

The school curriculum and environmental education: A school environmental audit experience

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Thirteen primary and pre-primary schools in Extremadura (Spain) were participants in an educational research project, "Ecocentros", based on school environmental audits (eco-audits). To understand the contribution these experiences can make to achieving the objectives of environmental education, it is essential to know what is actually incorporated into the curriculum and how. Progress was made in the integration of environmental education at the classroom level. This strengthens the development of the processes of participation and the motivation of the pupils and the teaching community.

Keywords: school environmental audits, school eco-audits, environmental education, curriculum, educational practice in schools, greening of schools

Introduction

The imminent need for a change in how we understand and interact with the world is now a matter of the first importance. The United Nations has declared 2005–2014 to be the "Decade of Education for Sustainable Development". The UNESCO, responsible for its promotion, states that all citizens should be involved given the "situation of real planetary emergency in which we find ourselves".

Education has an important role to play in the process of changing society. This is clearly laid out by the UNESCO for the Decade of Education for Sustainable Development (UNDP, 2005): to promote an education in solidarity capable of generating responsible attitudes and commitments, and that prepares citizens to make well-founded decisions aimed at achieving culturally plural, socially just, and environmentally sustainable development. In other words, a profoundly humanistic education that will ensure the consolidation of these principles (Schnack, 2008). According to Robottom (2000), this change of model requires diverse measures and instruments to transform our attitudes, lifestyles, patterns of social participation, and conceptions on how politics is done. They see that the challenge for environmental education and for educational research is to address a broad range of diagnostics in order to set objectives for progress and to evaluate results in the short, medium, and long terms.

Environmental education research may represent challenges to traditional conceptions of (science) education research in ways that parallel those just described in pedagogical theory and practice (Hart, 2006). It is in the context of evaluation of our work towards this end that we present this description of the research. Its basis was a practical experience aimed at integrating en-

vironmental education into pre-primary and primary school programs. The specific proposal was an educational research project entitled "Ecocentros" (Eco-Schools) in the framework of experiences known as school environmental audits (or eco-audits). In these programs, the process of participation is of prime importance since, as Pujol (2003) argues, acquiring the capacity to act requires immersion in environments that practice what they preach. For Jeronen, Jeronen and Raustia (2009), pupils have to work together in solving problems rather than receiving direct instructions on what to do from the teacher. One is thus working with a motivating methodological approach in which the entire educational community performs some task aimed at diagnosing the school's overall environmental status. Proposals are generated, assessed, and then implemented, thereby fostering progress towards the objectives of environmental education. This process, in which the entire school and its organization is involved, naturally affects the curriculum – a curriculum that as part of this process must necessarily be open and flexible, and reflect the complexity of today's world. For environmental education to be fully integrated into schools, particular care must be taken to properly incorporate it into the curriculum. This will be the focus of the present article, especially in the practical aspects of how this curricular incorporation is undertaken at the classroom level.

Theoretical Framework

Integration of environmental education is still a topic of concern. At the international level, the ENSI-SEED Conference "Sustainable Community and School Development - Innovation in Teacher Education, the Potential of Action Research and Environmental Education", contains some related case studies (Kyburz-Graber, Hart, & Robottom, 2006). In 1990 in Spain, the General Education Law (LOGSE), following the UNESCO-UNEP (1978) recommendations to avoid environmental education becoming just another discipline added to those already existing, required it to be introduced as a transversal theme in school curricula.

The concept of transversality referred to teaching that had to be present in compulsory education as a "guardian" of interdisciplinarity in the different areas – not in the form of isolated teaching units, but as clear connecting axes of objectives, content, and procedural principles endowing the different subjects with coherence and solidity, and, in so far as possible, safeguarding their interconnections. Since its incorporation by law as a transversal theme, many authors have contributed elements and reflections on how to put environmental education into practice. Thus, for Novo (1995) the incorporation of environmental education into the curriculum should be more comprehensive than a mere "addition" of environmental issues to existing content. . ., and greening the curriculum means consistently aligning it with the ethical, conceptual, and methodological principles underlying environmental education.

Pujol (2003) used a sequence of four metaphors to describe the different ways in which environmental education can be incorporated into the curriculum. The first is a "sword" model in which the transversal theme cuts through all the areas of the curriculum as a complement in the form of isolated activities or occasional workshops, whether internal or external to the school context. A second is a "needle-and-thread" model. The third is a "benign-kingle" model and the fourth is an "infusion" model in which the incorporation of the transversal themes is integrated into all areas of knowledge and the everyday life of the school. Pujol and Bonil (2003) see the greening of today's curriculum as a complex and dynamic process constructed on three essential bases: a new collective ethic, a new style of thinking, and a new form of transformational action. To overcome limitations in current approaches, García (2000) proposes a greening of the curriculum in which environmental considerations are taken into account as an educational principle in all decision making processes. These have been some of the contributions towards integrating

environmental education into the curriculum, following the directives of the LOGSE of 1990. Today in Spain, a new Education Law is in force (LOE, 2006), but the incorporation of environmental education into the curriculum remains a challenge. Among the objectives set out by the Law, there is one clearly linked with education for sustainable development: –“*discovering and appreciating the natural, social, and cultural environment, and the possibilities for action and care concerning it*”. The new Law gives particular importance to defining the eight core competencies to be incorporated into the curriculum and judged indispensable from an integrating perspective. Those which are most closely related to environmental education are competence in knowledge and interaction with the physical world, and social and civic competence.

To prepare our pupils to be citizens of the twenty-first century, it is important to search for exemplary practical proposals in which environmental education is integrated into the curriculum. In this sense, Jensen and Schnack (2006) describe the objective of environmental education as being to enable pupils to imagine alternative forms of development and to participate in actions in accordance with those objectives. This requires a form of teaching in which the pupils acquire the courage, commitment, and desire to participate in social interests relating to environmental issues, learning to be active citizens. A key aspect is the acquisition of skills for alternative actions in which the pupils can choose whether or not to participate. For those authors, the criteria for such an action would be first that the pupils had decided to do it, and second that the act itself was targeted at resolving some environmental problem; with this one overcome the situation in which practice is reduced to mere technique. Experiences such as those described by Breiting, Hedegaard, Mogensen, Nielsen and Schnack (2009) represent important referents of progress on these issues.

School Environmental Audits (eco-audits) and Their Relationship with the Greening of the Curriculum

Integrating environmental education into school life requires a coherent approach on various fronts for there to be progress towards sustainable development in the school itself. The guiding rule is to practice what we preach. In particular, environmental management, the greening of the curriculum, the type of organization, and the relationships among members of the educational community need to be consistent with the environmental education that is being advocated. The school's entire educational community must participate in moving towards a comprehensive working commitment.

In this context, there appeared over 15 years ago the first experiences known as school environmental audits or eco-audits. Their purpose was to seek environmental coherence in schools which would make it possible to truly educate in this regard. Thus, every action in the school (including incorporating environmental education into the curriculum) should satisfy environmental criteria, and be based on methodological strategies in tune with environmental education. The ultimate goal would be to put the objectives of that education into practice in the school itself.

The most recent projects of this type have been termed “School Agenda 21”. Their methodological approach is similar to that of the school eco-audits. Some major referents for eco-audits at the international level are the EcoSchools project which are described in Sureda and Calvo (1997), Mogensen and Mayer, (2005), and Mayer (2006). In Spain, some of the earliest programs began in 1992/03 (Ciclos, 2001) and are continuing to generate data from their experiences. Internationally, there is a growing connection between these experiences, sometimes through learning experiences such as those cited by McCormick et al. (2005), and this represents an enrichment for both pupils and teachers.

School eco-audits are implemented as active and participatory teaching and learning processes, whose objective is to provide an environmental diagnostic of the school. To this end, the entire teaching community participates in taking on commitments, drafting plans of action for some given topic, and evaluating the process and the results (Figure 1). Two working groups are constituted to operate in coordination. One is the Environmental Commission in which representatives of all sectors of the educational community participate. The other is the teachers' Working Group which includes every teacher interested in taking part.

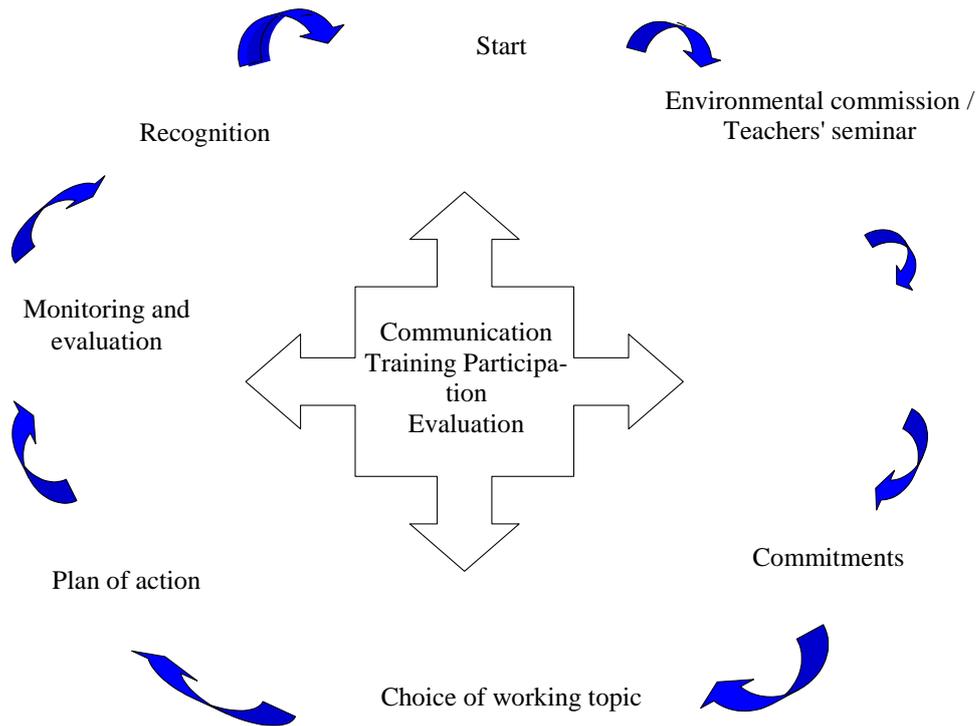


Figure 1. The stages of a school eco-audit

This educational process is of key importance (Conde & Sánchez, 2008). One needs to know what is really incorporated into the curriculum and how it is worked on in order to understand how these experiences contribute to achieving the objectives of environmental education for sustainable development in schools. The teachers' awareness of the goals and active participation is crucial to the entire process of curricular integration (Mellado, Ruiz, Bermejo, & Jiménez, 2006). To this end, teacher education must be accordant with an STS (science, technology, and society) model both pre- and in-service (Yetisir & Kaptan, 2008). Another important issue is the idea of developing criteria of quality for teacher education in order for teachers to gain competences in environmental education (Kyburz-Graber & Robottom, 1999). Qablan, Al-Ruz, Khasaweh, and Al-Omari (2009) speak of the need during teacher education to fight the indoctrination of teaching practices. Their attitudes towards environmental education will also influence the process, since it can only be improved with their input (Erol & Gezer, 2006).

Objectives of the "Ecocentros" educational research study in Extremadura (Spain)

The "Ecocentros" educational research project began in the 2000/01 school year. The design was based on school eco-audits, and involved thirteen primary and pre-primary schools in Extremadura (Spain). The research study was carried out from the middle of the 2000/01 school year to the end of 2002/03. The complete results can be found in Conde (2005). Together with the University of Extremadura, there also collaborated in the project the Regional Administrations with competencies in environmental education. An Organizing Committee was created consisting of representatives of the different entities involved. Its task was to coordinate the program. After more than 15 years of operation of this type of educational program worldwide, it is necessary to understand in greater depth how they are actually put into practice in order to determine their real strengths and weaknesses. There are other similar international experiments under evaluation (Mayer, 2006; Mogensen & Mayer, 2005; Pirrie, Elliot, McConnell, & Wilkinson, 2006; Hens et al., 2009). There have also been advances in developing the corresponding quality criteria (Coleman, 2002; Breiting, Mayer, & Mogensen, 2005).

The specific objectives of the study described in the present article relate to how the integration of environmental education into the curriculum is put into practice at the classroom level. Finally, we also evaluated how the process of integration actually unfolded. These specific objectives formed part of a broader research goal (Conde, 2005), which was to analyze the influence and effectiveness of the project in the participating schools' actual incorporation of environmental education. In our research, we use the term effective to refer primarily to the actual attainment of results, and efficient to refer to the process by which these results are achieved. Both the results and the process are of great value as being inherent parts of the learning and teaching actually carried out in the schools.

Research Methods

The "Ecocentros" project consisted of a process of collaborative and participatory action research carried out by the teachers of the schools and their respective advisors, together with university teachers. The methodological approach used had the characteristics of the three models of action research: technical, practical, and critical. As with other work in this line (Vázquez et al., 2006), it is designed to contribute to the professional development of the teachers in developing their role as critical and reflective researchers. Thus, the different sectors participating in the research continuously evaluated the process and the results, introducing modifications to improve the original proposal. This practical experience contributed to progress in their continuing professional education in this area.

The research was divided into two cycles of action. The first began in the 2000/01 school year, and lasted until the beginning of 2002/03. It included the following phases: design, presentation of the project to the collaborating entities, tasks needed to prepare for its implementation in the participating schools, and diagnosis of the initial situation of the schools in dealing with environmental education (2000/01), and then the first school year of implementation (2001/02). The second cycle consisted of the implementation in the following year (2002/03). The decisions taken after the first cycle of research were taken into account in the second cycle by redefining the situation, and revising the plan of action.

The Research Context

Thirteen schools were selected, having different characteristics and covering the geography of Extremadura. Key elements in the research were the coordinators of the “Ecocentros” project. These were the teachers who were responsible for the experiment in the thirteen schools. Two forums were formed to represent the teachers: the Environmental Commission consisting of representatives of the entire educational community, and the Working Groups of the teachers in each school as part of their process of continuing teacher education. This ongoing education was supported and recognized by the Teacher Training Centres of the Regional Education Administration. The Environmental Commission also included representatives of the parents and of each school's local Town Council. An Organizing Committee was created, consisting of two representatives of the Regional Administration with competencies in environmental education and two university teachers.

Data Collection and Analysis

This research project, as part of a broader research objective, had the specific goal of determining how the integration of environmental education into the curriculum is put into practice at the classroom level. In our research, this aspect is included in the variable “greening the curriculum” which we divide into the subvariables listed in Table 1.

Table 1. The study's contextualization of the greening of the curriculum

Variable	Subvariables
“Greening the curriculum”	Organization of content Preparation and use of teaching materials Motivating pupils Improving attitudes and habits Evaluation of the process

A variety of data collection techniques were used to record the observations: interviews (with the project coordinator and head teacher of the school, one before the beginning of the study and one after the first school year), questionnaires (an evaluation questionnaire completed by ten teachers of each school in the two consecutive school years), participant observation, discussion groups, field notes, document analysis, reports, minutes, and audio/video recordings (of the scheduled educational sessions between the schools and the Organizing Committee).

The data analysis was guided by the variables under study. For the variable “greening the curriculum”, it was primarily qualitative. For other variables, a quantitative study was also carried out. Triangulation of the data collection methods and techniques, including spatial, temporal, and personal diversity, was used to verify that the data satisfied a criterion of veracity. The internal reports prepared by the teachers of the participating schools were the main source of data in the case of the “greening the curriculum” variable. We reviewed two (one for each school year, prepared by the group of participating teachers as a form of continuous evaluation, reflection, and monitoring of the work), together with the documents prepared for a joint publication authored by the participants in the experiment in which they reflected on how the work had been carried out during the first year, field notes, and participant observations made at various times. The re-

ports of the schools were prepared in accordance with a common criterion, with separate documents for the different topics. An analysis was made of all the aspects they contained that had to do with the greening of the curriculum.

Sometimes the results were grouped by topic to obtain the frequency with which each had been worked on. At other times, the data consisted of textual elements taken from the reports of the teachers' Working Groups and from the documents prepared on the basis of those groups for a joint publication authored by the participants in the experiment. This enriched the frequency analysis data and allowed its triangulation. Further enriching and triangulating elements were provided by the participation as observer of the principle researcher at many moments during the course of the experiment, especially at those connected to the teachers' continuing teacher education and in visits to the participating schools.

The data were thus obtained from different sources. They will be presented either literally or encoded. A specific example which will appear later in the presentation of the results is encoded as MVG1-9. This is the document presented in the report [M, '*memoria*' in Spanish] entitled "Overall evaluation [VG, '*Valoración global*' in Spanish] of the project's environmental education strategies and instruments", corresponding to the first cycle of action in school number 9 [1-9]. Other documents taken into account for the presentation of results in the section that follows were: plan of action, DECP (document prepared for publication by the schools), MAS (minutes of the seminar of the teachers' Working Groups), and EIFF (internal evaluation of the continuing teacher education program in the different schools).

Results

In this article, we present the results of the research into how environmental education is actually integrated into the curriculum. The results will be described according to each of the subvariables of Table 1 – organization of content, preparation and use of teaching materials, motivating pupils, improving attitudes and habits, and process evaluation – and relating the two cycles of action so as to shed light on how the process evolved.

Organization of Content

In both school years, the schools followed a common working plan for the “diagnosis of the personal environmental situation”, “environmental diagnosis of the chosen topic”, and “preparing a plan of action” on the topic chosen to work on that year in the project. The “diagnosis of the personal environmental situation” was designed for each class to work on with its teacher. It consisted of a test on personal habits and attitudes. The idea was for each pupil to reflect on and gain awareness of his or her everyday relationship with the environment. In the Environmental Commission and the Working Group forums, these preliminary results were analyzed, and a final consensus diagnosis was drafted for each school. On its basis, a code of conduct and a series of commitments were set out in each school, together with a plan of action on the chosen topic.

The schools' internal reports, in particular the “Plan of Action” document, included descriptions of the actions undertaken in the two school years. These data were triangulated with those collected in monitoring the schools, and with the presentations that the schools made in the exchange of experiences sessions which were held at the end of the academic year. The descriptions in the internal reports included the work that was either directly carried out in class or that derived from class activities, allowing us to approach more closely to how environmental education was actually integrated into the curriculum in the classroom. Table 2 presents these actions and

the frequencies with which they were carried out (number of schools that put them into practice) for the two consecutive years.

The first five actions taken by all the schools (Table 2) were provided support by the project's Organizing Committee. Schools were already customarily conducting activities of this type, but in isolation, in a form that would correspond to a model of curricular integration of the "sword" type (Pujol, 2003). The project's Organizing Committee therefore wished to contribute to making such activities a more natural part of the different areas of knowledge by providing teaching support material to work on, and actively involving the pupils in the purpose of these events. The visit to "Eco-parks", for example, was done after having worked on the topic of waste and carrying out the separation of rubbish (Conde & Sánchez, 2008). In this way, the subject had become an important focus of interest for the pupils, as was also the case with the World Environment Day.

In the classes in all the schools, practical actions were undertaken to improve the institution's environmental quality in many ways. Examples were monitoring the school's water and electricity bills, maintenance and care of the schoolyard's garden areas, and making and maintaining containers for waste. This all contributed to the school's environmental management being consistent with the ultimate aim of environmental education, and therefore to the implicit or hidden curriculum also reflecting this consistency.

The creation of "eco-vigilante" or environmental monitoring groups in nine of the schools (Table 2) was one of the activities which was widely taken up because of its enthusiastic reception by the pupils, even though it was not directly promoted by the organization. It is certainly an effective way of starting to develop skills and motivation for action, favouring the existence of groups which, by their own initiative, generate positive emotions in their participants. This indubitably has great educational significance, as has been argued for other similar cases by authors such as Sanmartí and Pujol (2002). The next step in preparation for involvement in this activity would be addressing, together with the pupils, the causes of the problems that they observed, focusing the work in this direction rather than trying to remedy the "symptoms".

The extension of the study of the topics towards more global perspectives was one of the activities that showed most progress in the second year. It has always been a methodological principle of environmental education that the themes worked on in the school, such as water, should be opened up to look beyond the local context. Some of the schools were in towns that had started their own Local Agenda 21 or Healthy Cities programs, with which the schools therefore initiated contacts. It was notable that one of the actions that were carried out by five schools during the first year was only implemented by one in the second year. This was the "General tidying of the school and its grounds, with the responsibility rotating among all the classes". During the follow-up visits, the schools' project coordinators explained that the schoolyards had become much cleaner, and that it was more difficult to find trash on the ground. They therefore considered that it was unnecessary to continue. Their view was that, once the pupils had been sensitized to the question and a change in habits and attitudes had been seen, it would have been counter-productive to still organize groups to pick up rubbish.

Also in the second year, four schools began on tasks to improve their town's environment, such as collecting trash or planting trees. One sees therefore that there had been a passage from one important goal – "awareness of the values of the environment" – to another that called for greater involvement and commitment – "direct participation in solving local environmental problems". Advance in this sense is of great educational interest for the formation of citizens along the lines expressed at the beginning of this article. In this process, the environment itself (their local surroundings in this case) became a basic teaching resource.

Table 2. Actions undertaken in relation to environmental issues in each year

Type of action/Activities	Frequency	
	Year 2001/02	Year 2002/03
Planting trees as part of School Tree Week	8	13
World Environment Day	1	13
Visit to a protected natural area	1	13
Preparation of drawings to participate in creating a poster on School Tree Week and World Environment Day	-	13
Visit to "Eco-parks"	-	13
Practical classroom-based actions carried out to improve the school's environmental quality	7	13
Making explicative murals and slogans	7	12
Creating eco-vigilante groups or green patrols to monitor the turning off of lights, radiators, etc.	6	9
Campaigns to improve information, awareness, and changes in	6	9
Creation of teaching materials for use in class on the subject	2	9
A comprehensive study of the topic: European Water Charter; the "Educational Contract with Water"; the Charter of European Cities and Towns Towards Sustainability – the Aalborg Charter,...	-	8
Activities studying the environment	3	7
Transfer collected rubbish to Ecopoints	3	5
Workshops on recycling paper, oil, and toys	3	5
Work improving the town's environment	-	4
Work with greenhouses and market-gardens	1	3
Communication of the experiment in congresses: National Children's environmental Congress	-	3
Notable inclusion in areas such as foreign language and Spanish to reinforce the work on the topic	-	2
Environmental teacher education at the National Centre for Environmental Education: Participation in the program and stay at the CENEAM	-	2
General tidying of the school and its grounds, with the responsibility rotating among all the classes	5	1
Production of radio programs	-	1
Drafting letters to the local town councils to improve the locality's environ	-	1

There were various activities related to Knowledge of the Natural Environment during both years, with a marked expansion in the second. Of these, because of their possibilities for future work in environmental education, we have only included in the table those which have to do with the creation of school greenhouses and market gardens. These were being undertaken in three schools in the second year. Three schools were selected in the second year to participate in the

National Children's Environment Congress (Table 2). In their classes, together with their teachers, the pupils prepared reports about the work they were carrying out and their public presentations for the rest of the participants in the Congress.

We have included in the table the item "Notable inclusion in areas such as foreign language and Spanish to reinforce the work on the topic". With the schools' participation in the project, the content of these areas now included environmental questions which previously had not been dealt with. Nevertheless, despite the need for integration of environmental education into all areas of knowledge as in other aspects of life in the school, there was little progress in this direction. Nonetheless, we believe that the approach to an "infusion" model as proposed by Pujol (2003), in which environmental education is fully incorporated at the curricular level, continued being a slow process. In the second year, two schools participated for the first time in the environmental education program of the CENEAM (National Centre for Environmental Education) (see Table 2). That these two schools chose the place at which to expand the education and community living experience of their pupils as part of their commitment to environmental education represents a definite step forward in its integration.

One of the four basic instruments of environmental education is information and communication. The activities of communication involved in the "Campaigns to improve information, awareness, and changes in behaviour" in which the pupils participated, and which had a high overall frequency in the second year (9 schools), as well as the communication that they presented to the National Children's Environment Congress, also contributed to this educational aspect. For Izquierdo (2005), the many different routes of access to knowledge have to be coupled with three dimensions of cognition: doing, thinking, and communicating. According to that author, a theory of school content should take into account that thinking operates in a multidimensional cognitive space, that "we know" when there is coincidence between different "dimensions", and that experience endows knowledge with meaning. In agreement with these ideas, we believe that the type of activities that the schools put into practice in this project have particularly favoured the doing and the communicating. There was clear progress in both aspects in the second year relative to the first.

In the third dimension, thinking, we believe that the experiment introduced a key aspect from which to start. This was the "Diagnosis of the personal environmental situation". Starting with an analysis of their own personal habits and attitudes regarding environmental issues gets the pupils to reflect on and gain awareness of their relationship with the environment. On these and other questions, however, we have no record of actually how the pupils were encouraged to think about these issues. We lack data that could reveal precisely how this process developed. We believe that the key is to ensure that, in the participatory process, the pupils are able to make decisions about what they are going to do (Schnack, 2000), to help solve environmental problems, with stress laid on the causes (Schnack, 1998). Otherwise, as was observed by Jensen & Schnack (2006), the approach will be the more simplistic one of proposing and carrying out activities rather than making any direct contribution to acquiring the skills required for action. In the present article we have also been guided by these terms. For this particular experience we can not guarantee with the data we have that many of the activities were indeed carried out following those authors' criteria for action, although there were working groups such as the Environmental Commission that included the participation of pupils.

Preparation and Use of Teaching Materials

As support material, the Organizing Committee provided materials, resources, and literature references of interest for going into greater detail in the work on the various topics. As was declared

in the reports, the efforts of the teachers' Working Groups were more devoted to reviewing and searching for new literature to use in their own learning and to clarify their ideas on these aspects, than to elaborating their own shareable material. The reports make no mention of materials of the teachers' own creation, but do recommend some for the teachers to work on in relation with the subject. With respect to the preparation of more comprehensive teaching materials on the subject, we only found some occasional works in the first year that made a start on this task.

During the second year, there was increased production of support materials for working on the topics (in 9 schools). There was also progress towards greater sophistication in preparing the support materials for work on the chosen topics, with collaborative preparation of teaching units and materials to work on personal habits and attitudes, including adaptations for parents and pupils. Also, the creation of the magazine *Ecocentros*, which was launched by the Organizing Committee, stimulated the preparation of materials and their presentation in different sections of the journal. This had a considerable positive impact on the teachers.

Motivating Pupils and Improving Attitudes and Habits

In the schools' reports, the document "Overall evaluation of the project's environmental education strategies and instruments" includes comments by the teachers that illustrate how this aspect was developed: "It's been great, positive, and [an object of] enthusiasm for the different sectors" (MVG1-11). "The teaching staff is becoming aware that the subject is central to the curriculum. Parents show their approval and interest in the subject. Pupils are increasingly sensitized through the code of conduct, the eco-vigilante rules, of being careful with the hedges... We see their behaviour changing. The schoolyard and the corridors now have nothing in common with what they were like at the beginning of the year" (MVG1-9).

We agree with Sanmartí (2002, p.50) that "developing the capacity to act does not come from doing the odd activity now and then, but from the pupils' immersion in contexts that practice what they preach. It is the entire educational community which identifies problems and generates proposals, which analyzes and evaluates them, which makes decisions and applies them, i.e., which learns. The desire to act in a certain way is essentially the result of the social interaction produced by sharing feelings and emotions within a group framework". We believe that this is the origin of the motivation apparent in the group of pupils, as well as in other sectors of the educational community that formed part of the project. Looking in more detail into the improvement in the pupils' habits and attitudes, we find interesting data in the schools' internal reports for the first year (in the "Overall evaluation of the project's environmental education strategies and instruments"): "Yes, these have occurred, which was something that was expected given the awareness achieved in the educational community. It is not yet clear whether these changes will become established, and the hoped-for environmentally respectful habits will be acquired"(MVG1-6).

There have been improvements, and the concern of teachers is now that these attainments will be consolidated. The second year continued with the evaluation of improvements in pupils' habits and attitudes. All of the assessments that we found in the schools' internal reports were positive, and included aspects that were most reaffirming of the previous year's attainments: "One clearly appreciates it in most of the pupils, since there has been awakened in them a greater respect and concern for the environment". "Great interest shown in the paper recycling and care of plants". "Great interest of pupils in the subjects worked on. "We believe that this level will be confirmed over time" (DEPC2-7). "We have seen a more positive attitude towards the environment in terms of saving water and respect for the environment around us, an attitude that is reflected in the consolidation of the habit of saving energy and water. There are no unnecessary

taps left running or lights left on" (DEPC2-11). "There stands out as a major strength the participation of the pupils which in general lines was very effective, and has helped to create environmental habits and attitudes" (DEPC2-4). "Schoolyard much cleaner". "Use of bins. Respect for the plants". "Keeness to participate and collaborate in improving the immediate environment". "Willingness for unselfish participation". "Keeness for group work" (DEPC2-1).

Hence, there were many improvements in the acquisition of habits and attitudes, and in motivation. One observes that all these questions of environmental awareness are closely interrelated, and represent one of the most important achievements of the experiment. Their direct relationship with interest for environmental topics makes the pupils far more receptive and eager to engage these issues in the classroom. We concur with Breiting et al. (1999) and Breiting & Mogensen (1999) that now the challenge in order to maintain progress is also in this sense. It is no longer a case of trying to modify behaviour towards pro-environmental attitudes, but one of continuing work on authentic preparation for action.

Evaluation of the Process

Implicit in the project's design and documents, in particular in the two documents on the diagnosis of the personal and of the school's environmental situations, there were aspects that could serve to orient the schools in their process of incorporating environmental education into the curriculum, and that were reinforced through the continuous monitoring by the Organizing Committee and the educational and assessment meetings held at the beginning and end of each year (Table 3).

However, the public document did not make explicitly clear the importance of taking the above aspects into account. Neither did it give any orientation as to which methodological approach would be best to use. The result was that the schools' teacher Working Groups lacked precise guidelines that would allow them to advance in this sense, and to concentrate, rather than on which activities to carry out, more on how to foster the development of skills for action.

In order to reflect on how the process of incorporating environmental education into the curriculum was actually put into practice, it may be interesting to consider some contributions extracted from the reports. Specifically, the following are two sections from a document "Internal evaluation of the continuing teacher education program":

"As the entire teaching faculty is integrated into the project, its meetings were conducted in small groups so that the dialogue could be more fluid. Each cycle addressed the topics from its pupils' perspective, and its conclusions, suggestions, questions, etc., are analyzed in the Pedagogical Committee to propose definitively what will be done. This is really the fundamental organ responsible for discussion, taking a position, and coordinating the views of the two cycles. This does not prevent the holding of meetings at least once a month, in which we all see each other together in the complete seminar. Especially in the most transcendental subjects: Audit review, deciding on the proposal for the definitive action Plan, periodic reviews, major proposals for change, etc. It should not be forgotten that the Environmental Commission has the last word, but at the teaching level it is the group of teachers constituting the seminar, this year the Project, which decides, does the studies and the debates, and makes the proposals" (EIFF2-9).

One sees that they collaborated to construct a common ground that each teacher could later adapt to his or her classroom. In the second year, there was an observed improvement in the channels the teachers used to ensure that progress was translated into their classroom work. One of the Organizing Committee's aims that in the end failed to be put into practice was for the Plan of Continuing Teacher Education in Schools to be better matched to each schools' specific needs. This would have allowed these and other aspects of the project to be worked on with the help of

experts. It is therefore necessary to investigate further into how these tasks are carried out, into the methodology, evaluation and results, the number of teachers who really deal with these questions in the context of the classroom, the problems they face when doing so, etc. It is not known how participation is implemented in the classroom to ensure that the pupils play a relevant part in deciding on the plan of action and on which commitments to undertake. For example, the “eco-vigilantes” or “green groups” were important active participants, but we do not know what part they themselves took in defining their role and establishing their commitments.

The new challenges for this project and others of its type are to set out guidelines on these questions in collaboration with the teachers. The aim will be to ensure that methodologically a constructivist option is followed, to encourage participation in solving local problems after those of the school, to organize appropriately the gathering of information, and to participate at the level of the class in communicating the results. As has been reported by the external evaluators of other experiences of this type (Mogensen & Mayer, 2005), that a subject has been dealt with in a class does not mean that it was dealt with from a constructivist perspective, or that there has been any significant learning on the part of the pupils. Neither is it known any more than superficially how participation in class is encouraged. For the evaluators of these projects, there may exist a

Table 3. Aspects of the project that was able to contribute to the greening of the curriculum

Thematic blocks	Aspects
Previous attitudes, interests, habits, and ideas	Starting out with interests close to the pupils, with their motivations, and with issues in which they can intervene directly and bring about changes Starting out on the basis of their previous attitudes, knowledge, and habits about the theme (for its integral development, considering aspects of cognition, affect, and action)
Overall treatment	An overall treatment of the theme, using some of the sections of the class sheets prepared for the environmental diagnosis to suggest work on the theme, taking different points of view into account (ethics, health, ecology, social, economics, political, geographical,...) in the attempt to incorporate a systemic perspective on environmental problems, which in turn could be organized towards strengthening cross-discipline activities
The school–environment relationship	Opening out the school to its environment, making contacts with organizations and associations of various kinds, parents, etc., in order to have more knowledge and different outlooks on the themes to be worked on in the project
Troubleshooting	Involvement in solving problems nearby, especially concerning the school's chosen theme, suggesting surveys of parents, and campaigns and actions that might serve to help improve some problem at a local level
Participation and organization	The organization's working styles, in which tasks are distributed and coordinated in order for the schools to have a common line of work. With the existence of the "Environmental Commission" forum, there was participation of the pupils as well as of other sectors of the educational community.
Commitments	The school undertook, by consensus, a series of "Commitments for change towards sustainability"

danger of activism but no content unless self-evaluation and reflection are also encouraged.

Conclusions

The "Ecocentros" proposal of the research project described in the present article was based on experiences with school environmental audits. The results showed that it has helped imbue the curriculum with more environment-related content, and has increased the number and quality of the activities involving a greater commitment with this area. Progress was achieved on the basis of core interests close to the pupils, made possible by the working dynamics generated in the experiment. An example was the sequence of first working on the relation with a topic at a personal level, then on aspects affecting the school as a whole, and then carrying out practical activities based on that preliminary work. This dynamic involved thinking and reflection as well as action and communication. There was also progress in terms of the quality in depth of the activities. This was due on the one hand to the support provided by the Organizing Committee in the form of specific teaching resources on the topic, and on the other to the teachers' search for and review of other resources of interest.

There was also improvement in quality with regard to taking a more global approach to some of the topics. Also particularly noteworthy because of its importance in education for sustainable development was the opening up of the schools' relationships with their local contexts, with pupils and teachers getting involved in solving local environmental problems. There were encouraging teaching and learning processes in which pupils learnt to be communicators of environmental issues. These advances in curricular integration began with simple, visible, and nearby issues. They led to the notable strengthening and development of the participatory processes and motivation not only of pupils, but also of the educational community in general, as was seen in the results. Another of the achievements that most stood out was how highly the pupils were motivated, and their improved attitudes and habits concerning the topics and commitments that had been agreed on. However, work remains to be done to ensure that pupils are truly acquiring skills for action. To this end, among other things, one needs to guarantee their active involvement in decisions regarding the solution of environmental problems. Otherwise, one could be turning the process towards one of mere activism with no content. The interdisciplinary search for resources, together with the progress in coordination that helped the teachers become more involved in the experiment, undoubtedly contributed to improving the reality of the incorporation of environmental education into the classroom. It is important to appreciate the real value of these participatory processes in the life of the school. They are of transcendental importance to make a new model of the school possible.

Implications

We believe that the data obtained in this research reflected great progress in various aspects related to the greening of the curriculum. In this, as in other related experiments, it is also necessary to provide the teachers involved with more explicit orientation. This should be both in the documents they are provided and in their continuing teacher education programs. The particular need is for methodological guidelines about how to translate these questions into their classrooms so as to ensure that pupils acquire real skills for action. This will also help move towards coherence between how the teaching processes are actually carried out in practice and the objectives and principles of environmental education, thus uniting the effectiveness of the

attainment of goals with the efficiency of constantly guaranteeing the quality of the educational processes.

Much work therefore remains to be done to further improve this and other experiences of this kind. The challenge for new studies is to better understand the initial teaching models of the participating teachers, and to determine how much these models change due to the professional experience the teachers gain in the experiment. A further objective will be to determine how these changes affect the greening of the curriculum, in particular, the treatment of the content, the preparation of materials, the motivation and habits and attitudes of the pupils, and which type of processes are actually carried out. A priority is for progress in integrating environmental education into the curriculum at the classroom level to be supported by the continuing teacher education programs, in the line of the teachers undertaking a more reflective study of their own practice. Achieving quality in this type of experiment is also conditioned by the support of the competent authorities. Educational Administrations need to commit themselves to involvement in these projects, with support for the new continuing education contexts that arise, in particular facilitating the allowance of time and recognition for the participants. Once again, the ongoing professional education of teachers becomes a tool for change that one can not neglect if one wants progress in fully integrating environmental education into school life.

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Okul müfredatı ve çevre eğitimi: bir okul deneyimi

“Ecocentros” adı verilen bir araştırma projesinde Extramadura’da (İspanya) 13ilköğretim ve okul öncesi okul katılımcı olarak bulunmaktadır. Bunlar tecrübelerin katkısını anlamak çevre eğitiminin almaçlarını gerçekleştirmeye yardımcı olabilir, müfredata gerçekte neyin, nasıl dâhil edildiğini bilmek açısından çok önemlidir. Sınıf düzeyinde çevre eğitiminin entegrasyonunda ilerleme sağlandı. Bu öğrencilerin motivasyonu ve katılımını sürecinin gelişmesi ve öğreten toplumu kuvvetlendirir.

Anahtar kelimler: çevre eğitimi, okullarda eğitsel pratik, okulların yeşillendirilmesi