing, or word, counts.´*

- **Point of view.**

Students in group A presented certain difficulties when locating a point of view different from their own, like the majority of groups that used traditional teaching methods, often showing a lack of defined characters and using omniscient narrators in their stories. At the end of the lesson programme, stories where a defined point of view could be located were found in this group.

Students in group B did not present the same difficulties when locating a point of view, both within and outside the narratives they created. The use of reflective questioning, (*Why do you think that? / What do you think she felt?)* by the teachers, even previously to the beginning of the lesson programme, could be linked to this.

After the lesson programme, children in this group wrote texts that employed more than one located point of view, or that explicitly explained the difficulties of locating a point of view different to one´s own, like in the following story.

'It is difficult to see things like another person. You would have to eat what the person eats, sleep in the same bed, have the same parents, and even then it would not be the same.

It is even more difficult to know how an animal thinks. Maybe it is impossible, but what we can do to understand them, as with people, is to respect them, and at least try to understand how different they are from us.'

- **Agency**

Agency indicators in group A were scarce at the beginning of the lesson programme. This lack of agency had not the negative undertones that were found in the group A or the Second School, or the texts in the Fifth School, and in this way were more similar to the lack of agency patterns found in the Third School groups; at the end of the lesson programme, stronger agency indicators were found in the texts written by children in this group.

Students in group B had an already established sense of agency at the beginning of the lesson programme. Their argument-like texts often contained indicators of these sense of agency, and they almost always were situated from the point of view of the students´ collective. (´Us´, ´We´).

After the lesson programme, students in this group wrote stories in which agency featured prominently, and became a central theme to their narratives, as in the case of the following text.

´We can feel sad by all the things we cannot do. But the little things we can do will probably add up at the end of our lives, or become big when combined with those other people do, and if we do not do them because we think they are of no value, that would be really bad.

It is better to do what we can, that not doing anything at all.´

Chapter 6

Observations

6.1 Socioeconomic indicators of the schools in the study.

Students in this study came from different socio-economic statuses. No school in this study had a highly discernible socio-economic background that particularly distinguished from the other schools, except for the Fifth and the First schools, which could be considered of a below-average socioeconomic level and of an above-average socioeconomic level, respectively.

The relations of class and language have been discussed before as early as Berstein (1973) and Barnes (1976). More recently, studies by Hart and Risley (1996) and Littlejohn (2002) suggest that, regardless the socioeconomic status, the language type that children receive from their parents and teachers greatly determines the language structure they will possess later on in life. On this, Alexander (2008) argues that the language that the child acquires as early as age 11 will shape his capacity of acquiring a new language structures later on.

This is relevant from the perspective of the study because in Mexico, official primary schools are by constitutional decree, mandatory and free of charge. Children of different socio-economic statuses join every day in the average Mexican classroom; the importance of the probable effects that this difference could have on creating a bias in the results obtained from each group had to be addressed from the beginning with the necessary caution.

Even when the necessary considerations should be taken before establishing a final conclusion, results in this study show how the initial indicators, both quantitative, in the form of exploratory talk keywords and qualitative, in the form of the indicators analysed in narratives of every group increased after the lesson programme, regardless of its perceived socioeconomic background. This increment apparently was not affected by nor had any apparent correlation with the socioeconomic background of the students in a group. At the same time, the

initial scores –especially the quantitative- not necessarily predicted the success of the study in a given group.

As an example, the school with the lowest average parental income was the Fifth School, and even when in fact this school showed the lowest starting quantitative scores, by the end of the study both groups showed an average to high level of improvement in both environmental and exploratory talk keywords –when compared with other groups- during the quantitative analysis. In the qualitative analysis, narratives written by both groups of this school showed a great development in narrative structure, use of dialogue and all the measured indicators. This development was comparable with that of schools of a higher socioeconomic status.

Taking into account the possible bias due to the reduced data sample and the fact that the Fifth school was the only school in which parents had a below-to-average income, we could observe how socio-economic indicators can point to a certain extent to the ´starting point´ of a classroom, but do not determine entirely what level of development in that classroom can achieve.

Again, the short time of the programme, and the possibility of other effects – as the fact that this was one of the schools where the programme had the strongest support by the participant teachers - makes it uncertain to establish a generalisation based in the results of this study alone, but the quantitative results obtained at the end of the lesson programme, and several other indicators seem to be supported by results obtained by Alexander (2008), Mercer and Dawes (2004) and Mercer and Rojas-Drummond (2004), in different settings.

It was concluded that although the effect of socioeconomic indicators was perceivable especially in the first stage of the study, and while of marked relevance, the socioeconomic background could not be taken as a concluding predictor of the probable success of the programme in a given group. The evidence highlights the importance of the use of dialogue as a central element

of class construction, and marks how the use of these methods can achieve Freire (1978) ideals of becoming a vehicle of cultural integration and of diminishment of cultural differences.

6.2. The role of the teacher in the study.

The central role that the teacher holds in fostering an environment for dialogue in the classroom, and a sense of agency of knowledge within their students has been addressed by Barnes (1976, 2008), Mercer and Dawes (2004) and Alexander (2008). Also, these authors have discussed the effects that the more traditional and authoritative methods of education have in creating an asymmetrical environment of participation within the classroom, and how this undermine the sense of agency and participation of students in the classroom.

The great importance the teachers had during this study cannot be understated. Not only did they greatly determined the environment of the classroom *before* the study, thus to a greater extent shaping the ´starting point´ of a classroom, but their support and the involvement in the study also greatly influenced the effect of the lesson programme.

During the study, many degrees of acceptance and involvement were found amongst participant teachers. Teachers with an opposition to the study and the methods would often signal their opposition often verbally, although other kind of resistance could also be present: They could take down the poster with the ´talking rules´, discredit the employed methods in front of the students, etc. Teachers like Ms A in group A of the Second school, or Mr O in group A of the Fourth school could be an example of this type of traditional, authoritarian teacher. Evidently, their influence had a great effect in their respective classrooms dialogue environment: Students in both groups had difficulties locating point of view or a sense of agency of knowledge.

Conversely, teachers that showed a favourable disposition to the study, and supported the use of dialogue- centred methods would often participate actively

in the lesson programme, keep the ´talking rules´ poster and even ask for more materials with a dialogic approach after the conclusion of the programme. They were open to participation, interviews, and collaborated greatly with the lesson programme, even incorporating the methods to their regular practice. These teachers often already possessed some constructivist background, as in the case of M, in the First school, or Mr D In group B at the Seventh school; or, as in the case of the Fifth School, even though not familiar with the theoretical background of dialogue-based teaching methods, had already tried to establish a culture of dialogue within their classrooms mostly due to personal conviction.

Arguably, the classrooms where the greatest positive changes were observed were classrooms where these teachers worked to establish a culture of dialogue, and at the end of the study the level of acceptance and involvement that the teachers showed during the study was considered more relevant in determining the degree of success of the programme than the socioeconomic background of the students in the classroom. Groups in which teachers collaborated with the study, supported the ´talking rules´ created by the group and helped foster a sense of participation showed the increments in the frequency of exploratory and environmental keywords at the end of the study, and, from a qualitative point of view, it was in these classrooms were the most complex and rich narratives were found at the end of the programme. The most noticeable examples of this can be the First school, group A in the Second School, both groups in the Fifth school and group B in the Seventh school, where the strongest common variable within these groups was the role of the teacher in fostering a culture of dialogue within the group, both previously to the beginning of the study and during the programme.

6.3. Comparing Quantitative and Qualitative Results.

The use of quantitative data analysis allowed us to compare the results of the programme using similar and comparable sets of data. Due to the nature of the study, this quantitative background would allow for a more objective

comparison of the obtained results. However, this set of data, in its own, would be only half-complete, especially when studying language-related phenomena. From a quantitative point of view, a conversation or a narrative could have very similar indicators, each possessing the same length or number of keywords, while their degree of complexity or even the meaning of each could be very different.

During the analysis, we would sometimes encounter classrooms where the quantitative scores would be high when compared with those in other groups, while the narratives written in that group displayed a lesser degree of complexity. The opposite was also true, as in some classrooms the average number of keywords would be low, while students in that group were capable of writing complex and rich narratives, understanding concepts as point of view or agency of knowledge more easily that students in other classrooms.

Taking this into account, the decision of analysing quantitative and qualitative data separately and then comparing them to better establish possible correlations or links between them was taken. As previously discussed, language can be seen as a multifaceted object, much like environment, and a whole, is composite of different aspects, and can be studied from different perspectives.

To study different aspects of the expression of children environmental knowledge, using a variety of methods, both quantitative and qualitative, allowed for a deeper comprehension of the effect of the study, both in the children forms of expression (oral and written) and their perception and interpretation of the environment.

6.4. Comparing Oral Recordings and Written Narratives: Considerations.

Comparing spoken language with written expression has to be approached with caution. As Barnes (2008) and Mercer (2008) point out, language is found at its ´purest form´ when spoken. As considered in the early stages of this study, the

incidence of key words that indicated exploratory talk and environmental knowledge was always greater in the oral interchanges, and diminished substantially in the written work of students. However, due to both technical and practical restrictions, audio recordings were not always possible in all of the classrooms. Had we had a wider variety of technical resources, that allowed us to record and code students´ oral interchanges, quantitative and qualitative indicators would probably closer to comparison, and we could have gained a deeper comprehension on how students conjunctively form their ideas on environment and community.

Taking these considerations into account, written narratives were used to obtain and analyse most of the students´ changes in the incidence of keywords, presence and use of main concepts, and use of language. In the pilot, it was perceived that dialogue keywords were more frequent not only in recorded dialogue, but also in the narratives written by children.

This relation was supported by Alexander (2008) who notes that the emphasis on dialogue in the classroom translates in an improvement in literacy, and that dialogue forms and patterns will eventually surface in written forms of dialogue.

The use of several and different forms of dialogue has been used by this study, not just in order to establish comparisons *between* them, as we understand that dialogue is a much more flexible way of interchanging ideas, and written work a more *presentational* tool. (Barnes 2008). The insight gained during the analysis of both spoken and written forms of dialogue, both quantitative and qualitative, can be considered the base of the observations made about the main indicators measured in this study.

6.5. Analysis of main indicators.

6.5.1. Narrative structure.

The complexity of narrative structure was considered an indicator of the development of ideas elaborated within the group. Alexander (2003, 2008) has

already discussed how dialogue based methods help children develop more carefully constructed texts, versus the emphasis in literacy.

It was found that groups that had greater development in the construction of their narratives were often those in which exploratory talk keywords indicators were higher before the study. It was also observed how the after the study, the most complex texts would be written in groups where the incidence of exploratory talk keywords increased the most. This correlation was in fact one of the more solid amongst the analysed indicators.

Even when the starting level of the classroom was above average (as in the case of the First school) a tangible progress could be observed in almost all of the participant groups after the lesson programme. While the average length of the constructed narratives increased in almost all the groups, the most significant changes were observed in the internal structure and quality of narratives. In all cases the grade of complexity that these written stories ac achieved after the research was higher, and the written texts were clearly more careful, detailed and multifaceted.

6.5.2. Dialogue.

The predominant type of talk in almost all of the groups at the beginning of the lesson programme -both in audio recordings and within written narratives- was cumulative. Students would engage in cumulative interchanges, and the characters in their texts would use a similar style of dialogue. Furthermore, dialogue would almost always be implicit or absent of the central plot, very rarely any verbal interaction taking place within the story. Conflict, if present, was left unsolved or solved out of the central narrative. If characters did offer advice or recommendations, these were never questioned, contended or built upon in an exploratory manner by other characters.

One of the few schools where this was not the norm was the Fifth school, were the dominant type of talk found in oral recordings was confrontational; in

the few texts written at the first stage of the programme by students in this school, dialogue was –when present- confrontational or negative in nature.

These observations find a base in Alexander´s (2008) and Mercer´s (2004) reflections on how constructed, external dialogue helps students develop constructed internal dialogue. As such, the presence and type of dialogue in narratives was taken as an indicator of the type of dialogue most frequently developed by students. This served as framework for several developments observed during the study: often, the groups that showed the greatest improvements in the development of dialogue during the audio recordings were the groups that elaborated more advanced forms of dialogue within their narratives. This could be measured both quantitatively and qualitatively.

> *Through collective discussion, children learn to understand and to respond to others; (…) they learn to reflect critically. The structure of enquiry supports the structure of logical argument that in turn supports discursive writing.´* (Haynes, 2002, p.128)

The stronger emphasis that the students in all groups made in constructing dialogue between characters also confirmed these observations. Students displayed a more tangible mastery of dialogue at the end of the lesson programme, and almost all stories written at this stage of the study contained an example of dialogue between characters, or more sophisticated forms of implicit or explicit dialogue.

Another interesting development concerning dialogue was the use of reflective sentences in the texts written by some students after the lesson programme, and the explicit highlight of the reasoning process of the students within their written work. (*´And because of this... we decided.´*)

Students in most schools started to write about their own reflections on what was being said and learned, suggesting a type of metacognitive reasoning. Children started reflecting on their way of speaking and constructing ideas

within their texts. Usually, dialogue was the most prominent feature of the narrative, and the narrative in itself was mostly about how the characters spoke or constructed ideas. Dialogue was the preferred way of reaching for a conclusion, or a joint resolution of a problem. Again, even if dialogue was not represented implicitly or explicitly, children described qualities of dialogue.

6.5.3. Point of view.

A number of authors have discussed before how dialogue based methods help students not only to locate their own place on the communication systems and flow of dialogue in the classroom, but also, and very importantly, to better locate a point of view different from their own. The great importance of point of view was only fully understood during the analysis process. The ability to assume a point of view different from one´s own -as observed by Green et al, 2008- was considered of crucial importance for both reaching a comprehension of different realities, and for acquiring a deeper environmental awareness.

   During the first stage of the lesson programme, children would often take the role of omniscient narrators in the majority of text they constructed, that would usually be constructed like a movie script; children never assumed the ´point of view´ or perspective of these characters: they were just writing a story about someone else´s experience and characters often were underdeveloped, their inner thoughts, motives and aspirations often left unexplored by the narrative.

   This saw an important change after the programme, when more developed use of dialogue and treatment of conflict resolution or exploration of motives could be perceived. Some of their stories were narrated using a first-person point of view, or even would tell the story using the point of view of different characters. The majority of narratives written in the last stage of the research allowed us to analyse how the focus on dialogue helped students to locate themselves in different perspectives, even when these were much different from their own sociocultural frameworks.

This follows Green´s observations regarding the process by which the students discuss and form narratives, which in this case allowed for the creation of a more ample language context that could be then explored in order to clarify how - through between interactions framed by the research –the class constructed patterned ways of ´knowing, being and doing´. (2008, p.117)

In this study, the most representative example of how the proposed methods helped students to gain an awareness of a point of view different from their own was found in both groups in the Fifth school, where children showed a greater sense of respect of another´s point of view in the later audio recordings of their of their oral interchanges, and a clear management of the concept of point of view, the perception an respect of another´s person role in the community and a greater sense of community and team work within their narratives.

It was hard to link the ability to locate a point of view different from one´s own to any of the quantitative indicators; while some apparent correlation was drawn between exploratory talk scores and the ability to locate a point of view different from one´s own, *point of view* was perceived as one of the most subjective, and un-quantifiable of the indicators of the study, and was more clearly linked to type of dialogue and participation habits promoted by the group´s teacher.

Seemingly, the emphasis on the importance of the self and the gained sense of agency of knowledge that children developed during the programme, helped them to gain an awareness of others´ roles in the communication process and the importance of these interactions. Thus, a strong link between the agency and point of view indicators, and, more unexpectedly, the anthropomorphism indicators was found.

6.5.4. Agency indicators.

One of the aims of this research was to empower children in order to avoid the feeling of ´ecophobia´ signalled by Sobel (1996) in which the author fears that,

due to the inability of taking action upon environmental issues, children will ´detach´ themselves from them, in order to confront the feelings of hopelessness and disempowerment. Said detachment is seen by the author as a natural reaction (a distancing technique, in the original), developed as a protection to ´avoid continuing exposure to the painful emotions they experience when told about environmental problems that are at the same time remote and not always fully understandable for them´ (p.2).

For this reason, the fostering of a sense of *empowerment* (UNESCO, 2005) – through *agency of knowledge* was seen as crucial for the purposes of this research. This sense of agency, as Barnes (2008), Solomon and Black (2008) and Freire (1978) recognise, is associated with the moment or process in which the individual recognises himself as a central, relevant piece in the creation of his own knowledge.

In the Fifth school and in group A of the Second school we could observe examples of feelings of ´powerlessness´ and lack of agency, where children in fact considered themselves as unimportant or powerless in the own learning process. These feelings were expressed in their initial interviews, attitudes during the lesson programme, and within the narratives written by them in the first stage of the study. At the later stages of the lesson programme, and as these feelings of ´lack of agency´ diminished, students expressed explicitly how different they felt about participating or engaging in dialogue, often stating that they felt ´more capable´ ´more important´ or even ´smarter´ during the interviews.

A correlation was found between the initial empowerment indicators measured at the beginning of the programme and the sense of agency measured within the narratives of students. Also, and of high relevance for the purposes of this study, groups where the indicators of agency (qualitative) and perceived empowerment (quantitative) had grown the most, were the groups were children reported a higher environmental interest, and saw themselves as more able –and likely- to participate in environmental action after the study.

6.5.5. Presence and Type of Anthropomorphism.

The environmental knowledge and precision with which children described nature was not always linked to their degree of environmental awareness and involvement. One of the assumptions at the beginning of the study was that students in groups with high scores in environmental knowledge and environmental awareness would write narratives in which anthropomorphism indicators would be lower.

This was disproved by the first results of the analysis, as anthropomorphic indicators could be found in schools whit high environmental knowledge indicators, as in the case of the First school, or group A in the Fourth school. Seemingly, the presence of anthropomorphic indicators had more to do with the ability to visualize, and *understand* animals and nature as forms of life than with environmental knowledge.

In almost all texts written at the beginning of the programme, animals featured prominently: however, a deeper analysis revealed that they often were portrayed outside their habitat, and displayed characteristics and behaviours strongly linked to anthropomorphism. In fact, they usually acted as charismatic human substitutes, not as animals.

This follows Tunnicliffe´s (2004, p.56) previously discussed observations on anthropomorphism and children, in respect of how common it is for them to explain the conduct of certain species using human logic, and Brown´s (2004, p. 51) remarks on the common portrayal of interrelationships between organisms amongst children, which is another form of *negative* anthropomorphism, as it is seen as an obstacle to reach a true understanding on environmental relationships by part of children.

In the case of this study, anthropomorphism after the programme, at least the inclusion of animals as ´human substitutes´, and the portrayal of non-realistic relationships between animals and humans and animals, had a strong diminishment. In fact, almost all of the narratives constructed after the programme were centred on humans, community and participation. Students

also showed an increased awareness and a more profound knowledge of their natural environment at the last stage of the study.

A marked and unexpected influence was observed between point of view and anthropomorphism, as seemingly, the emphasis made in the relevance of expressing one owns opinion, and a reinforced sense of identity, helped students develop and situate not only a more ´global´ point of view, -which concerned community and participation - but also to establish a more realistic view towards nature and to reach a more profound comprehension of its processes; as opposed to the anthropomorphic view, based in the projection of human values and attitudes to nature-related-phenomena and processes.

6.5. Other effects of the study on the classroom life.

6.5.1. The conduct of participant children.

In almost all participant schools, a great improvement in the conduct of participant students could be observed. Even when the subjective nature of this change and the short time of the intervention could make it difficult to establish generalisations in this aspect, this observation was primarily based in the impressions of teachers and parents that took place during the programme, and mainly reported during the interviews at the end of the lesson programme.

To what extent this change was a result of the effects of a sudden change in the classroom environment, or the presence of the researcher, and probably only a short lived temporal effect, could hardly be determined, as the only available data that could serve as indicators of the permanency of this change over time were the reports of both teachers in the Sixth School. Since the only available data for the measurement of the possible effects of the study over time were gathered in a single school, and were obtained from the testimonials of teachers that already possessed a favourable views towards the study, establishing generalisations on this aspect of the programme would be uncertain at best.

6.5.2. Scores in Natural Sciences, Mathematics and Spanish.

One of the initial concerns of participant teachers was that the grades of students in other subjects other than natural sciences would drop as a result of focusing more time of the regular schedule to environmental education. Literature contradicts this point of view and the positive effect that a sociocultural, dialogue-based approach has on children´s science and mathematics learning has also been discusses by Scott (2008) and Cazden (2008). In order to measure this effect during the study, we included the average grades of groups before and after the lesson programme. In all groups where this data could be obtained, a significant improvement in the grades of participant students could be observed.

6.5.2 1. Natural sciences.

Significant improvements on the subject of natural sciences (biology, environment, natural history) could be observed in all the participant groups where such data was available for comparison.

This perceived effect was more or less expected as the subject of environmental education was directly linked to the contents of the lessons in the programme, to the extent that many of the teachers would choose the lesson plans that were closer to the contents of their own programme. Qualitatively, half of the teachers reported a change in the way that children took part in this subject: They made more questions, and were more participative and active during lessons.

6.5.2.2. Mathematics and Spanish.

A less expected improvement was observed in the scores of mathematics and Spanish (Language) lessons. The scores of these subjects were recorded at first in order to obtain data that either confirmed or contradicted some of the fears expressed by teachers during the pilot; that *´...introducing environmental education lessons in the curriculum would be detrimental to other subjects´*. It

was confirmed through these score recordings that the Mathematics and Spanish scores of this groups not only did not became lower, but in fact, improved after the after the programme period ended.

Roughly half of the participant teachers observed, during the interviews at the end of the lesson programme, that children were less concerned with ´being wrong´ or making mistakes when they participated. Conversely, they asked more questions, were able to produce more complex texts, and were more willing to share their thoughts about the lessons with the class.

6.6. Limitations and Considerations of the Study.

6.6.1. Time restrictions.

One of the main constraints that this research confronted was the limited amount of time available for carrying on the research. Great efforts were taken to compensate for this by making the best effort to capture all the possible relevant data concerning each school and spending the full duration of the study immersed in each school´s environment.

Over a period of five months research was carried on seven schools, and so the available time for imparting the lesson plans and gathering data was reduced to two weeks per school, although in most of the schools this period extended to over three weeks. Even when it was considered that a longer research period would have helped generate more and more reliable data, the financial and temporal limitations of the study were too strong to avoid.

Time and budget limitations made it impractical to assess how dialogue-based strategies might have influenced participant children or teachers in and outside the classroom over time. Studies made by Green et al (2008) and Alexander (2010) suggest that dialogue based strategies have a powerful and lasting effect in participants over the course of time. However, collecting such data was beyond the scope of the current study. Future studies might consider dialogue

based strategies and their effect on the teaching of environmental education, followed up with periodical reviews to assess the effect on environmental awareness and involvement over time.

6.6.2. Practical and Technical limitations.

Another important constraint of this study was limited availability of financial and technical resources. A good example of this was the available audio recorders; these did not possess a system for blocking environmental sound and were limited in quantity. As a result, many of the audio recordings were of limited or poor quality, and could not be taken into account for establishing reliable quantitative indicators (although some of the audible fragments of these recordings were used to enrich the qualitative data analysis, as in the case of the Fifth School).

In other schools, headmasters or teachers opposed audio recordings or recorded interviews from the very beginning of the study. (See, also: 6.7.5. Ethical considerations.) Some cited safety concerns –as in the case of the Seventh school- while others declared a degree of uneasiness when having a recording device in the classroom.

6.7. Other considerations.

Although great efforts were made to avoid subjectivity of personal bias through the research, some concerns relating to internal validity should be taken into account.

6.7.1. Questionnaires.

Questionnaires, both those used in the pilot study and the main research period, were elaborated, conducted and analysed by the researcher. Even due to the quantitative characteristics of this process, and when the best possible efforts were made to ensure clarity and objectivity in each of these stages.

Questionnaires were designed and re-written –after the pilot- to better adapt to the use of language and context of the participants. The researcher was available for assisting the participant children at all stages of its completion.

6.7.2. Interviews.

It should be noted that participation in interviews was entirely voluntary. As such, it is probable that teachers that had a positive disposition or view of the research decided to participate in interviews. As such, the inclusion of teachers´ testimonials about their impressions and the study could suppose a certain amount of bias. The only exception of this could be Ms A, of the Second school, who openly spoke against dialogue based methods, and the importance of environmental education during her both of her interviews, at the beginning and ending of the programme.

6.7.3. Analysis and translation of narratives.

Much like questionnaires, narratives were translated, analysed and processed by the researcher. The inclusion of the perspective of the researcher in all of these processes could suppose a certain amount of bias, more so due to the intrinsically qualitative nature of both the materials and the processes.

In order to try to counter this, great efforts were made during all this steps, in order to carefully choose the closest possible words or meanings to those employed by the students in their narratives, during the translation and analysis processes, and in choosing the most representative material written in each classroom, not just the best, more elaborate or complex, or that that would serve best to show the advances made during the research.

6.7.4. Replicability considerations.

While designing the research, it became apparent that due to the particular context in which it took place, some issues regarding replicability could arise. While the uniqueness of the La Paz region was known from the beginning, especially regarding the environmental situation, the demographic data obtained during the study further highlighted this. This particular research can be categorised as a unique or extreme case study (Yin, 2003). The unique or extreme case is, as Yin observes, a common focus in clinical studies, and it serves to depict a situation or condition perceived as *unique* by the researcher.

A well-known example of this type of research in the social sciences was Margaret Mead´s (1928) study of growing up in Samoa that seems to have been motivated by her belief that the culture of the country represented a unique case. As such, we could not expect that the results of this research could be faithfully replicated, as the context and conditions of the research area are rather particular to it.

This research has been further framed as a ´Single Case Study with Embedded Units´ (Baxter, 2008). It is understood that we are looking at the same processes within the same community, but we fully acknowledge that the different school contexts can produce different outcomes, and, as Baxter highlights, a holistic case study with embedded units enables the researcher to explore the case while considering the influence of the various factors that could influence the process.

> *´The data can be then analysed within the subunits separately (within case analysis), between the different subunits (between case analysis), or across all of the subunits (cross-case analysis)* ´ (Baxter, 2008, p.554).

This type of analysis greatly enriches the general perspective that can be reached through the research, and to better frame the case. However, one has to be careful when elaborating this type of research, as one can become deeply

engaged in the analysis at the individual subunit level and then fail to return to the global issue that they initially set out to address. (Yin, 2009).

As such, it was decided that the portrayal of the particular characteristics in each school would be critical to better support and validate the outcomes and results of the research. It also became apparent that this case could present generalisation issues, again taking into account the singularity of the research area. Even when it is stated in the research outcomes that the main objective is to test the suitability of dialogue-based educational strategies in the context of Baja California Sur classrooms, and so the generalization of the results of this work is not regarded as essential, even when this case could not be highly representative it is considered that it might yield significant findings that can be applied more generally to other educational contexts. These findings are discussed in the following chapter, *Conclusions*.

6.7.5. Ethical Considerations.

Great efforts were made to comply with most of the ethical considerations that could arise during the course of the study; here are the most relevant:

Informed consent: Headmasters, teachers and students were informed beforehand of the objectives and methods to be used. All the headmasters of the researched schools were presented with the option of taking part in the study or not. Also, headmasters would sign an informed consent form in which I detailed the most relevant features of the research before I started the lesson programme in each of the schools. All of them read and signed the informed consent form (See: *Appendices*, p. 317) before the study began.

Fair and ethical treatment: Participant students would be fairly treated, and their wellbeing and respect of their context was taken into account in all moments of the research.

When a school had 3 classrooms of the same grade, the decision of which 2 classrooms would participate in the study was taken by teachers and the principal of each school.

All teachers in the school, whether or not they belonged to participant classrooms, could choose to attend or participate in the lessons, and ask for annotations, my contact information and the totality of the designed lesson plans, in case they wanted to access to further information about the research, the employed methods, or even implement an adaptation of these lesson in their classrooms.

Confidentiality: The Ministry of Education of the State stated its opposition (before the beginning of the research) to the use of photographs and video that included the image or interactions of students or teachers. This research does not include any of these materials for this reason.

The decision of allowing audio recordings and interviews to the students was taken jointly by the fathers´ board of each classroom, the teacher(s) and the headmaster of each school. Headmaster´s, teachers´ and students´ names were recorded but not disclosed during the duration of the research.

The decision to participate in interviews and answer (or not) any or all of these questions was taken by the participant teachers and students. In order to ensure the anonymity of the participants (teachers, students and headmasters) the name of the schools is not used in this work. Instead, schools are referred to by the order in which they participated in the study (the First, Second, and so on). To further protect their privacy, the names of the teachers were removed and in this work and are identified by an initial, which has no relationship with their real name and was assigned only for organisational purposes. The students' names were also changed to protect their identity. All this was made to better preserve the anonymity of participants and under-age individuals.

Knowledge about the research: Content about the research was made available for all interested parties, including but not limited to: SEMARNAT,

SEP, CONACYT, participant headmasters, teachers and parents, and even to some interested students.

Copyright and acknowledgments: The best efforts have been made by the researcher to acknowledge and correctly cite: Authors, sources and bibliography, third parties, participants and sponsors.

Chapter 7

Conclusions

7.1. Do dialogue-based strategies facilitate environmental education?

As the individual grows, he comes in contact with different ways and currents of though. It is not supposed that each child will grow to become an environmental researcher, but even as a citizen involved in the decision making process of its community, he will face a number of environmental decisions, even in a day to day basis. Which policies will this citizen enforce? Will he get involved in environmental activities? Will he pass on that environmental culture to his children?

According to Kenis and Mathjis (2012) one of the most difficult challenges that environmental education faces today is to guarantee individual behaviour change concerning the environment, a task that once was thought could be achieved mainly through the accumulation of scientific environmental knowledge.

A number of authors (Wibeck, 2013, Tsevereni, 2011, Duhn, 2012, Kollmuss and Agyeman, 2002) have suggested that instead of forming mere receivers of environmental education, environmental engagement should seek that the citizen actively takes part in learning and action on environment. It is considered that to become an involved citizen he will require critical thought, a strong sense of agency, but also the capacity of seeing things from a different perspective from his own, or at least understand or respect said perspectives.

Almost all of these capacities and attitudes are much more easily developed in the early years of education; and dialogue based strategies have been proven to foster and develop all of these traits in children. (Alexander, 2010; Mercer, 2008; Green, 2008).

Although at the end of the literature reviews it was found that no previous formal research had been conducted about the use of this approach in environmental education in Mexico, valuable evidence of the use of dialogue based methods were found in citizenship education (Alexander, 2008), sciences, (Liversidge, 2009) and Mathematics (Rojas-Drummond and Mercer, 2008). Due to the composite nature of environmental education, all these examples were considered of great importance to the research.

Both within the literature and the research process it was found that dialogue based techniques and methods facilitate the teaching of environmental education themes. During the study, a substantial increment in the indicators for environmental knowledge, awareness and involvement- all relevant to the purposes of the study- were found.

Through the study it was perceived that a high majority of students possessed a fuller and more complete grasp of environmental knowledge and a more developed capacity to form constructive and exploratory forms of dialogue, and a more developed sense of agency and an improvement in the self-perceived capacity of children to make a significant change in their community and environment.

It was perceived during the study that dialogue based strategies help to communicate environmental education in a unique manner. To teach a subject using dialogue based strategies can help to draw a more plural approach to the different visions, emotions, and perceptions involved in said subjects. These views are closer to the view of environmental literacy vs a more scientific -even mechanical- perception as something abstract and intangible.

To teach environmental education using dialogue based strategies facilitates the comprehension and assimilation by students of environmental topics at a more personal and social level. During the study, important advances were not only found in the environmental knowledge indicators, but in those considered relevant to the development of a true environmental awareness and involvement

in the political processes of environmental decisions: ability to adopt a point of view different form one´s own (Green et al, 2008; Alexander, 2008) Agency (Kollmuss, 2002; Tsevereni, 2011) and a less anthropomorphic view about the natural processes involved in the ecosystem (Tunnicliffe, 2004).

Improvements in these aspects were recorded even in classrooms where the environmental scores where high at the beginning of the research, or in classrooms with different socioeconomic levels, a significant improvement was perceived in both quantitative and qualitative indicators. Furthermore, and contrary to some teacher´s expectations, this improvement was non-detrimental of other subjects.

As such, it can be concluded that dialogue based strategies are an effective method of teaching environmental education, which is an interdisciplinary subject, composed by a variety of secondary subjects (Feng, 2012). Environmental education is also constructed by different points of views and not only requires critical thought and the capacity to reason scientific knowledge to fully understand, but the capacity to learn and respect a point of view different from one´s own.

Given the evidence, to use dialogue based strategies in the teaching of environmental education in the average Mexican classroom is not only possible, but would represent a considerable improvement over the more authoritarian methods found nowadays in primary classrooms, and would help to form involved citizens that take part and really engage in the environmental decisions of their community.

7.2. Can these strategies help foster a different approach to environmental education by part of the students?

Dialogue based education not only proved to be a reliable method for teaching environmental education, but to develop the characteristics, values and attitudes contemplated by the UNESCO (2012) and SEMARNAT (2012) regarding the principles of citizen participation and environmental involvement.

To foster a participative, integrated approach was considered as essential for UNESCO (2005, 2012). As such, this research intended not only to facilitate the transmission of environmental knowledge in students, but to foster a change in attitude in them. Dialogue-based strategies, as found in the literature review, comply with the UNESCO´s views and ideals on participation and empowerment reflected in agency of knowledge in most of the socio-constructivist literature. At the end of the research, children not only were more willing to participate and share their views about the environment, but reported to feel more capable of making a change in their communities. The sense of empowerment –agency of knowledge- that children developed during the research is considered vital to foster a citizenship that not only limits itself to acquire knowledge in a subject, but acts accordingly to that knowledge. (Kollmuss and Agyeman, 2002).

Dialogue-based methods, with their focus on the students´ collaboration and participation have proved in a variety of studies to help foster a sense of agency in them. (Alexander, 2010) This sense of agency was perceived as fundamental to generate a sense of active participation, for a number of authors, both environmental educators (Palmer, 2004; Novo, 2010; Gaudiano, 2010) and of socio-cultural or socio-constructivist extraction. (Green, 2008; Alexander, 2010; Mercer, 2008).

7.3. Can these strategies be successfully incorporated in the permanent school curricula of Baja California Sur classrooms?

From the beginning of the research, it was understood that one of the main aims of the study was to produce a set of strategies that could be implemented in the context of the primary school classrooms of Baja California Sur. In order to achieve this, great efforts were made to incorporate into the research the views and perceptions of participant teachers regarding the suitability of the employed strategies in the context of their classrooms and how likely it was that they would continue using dialogue based strategies in their classrooms after the end of the study.

Most expressed that the use of a manual or a series of lesson plans that served as a guide would help them develop environmental education lessons focused on dialogue, and the majority of participant teachers expressed the intention of continuing with the use of dialogue based strategies in their classrooms. Although we could consider that this feedback was mostly positive, it remains to be seen to what extent these strategies would be successful in a larger-scale project and the effects and changes they would bring to classrooms in the state over the course of years.

We should also add that the strategies proposed in this work comply in every aspect to the current regulations and laws concerning environmental education in the state; and although through the course of the research it became evident that most teachers in Baja California Sur do not possess a solid background or up-to-date information regarding a constructivist or socio-cultural approach, most of the opinions expressed by teachers regarding the utility of the methods, and their replicability within their regular practice in their own classrooms, were positive.

7.4. Considerations for future research.

The aim of this study was to examine how and to what extent dialogue based strategies would support the teaching of environmental education in Baja California Sur primary school classrooms. We will present and discuss some of the most note-worthy findings, and the possible implications of these findings for future research:

- The highly significant role teachers have in developing a culture of dialogue and participation within the classroom, and fostering a sense of agency within their students, previously explored by Mercer and Dawes (2008) and Alexander (2010). It was found that the role of the teacher was as one of the most accurate predictors of the existence of a sense of agency in a classroom and of the capacity of establishing a point of view by part of the students. In Mexico there exists little or no research that explores the role of the teacher as facilitator of Environmental Knowledge, and how the teacher views about the Environment could reflect on his students.

- The importance of taking into account the context of the students. It was found during the research that socio-economic status or context could determine to a certain extent the starting point of the dialogue dynamics in a group –especially in the case of negative conditions, as conflictive dialogue patterns, or poor relations between classmates- even when this influence could diminish overtime and with the right attention.

- One of the most important points that were explored in this research, and of particular importance for future research on Environmental Education in Mexico, is that the accumulation of environmental knowledge –especially when based solely in scientific data- does not always translate into environmental involvement/action. (Kollmuss and Agyeman, 2002) Although this point is often signalled by a number of

authors in UK and the World, (Duhn, 2012; Tsevreni, 2011; Kenis and Mathjis, 2012) In Mexico, Environmental Education, especially in schools, is still more based on the accumulation of scientific data and knowledge that on the fostering of an environmental conscience, or the formation of a critical attitude towards environmental problems. This was exemplified by the low incidence of perceived agency sense in groups that scored highly in environmental knowledge indicators, and the high incidence of anthropomorphic indicators in all the groups, even in those with high levels of environmental knowledge. Using methods that really involve students in the creation of their own knowledge and invite them to reflect on environmental issues should be a fundamental part of any programme of Environmental Education.

- The great importance that a sense of agency of knowledge has within environmental education. Through the study and in the literature strong links were found between this gained sense of locus of control (Kollmuss and Agyeman, 2002) and agency of knowledge (Barnes, 2008) possessed in predicting environmental involvement, and the ability to establish a point of view different of one´s own (strongly linked with the notion of community and participation habits, according to Green et al, 2008, and Tsevreni, 2011) and a true, deep knowledge of nature, as opossed to the mere accumulation of knowledge. The role that this sense of agency plays in the understanding and involvement of the children towards the Environment, and in their willingness to participate in relevant Environmental decisions within their community and in a more global scale could constitute a rich field of research in the future.

It should be noted that this was the first study that employed dialogue based strategies in the teaching of formal environmental education in Mexico. Little research has been realised in formal Environmental Education in the country, and it is considered that this research possess a considerable delay, when

compared to this research field in UK or the rest of the world. (Gonzalez-Gaudiano, 2010).

Although it is considered that this study has explored the suitability and reach of dialogue based strategies in the teaching of environmental education with favourable results, whether or not these strategies will reach classrooms in Baja California Sur and be implemented in the near future will remain a prerogative of the Ministry of Education of the State and of SEMARNAT, the agencies responsible of the funding of this work. Possible future research should consider a greater scale study, probably with more closely monitored control groups, in which SEMARNAT and the Ministry of Education collaborated more closely. Such project could represent a more complete understanding of the effects of the use of dialogue based strategies in the teaching of Environmental Education, and the possible effects on environmental involvement and participation, and their possible effects in the community over the course of time.

Appendices

Appendix I: Fifteen Currents of Environmental Education (From Sauvé, 2005)

Current	Conception of Environment	Aims of Environmental Education	Dominant Approaches	Examples of Strategies
Naturalist	Nature	Reconstruct a link with nature.	Sensorial, Cognitive, Affective, Experiential, Creative/Aesthetic	Immersion; interpretation; Sensorial games; Discovery activities.
Conservationist/ Resourcist	Resource	Adopt behaviours compatible with conservation. Develop skills related to environmental management.	Cognitive, Pragmatic	Guide or code of behaviours; 3 Rs set of activities; Environmental audit; Conservation project.
Problem-solving	Problem	Develop problem-solving skills: from diagnosis to action.	Cognitive, Pragmatic	Case study: issue analysis; Problem-solving project.
Systemic	System	Develop systemic thinking: analysis and sythesis, toward a global vision. Understand environmental realities in view of enlightened decision-making.	Cognitive	Case study: environmental system analysis; Construction of ecosystem models.
Scientific	Object of study	Acquire knowledge in environmental sciences. Develop skills related to the scientific method.	Cognitive, Experiential	Study of phenomena; Observation; Demonstration; Experimentation; Hypothetico-deductive research activity.
Humanistic/ Mesological	Living Milieu	Know and apreciate one's milieu of life; better know oneself in relation to this living milieu. Develop a sense of belonging.	Sensorial, Affective, Cognitive, Experiential, Creative/Aesthetic	Itinerary; Landscape reading; Study of milieu; investigation.
Value-centred	Field of values	Adopt ecocivic behaviours. Develop a system of ethics.	Cognitive, Affective, Moral	Analysis of values; Clarification of values; Criticism of social values.
Holistic	Holos, Gaïa, All, The Being	Develop the many dimensions of one's being in interaction with all aspects of the environment. Develop an "organic" understanding of the world and participatory action in and with the environment.	Holistic, Organic, Intuitive, Creative	Free exploration; visualization; Creative workshops; Integration of complementary strategies.

Table A: Fifteen currents of Environmental Education. (From Sauvé, 2005. p. 34)

Current	Conception of Environment	Aims of Environmental Education	Dominant Approaches	Examples of Strategies
Bioregionalist	Place of belonging, Community project	Develop competencies in/for local or regional community ecodevelopment.	Cognitive, Affective, Experiential, Pragmatic, Creative	Exploration of our shared milieu; Community project; Project of local or regional ecodevelopment.
Praxic	Locus of action/reflection	Learn in, by, and for environmental action. Develop reflexive skills.	Praxic	Action-research; Reflexive posture in activities or project.
Socially Critical	Object of transformation, Place of emancipation	Deconstruct socio-environmental realities in view of transforming them and transforming people in this process.	Praxic, Reflexive, Dialogic	Analysis of discourses; Case study, Debate, Action-research.
Feminist	Object of solicitude	Integrate feminist values into the human-environment relationship.	Intuitive, Affective, Symbolic, Spiritual, Creative/Aesthetic	Case study, Immersion, Creative workshop. Communication & exchange activity.
Ethnographic	Territory; Place of identity. Nature/culture	Recognize the close link between nature and culture. Clarify one's own cosmology. Valorize the cultural dimension of one's relationship with the environment.	Experiential, intuitive, Affective, Symbolic, Spiritual, Creative/Aesthetic	Fables, Stories and legends; Case study; Immersion; Modelling; Mentoring.
Eco-Education	Role of interaction for personal development, Locus of identity construction	Experience the environment to experience oneself and to develop in and through it. Construct one's relationship with the "other-than-human world".	Experiential, Sensorial, Intuitive, Affective, Symbolic, Creative	Life story; Immersion; Exploration; Games; Introspection; Sensitive listening; Subjective/objective *alternance*.
Sustainable Development/ Sustainability	Resource for economic development, Shared resource for sustainable living	Promote economic development that takes care of social equity and ecological sustainability; Contribute to such development.	Pragmatic, Cognitive	Case study; Social marketing; Sustainable consumption activities; Sustainable living management project.

Table A (Continued): Fifteen Currents in Environmental Education (From Sauvé, p.34-35)

Appendix II: Timeline of the Study.

Date / School	First School	Second School	Third School	Fourth School	Fifth School	Sixth School	Seventh School
September 21	�©						
September 28	▢						
October 5	Follow-Up						
October 12		▢					
October 19		Follow-Up					
October 26			▢				
November 2				▢			
November 9					▢		
November 17					▢		
November 24					Follow-Up		
December 1						▢	
December 8						▢	
January 11							▢
January 18							▢

Fig. B. Timeline of the Main Study

Appendix III: Questionnaires (Translated from Spanish)

1. Are you used to work in groups?

Yes   No

2. Are you used to participate during lessons?

Yes   No

3. Do you like animals?

Yes   No

4. Do you know some of the animals that live in the state?

Yes   No

5. If you answered "Yes" please mention 2 of them.

6: Of the following options, choose the one that you think is more representative of the water situation in the state:

Scarcity (Lack of Water) / Too much Rain / We do not have water problems

7. From the following options, choose the photo of the animal (or animals) that does not live in the state:
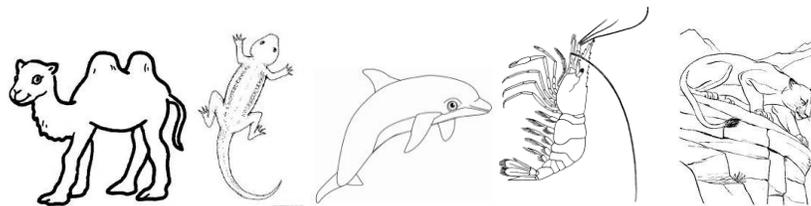
  Camel Gecko Dolphin Shrimp Mountain Lion

8. From the Following options, choose the one that is more representative of your opinion about the state landscape:

I like it very much/ I like it/ I do not care/ I do not like it very much/ I do not like it at all.

9. From the following options, choose the one that you think explains what you CAN do for the state´s environment.

A lot/ Some things / Not so much/ Nothing

10. From the following options, choose the one that you think explains what you ARE WILLING to do for the state´s environment.

A lot/ Some things / Not so much/ Nothing

Appendices IV: Informed consent form, translated from Spanish.

Name of the Director/Teacher:

With this form, I confirm my willingness to participate in the research project of conducted by Mildred Arizpe Vicencio entitled "**Dialogue based strategies in the teaching of environmental education in Baja California Sur, Mexico**" which will explore the effectiveness of dialogue based strategies in the teaching of environmental education in primary school classrooms. I also understand that said research will require taking the collection of data in my school/classroom and the presence of the researcher in the school/classroom.

These data could include (**please mark accordingly**):

A set of lessons elaborated and imparted by the researcher.
Audio recordings of the students´ classroom interactions.
Interviews with students and/or teachers.
Questionnaires directed to students and/or teachers.

I understand that said data could be used by the researcher in her study, but that the researcher will be, at all times, trait the data generated in my school/classroom in a professional and confidential manner. In the same way, these data will not be used for any other purpose other than the present research and as a base of possible future studies.

I understand that the researcher will not disclose personal information of the faculty of the school or participant children, and will always seek to protect the identities and names of the participants.

I have been given a copy of this form.

Signature   Date

References

Ailwood, J. (2008). Mothers, teachers, maternalism and early childhood education and care: Some historical connections. *Contemporary Issues in Early Childhood* 8, no. 2: 157–65.

Alexander, R. J. (2008) Culture, Dialogue and Learning: Notes on an Emerging Pedagogy in Mercer and Hodgkinson, (eds) 2008, London, Sage pp. 91-113

Alexander, R. J. (2010) *Towards Dialogic Teaching: Rethinking classroom talk.* Dialogos

Alexander, R.J. (2001). *Culture and Pedagogy: International Comparisons in Primary Education*. Blackwell Publishing, Malden, United States of America.

Alexander, R.J. (2003). *First formative evaluation of North Yorkshire's Talk for Learning Project, part of the Council's Education Development Plan for 2002-7.* University of Cambridge.

Alexander, R.J. (2006) *Education as Dialogue: Moral and pedagogical choices for a runaway world*. Ed. Dialogos, in collaboration with the Hong Kong Institute of Education.

Appleby, A. (1978). *The child's concept of story*. Chicago.The University of Chicago Press.

Ashenden, S. (2002). Policing perversion: The contemporary governance of paedophilia. *Cultural Values* 6, no. 1–2: 197–222.

Ausubel, D. P. (1963) *The Psychology of Meaningful Verbal Learning.* New York, Grune and Stratton.

Ausubel, D. P. (1968). *Educational psychology: A cognitive view*. New York: Holt, Rinehart & Winston.

Bamberg, M. and Reilly, J.S. (1996) Emotion, Narrative, and Affect. In D.H. Slobin et al (eds.) *Social Interaction, Social Context and Language: Essays in Honor of Susan Ervin-Tripp* (pp 329-341) Norwood, NJ: Earlbaum

Bamberg, W. Michael (1987) *The Acquisition of Narratives: Learning to use the Language.* New York, Berlin: Mouton de Gruyter

Barnes, D. and Sheeran, Y. (1992) Oracy and Genre: Speech Styles in the classroom . in Norman, K. (Ed.) (1992) *Thinking Voices: The Work of the National Oracy Project, London*, Hodder and Stoughton.

Barnes, D. (1976/1992) *From Communication to Curriculum*. Hardmondsworth: Penguin. (Second Edition, 1992, Portsmouth, NH: Boynton/Cook-Heinemann.)

Barnes, D. (2008) Exploratory Talk for Learning. in Mercer and Hodgkinson, (eds) *Exploring Talk in School.* London, Sage pp. 1-15

Barnes, D. And Shemilt, D. (1974) ´Transmission and Interpretation´, Educational Review, 26: 3. (Reprinted in *Language Perspectives* (1982) B. Wade (ed.) London: Heinemann.)

Barnes, D. and Todd, F. (1977) *Communication and Learning in Small Groups*. Abingdon: Routledge.

Barratt Hacking, E., Barratt, R. and Scott, W., 2007. Engaging children: research issues around participation and environmental learning. *Environmental Education Research*, 13 (4), pp. 529-544.

Barratt Hacking, E., Scott, W.A.H. and Barratt, R.. (2007). ESD: Bringing Students´ Community Experience into Schools. In: McKeown, R., (ed). *Good Practices in Education for Sustainable Development: Teacher Education Institutions*. Paris: UNESCO, pp. 17-22.

Barratt, R. and Barratt Hacking, E. (2003). *Rethinking the Geography National Curriculum: A case for community relevance. Teaching Geography*. 28 (1), pp. 29-34.

Barraza, L and A.D. Cuarón. (2004). How values in education affect children's environmental knowledge. *Journal of Biological Education*. 39(1):18-23

Barraza, L. (1999). Children's Drawings about the environment. *Journal of Environmental Education Research.* 5(1):49-66

Barraza, Laura and Walford, Rex A.(2002) 'Environmental Education: a comparison between English and Mexican school children', *Environmental Education Research*, 8: 2, 171 — 186

Baxter, P and Jack, S. (2008) Qualitative Case Study Methodology: Study design and implementation for novice researchers. in *The Qualitative Report*, 13(4): 544-559

Berman, R. and Slobin, D. I. (1994) *Different ways of relating events in narratives: A crosslinguistic developmental study*. Hillsdale, NJ: Lawrence Erlbaum Associates.

Berstein (1973). *Class, Codes and Control,* vol. 1 Londres, Routledge pp. 76

Bishop, D. V. M., & Edmundson, A. (1987). Language impaired 4- year-olds: Transient from persistent impairment. *Journal of Speech and Hearing Disorders*, 52, 156- 73

Bishop,K, Reid,A, Stables,A, Lencastre,M, Stoer,S and Soetaert,R (2000) Developing Environmental Awareness Through Literature and Media Education: curriculum development in the context of teachers' practice *Canadian Journal of Environmental Education* 5, 268-286

Black, L. (2007) ´Analysing cultural models in socio-cultural discourse analysis´ in J. Williams, P.S. Davis and L. Black (eds.) *International Journal of Educational Research Special Issue on subjectivities in School: Socio-cultural and Activity Theory Perspectives*, 46 (1-2): 20-30.

Blewitt, J. (2004) The Eden Project – making a connection. *Museum and society*, Nov 2004. 2 (3) 175-189

Bloome, D., Carter, S., Christian, B., Otto, S., & Shuart-Faris, N. (2005). *Discourse analysis and the study of classroom language.* Mahwah, NJ: Erlbaum.

Braund and Reiss, (2004) *Learning Science Outside the Classroom*. RoutledgeFalmer, 2004. p.4

Braund, M. (2004) *Using Freshwater Habitats*. London. Routledge Falmer pp.35-53

Brown, R. (1973). *A first language: The early stages*. London: George Allen & Unwin.

Bruner, J. (1996) *The Culture of Education,* Cambridge, Mass.: Harvard University Press.

Bryman, A. (2008). *Social research methods* (3rd ed.). Oxford: Oxford University Press

Caduto, M. J. & Bruchac, J. (1988). *Keepers of the earth - Native American stories and environmental activities for children.* Golden, Colorado: Fulcrum Inc.

Carmona-Lara, M. (2000) Derechos *en Relacion con el Medio Ambiente.* Universidad Nacional Autónoma de México. México. 2000., pp.114.

Carmona-Lara, M. (2012) ´20 años de procuración de justicia ambiental en México : un homenaje a la creación de la Procuraduría Federal de Protección al Ambiente´ / Coord. María del Carmen Carmona Lara et al. SEMARNAT México, DF : UNAM : Profepa, 2012., xi, 275p. -

CapeUK (2005) *Creative space: Collaborative Approaches to Science Learning in School.* Leeds: CapeUK

Castro, E.A. y Balzaretti, K. (2007). La educación ambiental no formal, posibilidades y alcances en *Educar* Nº 13. Jalisco. México.

Cazden, C. (2001) *Classroom Discourse: the language of teaching and learning.* (second edition), Porthmouth NH: Heinemann, pp170-172.

Cazden, C. (2008) Reflections on the Study of Classroom Talk. in Mercer and Hodgkinson,(eds.) *Exploring Talk in School* London, Sage pp. 151-166

Christidou, V. Tsevreni I. Epitropou, M. Kittas, C. (2012) Exploring primary children's views and experiences of the school ground: The case of a Greek school. *International Journal of Environmental & Science Education*; Vol. 8 Issue 1, p59

Clough P., (2002) *Narratives and Fictions in Educational Research*. Buckingham: Open University Press.

Cohen, L., Manion, L. (1989) *Research Methods in Education*. 3d ed. London, Routledge.

Cornell, J (1989) *Sharing Nature with Children II* 1st ed. Nevada City, California. Dawn

Denzin N. and Lincoln Y. (2008a) *The Collecting and Interpreting Qualitative Data*. 3rd Edition. Sage Publications. London

Denzin N. and Lincoln Y. (2008b) *The Landscape of Qualitative Research. 3rd Edition*. Sage Publications. London

Dickinson, D. K., & McCabe, A. (1991). The acquisition and development of language: A social interactionist account of language and literacy development. In J. F. Kavanagh (Ed.), *The language continuum from infancy to literacy*. Parkton, MD: York Press

Driver, R. Squires, A. P. Rushworth, and V. Wood-Robinson. (1994) *Making sense of secondary science: Research into children's ideas*. Rutledge, London,

Duhn, I. (2012) Making 'place' for ecological sustainability in early childhood education, *Environmental Education Research,* 18:1, 19-29.

Duveen, G. (1997). 'Psychological development as a socials process'. In Smith, L., Dockrell, J. and Tomlinson, P. (eds.), *Piaget, Vygotsky and beyond: future issues for developmental psychology and education.* New York: Routledge, pp.67–90.

Edwards, D. And Mercer, N. (1987) *Common Knowledge: the development of understanding in the classroom.* London: Routledge, pp142-146)

Erdoğan, M., Kostava, Z., & Marcinkowski, T. (2009). Components of environmental literacy in science education curriculum in Bulgaria and Turkey. Eurasia, Journal of Mathematics, Science, & Technology Education, 5(1), 15-26.

English, E. & Machin, J. (2005). Environmental Story Sacks. *Education* 3-13 33(2): 9-14.pp. 13

Farmer, T. A., Cargill, S. A., Hindy, N. C., Dale, R., Spivey, M. J. (2007). Tracking the continuity of language comprehension. *Cognitive Science*, 31, 889-909.

Feagans, L. (1982). The development and importance of narratives for school adaptation. In L. Feagans & D. C. Farran (eds.), *The language of children reared in poverty* (pp. 95–116). New York: Academic Press.

Feng, L. (2012) Teacher and student responses to interdisciplinary aspects of sustainability education: what do we really know?, *Environmental Education Research*, 18:1, 31-43,

Freire, P. (1978) *Pedagogy in Progress- The Letters of Guinea Bissau*. London, Writers and Readers Publishing Cooperative. W1V 7FS"

Freire, P. (1994) *Pedagogy of the oppressed* (3rd ed.). New York, Continuum Publishing Company.

Gonzalez-Gaudiano E.(2010) *Elementos estratégicos para el desarrollo de la educación ambiental en México.* México, D. F., Secretaría de Desarrollo Social /Instituto Nacional de Ecología.

González-Gaudiano, E. (2004): «Encuesta Latinoamericana y Caribeña sobre la Educación para el Desarrollo Sustentable». Ponencia presentada en *la Conferencia Internacional de Educación para el Desarrollo Sustentable*, Universidad de Braga, Braga.

Gonzalez-Gaudiano, E. (2005): «Atisbando la construcción conceptual de la educación ambiental en México», en M. Bertely Busquets (ed.): *Educación, derechos sociales y equidad. La investigación educativa en México.* 1992-2002, México, D. F., Consejo Mexicano de Investigación Educativa.

Gough, S. and Scott, W. (2005). Promoting environmental citzenship through learning: towards a theory of change. In: Dobson, A. and Bell, D., eds. *Environmental Citizenship: getting from here to there.* Cambridge, MA: MIT Press, pp. 263-285.

Green,J. Yeager B. and Castanheira, M. (2008) Talking Texts into Being: on the Social Construction of Everyday Life and Academic Knowledge in the Classroom. in Mercer and Hodgkinson, (eds.) *Exploring Talk in School.*   London, Sage pp. 115

Hale, M. (1990) The use and provision of urban land for ecology field teaching: recent development in North London. in *Land-Use Change: Proceedings of the*

International Geographical Union Asahikawa-Sapporo International Symposium, Hong Kong University Press. pp. 176-192.

Hale, M. (1993) Educating for sustainability in developing countries: the need for environmental education support. *The International Journal of Environmental Education and Information,* Salford.

Hardman, F. (2008) Teacher´s Use of FeedBack in Whole-Class and Group-Based Talk. in Mercer and Hodgkinson, (eds.) *Exploring Talk in School.* London, Sage pp. 113-150

Hart, B. And Risley, T.R. (1996*) Meaningful differences in the Everyday Experience of Young American Children,* London.Brooks Publishing

Haynes, J. (2002) *Children as Philosophers* London: Routledge Falmer

Holland, P. (2004). *Picturing childhood: The myth of the child in popular imagery*. London: I. B. Tauris.

Hungerford H.R. (2006). Old story–new look. J *Environmental Education* 37:56–57.

INEGI (2006)Baja California Sur, México. Instituto Nacional de Estadística, Geografía e Informática.

Johnson, D.L.; Ambrose, S.H.; Bassett, T.J.; Bowen, M.L.; Crummey, D.E.; Isaacson, J.S.; Johnson, D.N.; Lamb, P. et al. (1997). Meanings of environmental terms. *Journal of Environmental Quality* 26: 581–589.

Johnson, M. (2004) *Developmental Cognitive Neuroscience,* 2nd Edition, Oxford: Blackwell.

Kenis, A. & Mathijs, E. (2012) Beyond individual behaviour change: The role of power, knowledge and strategy in tackling climate change, Environmental Education Research, 18:1, 45-65

Kincheloe J.L.(2008) *Knowledge and Critical Pedagogy: An Introduction*. Amsterdam: Springer Publishers.

Krauss, S., (2005) Research Paradigms and Meaning Making: A Primer. *The Qualitative Report,* 10 (4), 758-770. p. 763

Kruger, D. J. (2003). Integrating quantitative and qualitative methods in community research. *The Community Psychologist*, 36, 18-19.

Kollmuss, A & Agyeman, J (2002) Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior?, Environmental Education Research, 8:3, 239-260

Kuhn, D. (1997). Constraints or guideposts? Developmental psychology and science education. *Review of Educational Research*, 67, 141-150

Küntay, A. & S. M. Ervin-Tripp (2000). Narrative structure and conversational circumstances. *Journal of narrative and life history*. 7: 113-120

Lamneck, S. (2005). *Qualitative Research. Textbook*. - Weinheim and Basel.

Leach, J,Driver, R, Scott, P. and Wood-Robinson, C. (1996) 'Childrens ideas about ecology 3': Ideas found in children aged 5-16 about the interdependency of organisms: *International Journal of Science Education*, 18 (2) 129-41

Lee, C.K. and Williams M. (2009) *Schooling for sustainable development in Chinese communities: Experience with younger children*. Hong Kong. Springer. p. 25

Littlejohn, S. (2002). *Theories of Human Communication.* Albuquerque: Wadsworth

Liversidge, T., Cochrane, M., Kerfoot, B. & Thomas, J. (2009) *Teaching Science – Developing as a Reflective Secondary Teacher* Moon, London , SAGE

Lovelock, J.E. (1986). Gaia: the world as a living organism. *New Scientist,* 18 December 1986, 25-28.

MacKinnon. B. (2007) *Ethics, Theory and Contemporary Issues.* 5th Edition Thomsom/Wadsworth. Belmont, California.

Margolyn, E. (1974) *Sociocultural Elements in Early childhood Education.* Florida International University, New York, MacMillan Publishing. p.264

Max-Neef, M. (2005) *Foundations of transdisciplinarity.* Ecological Economics. Universidad Austral de Chile, Casilla 567 Valdivia, Chile. Elsevier.

McCabe, A. (1996). Evaluating discourse skills. In K. N. Cole, P. S. Dale, & D. J. Thal (eds.), *Assessment of communication and language* (pp. 121–141). Baltimore, MD: Paul H. Brookes.

McKeown, R. (2000). Environmental Education in the United States: A Survey of Pre-Service Teacher Education Programs *Journal of Environmental Education*. Vol. 31, no. 4. pp. 37 - 45.

McKnight D.M. (2010). *The lost seal.* Lafayette, CO: Moonlight Publishing.

Mercer, N. and Hodgkinson, S. (2008) *Exploring Talk in School.* London, Sage

Mercer, N. and Littleton, K. (2007), *Dialogue and the Development of Children´s Thinking.* London Routledge.

Mercer, N. and Dawes, L.(2008) The Value of Exploratory Talk in Mercer and Hodgkinson, (eds) *Exploring Talk in School* London, Sage pp 56-71

Mercer, N. Fernandez, M., Wegerif, R., and Rojas-Drummond, S. M. (2001). Re-conceptualising scaffolding and the Zone of Proximal Development in the context of symmetrical collaborative learning. *Journal of Classroom Interaction*. 36, 2, 40-54.

Mercer, N., Littleton, K., Wegerif, R. (2004) Methods for studying the processes of interaction and collaborative activity in computer-based educational activities. *Technology, Pedagogy and Education*, 13, 2, 193-209.

Merriam, S. B. & Heuer, B. (1996). Meaning-Making, Adult Learning and Development: A Model with Implications for Practice. *International Journal of Lifelong Education,* 12(4), 243-255.

Mezirow, J (1994). Transformative learning: Theory to practice. *New Directions for Adult and Continuing Education,* 74, 5-12.

Mezirow, J. (1981). A critical theory of adult learning and education. *Adult Education Quarterly,* 32(1), 3-24.

Mezirow, J. (1991). *Transformative Dimensions of Adult Learning*. San Francisco: Jossey Bass.

Mortimer, E.F. and Scott, P.H. (2003) *Meaning Making in Science Classrooms*, Bukingham: Open University press.

Moscovici, S. (1990). Social psychology and developmental psychology: extending the conversation. *in* G. Duveen & B. Lloyd (eds.), *Social representations and the development of knowledge*. Cambridge: Cambridge University Press. Pp. 169

Moyer, P. S. (2002). Are we having fun yet? How teachers use manipulatives to teach mathematics. *Educational Studies in Mathematics*, 47, 175–197.

Muda, A. Shaik, N. Suandi, T and Rashid, N. Analysis of Cognitive and Affective Component of Environmental Literacy of Pre-service Teachers from Institute of Teacher Education Malaysia. *World Applied Sciences Journal 14 ´Exploring Pathways to Sustainable Living in Malaysia: Solving the Current Environmental Issues´*: 114-118, 2011 ISSN 1818-4952; IDOSI Publications, 2011

Neal D. and Palmer, J. (1994) *The Handbook of Environmental Education.* London: Routledge. P.1

Novo, M (2006). *El desarrollo sostenible. Su dimensión ambiental y educativa*. Madrid: Pearson/UNESCO.

Novo, M. (2005) *La educación ambiental.* Madrid: Anaya. p. 20-21

Novo, M. (2010) *Bases para una Estrategia Española de Educación Ambiental*. Madrid: ICONA.

Orr, D. W. (1992). *Ecological Literacy, Education and the Transition to a Postmodern World*. Albany, NY: State University of New York Press. p. 131

Palmer, J. & Cooper , D. (1992)*The Environment in Question. Ethics and Global Issues* London and New York, Routledge.

Palmer, Joy, A. (1994). Significant Life Experiences and Formative Influences on the development of Adult's Environmental Awarenes in the UK, Australia and Canada. *Environmental Education Research*, 5 (2), 181 – 200.

Palmer, Joy, A. (1998) *Environmental Education in the 21st Century*, London: Routledge

Palmer, Joy, A. and Birch, J. (2004) *Geography in the Early Years,* London: Routledge

Paprotna, G. (1998). On the Understanding of Ecological Concepts by Children of Preschool Age. I*nternational Journal of Early Years Education*, 6(2).

Peterson, C., & McCabe, A. (1983). *Developmental psycholinguistics: Three ways of looking at a child's narrative.* New York: Plenum

Pierce, K. and Gilles, Carol (2008) : From Exploratory Talk to Critical Conversations in Mercer and Hodgkinson, (eds.) *Exploring Talk in School.* London, Sage. pp 37-53 QCDA 2000 The National Curriculum: Handbook for Primary Teachers in England: Key Stages 1 and 2 https://www.education.gov.uk/publications/standard/publicationDetail/Page1/QCA/99/457 Retrieved September 9 2009

Reid, A., B.B. Jensen, J. Nikel, and V. Simovska. (2008). *Participation and learning, perspectives on education and the environment, health and sustainability.* Dortrecht: Springer.

Reilly, J., Thal, D., Seibert, L. and Jeffries, R. (2004). Language development in children at risk for language impairment: Cross-population comparisons . In B. Wulfeck & J. Reilly (Eds.), *Plasticity and development: Language in atypical children.* Special issue, Brain & Language,88, 167-179 .

Robottom, I., & Hart, P. (1993) *Research in Environmental Education: Engaging the debate*. Geelong: Deaking University Press.

Rojas-Drummond, S. and Mercer, N. (2003): ´Scaffolding the Development of Effective Collaboration and Learning´, *International Journal of Educational Research*, 39: 99-111.

Pramling, S, and Kaga, Y. eds. (2008). *The contribution of early childhood education to a sustainable society.* Paris: UNESCO.

Sauvé L. (1996) "La educación ambiental entre la modernidad y la posmodernidad: en busca de una marco de referencia educativo integrador", en *Tópicos en Educación Ambiental*, No. 2, México.

Sauvé, L. (2004) "Una cartografía de corrientes en educación ambiental"; en Sato, M. y Carvalho, I. (2004) *A pesquiza em educaçao ambiental: cartografias de uma identidade narrativa em formaçao*. Porto Alegre, Artmed   pp.2

Sauvé, L. (2005) "Currents in Environmental Education: Mapping a Complex and Evolving Pedagogical Field" Canadian Journal of Environmental Education, 10, Spring 2005

Scott P.H.; Ametller J; Mortimer E; Emberton J (2009) "Teaching and Learning Disciplinary Knowledge: Developing the dialogic space for an answer when there isn't even a question.", in Littleton K; Howe C (eds.). *Educational Dialogues*, Taylor & Francis.

Scott, P.H: (2008) Talking a Way to Understanding in Science Classrooms. In Mercer and Hodgkinson, (eds.) *Exploring Talk in School.* London, Sage pp. 17- 36

Semarnat. (2006). *La Gestión Ambiental en México*. Secretaría de Medio Ambiente y Recursos Naturales. México.

Semarnat. (2012). *Secretaria del Medio Ambiente y Recursos Naturales. La Gestión Ambiental en México*.   http://www.semarnat.gob.mx/educacion-ambiental. Consulted on September 2013.

Shayer, S. (1997). 'Piaget and Vygotsky: a necessary marriage for effective educational intervention'. in Smith, L., Dockrell, J. and Tomlinson, P. (eds), *Piaget, Vygotsky and beyond: future issues for developmental psychology and education*. New York: Routledge, pp. 36–59.

Simovska, V., & Jensen, B. (2009). Conceptualizing Participation: the health of children and young people. WHO, Regional Office for Europe Slobin, D. (1985). Crosslinguistic evidence for the language-making capacity. in *The crosslinguistic study of language acquisition,* D. Slobin (ed.), 1157--260. Hillsdale, NJ: Lawrence Erlbaum Assoc.

Snow CE. (2010). Academic language and the challenge of reading for learning about science. *Science* 328: 450–52.

Sobel D. (1996). *Beyond ecophobia: reclaiming the heart in nature education.* Great Barrington, MA: The Orion Society and the Myrin Institute.

Sobel, D. (2004). *Place-based education: Connecting classrooms to communities*. Great Barrington: MA: The Orion Society.

Solomon, Y. and Black, L. (2008) Talking to Learn and Learning to Talk in the Mathematics Classroom. in Mercer and Hodgkinson, (eds) *Exploring Talk in School.* London, Sage pp. 73-90

Stables, A. and Bishop, K. N. (2001). Weak and Strong Conceptions of Environmental Literacy : implications for environmental education. *Environmental Education Research*, 7, 89--97.

Stables, A. W. G. and Scott, W. A. H., (2002). The Quest for Holism in Education for Sustainable Development. *Environmental Education Research*, 8 (1), pp. 53-60.

Stables, A.W.G.   (2007). Is Nature Immaterial? The possibility of environmental education without an environment. *Canadian Journal of Environmental Education*, 12, pp. 55-67.

Steinitz, C., R. Faris, M. Flaxman, J. C. Vargas-Moreno, G. Huang, S.-Y. Lu, T. Canfield, O. Arizpe, M. Angeles, M. Cariño, F. Santiago,T. Maddock III, C. Lambert, K. Baird, and L. Godínez.(2006) *Futuros Alternativos para la Region de La Paz, Baja California Sur, Mexico/Alternative Futures for La Paz, BCS, Mexico. Mexico D. F., Mexico:* Fundacion Mexicana para la Educación Ambiental, and International Community Foundation.

Sterling, S. (1992*). Coming of Age: A Short History of Environmental Education (to 1989).* Walsal: National Association for Environmental Education.

Sterling, S. (2004). Higher Education sustainability and the role of systematic learning. in B. P. Corcoran & A. E. J. Wals (eds.). *Higher Education and the Challenge of Sustainability: Problems, Promise and practice* (pp. 49 – 70). Dordrecht: Kluwer Academic Publishers.

Stern P.C. (2000)   Psychology, Sustainability and the Science of Human-Nature Interaction. *American Psychology* 55, 523-530

Taylor, S. (2010), *Narratives of Identity and Place.* London and New York, Routledge.

Tsevreni, I. (2011) Towards an environmental education without scientific knowledge: an attempt to create an action model based on children's experiences, emotions and perceptions about their environment, *Environmental Education Research*, 17:1, 53-67.

Tulis, M., & Fulmer, S. M. (2011). Changes in motivation and affect during an excessively challenging mathematics problem: Persistence and competence beliefs. *Paper presented at the 2011 Annual Meeting of the American Educational Research Association:* Vancouver, BC.

Tunnicliffe S D (2004) Where does the drink go? *Primary Science Review,* 85, 8 – 10.

UNESCO (2005) Promoting a global Partnership for the UN Decade of Education for Sustainable Development (2005–2014) on line. Available at http://portal.unesco.org/education /en/ev.php- ml. Retrieved on 11th oct. 2009.

UNESCO (2006). United Nations decade of education for sustainable development 2005-2014: draft international implementation scheme. (http://portal.unesco.org/education/en/file_download.php/e) (Retrieved on 20 th August 2010).

UNESCO,(1990) Agenda 21 www.unesco.org/education/esd/English/chapter/chapter.shtml. (Retrieved September 9, 2009).

UNESCO-UNEP (1976) The Tbilisi Declaraction. Connect, 111 (1), 1 – 8. UNESCO-UNEP Environmental Education Newsletter.

UNESCO (2012) *Report of the United Nations Conference on Sustainable Development*. Rio de Janeiro, Brazil 20–22 June 2012. United Nations, New York, 2012.

Van Dam-Mieras R, Lansu A, Rieckman M, Michelesen G (2008) Development of an interdisciplinary, intercultural master's program in sustainability: learning from the richness of diversity. Innov High Educ 32(4):251–264

Vernot, A. (1989). *Construcción de la nueva pedagogía, Ecológica,* Madrid. Nueva Imagen.

Vygotsky, L.S. (1962) *Tought and Language;* Cambridge MA: M.I.T press.,

Vygotsky, L.S. (1981) ´Thinking and Speech´, in R.W. Rieber and A.S. Carton (eds), *The Collected Works of L.S. Vygotsky, Volume 1: Problems of General Psychology*. New York: Plenum. pp. 39-285.

Wellington J.J. and Osborne, J. (2001) *Language and Literacy in Science Education.* Buckingham: Open University Press.

Wells, Gordon and Ball, Tamara: Exploratory Talk and Dialogic Inquiry. in Mercer and Hodgkinson, (eds) *Exploring Talk in School.* London, Sage. pp. 167-184

Wibeck, V. (2013): Enhancing learning, communication and public engagement about climate change – some lessons from recent literature, *Environmental Education Research,* DOI: 10.1080/13504622.2013.812720

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage.

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Thousand Oaks, CA: Sage.