

# Educational Paths towards Sustainability

Proceedings of 3<sup>rd</sup> World Environmental  
Education Congress (3<sup>rd</sup> WEEC)

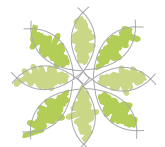
Edited by **Mario Salomone**

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Research and assessment  
in environmental education

Recherche et évaluation  
dans l'éducation relative  
à l'environnement

Ricerca e valutazione  
in educazione ambientale



**WEEC**  
International Environmental  
Education Network

# **Educational Paths towards Sustainability**

*Proceedings of 3rd World Environmental Education Congress (3<sup>rd</sup> WEEC)  
Torino (Italy), 2-6 October 2005*

*Actes du 3<sup>e</sup> Congrès Mondial de l'Éducation Relative à l'Environnement  
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Torino (Italia), 2-6 ottobre 2005*

## **SESSION 1**

**Research and assessment in environmental education**  
**Recherche et évaluation**  
**dans l'éducation relative à l'environnement**  
**Ricerca e valutazione in educazione ambientale**

*Edited by/Sous la direction de/A cura di:*  
**Mario Salomone**

*Edited by/Sous la direction de/A cura di:*  
Mario Salomone

*Publishing coordination/Coordination de la publication/Coordinamento editoriale:*  
Bianca La Placa

*Translations and collaboration/Traductions et collaboration de/Traduzioni e  
collaborazione all'editing:*

Patrizia Bonelli, Mei Chen Chou, Katherine Clifton, Dorys Contreras, Felicita Elss, Eliana  
Finotello, Elisabetta Gatto, Rachida Hamdi, Debra Levine, Catherine Marini, Simona Pede,  
Luciana Salato, Natalia Tolstickina, Zhou Yuep, Silvia Zaccaria.

*Cover/Couverture/Copertina:*  
Beppe Enrici

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Istituto per l'Ambiente e l'Educazione Scholé Futuro (Onlus)  
via Bligny, 15 -10122 Torino (Italia), 2006

*E-mail:*  
secretariat@environmental-education.org  
schole@schole.it

**Con il contributo di:**



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Dipartimento Politiche dell'Ambiente



Consorzio per il Recupero degli Imballaggi

## Table of contents/Sommaire/Sommario

### Sub session/sous session/sottosessione 1.1

Mauri Åhlberg <i>Results of over twelve years (1992 – 2005) of systematic R&amp;D for EE and ESD: theories and methods, tested in practise, for UN DESD (2005 – 2014)</i>	15
Antonietta Albanese <i>Environmental psychology and environmental education: research and experiences</i>	21
<i>Psicologia ambientale ed educazione ambientale: tra ricerca e sperimentazione</i>	27
Rita Bissoonauth <i>Evaluating environmental education programmes for teacher training using distance education</i>	33
Stefano Calvillo, Luciano Marcello <i>Un sistema di indicatori di qualità per i centri di educazione ambientale liguri</i>	41
Carmela D’Aiutolo, Francesca Benassai, Serena Innocenti <i>Research materials and methods towards a system of quality indicators for environmental education in Tuscany: a program of participatory research</i>	47
<i>Materiali e metodi della ricerca. Verso un sistema di indicatori di qualità per l’EA in Toscana: un percorso di ricerca partecipata</i>	53
Grodzińska-Jurczak, H. Kobierska, M. Tarabuła-Fiertak, G. Bryda <i>Environmental awareness of pre-school and school children, teachers, and pre-school children’s parents in four regions in Poland</i>	59
Shih-Tsen Liu, Matthew Kaplan, S., Huei-Hsu Wu <i>Effectiveness of an intergenerational approach for enhancing knowledge and improving attitudes toward the environment: study in the U.S. and Taiwan</i>	69

Phillip G. Payne <i>Ecopolitics, families and intergenerational influences: the household as a site of environmental education</i>	83
Phillip G. Payne <i>Environmental Education and Curriculum Theory</i>	99
Svantje Schumann <i>Evaluation of an environmental education measure in the context of education for sustainable development. The assessment of a project day for primary school students at the "Ökostation Freiburg"</i>	115

### **Sub session/sous session/sottosessione 1.2**

Alaya Alaya, Pierre Clement <i>Éducation a l'environnement en Tunisie : conceptions et changements conceptuels chez des lycéens (cas de la 2<sup>ème</sup> année secondaire)</i>	131
Antonella Arcangeli <i>Role, methodologies and strategies laboratories for ESD of the Provincia di Roma: results of an assessment process on five years of practice</i>	137
Antonella Bachiorri, Cristina Bondavalli, Alessandra Pugliesi, Silvia Selmi <i>Scuola 10 e lode. An environmental-certification project for schools in the Emilia Romagna region (Italy)</i>	145
<i>Scuola 10 e lode. Un progetto per le scuole dell'Emilia Romagna</i>	151
Anastasia Dimitriou <i>Kindergarten and primary school student teachers' conceptions of environment</i>	157
Elisabetta Falchetti, Nicola Margnelli <i>Park, yes or no? A teaching experience on a socio-environmental conflict. Introduction and theoretical guidelines</i>	163

Elena Ferrero, Daniele Gimigliano, Antonella Pogliano <i>Educazione ambientale in un'area protetta del territorio piemontese. Il progetto "la foresta ritrovata"</i>	169
E. Flogaitis, M. Daskolia, A. Chatzifotiou, G. Liarakou <i>Conceptions of the environment and of environmental problems as social issues among Greek students of early childhood education</i>	177
Konstantinos Korfiatis, Tasos Hovardas, Elissavet Tsaliki, Joanna Birch, Joy Palmer <i>Children's attitudes towards primary sector economic activities and ecotourism in a protected wetland, and implications for environmental education</i>	187
Klaus Hübner <i>Learning to shape life</i>	195
<i>Leben gestalten lernen</i>	203
Enrique Leff <i>Complejidad, Racionalidad Ambiental y Diálogo de Saberes</i>	213
Elena Marescotti <i>Educazione ambientale: la necessità della prospettiva pedagogica</i>	227
Ángeles Murga Menomo <i>La percezione sociale della sostenibilità: conoscenze, atteggiamenti e valori in studenti ad alto profilo</i>	237
Miquel F. Oliver Trobat, Margalida Castells Valdivielso <i>The attitudes of young spaniards students towards the environment and their perception of the future</i>	247

### **Reports of research/Rapports de recherche/Rapporti di ricerca**

Mauri Åhlberg <i>A new theory of high quality learning to enhance education and learning for sustainable development</i>	273
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Mauri Åhlberg <i>Research on promoting wisdom for sustainable development: educating for wisdom, creativity and intelligence as a main part of education for sustainable development</i>	277
Aitor Albizu Intxausti, José Manuel Gutierrez Bastida <i>Self-regulation of attitudes in education for sustainable development</i>	281
<i>Autorregulación de actitudes en educación para el desarrollo sostenible</i>	287
Thomas Bevins, Sharon Irish Bevins, Peg Gray-Vickre <i>Environmental and Sustainability Education in a University Setting: Outcomes Assessment</i>	291
Antonio Bossi <i>Environmental education, a matter of quality</i>	295
<i>Educazione ambientale, una questione di qualità</i>	299
Cano Margarita <i>Preschool children knowledge and attitudes about their community ecosystems: a study case in the Mexican west</i>	303
Natalia A. Gallo <i>Educazione linguistica per la sostenibilità ambientale</i>	305
Gerhard T. Hornsteiner <i>“We children aim high!” – Large topics of the future for children in the alpine region</i>	311
Michela Mayer, Francesco Paglino <i>Is it possible to evaluate environmental competencies? ICAM– A national study for the evaluation of environmental competencies</i>	315
Michela Mayer, Francesco Paglino, Paolo Tamburini, Stefania Bertolini <i>Quality criteria for environmental education centres in Europe</i>	321
<i>Criteri di qualità per i centri di educazione ambientale (CEA) in Europa</i>	327
Elza Maria Neffa Vieira de Castro, Fátima Teresa Braga Branquinho, Madrilene de Sà Cadei <i>Contribution of the Philosophy of Science to Environmental management: A Case Study in Vila Dois Rios, Ilha Grande, RJ/Brazil</i>	333

Antonio Moroni	
<i>Progettare l'educazione ambientale per una società in transizione</i>	337
Pietro Pizzuto	
<i>Verso modelli ecologici di trasmissione della conoscenza</i>	341
Carolin Rettig	
<i>Informal environmental education focusing on water. Analysis and evaluation of educational concepts applied in Germany</i>	345





## MESSAGE FROM THE EDITOR

This volume is part of the series of texts that make up the *Acts of the 3rd World Environmental Education Congress – Educational Paths towards Sustainability*, held in Torino, Italy October 2<sup>nd</sup> – 6<sup>th</sup> 2006.

The *Acts* contain the texts which were sent in or which it was possible to gather in time and while it is obvious that no collection of materials could ever completely represent the richness and the atmosphere of an event of such dimensions and complexity in which the photographs and the videos that accompanied (or replaced) with sounds and images the words of the speakers and in which a major role was played by interpersonal communication and by the ‘atmosphere’ lived by the participants in the congress.

For further documentation reference can be made to the web site of the congress ([www.3weec.org](http://www.3weec.org)) and to the Permanent International Secretariat, which has its headquarters in Torino ([www.environmental-education.org](http://www.environmental-education.org)).

The *Acts* are composed of a general volume (published in two separate editions, one in English and French, and one in Italian) and of twelve themed volumes, one for each of the sessions that made up the congress. The general volume has been printed, while the themed volumes are only available in electronic form and can be downloaded from the congress website, they are also included on a DVD enclosed with the general volume.

Only the general volume, which contains the contributions from the two opening and closing plenary sessions have been translated into the three official languages of the congress. The contributions for the themed volumes have been left in the language in which they were presented.

It is important to note that many participants in the congress used a foreign language when preparing their papers and posters and this explains any linguistic errors that the reader may encounter, we apologise for these. The high quality of the texts and the variety of languages used made it impossible to thoroughly review all the material, therefore we preferred to leave to each author the responsibility for the style and/or formal precision of his/her work. The translations realised for the general volume were carried out under our responsibility.

Mario Salomone

## AVANT-PROPOS

Cet ouvrage fait partie de la série de volumes constituant les *Actes du 3rd World Environmental Education Congress – Educational Paths towards Sustainability* qui s'est tenu à Turin (Italie) du 2 au 6 octobre 2005.

Les *Actes* réunissent les textes qui nous sont parvenus ou qu'il a été possible de récupérer en temps utile. Cela dit, aucune collecte de matériels ne pourra jamais rendre complètement la richesse et l'atmosphère d'un événement d'une telle envergure et d'une telle complexité, où les photos et les vidéos ont souvent accompagné (ou remplacé) par des sons et des images les mots des intervenants et où la communication interpersonnelle et l'«atmosphère» vécue par les congressistes ont joué un rôle fondamental.

Pour une ultérieure documentation, nous renvoyons à ce qui a été publié sur le site web du congrès ([www.3weec.org](http://www.3weec.org)) et du Secrétariat permanent international qui est justement situé à Turin ([www.environmental-education.org](http://www.environmental-education.org)).

Les *Actes* sont composés d'un ouvrage général (publié en deux éditions séparées, l'une en anglais/français et l'autre en italien) et de douze volumes thématiques, un pour chacune des sessions du congrès.

L'ouvrage général est publié sur papier tandis que les volumes des sessions thématiques sont uniquement publiés en format électronique, téléchargeables du site web du congrès et contenus dans un DVD joint à l'ouvrage général.

Seuls les textes de l'ouvrage général, qui contient les interventions des deux sessions plénières d'ouverture et de clôture, ont été traduits dans les trois langues officielles du congrès. Pour ce qui est des interventions des sessions thématiques, elles ont été laissées dans la langue, ou dans les langues, dans laquelle/lesquelles elles nous sont parvenues.

Un avertissement important concerne le fait que de nombreux congressistes ont souvent utilisé pour leur paper ou leur poster une langue différente de leur langue maternelle et ceci peut expliquer les fautes de langue éventuelles que le lecteur ou la lectrice pourra relever dans certaines interventions et pour lesquelles nous vous prions de nous excuser. La grande quantité de textes et la variété des langues utilisées rendaient toutefois impossible toute réélaboration minutieuse : nous avons donc préféré laisser à chaque auteur la responsabilité de l'élégance et de la précision formelle de ce qu'il avait écrit. En revanche, nous assumons la responsabilité des traductions réalisées pour l'ouvrage général.

Mario Salomone

## AVVERTENZA DEL CURATORE

Questo volume fa parte della serie di volumi che costituiscono gli *Atti del 3rd World Environmental Education Congress – Educational Paths towards Sustainability*, tenutosi a Torino (Italia) dal 2 al 6 ottobre 2005.

Gli *Atti* raccolgono i testi che ci sono giunti o che è stato possibile recuperare in tempo utile, anche se ovviamente nessuna raccolta di materiali potrà mai rendere completamente la ricchezza e l'atmosfera di un evento di tale dimensione e complessità, in cui spesso le foto e i video hanno accompagnato (o sostituito) con suoni ed immagini le parole dei relatori e in cui un grande ruolo è stato giocato dalla comunicazione interpersonale e dalla "atmosfera" vissuta dai congressisti.

Per un'ulteriore documentazione si rinvia anche a quanto pubblicato nel sito web del congresso ([www.3weec.org](http://www.3weec.org)) e del Segretariato Permanente internazionale, che a sede proprio in Torino ([www.environmental-education.org](http://www.environmental-education.org)).

Gli *Atti* si compongono di un volume generale (edito in due edizioni separate, una in inglese e francese e una in italiano) e di dodici volumi tematici, uno per ciascuna delle sessioni in cui era articolato in congresso.

Il volume generale è edito su carta, mentre i volumi delle sessioni tematiche sono editi solo in forma elettronica, scaricabili dal sito web del congresso e inclusi in un DVD allegato al volume generale.

Solo i testi del volume generale, che contiene gli interventi delle due sessioni plenarie di apertura e di chiusura, sono stati tradotti nelle tre lingue ufficiali del congresso. Gli interventi delle sessioni tematiche sono invece stati lasciati nella lingua, o nelle lingue, in cui ci sono pervenuti.

Un'avvertenza importante è che molti congressisti hanno spesso utilizzato per il loro paper o poster una lingua diversa da quella materna e questo può spiegare gli eventuali errori di lingua che il lettore o la lettrice potrà trovare in alcuni interventi e di cui ci scusiamo. La grande quantità di testi e la varietà di lingue utilizzate ne rendevano però impossibile una rielaborazione a fondo: abbiamo quindi preferito lasciare a ciascun autore la responsabilità dell'eleganza e/o precisione formale di quanto scritto. Sono invece sotto la nostra responsabilità le traduzioni realizzate per il volume generale.

Mario Salomone



## **Sub session 1.1**



## **RESULTS OF OVER TWELVE YEARS (1992 – 2005) OF SYSTEMATIC R&D FOR EE AND ESD: THEORIES AND METHODS, TESTED IN PRACTISE, FOR UN DESD (2005-2014)**

**Mauri Åhlberg**

*Professor of Sustainability Education, University of Helsinki  
<http://ksgnotes1.harvard.edu/bcsia/forum.nsf/proj/culturallysd>  
<http://ksgnotes1.harvard.edu/bcsia/forum.nsf/people/AhlbergMauri>*

### **Personal and research group background**

I have been a director of international research groups of EE/ESD (Environmental Education/ Environmental and Sustainability Education) in Finland from 1992. I have participated in several EU and Ministry of Education funded R&D projects. Seven doctoral dissertations have been supervised in the research group. Practical theories and methods are created and continually tested both theoretically and empirically. Theoretical testing means comparing our theories and methods with the best theories and methods in literature. Empirical testing means practical testing of our theories and methods in everyday use of teachers, pupils and researchers.

In 2004 I was nominated as the professor of Biology and Sustainability Education at University of Helsinki. I integrated my theory of Sustainable Development with theories of different capitals Sternberg's balanced theory of wisdom. This project of my research group for the UN Decade of Education for Sustainable Development 2005 – 2014 has been accepted into the Forum on Science and Technology for Sustainable Development, based at Harvard University, USA.

### **Main aspects of education for sustainable development**

Some of the main ideas and tools are presented in the following figure and table. The Figure1 shows only the main ideas what is needed to promote sustainable development in education. These ideas are more elaborated in the Table 1. Wisdom can be developed by education and it is wise to balance at least interests described in the Table 1.



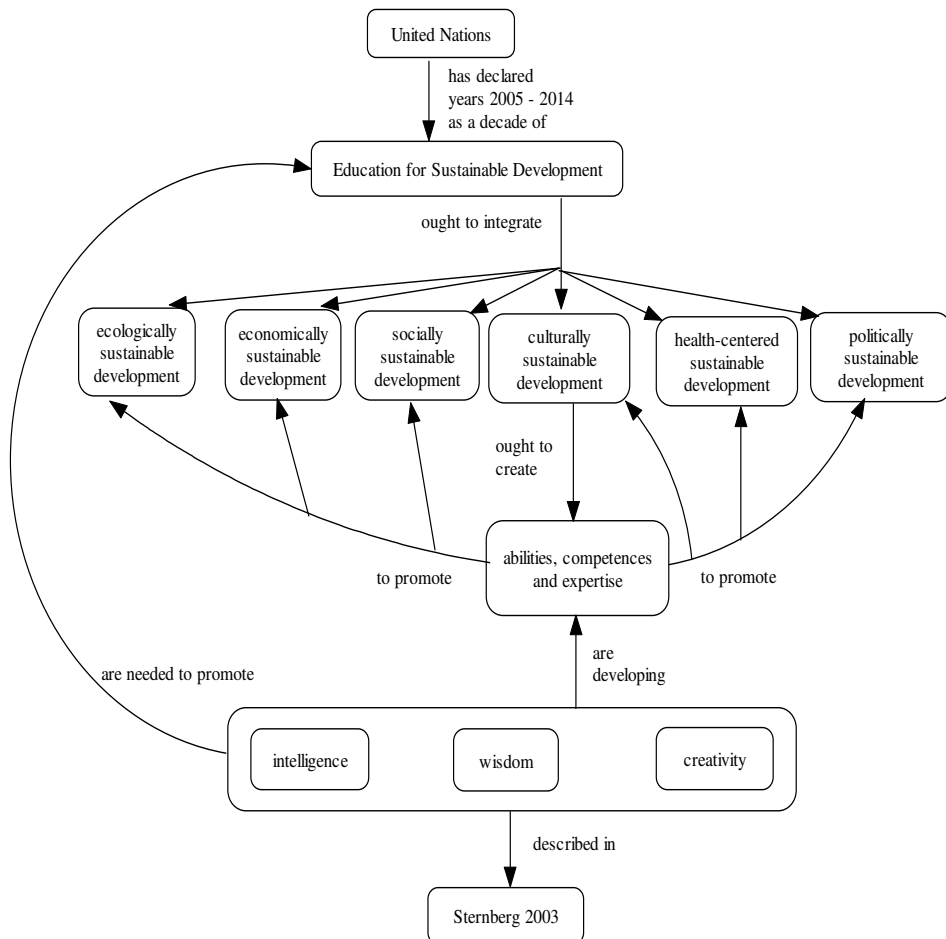


Fig. 1. A theoretical framework for my research project to promote the UN Decade of Education for Sustainable Development (2005 – 2014).

<b>Aspect of sustainable development</b>	<b>Form of capital (accumulated work)</b>	<b>Interests which ought to be balanced applying Sternberg's balanced theory of wisdom</b>
1) Ecologically sustainable development	Natural capital, accumulated "work" of Nature, work of ecosystems and resulting free services: cleaning of air, and water, food, raw materials, biodiversity.	Nature's interests, interests of life, ecosystems, biodiversity, protection of nature, management of nature
2) Economically sustainable development	Monetary capital, financial capital: Infrastructure, houses, factories, roads, money etc.	Interests of global, regional and local economy, interests of households, interests of quality of life for individual and societies
3) Socially sustainable development	Social capital, social networks, family, friends, humankind, all who share increasing and accumulating win-win thinking and acting	Interests of individuals, families, societies and humankind for good life
4) Culturally sustainable development	Cultural capital, in a new and broader sense: everything worthwhile that individuals, societies, organizations, nations and humankind have learnt during history, including all developing abilities, competence and expertise, intelligence, creativity and wisdom. Cultural capital in this sense includes intellectual capital, creativity capital and a part of human capital.	Cultural interests, interest for education and learning, developing abilities, competence and expertise, intelligence, creativity and wisdom
5) Health-centred sustainable development	"Health capital" is an important part of human capital, which ought to be taken care of. Good health is requirement for all other forms of human capital.	Health interests, interests for obtaining and maintaining optimal level of health individually and socially, nationally and for humankind
6) Politically sustainable development	Trust capital, political capital, e.g.: Representatives of nations have signed many agreements to promote sustainable development. They have promised to promote it. If the nations, mu-	Political interests, individual and group interests to promote common good, as they understand it. Interest for obtaining and maintaining credibility, trust.

	<p>municipalities, organizations and individuals do not act as they have promised and agreed on, then they lose credibility, their trust capital, political capital.</p>	
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Table 1. How different aspects (components) of sustainable development are related to different forms of Sustainable Development according to Halberd (June 2004).

## Main theories developed and tested in our research group

The space allows me only to name four theories, but they are described in references (Halberd 1993-2005):

- Theory of sustainable development.
- Theory of integrating education.
- Theory of continual quality improvement (mainly organizational level).
- Theory of high quality learning with twenty aspects (from individual level to the level of all humankind). According to Steinberg, Prêt, & Kaufman (2003), integration is one of the eight types of innovation and an essential part of creativity.

I have scrutinised definitions of sustainable development. The one developed and tested in my research group is: “promotion of sustainable development means striving for optimal satisfaction of *real* human needs”. There is a big difference what people say they need (expressed needs), and what they really need, after careful studies and reflection on what are their real long term needs. Real needs are not all kinds of fashions, whimsies, etc. In each ecological, economical and societal context, only continual research programs can reveal which are real needs and what would be their optimal satisfaction. No political declaration is enough alone.

Theory of integrating education is used for interdisciplinary and trans-disciplinary design experiments. The second theory is important because resources for education are available mainly from healthy organisations. They have to be continually improved as much as possible, to provide resources needed to take care of sustainability, good environment and good quality of life. In continual quality improvement and in high quality learning, quality is defined as optimal satisfaction of *real* human needs. The more optimally real human needs are satisfied, the better is quality.

The theories and quality methods have stood continual theoretical and empirical testing. They have been continually improved and enriched.

## Main tools developed and tested in our research group

Two of the main tools we have developed and tested in our research group are:

- improved concept mapping
- improved Vee heuristic

The space does not allow me to present them in detail, but they are used and described in the references (Åhlberg 1993 – 2005). These tools are used also in our collaborative knowledge building for ESD.

### **Collaborative knowledge building to promote ESD**

The biggest learning challenge for humankind is to learn to live in sustainable ways. Science and technology are main collaborative learning projects for humankind. Scientific knowledge building has been a model for our collaborative knowledge building design experiment.

Since the year 2000 our research group has experimented with collaborative knowledge building using Knowledge Forum®, a leading edge computer program developed for it. In 2000, I visited three times at University of Toronto, Canada, to learn the method and its theoretical underpinnings from its developers, professors Carl Bereiter and Marlene Scardamalia. We have now over five years research data (over 1100 notes) collaboratively built over five years in our Knowledge Forum website of ENSI/UNESCO/Finland.

In September 2005 we found even a better program for both individual and collaborative knowledge building: CmapTools (Version 4). We learnt it from professor Alberto Cannas, who visited in my research group at University of Helsinki. He demonstrated the new empowering software, CmapTools (version 4).

### **Analysis of Reasoning, Rhetoric and Argumentation (ARRA)**

Both science and democracy are based on reasoning, reasoned argumentation and reasoned rhetorical persuasion based on evidence and justifications. Using ARRA, chains of rational reasoning and persuasion can be revealed. (<http://bursa.helsinki.fi/~maahlber/sivut/ARRA.htm>)

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## **ENVIRONMENTAL PSYCHOLOGY AND ENVIRONMENTAL EDUCATION: RESEARCH AND EXPERIENCES**

**Antonietta Albanese**

*Professor of Social Psychology, Università degli studi di Milano  
Co-ordinator of the Master in Politics and Economy  
of the Environment, Università degli studi di Milano*

The object of study in psychology is the living creature's interaction with the environment. At first the perception and the memory processes within the relation between the human being and the environment have been studied, as well as the selection and the elaboration processes of the environmental stimuli which come from the living creature. Jean Piaget's research about the cognitive development has – then – identified four fundamental elements of the thought maturity:

- biological elements
- elements of interaction between the subject and the environment and the progressive coordination of the subject's actions in structures which are more and more balanced
- social elements of inter-individual coordination (information exchanges, cooperation and so on)
- social elements of educational and cultural transmission.

The mental development progresses through the *assimilation* of information coming from the environment and the *accommodation*, that is the progressive coordination of the action schemes.

The mental structures coming from the subject's interaction with the environment develop through stages in sequential order (each stage is necessary to the following one) and in chronological order. These evolutionary stages (sensorimotor period, preoperational period, concrete operational period, formal operational period) are influenced by interactive elements between the subject and the environment, by social elements, by elements of educational and cultural transmission. Later on, we are going to focus on these latter elements, by showing – moreover – interesting experiences of environmental education at school age.

J. Bruner's research has considered the sensory and cognitive experience as a process the subject takes part in, in an intentional and dynamic way, in order to organise his own knowledge. The cognitive development is the result of an interaction between innately determined abilities and human abilities which are culturally transmitted: sensory and movement innate abilities are developed through tools, methods, systems that are learnt from the cultural environment the subject belongs to. The growth of the innate abili-

ties, caused by the culture the subject belongs to, let the subject adapt to the environment he lives in. According to Bruner, the study of the cognitive development is “the study of the means and the ways employed by the subject, during different ages and in different cultures, to create and use his own knowledge”.

At first the child knows, interacts with the environment using the “*enactive representation*”: he knows through actions and he “keeps” the schema of the actions already done. He will learn soon after to know things by understanding their perceptive qualities (shape, colour, size) and he is going to “keep” them through mental “images” (*iconic representation*) and finally through symbolism, first of all through the speech (*symbolic representation*). Bruner, like Vygotskji, highlights the effect of the belonging culture both in the different ways of “amplifying” knowledge and in the process of speech internalisation: the thought is, according to Vygotskji, “inner speech”.

The pedagogical procedure shows that the *real experience* is the basis of knowledge and that it is not related just to the first years of the child’s life or to the years of the nursery school; *it is a knowledge device which goes with a whole human life*. Research that we carried out through the national scientific interdisciplinary Committee “Psychology and Tourism” about school tourism shows how the *interaction with the environment, with environmental, historic and archaeological heritage*, experienced in a group and internalised with individual devices (iconic, symbolic devices) and with interpersonal communicative relations, “amplify” knowledge, encourage the memory processes, involve emotional nature and the whole personality.

The interaction with the environment experienced not only by a single subject, but also by groups is stronger and more effective. The cooperation among groups, even and above all during the moment of knowledge and interaction, stimulates creativity and it generates effective solutions to the problem solving created by the environment. The cooperation among groups, the emulation, the synergies among groups belonging to different institutions encourages, in fact, adaptability and adaptation, in the overcome of the sclerotic behaviour which is typical of close organisations.

The environmental education is not only environmental knowledge, but also an acquisition of adaptable behaviors to the environment, that is behaviors that have respect for the context and for the social rules of the belonging group. The environmental psychology has deepened these themes over the last ten years with an interdisciplinary approach, which is strongly linked to the economic, sociologic and legal research.

Research that has been carried out by the University of Milan over the last five years regards both the environment safeguard and the training for new generations to establish an optimal relation between the subject and the environment.

In this occasion I would like to remind you the research that we have carried out since 1998 on this issue. In particular, I would like to stress the experimental research: “Grandparents and Grandchildren on Holidays: Environmental Education and Digital Photography” I am the national scientific

coordinator of. It concerns experimental research organized in a context of holiday between different generations: it is a week-holiday during which elderly and young people get to know and “enjoy” the surrounding environment through trips and excursions, living an experience of learning the computer science language and the values associated with the environment.

This research is part of the larger reference context of national research “Computer Science Language and Communication between Generations”, that we have carried out since 1998 and that takes place in association with Corporations, Institutions, Associations, by stressing pedagogic and social synergies related to a common aim:

- environmental education, with the transmission between generations of the concept of environment as a natural resource and cultural heritage for the development of the mankind.

Starting from the Self theory applied to the society and from the psychosocial studies about changing processes and relation dynamics, the research-experience has the following aims:

- verifying the communication and meeting dynamics between generations;
- analysing the changing processes, of subjects, toward what is “new”;
- learning of multimedia instruments in a new formative context;
- promoting the environmental education, by encouraging the concept of environment as a natural resource and a cultural heritage for a harmonic development of the mankind;
- introducing a new concept of holiday where formative and playing aims meet each other through the relation between generations;
- starting research trainings for young students in order to learn the methodologies *of active research in the context*.

The methodology used by the research-experiences of holiday between generations refers to the scientific approach of action-research by Kurt Lewin. By referring to the publications on this issue, edited by A. Albanese and S. Pozzi (it is being printed for the 2005 edition of F. Angeli), I underline the importance of the already said research-experiences “Grandparents and Grandchildren on Holidays: Environmental Education and Digital Photography”, which have been carried out since 2000 at Sfruz (Trento) – Val di Non, in the domain of the research convention between the “Università degli studi di Milano” and “Casa degli scoiattoli” at Sfruz, (socio-psycopedagogic institute for children) and I also underline the research carried out in Viterbo Terme, in collaboration with the colleagues from University of Rome “La Sapienza” (during the summer 2002-2003-2004). It was also significant the research-experience at Benetutti Terme (Sassari) in 2004, in collaboration with the University of Sassari.

The holiday between generations activates in the small group the creation of environmental values shared by everyone.



The environmental education of these researches takes place through different methods, which are associated with the members and the context.

The leit motif that links all the experiences, is nevertheless the connection of the couple “grandparent/grandchild” which allows them to work out the external factors in a new way.

This is a new method of environmental education, which, according to the principles of NEP (New Ecologic Paradigm), contributes to create an awareness among young people and children of the necessity of a good administration of the limited resources of our planet, of the interdependence of the different forms of life and of the effect the material environment has on the quality of the man’s life.

The comprehension of the national, European, international regulations for an intelligent employ of natural resources, in a small interactive group context, encourages to learn and above all to interiorise environmental and social rules.

These issues, faced with the research, are moreover the object of study during the interdisciplinary training Seminars for students of the II level Master with FSE in Politics and Economy of the Environment which has been organised since 2000, in the prospective of a close interaction of Research, Training and Procedure (A. Albanese, 1990).

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## **PSICOLOGIA AMBIENTALE ED EDUCAZIONE AMBIENTALE: TRA RICERCA E SPERIMENTAZIONE**

**Antonietta Albanese**

*Professore di Psicologia Sociale,  
Università degli studi di Milano*

*Coordinatore Master in Politica ed Economia dell'Ambiente,  
Università degli studi di Milano*

Oggetto di studio della psicologia è l'interazione dell'organismo vivente all'ambiente. Sono stati studiati dapprima la percezione ed i processi di memoria nella relazione dell'individuo all'ambiente, nonché i processi di selezione e di elaborazione degli stimoli ambientali da parte dell'organismo vivente. Le ricerche di Jean Piaget sullo sviluppo cognitivo hanno – poi – individuato quattro fattori fondamentali di maturazione del pensiero:

- i fattori biologici
- i fattori di interazione tra soggetto e ambiente e la progressiva coordinazione delle azioni del soggetto in strutture sempre più equilibrate
- i fattori sociali di coordinazione interindividuale (scambi di informazione, cooperazione, ecc.);
- i fattori sociali di trasmissione educativa e culturale.

Lo sviluppo mentale procede attraverso l'*assimilazione* delle informazioni provenienti dall'ambiente e l'*accomodamento*, coordinazione progressiva degli schemi di azione. Le strutture mentali derivanti dall'interazione del soggetto all'ambiente evolvono secondo stadi in ordine sequenziale (ogni stadio è necessario a quello successivo) e in ordine cronologico. Questi stadi evolutivi (pensiero senso motorio, pensiero preoperatorio, pensiero operatorio concreto, pensiero formale) risentono dei fattori interattivi soggetto-ambiente, dei fattori sociali, dei fattori di trasmissione educativa e culturale. Su questi ultimi fattori ci soffermeremo più avanti, presentando – peraltro – interessanti esperienze di educazione ambientale in età scolare.

La ricerca di J. Bruner ha considerato l'esperienza sensoriale e cognitiva come un processo in cui il soggetto interviene in modo intenzionale e dinamico per organizzare la propria conoscenza. Lo sviluppo cognitivo è, cioè, la risultante di un'interazione tra capacità innaticamente determinate e capacità umane trasmesse culturalmente: le abilità sensoriali e motorie innate sono sviluppate attraverso strumenti, modalità, sistemi appresi nella cultura di appartenenza. L'amplificazione delle capacità innate, dettata dalla cultura in cui l'uomo è inserito, consentono l'adattamento dell'uomo all'ambiente in cui vive. Studiare lo sviluppo cognitivo è per Bruner "studiare lo sviluppo dei mezzi e dei modi con cui l'uomo, in diverse età e in di-

verse culture, realizza ed usa la propria conoscenza”.

Dapprima il bambino conosce, interagisce con l'ambiente utilizzando la “*rappresentazione empirica*”: conosce attraverso le azioni e “conserva” lo schema delle azioni compiute. Imparerà subito dopo a conoscere le cose cogliendo qualità percettive (forma, colore, grandezza) e le “conserverà” tramite “immagini” mentali (*rappresentazione iconica*) ed infine attraverso il simbolismo, il linguaggio in primis (*rappresentazione simbolica*).

Bruner, come Vygotskji, evidenzia l'incidenza della cultura di appartenenza sia nel diverso modo di amplificare la conoscenza, sia nel procedere all'interiorizzazione del linguaggio: il pensiero per Vygotskji è “linguaggio interiore”.

La prassi pedagogica dimostra che l'*esperienza concreta* è la base della conoscenza e non è certo riservata ai soli primi anni di vita del bambino o agli anni di Scuola materna; è uno *strumento di conoscenza che accompagna tutta la vita dell'uomo*. Le ricerche da noi condotte nell'ambito del Comitato scientifico nazionale interdisciplinare “Psicologia e Turismo” concernenti il Turismo scolastico evidenziano come le *interazioni all'ambiente, ai beni ambientali e storico-archeologici*, effettuate *in gruppo* ed interiorizzate con strumenti individuali (iconici, simbolici) e con relazioni comunicative interpersonali “amplificano” la conoscenza, favoriscono i processi di memoria, coinvolgono l'emotività e la personalità tutta.

L'interazione all'ambiente operata non più soltanto dal singolo individuo, ma dai gruppi è più solida ed efficace. La cooperazione tra gruppi, anche e soprattutto nel momento della conoscenza e dell'interazione, stimola la creatività e genera soluzioni ottimali ai problem solving che l'ambiente pone. La cooperazione tra gruppi, l'emulazione, le sinergie tra gruppi appartenenti a diverse istituzioni favorisce, infatti, adattabilità e adattamento, nel superamento delle sclerotizzazioni tipiche delle organizzazioni chiuse.

L'educazione ambientale non è solo conoscenza dell'ambiente, ma acquisizione di comportamenti adattativi all'ambiente, ovvero rispettosi del contesto e delle norme sociali del gruppo di appartenenza.

La psicologia ambientale ha approfondito queste tematiche nell'ultimo decennio in un approccio interdisciplinare, in stretta connessione con la ricerca economica, sociologica, giuridica.

Le ricerche svolte dall'Università di Milano nell'ultimo quinquennio concernono sia la salvaguardia dell'ambiente, sia la formazione delle nuove generazioni alla relazione ottimale organismo-ambiente.

In questa sede vorrei brevemente ricordare le ricerche da noi svolte sin dal 1998 sul tema. In particolare vorrei evidenziare le ricerche-sperimentazioni dal titolo: “Nonni e nipoti in vacanza: educazione ambientale e fotografia digitale”, di cui sono coordinatore scientifico a livello nazionale.

Si tratta di ricerche-sperimentazioni realizzate in un contesto di vacanza intergenerazionale: una settimana di vacanza in cui anziani e giovani, attraverso gite ed escursioni, conoscono e “godono” l'ambiente *circostante*,

vivendo un'esperienza di apprendimento dei linguaggi informatici e del sistema valoriale connesso all'ambiente.

Queste ricerche si inseriscono nel più ampio quadro di riferimento di ricerca nazionale "Linguaggi informatici e comunicazione intergenerazionale", da noi svolta sin dal 1998 e si svolgono in convenzione con Enti, Istituzioni, Associazioni, sollecitando sinergie pedagogiche e sociali in relazione ad un comune obiettivo:

- educazione ambientale, nella trasmissione tra generazioni della concezione di ambiente in quanto bene naturale e patrimonio culturale per lo sviluppo dell'uomo.

Partendo dalla teoria del Sé applicata alla società e dagli studi psicosociali sui processi di cambiamento e sulle dinamiche di relazione, la ricerca-esperienza si propone i seguenti obiettivi:

- verifica delle dinamiche di comunicazione e di incontro tra le generazioni;
- analisi dei processi di cambiamento, da parte dei soggetti, nei confronti del "nuovo";
- apprendimento di strumenti multimediali in un innovativo contesto formativo;
- promozione di un'educazione ambientale, stimolando la concezione di ambiente in quanto bene naturale e patrimonio culturale per lo sviluppo armonico dell'uomo;
- introduzione di una concezione nuova di vacanza nella quale obiettivi formativi e obiettivi ludici si incontrano nella relazione intergenerazionale;
- attivazione di stage di ricerca per giovani studenti/laureandi per l'apprendimento di metodologie di ricerca attiva sul campo.

La metodologia adottata dalle ricerche-esperienze di vacanza intergenerazionale fa riferimento all'approccio scientifico dell'action-research di Kurt Lewin. Nel rinviare alle pubblicazioni sul tema, a cura di A. Albanese e S. Pozzi (in corso di stampa per l'ed. F. Angeli, 2005), sottolineo l'importanza delle citate ricerche-esperienze "Nonni e nipoti in vacanza: educazione ambientale e fotografia digitale", svolte dal 2000 a Sfruz (Trento) – Val di Non, nell'ambito della convenzione di ricerca tra Università degli studi di Milano e "Casa degli scoiattoli" di Sfruz (Istituto sociopsicopedagogico per bambini), nonché le ricerche svolte a Viterbo Terme, in collaborazione con i colleghi dell'Università di Roma "La Sapienza" (nell'estate 2002-2003-2004).

Rilevante anche la ricerca-esperienza a Benetutti Terme (Sassari) nel 2004, in collaborazione con l'Università di Sassari.

La vacanza intergenerazionale, dunque, avvia nel piccolo gruppo la costruzione di valori ambientali condivisi.

L'educazione ambientale in queste ricerche avviene attraverso modalità differenti, in relazione ai partecipanti ed al contesto.

Vi è comunque in ogni esperienza una relazione di complicità nella coppia “nonno/nipote”, che permette di elaborare in modo innovativo gli input provenienti dall’ambiente.

Un’innovativa modalità di educazione ambientale che, secondo i principi del NEP (Nuovo Paradigma Ecologico) contribuisce alla consapevolezza nei giovani e nei giovanissimi della necessità di una buona gestione delle risorse limitate del pianeta, dell’interdipendenza delle diverse forme di vita e dell’incidenza dell’ambiente fisico sulla qualità della vita dell’uomo.

La comprensione della normativa nazionale, europea, internazionale ai fini di una gestione intelligente delle risorse naturali, in un contesto di piccolo gruppo interattivo favorisce l’apprendimento e, soprattutto, l’interiorizzazione delle norme ambientali e sociali.

Questi temi, affrontati nella ricerca, sono inoltre oggetto di studio nei Seminari interdisciplinari di formazione per i corsisti del Master di II livello con FSE in Politica ed Economia dell’Ambiente dal 2000 ad oggi, nell’ottica di una stretta interazione tra Ricerca-Formazione-Intervento (A. Albanese, 1990).

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## **EVALUATING ENVIRONMENTAL EDUCATION PROGRAMS FOR TEACHER TRAINING USING DISTANCE EDUCATION**

**Rita Bissoonauth**

*Senior Lecturer*

*Mauritius Institute of Education, Réduit, Mauritius*

### **Abstract**

More and more environmental education programs using distance education are being developed around the world. They are intended not only for teachers but also for educators, people in NGO's, ministries, etc. One of the challenges, with the increasing number of such programs, is to ensure quality. Evaluation enables to determine the quality of a program.

There are several evaluation frameworks with their own set of criteria and standards to evaluate environmental education programs, teacher education programs and distance education programs. However there are no existing evaluation frameworks, which encompass these three fields. The aim of this research was to develop an evaluation framework to evaluate environmental education programs for teacher training using distance education.

### **Introduction**

More and more programs using distance education have been designed by various universities around the world in environmental education for teacher training. Filho (1998) has identified around a dozen such programs (English and French), which include modules, certificates and degrees in environmental education. However there has hardly been any systematic evaluation of environmental education programs (OECD, 1995). "If we want a niche for environmental education in our curriculum, we cannot afford not to evaluate our programs" (Bennett, 1989). If environmental education is to have an impact on our society, environmental education programs for teacher training have to be evaluated to determine how effectively they address its essential components (Lane & al., 1995).

It is only by evaluating environmental education programs that concerned parties can decide which aspects of a program need to be modified, dropped or retained. Evaluation should be a common feature of all educational programs, since it provides the means of developing knowledge, of knowing how programs were conceived and its outcomes (Somekh, 1994).

One of the challenges, with the increasing number of teacher training programs in environmental education using distance education, is to ensure quality. Standards and set of criteria are enable to determine the quality of a

program. They depend on the context, the purpose of the learning process and on the evaluator (Robinson, 1992).

There are existing evaluation frameworks to either evaluate environmental education programs or teacher education programs or distance education programs. However, there are no evaluation frameworks encompassing the three fields. Even if there were, this doesn't mean that they would correspond to our theoretical framework. Moreover, these evaluation models do not come without any mishaps, as we shall see.

### **Approaches in program evaluation**

Education is a very complex field and it is important to choose appropriate reference models or frameworks to evaluate such programs. There are two major trends in program evaluation: the experimental/technicist approach and the naturalistic approach. Each has diverging views of evaluating a program.

The experimental/technicist approach has a more objective view of reality where the stakeholders' opinions are not considered to be important. The naturalistic approach is more concerned with the human dimension of the situation to be evaluated, of the significance of reality for the people involved (Sauvé, 1997).

The main aim of an experimental/technicist approach is to provide decision-makers with information on a program's efficiency (Nadeau, 1988). The evaluator uses pre-determined categories or variables to describe the program under study (Guba, 1978). He distances himself from his work, intentionally sealing the objective stance of objective reality (Greene, 1994). Data are measured with precision and analysed with powerful mathematical and statistical tools (Guba & Lincoln, 1989). One of its greatest failures is not taking evaluation values into account.

The naturalistic approach aims at developing the most complete and faithful perception of a program, including its strengths and weaknesses (Nadeau, 1988).

The evaluator sets out to understand the day-to-day reality of the program, making no attempt to manipulate, control or eliminate situational variables or program developments (Patton, 1990). Evaluation data include whatever emerges as important to understanding the program (ibid.). The researcher does not attempt to manipulate the research setting, that is the program and does not place any prior constraints on what the outcomes of the research will be (Guba, 1978). Cronbach (1975) stresses that the main aim of an evaluation is an "interpretation in context" instead of a generalization of facts.

These evaluation approaches generate various evaluation models which themselves adopt different standards and set of criteria. Identifying suitable standards or criteria is one of the most difficult tasks to accomplish for it depends on factors such as the target group or the context (Nadeau, 1988).

## **Approaches used in evaluating environmental education programs**

The experimental/technicist approach has dominated evaluation of environmental education programs for a long time. Iozzi's (1981) review of research relating to EE in the 1970's, that of Marcinkowski's (1990) for the 1980's and the examination of the 1990's evaluation research in EE (Hart & Nolan, 1999) reveal a very positivistic outlook. As Robottom (1989) points out, this approach is "occupying a position of near-orthodoxy in the field of EE research". One of the reasons is that EE is seen as being a branch of positivist science education (Mayer, 1994; Robottom, 1989). The experimental/technicist approach aims at determining the effectiveness of a program. Congruence between goals and outcomes is measured quantitatively and presented as an indicator of program effectiveness (Robottom, 1985). Scientific methods are seen as being the only rational avenue to valid knowledge; scientific meaning is viewed as a series of propositions or hypotheses that can be tested directly or indirectly by means of observation or experiment (Robottom, 1989). The legitimate route to truth involves testing and quantification.

Moreover, stakeholders are not part of the evaluation process and values are precluded in this approach. Losito and Mayer (1997) underline the importance of searching for evaluation approaches closer to the requirements and values of EE. "Evaluation must take into account the specific aspects of environmental education, and look at the congruency between environmental values and teaching-learning behaviour, between environmental attitudes and cognitive attitudes, between the image of the natural and social world and the image of the inner world where knowledge is constructed" (Mayer, 1994).

An evaluation framework in environmental education should reflect the paradigm that one is attached to. Content, aims, objectives and teaching strategies are identified and selected according to one's paradigm or theoretical constructs and context (Sauvé, 1997).

There are existing standards, sets of criteria to evaluate environmental education programs. However they do not consider all dimensions of learning, or of environmental education itself. It is not an easy task to find a suitable reference framework for evaluating environmental education programs. Moreover, it is important to look for elements, which are consistent with one's own theoretical constructs and the contemplated methodology.

## **Approaches used in evaluating teacher education programs**

There has been very little analysis of past practice, few positions on method and only a handful of theoretical papers inquiring into the purpose and results of program evaluation in teacher education (Galluzzo & Craig, 1990). Because of this lack of information, very little is known about the nature of teacher preparation curricula, teaching strategies used, and if teachers

have the opportunity to put in practice what they have learnt (Howey & Zimpher, 1989). According to Knowles (1990), evaluating teacher education programs is quite an arduous task, as it encompasses several aspects not always easy to identify. The purpose of evaluation in teacher education is “inquiring into practice, facilitating communication, improving how teacher education is practiced, advancing what is known about education and raising important questions about issues and practices that need to be addressed” (Freeman, 1987 in Galluzo & Craig, 1990).

The majority of teacher education programs use experimental/technicist or quasi-experimental/technicist evaluation approaches with pre-tests, post-tests as well as control groups (Yarbrough, 1995). These approaches to evaluation or research in teacher education attempt to model the scientific method that has over the years been adopted from natural sciences (Yarger & Smith, 1990).

Realities of teacher education do not allow for complete adoption of a scientific research methodology, that is manipulation of variables or use of control groups (Yarger & Smith, 1990). The aim of evaluating a teacher education program is to describe, to understand how teaching is practiced and to raise questions. Teacher education is linked to a social context and it is important to consider teachers' opinions, expectations and values during an evaluation. In a naturalist approach, participants can answer freely without feeling compelled.

Existing evaluation models for teacher education are incomplete. They either lack one or more of the main aspects that are usually considered important in teacher education. It would be useful to develop an evaluation model, which incorporates among others, taking into account teacher competencies, metacognition, reflective practice and andragogical principles.

### **Problems pertaining to evaluating distance education programs**

Distance education adds another level of complexity to program evaluation. As distance learning courses and programs become more numerous, university or college administrators are faced with the challenge of assuring quality (Gellman-Danley, 1997).

Approaches in distance education, as in other educational fields, have concentrated on empirical and quantitative procedures (Simonson, 1997). The experimental/technicist approach in evaluating distance education programs aims at describing, characterizing the program as well as focusing on its success and failure. It fails to address the underlying concepts or approaches, and adds little to our understanding of the generic issues involved in the application of technologies to distance education (Curran & Wickham, 1991).

Moreover, evaluations employing scientific methodology often do so in a haphazard way. Small sample sizes, samples of learners from very specific populations and settings, non-comparable comparison groups, measures with untested reliability and validity are used (Dean & al., 1995).

Evaluators of distance education programs have recently begun to propose naturalistic approaches, which include the collection of non-numerical types of information (Simonson, 1997).

Many evaluators believe that the experimental/technicist approach is not very well adapted for distance education programs.

Guba and Lincoln (1981) suggest that an evaluation should encompass both the scientific and naturalistic paradigms with emphasis being laid upon the interactions between the program and its context. Other authors, such as Jones, (1996), call it an eclectic approach incorporating both quantitative and qualitative methods. The aim is to evaluate the effectiveness and quality of distance education programs whilst at the same time investigating the educational situation as a whole and focussing on the learners. Quantitative data seem to be more privileged when evaluating distance education programs. Criteria used to evaluate the learner or the learning process is often neglected to the technical capacities of media or the number of courses produced.

### **Aim and objective of this research**

- Aim

The aim of this research is to develop a theory in the evaluation of environmental education programs for teacher training using distance mode.

- General objective of the research

The general objective is to develop an appropriate evaluation framework to evaluate environmental education programs for teacher training using distance mode.

### **Methodology**

The methodology of this research is based on a developmental research, which is defined as “the systematic study of designing, developing and evaluating instructional materials, processes, and products that must meet the criteria of internal consistency and effectiveness” (Seels & Richey, 1994). It is based on the process of anasynthesis which consists of firstly analysing the situation, secondly of synthesizing, thirdly developing a prototype and lastly a simulation process.

This research consists of four steps:

1. Identifying and analysing all the existing evaluation frameworks.  
The first step consists in identifying and analysing the existing evaluation frameworks in Environmental Education, teacher education and distance education.
2. Developing a prototype of an evaluation framework.  
The second step tries to put together all the relevant information in an understandable structure. An evaluation framework is de-

defined as a set of criteria or standards, which enable to have a value-judgement on the object being evaluated.

An evaluation requires an evaluation framework which:

- Specifies the object to be evaluated.
- Chooses the evaluation approaches and strategies.
- Identifies criteria and indicators.
- Guides the value-judgement on the object being evaluated.

3. Validating the framework and trying it out by evaluating four programmes.

This step consists in validating the prototype by using certain criteria and confronting it to reality. Two validation processes were used here: a theoretical validation and a “field” validation. Experts in program evaluation, distance education and environmental education undertake the theoretical validation of the evaluation framework. The experts are given certain specific criteria such as the relevance, the completeness of the evaluation objects, the coherence of the structure, the clarity to validate the evaluation framework.

The “field” validation is carried out by evaluating four different Masters programmes by the stakeholders involved in each program and the researcher. The designer or team leader of the program, a tutor and a student validated each program. This step comprises four sub-steps: 1) description; 2) critical analysis; 3) value-judgement of the programme; 4) evaluation of the evaluation framework. The stakeholders evaluated their program using the evaluation framework given. The researcher then proceeded to evaluate the different programs using the same format as the different stakeholders.

4. Improving the evaluation framework.

This last step has helped in improving the evaluation framework, leading to the finalized version of the evaluation framework. All the suggestions, comments, modifications proposed by the experts as well as that of the stakeholders have been taken into consideration in order to come up with the final version.

## **Conclusion**

This evaluation framework fills a specific gap; it enables us to evaluate environmental education programs for teacher education using distance education mode. It can also be used to improve existing programs. The different components in the evaluation framework can help the designer to identify the strong and weak points of a program so as to improve it. The evaluation framework can also guide a designer in developing a new program.

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## **UN SISTEMA DI INDICATORI DI QUALITÀ PER I CENTRI DI EDUCAZIONE AMBIENTALE LIGURI**

**Stefano Calvillo**

*Responsabile Scientifico del Centro di Educazione Ambientale  
del Parco di Portofino*

**Luciano Marcello**

*Responsabile Scientifico del Centro di Educazione Ambientale  
Varese Ligure e Val di Vara*

Il progetto “Indicatori di qualità e accreditamento dei centri”, realizzato nel triennio 2002/2005 dalla rete dei Centri di Educazione Ambientale (CEA) della Regione Liguria, ha curato la definizione di uno scenario di qualità in grado di orientare lo sviluppo e la crescita dei Centri liguri di educazione ambientale, oltre che la nascita di nuovi Centri.

Il progetto è stato condotto con una modalità “bottom-up”, attraverso l’attivazione di un gruppo di progettazione, costituito dai referenti di alcuni CEA del territorio ligure, che ha delineato modalità e struttura del lavoro, ponendo particolare attenzione alla ricerca della massima partecipazione in tutte le fasi di sviluppo del percorso progettuale.

### **Obiettivi**

Obiettivo preminente è stata la redazione di un documento finale di sintesi, il Sistema di Indicatori di Qualità (SIQUAL), che si propone come uno strumento di “navigazione” soprattutto per orientare le attività/identità dei Centri e che apre alla riflessione sulla qualità delle relazioni, delle funzioni e della struttura del Sistema Ligure nel suo complesso.

Il progetto è finalizzato, dunque, a valorizzare l’intera comunità dei soggetti coinvolti e a indirizzare la loro crescita attraverso un confronto culturale orientato alla partecipazione attiva, all’autovalutazione e all’inclusività.

In sintesi, si elencano gli obiettivi perseguiti:

- Creazione di strumenti e modalità ad uso dei CEA per riflettere su se stessi e definire gli obiettivi di miglioramento.
- Rafforzamento della rete dei soggetti del sistema - comunità di pratica e di ricerca - attraverso la condivisione e la costruzione di elementi comuni.
- Realizzazione di uno strumento per l’accreditamento dei CEA.
- Attivazione di un lavoro *in progress*, mai concluso.

Il SIQUAL ha portato i CEA liguri a definire e adottare un proprio concetto di qualità. Il primo passaggio interpretativo è stato capire che non è possibile descrivere la qualità indipendentemente dal contesto di riferimen-

to. La qualità è un concetto relativo e dinamico, che si modifica a seconda dei punti di vista, degli interessi e dei valori di chi la definisce e/o la osserva, delle condizioni in cui si sviluppa.

## **Strumenti e prodotti**

L'attività di formazione propedeutica al processo, la definizione di un Quadro di Riferimento teorico condiviso (QdR), l'elaborazione partecipata di un Sistema Indicatori di Qualità (SIQUAL), l'elaborazione di strumenti per l'applicazione del SIQUAL (il dossier, il *portfolio* e il *report* di visita), il processo di valutazione e autovalutazione fra pari, la validazione del SIQUAL costituiscono gli strumenti e i prodotti principali che hanno caratterizzato il percorso.

## **Organizzazione del lavoro**

La conduzione del processo con modalità partecipative ha implicato la sperimentazione di pratiche facilitanti l'inclusione di tutti i referenti liguri, rappresentanti la comunità dei nodi del Sistema InFEA (Informazione, Formazione e Educazione Ambientale) ligure comprendente (dati 2004) ventuno Centri territoriali, quattro Centri provinciali ed un Centro regionale.

L'organizzazione del progetto ha previsto la definizione di un'articolazione funzionale, composta da: Gruppo di Progetto (GdP), Tavolo di Lavoro (TdL) e Consulenti esterni. Al GdP hanno partecipato i rappresentanti di quattro Centri territoriali, in gran parte coincidenti con il Gruppo di progettazione originario, (il Laboratorio Territoriale "R.Sanna" del Comune di Genova, il LabTer del Parco di Portofino, il LabTer Tigullio del Comune di Sestri Levante e il CEA Varese Ligure e Val di Vara) e un rappresentante di ARPAL-CREA. Al GdP sono state attribuite funzioni di organizzazione e conduzione del percorso progettuale, elaborazione degli strumenti per la partecipazione, stesura dei documenti e dei prodotti del percorso.

Al TdL, sede della partecipazione allargata, hanno partecipato tutti i Centri liguri – quattordici Centri, oltre a quelli già presenti nel GdP – e un referente della Regione Liguria. Il TdL ha avuto funzioni di: condivisione degli orizzonti teorici; elaborazione comune di parte dei prodotti; validazione, in itinere ed in conclusione, di tutti i documenti e le proposte emerse dal percorso.

## **Il Quadro di Riferimento**

Il Quadro teorico di Riferimento (QdR), insieme al Sistema di Indicatori di Qualità (SIQUAL), costituisce il prodotto principale del percorso progettuale verso la Qualità del Sistema ligure InFEA.

L'elaborazione del SIQUAL ha comportato la necessità di definire un QdR, una *vision* dell'educazione ambientale, che integrasse le istanze, i principi, le modalità dell'agire in educazione ambientale del Sistema ligure.

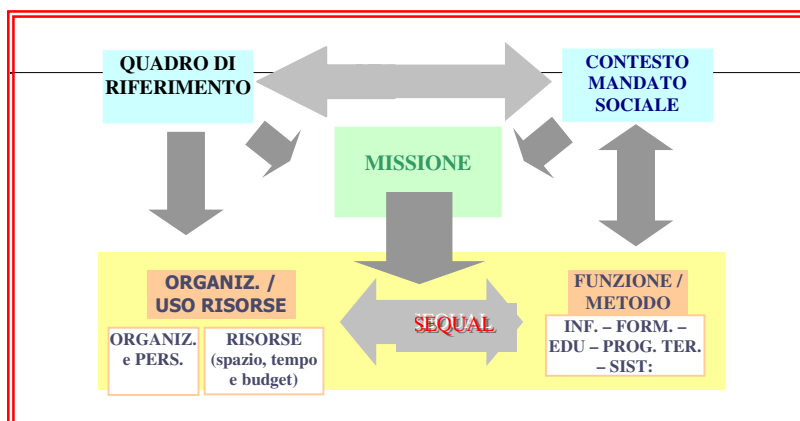
Uno sfondo teorico condiviso, una connotazione dei Centri del Sistema ligure, e uno strumento di riferimento per l'elaborazione e la successiva applicazione degli indicatori e indizi del SIQUAL.

Nel Quadro di Riferimento si riflette su:

- Alcune linee di interpretazione della realtà e delle sue trasformazioni, nell'intento di comprendere il contesto storico, sociale ed economico in cui operiamo
- Le relazioni e gli effetti sul fare educazione ambientale e sulla sua evoluzione nel tempo
- Quale educazione ambientale propongono i CEA liguri, secondo quali presupposti teorici, in riferimento a quali principi e con quali modalità
- L'acquisizione dello scenario della "sostenibilità" come contesto di riferimento e lo scenario mutato di obiettivi, campo di attività e soggetti di riferimento per l'educazione ambientale. Si va delineando per i CEA un ruolo di supporto tecnico e metodologico nei processi locali verso la sostenibilità e, più in generale, nei processi di progettazione territoriale.

È, inoltre, tracciata una rappresentazione del Sistema ligure dei Centri (nella misura dei soggetti coinvolti, le regole del gioco, la struttura, ecc.) e sono indicati alcuni elementi inerenti i principi e il funzionamento del Sistema stesso.

Il documento elaborato ha carattere aperto e dinamico, – si snoda attraverso domande e l'articolazione di risposte condivise – non ha alcuna pretesa di essere esaustivo ma, anzi, è suscettibile di modifiche e integrazioni.



Il Sistema di Indicatori di Qualità

Nello schema sono indicate le relazioni tra la *mission* dei Centri, il QdR, il contesto e il mandato sociale e le macroaree e aree che individuano l'identità e le azioni dei Centri.

È innanzi tutto tracciata la necessaria connessione tra il QdR e il contesto e il mandato sociale. Entrambi contribuiscono a determinare la *mission* del Centro. L'identità e le azioni del Centro si esplicano attraverso due macroaree: 1) Organizzazione-Risorse e 2) Funzioni-Metodo.

La macroarea Organizzazione-Risorse si articola nelle seguenti Aree: Organizzazione, Risorse materiali (spazi), Risorse materiali (attrezzature), Risorse umane e Risorse finanziarie.

La macroarea Funzioni-Metodo è declinata in: informazione, formazione, proposta educativa, progettazione territoriale e fare sistema tra centri.

Il Sistema di Indicatori di Qualità definisce gli Indicatori, gli Indizi e gli elementi di documentabilità inerenti ciascuna delle aree indicate. Dal punto di vista funzionale, dunque, l'unità e l'articolazione del SIQUAL ha previsto la definizione degli elementi strutturali quali le aree e gli indicatori. Le prime rappresentano gli ambiti significativi nei quali ricade il lavoro del Centro, i secondi costituiscono gli aspetti essenziali e sintetici rispetto alla qualità, rappresentativi della complessità strutturale e funzionale dell'area in esame.

Il SIQUAL ha permesso di adottare alcuni aspetti metodologici della *responsive evaluation*, attraverso la quale si è interpretata la valutazione come strumento di miglioramento del lavoro dei soggetti coinvolti. Gli esiti della valutazione sono stati successivamente proposti come elementi concreti per la possibile rivisitazione di pratiche dei CEA valutati.

## **Conclusioni e opportunità**

Il progetto ha costituito un'opportunità concreta per il confronto e la definizione, da parte dei Centri del Sistema ligure, di una *vision* comune di educazione ambientale e per l'elaborazione dei criteri (indicatori, indizi, documentabilità) per la qualità in educazione ambientale.

Questo percorso ha attivato, di fatto, un processo di costruzione e valorizzazione della "identità" dei soggetti del sistema, rappresentando uno strumento di crescita interno.

Cardini del progetto sono stati la comunicazione, il dialogo tra i Centri, la costruzione e condivisione del senso della ricerca. Il riconoscimento e il rafforzamento di tali pratiche riveste un ruolo significativo verso lo sviluppo di un Sistema ligure di educazione ambientale sempre più integrato, sinergico ed efficace.

I prodotti del progetto SIQUAL sono stati raccolti in una pubblicazione, che costituisce uno strumento teorico-filosofico di presentazione del Sistema, che può avere la finalità di accreditare ulteriormente i Centri per rafforzare l'impegno istituzionale sull'educazione ambientale.

In questo senso muove anche l'ipotesi di procedura di accreditamento e certificazione dei Centri: la prima riguarda l'inclusione del soggetto ac-

creditato all'interno della comunità di pratica e di ricerca – il sistema ligure –; la seconda presuppone un più elevato livello di qualità, che può essere limitato solo ad alcune funzioni.

Sono dunque disponibili tutti gli elementi per un processo virtuoso di miglioramento continuo dei Centri del Sistema ligure. I prodotti di cui si è parlato – QdR, SIQUAL, procedure di Accreditamento e Certificazione – non sono solo, quindi, obiettivi raggiunti, ma soprattutto punti di partenza per una riflessione continua e una revisione progressiva del SiquaI stesso, alla luce dell'evoluzione del quadro complessivo regionale e globale.



## **RESEARCH MATERIALS AND METHODS TOWARDS A SYSTEM OF QUALITY INDICATORS FOR ENVIRONMENTAL EDUCATION IN TUSCANY: A PROGRAMME OF PARTICIPATORY RESEARCH**

**Carmela D'Aiutolo,**

**Francesca Benassai & Serena Innocenti**

*ARPAT Environmental Protection Agency. Tuscany Region.*

*Organizational and Technical Support Structure  
for the Tuscan System of Environmental Education*

The definition of a system of quality for environmental education in Tuscany is one of the priorities pinpointed by the programs that the Environmental Authority and the Education Authority of the Region of Tuscany have taken part in and have wanted to bring to full force by launching a specific "Quality Project". ARPAT, the Environmental Protection Agency – Tuscany Region, as a structure that provides organizational technical support for the Tuscan System, offered its services to plan and carry out, in March of 2005, the first part of the project from which arose the first proposal for quality indicators for Environmental Education in Tuscany, which is currently being validated (ARPAT, 2005).

Instead of focusing on selecting purely quantitative measures, the program conceives of evaluation as a moment of critical reflection, as attention to emergencies, to better highlight the strong points of the system and its critical points, with the goal of carefully developing the resources of the system itself.

The Quality Project, coordinated by Michela Mayer and actively managed by a group of young consultants, has taken on the form of an action-research project and has involved various actors, from the sphere of Environmental Education in Tuscany, through the integration of and strong ties with training courses and research projects foreseen by the Tuscan program. The training aspect, in particular, has served as a guiding theme that has enabled comparisons, participation and planning with all of the potential actors of the system.

The project demonstrates remarkable results as well as interesting and innovative developments in terms of research planning and the instruments utilised. Two complementary approaches were adopted:

1. Top down, starting from the elements that constituted the reference framework.
2. Bottom up, adapting and remodelling the experience in light of the results of studies and by participating in each phase with the system actors.

One of the principal instruments relied upon to involve the so-called "system nodes" was the focus group, a survey technique for social research



based on the discussion between a small group of persons in the presence of one or more moderators that focuses on the issue to be examined in-depth (Corrao, 2000).

Ten focus groups were held – one for each Tuscan Province – involving the participants of the course “The Local INFEA System. Participatory research and planning laboratory,” which was also organised through the implementation of Environmental Education programs.

The focus groups enabled us to get to know and to understand the cognitive perspectives of the participants, their agendas (the aspects they considered most relevant, and in which order), and the language and analytical and discursive categories used. We aimed to achieve a goal that was two-fold: on one hand, to compile and understand the various interpretations of Environmental Education that is high-quality and interconnected, held by those who are recognized by the Provinces and by the Region as potential system “nodes” because they are interested in, responsible for, or promoters of Environmental Education initiatives; and, on the other hand, to involve these persons, from the outset, in a participatory process that also constitutes a model that is consistent with the quality standards that the Systems aims to create.

For the focus-group sessions we prepared a questionnaire in advance to meet the needs of the research. This was drawn up by a group of consultants in a series of meetings, in which they analysed the goals of the research, the characteristics of the participants, and the sphere and context in which the sessions would be held.

Part of the research consisted of ten in-depth interviews held, using a semi-structured questionnaire, of so-called “peripheral” system respondents who, though they did not promote Environmental Education initiatives in an explicit or comprehensive way, were in some way close to the goals, methods or content (public libraries, consumer associations, local communities, didactic farms) within the context of system that is integrated as it is in Tuscany.

We chose to rely on this technique, frequently used in the Social Sciences, to explore the following aspects with analogous and comparable methods: the characteristics, objectives and founding principles; the organizational aspects and the educational programs promoted by some of the actors who are situated, at least in appearance, on the margins of the system, in an attempt to unearth the similarities and differences in the various interpretations of Environmental Education expressed by the Regional INFEA Program.

The questionnaires used for the interviews were given a different slant than those used for the focus groups, not only because of the differences inherent in the two survey techniques, but also because of the differences between the persons to whom the questions were posed. The interview questionnaire was thus more detailed than the one for the focus groups, not only because an interview situation, as an interaction between just two people, facilitates more in-depth discussion on certain arguments, but also because one of the goals of the interviews was to identify and explore the specific characteristics of the chosen respondent, as well as the aspects of the work that he/she had done that was most integrated with the idea of sys-

tem-wide Environmental Education, and thus as education for an active general public and for sustainable development.

In order to experiment the functionality and practicality of the rough draft<sup>1</sup> drawn up by the research group at the end of the first phase of work, nine “case studies” were created, drawing on the case studies routinely used in Social Sciences, but adapting them to the theme and the goals of the project. To carry out studies/experimentation on this draft, we chose persons who had been active for years in the field of Environmental Education in Tuscany. The criteria used to make this choice were primarily the following:

- Experience gained from and awareness of operating in the field of Environmental Education
- Having focused primarily on (at least) one of the functions identified in one of the early versions of the System of Quality Indicators.

It was therefore, in a sense, a reasoned choice: we called upon these persons because they had experience and had demonstrated continuity in the specific field of Environmental Education. We believed that the best way to examine, delve into and discuss the proposal – so that we could then improve it – was to try to compile data and critically discuss its various aspects together with expert and competent persons.

All of the materials produced during the focus groups, interviews and case studies were first analysed by the research group and subsequently elaborated in a more succinct form, to create charts that would be easier to use for the target audience.

The participatory process that served as a framework for the project demonstrated itself to be an exceptional experience for building a network of relationships between the various players involved in the system, as well as for training, self-learning and critical comparison.

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1. The draft consists of charts related to the functions served in the sphere of the Tuscan System of Environmental Education that are described in the field indicators, indicators and evidence.

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## **MATERIALI E METODI DELLA RICERCA VERSO UN SISTEMA DI INDICATORI DI QUALITÀ PER L'EA IN TOSCANA: UN PERCORSO DI RICERCA PARTECIPATA**

**Carmela D'Aiutolo, Francesca Benassai, Serena Innocenti**  
*ARPAT (Agenzia Regionale per la Protezione Ambientale della  
Toscana). Struttura di supporto tecnico organizzativo del  
Sistema toscano per l'educazione ambientale*

La definizione di un Sistema di qualità per l'Educazione Ambientale in Toscana è una delle azioni prioritarie individuate dai programmi che l'Assessorato all'Ambiente e l'Assessorato all'Istruzione della Regione Toscana hanno condiviso e voluto attivare con determinazione attraverso l'avvio di uno specifico "Progetto Qualità". ARPAT, in qualità di Struttura di supporto tecnico organizzativo del Sistema toscano, ha messo a disposizione le proprie competenze per la predisposizione e il compimento, nel Marzo 2005, della prima parte del progetto, da cui è scaturita una prima proposta di indicatori di qualità per l'Educazione Ambientale (EA) in Toscana, adesso in corso di validazione (ARPAT, 2005).

Non si è trattato di individuare misure strettamente quantitative, ma di intendere la valutazione come riflessione critica, come attenzione alle emergenze, per poter evidenziare i punti di forza del Sistema e le sue criticità, con l'obiettivo di un'attenta valorizzazione delle risorse del Sistema stesso.

Il Progetto Qualità, coordinato dalla dottoressa Michela Mayer e attivamente condotto da un gruppo di giovani consulenti, si è configurato come un vero e proprio percorso di ricerca azione ed ha coinvolto i diversi attori dello scenario toscano dell'EA, attraverso l'integrazione e il forte collegamento con i percorsi formativi e con le azioni di ricerca previsti dal programma toscano. La formazione in particolare ha rappresentato il filo conduttore che ha permesso il confronto, la partecipazione e la coprogettazione con tutti i potenziali attori del sistema.

Il progetto, oltre che per i risultati raggiunti, mostra interessanti ed innovativi sviluppi per il disegno di ricerca e gli strumenti utilizzati. Sono stati adottati due approcci tra loro complementari:

1. top down, partendo dagli elementi che costituivano il quadro di riferimento
2. bottom up, adattando-rimodulando il percorso alla luce di quanto emergeva dalle indagini e partecipando ogni fase con i soggetti del sistema.

Uno degli strumenti principali cui si è fatto ricorso per coinvolgere i cosiddetti nodi del sistema è stato il focus group, ovvero una tecnica di rilevazione per la ricerca sociale, basata sulla discussione fra un piccolo

vazione per la ricerca sociale, basata sulla discussione fra un piccolo gruppo di persone, alla presenza di uno o più moderatori, focalizzata su un argomento che si vuole indagare in profondità (Corrao, 2000).

Sono stati effettuati dieci focus group – uno per provincia – coinvolgendo i partecipanti al corso “Il Sistema INFEA locale. Laboratorio di progettazione e ricerca partecipata” organizzato anch’esso in attuazione dei programmi di EA.

I focus group hanno permesso di incontrare e conoscere la prospettiva cognitiva dei partecipanti, la loro agenda – ovvero gli aspetti per loro rilevanti e il loro ordine – il linguaggio usato, le categorie analitiche e discorsive. L’obiettivo che s’intendeva raggiungere era infatti duplice: da una parte conoscere e raccogliere le concezioni di educazione ambientale, di qualità e di rete di quei soggetti riconosciuti dalle Province e dalla Regione come potenziali nodi del sistema perché interessati, responsabili o promotori di iniziative di educazione ambientale; dall’altra coinvolgere questi stessi soggetti, sin dall’inizio, in un processo partecipativo che costituisse anche un modello coerente con la qualità che il Sistema intende costruire.

Per effettuare i focus group è stata utilizzata una traccia con domande prestabilite, poiché meglio si confaceva alle esigenze della ricerca. Essa è stata elaborata dal gruppo di consulenti nel corso di diversi incontri, in cui sono stati analizzati gli obiettivi della ricerca, le caratteristiche dei partecipanti, l’ambito e il contesto in cui si sarebbero svolti gli incontri.

Nell’ambito della ricerca sono state effettuate dieci interviste in profondità, con traccia semistrutturata, a cosiddetti soggetti “periferici” del sistema, che, pur non proponendo percorsi di EA in maniera esplicita ed esaustiva, ci si avvicinano come finalità, metodi o contenuti (biblioteche aperte al territorio, associazioni di consumatori, comunità di base, fattorie didattiche) nell’ambito di un sistema integrato come quello toscano.

Si è scelto di far ricorso a questa tecnica, molto utilizzata nelle Scienze Sociali, per esplorare, con modalità analoghe e confrontabili, le caratteristiche, gli obiettivi e i principi fondanti, gli aspetti organizzativi e le azioni educative promosse da alcuni di quei soggetti situati, almeno apparentemente, ai confini del sistema, cercando di far emergere somiglianze e differenze con la concezione di educazione ambientale espressa dal Programma regionale INFEA.

Alla traccia d’intervista è stato dato un taglio diverso rispetto a quella usata nei focus group, non solo in considerazione della diversità delle due tecniche di rilevazione, ma anche perché diversi erano i soggetti che si andavano a interrogare. La traccia d’intervista è risultata, quindi, più dettagliata di quella dei focus group, non solo perché la situazione stessa, in quanto interazione fra due soli soggetti, permette di indagare più a fondo un certo argomento, ma anche perché uno degli obiettivi delle interviste era individuare ed esplorare le specificità del soggetto prescelto, nonché quegli aspetti dell’attività da lui svolta che più si integrano con l’idea di EA del Sistema e dunque come educazione alla cittadinanza attiva e allo sviluppo sostenibile.

Al fine di sperimentare la funzionalità e l'operatività della bozza di matrice<sup>2</sup> elaborata dal gruppo di ricerca al termine della prima fase del lavoro, sono stati realizzati nove "studi di caso", prendendo spunto da quelli abitualmente effettuati nelle Scienze Sociali ma adattandoli al tema e agli obiettivi del progetto. Per effettuare lo studio/sperimentazione della matrice sono stati scelti soggetti che operano da anni nell'ambito dell'EA toscana. I criteri che hanno guidato la scelta sono stati principalmente due:

- l'esperienza e la consapevolezza del proprio operare nell'ambito dell'Educazione Ambientale
- lo svolgere in maniera precipua (almeno) una delle funzioni individuate in una prima versione del Sistema di Indicatori di qualità.

Si è quindi trattato di una scelta, per così dire, ragionata: ci si è rivolti a questi soggetti proprio in quanto portatori di esperienza e continuità nel campo specifico dell'EA. Si è ritenuto che il miglior modo per esaminare, approfondire e mettere in discussione (per poi migliorare) la proposta fosse proprio provare a compilare lo strumento e discutere criticamente i suoi vari aspetti insieme a persone esperte e competenti.

Tutti i materiali raccolti nel corso dei focus group, delle interviste e degli studi di caso sono stati prima analizzati dal gruppo di ricerca e successivamente rielaborati sotto forma di schede sintetiche al fine di renderli più facilmente fruibili dai destinatari.

Il processo partecipato attraverso il quale è stato svolto il progetto è divenuto un momento incomparabile di costruzione della rete di relazioni tra i vari soggetti del sistema e di formazione, autoformazione, confronto.

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2. La matrice è costituita da schede, relative alle funzioni svolte nell'ambito del Sistema toscano di EA, articolate in indicatori di campo, indicatori e indizi.



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# **ENVIRONMENTAL AWARENESS OF PRE-SCHOOL AND SCHOOL CHILDREN, TEACHERS, AND PRE-SCHOOL CHILDREN'S PARENTS IN FOUR REGIONS IN POLAND**

**M. Grodzińska-Jurczak, H. Kobierska,  
M. Tarabula-Fiertak & G. Bryda**

*Institute of Environmental Sciences, Jagiellonian University.  
Gronostajowa 7, 30-387 Kraków, POLAND  
Email: GRODZ@EKO.UJ.EDU.PL*

## **Abstract**

The aim of the following study was to assess the current level of environmental knowledge and awareness among children of all education levels as well as their teachers in Poland. Using questionnaire, data were collected over the whole country from randomly chosen pre-schools and 3 school levels (elementary, middle and high school). Altogether 2884 respondents (947 teachers and 1937 pupils) were investigated. Results were examined in the context of place of residence, type of school, and educational status of parents.

## **Objective of the study**

Considering that the education process is of great importance in shaping environmental awareness, it seemed expedient to determine the level of environmental awareness among pre-school children, pupils at all levels of education, pre-school and primary school children's parents as well as teachers. Environmental awareness was understood as knowledge of the environment, actions for the good of the environment and how the two are related. To give the broadest possible picture, it was decided to conduct the research on a sample of respondents residing in provinces differing with regard to the level of environmental pollution, the occurrence of natural assets, and economic and industrial development.

## **Area of the study**

The study was conducted in four provinces: Malopolska, Silesian, Mazovian, and Warmian-Mazurian. The provinces were selected because of their differing environmental situations. A hypothesis was made that the province itself, its' natural assets and the state of its environment have a significant effect on the environmental knowledge and attitudes to the environment of the people who live in it.

The Warmia and Mazury areas are the least polluted in terms of gas and dust emissions. More than half of their areas are under special protection. A low proportion of the land is covered by housing estates or transportation routes.

They are also characterised by large areas of uncultivated land and a high unemployment rate. The Malopolska province, with its moderate proportion of land used for transport purposes, has more than a half of its area covered by places with particular natural assets.

Also, the province's area, which is moderately polluted with airborne dust and gases, has a waste generation level lower than that of Silesia, but higher than in other provinces.

The area of Mazowsze, characterised by low air pollution, has similarly a moderate proportion of areas protected by law and the lowest proportion of uncultivated land. Silesia, with its high proportion of devastated and degraded land, mining areas and land used by transportation routes and housing, has the lowest proportion of areas with natural assets among the four provinces under study. It also has the highest pollution from gas and dust emissions. Silesia generates the highest amounts of waste per square kilometre (GUS, 2002; WIOŚ Kraków, 2002; WIOŚ Katowice, 2002).

### **Sample description**

The sample groups were selected by the Chief Statistical Office using the stratified random sampling method. Of the selected 30 kindergartens, 46 primary schools, 20 lower secondary schools and 22 upper secondary schools (altogether 118 units), the tests covered 947 teachers, 1937 pupils, 674 pre-school children and 686 of the children's parents. The pre-school children tested were aged 5-6, the primary school children were aged between 10 and 11 years, while tests in lower secondary schools covered the second-graders (aged 14-15) and in the higher secondary school, covered third-graders (aged 18-19).

### **Methodology of the study**

In the study, questionnaires were used that were individually tailored to the selected groups of respondents: for pre-school children (sets of pictures), for primary school children, lower secondary school children, higher secondary school children, for teachers and the children's parents (set of closed and open questions). The scenario of the interview for the pre-school children was prepared on the basis of the American CATES-PV (The Children's Attitudes Toward the Environment Scale – Preschool Version) Program. The questions were suited to the pre-school child's perception abilities and were oriented at testing the level of children's involvement in environmental issues on the basis of their behaviour in daily situations. School children answered their questionnaires in an auditorium. Pre-school children

were studied in groups of five, supervised by the person conducting the questionnaire, who explained each question and the method of answering it.

In the case of teachers and parents, questionnaires were sent by post. To find out the respondents' attitude to the statements presented to them, a position scale and the Lickert scale were exploited. Analysis, presented in this paper, made it possible to determine the respondents' attitude to the environment through the actions they declared they carried out for the benefit of the environment (Mika, 1972; Obuchowski, 1966).

### **Results: pupils' and teacher's knowledge regarding nature and the environment**

The level of environmental knowledge of the pupils studied depends on the type of school, place of residence (province, size of the locality), and their sex. In all provinces pupils of gymnasiums and lyceums displayed the highest level of knowledge. In Mazovian and Warmian-Mazurian provinces they come from localities with less than 1000 residents or greater than 10.000 residents. In the case of Silesian province, all the boys attained a high degree of knowledge, whereas in the case of girls, a high degree of knowledge attained only those from localities with less than 10.000 residents. Among primary school children, those from Malopolska province displayed a high level of knowledge, except for young people from localities with under 1000 residents and whose fathers have at least secondary school education. In Mazovian and Warmian-Mazurian provinces, children with the highest knowledge came from families in which fathers have a university-level education. Primary school pupils from Silesian province have only a moderate or low level of knowledge about nature. A moderate level was displayed by those whose mothers have at least secondary education. There could be a margin of error regarding results pertaining to primary schools, resulting from children's difficulty in identifying their parents' education levels or professions.

A tendency was noted, that the average environmental knowledge increased with the size of the locality, current stage of education, and the child parents' education. The highest proportion of pupils who got the best scores regarding this knowledge came from Malopolska and Mazovian provinces. Also, in Malopolska and Mazovian provinces the level of knowledge was found to be dependent on whether the child's parents were employed: children's knowledge was the lowest when both parents were unemployed. A similar relationship was found in the Warmian-Mazurian province, with the highest scores obtained by children who had at least one employed parent. Only in the Silesian province was no such relationship observed.

The higher the pupils' level of knowledge, about both nature and the environment, the more often were the sources of that knowledge identified as school, magazines and the Internet, and less often family or friends. As the effect of parents' education on pupils' knowledge was found only in primary schools, and the highest level of knowledge about both nature and

the environment was found in pupils of higher education levels, one could conclude that the role of school in environmental education is very important. The second most frequent source of environmental knowledge indicated by this group of respondents was subject journals. Yet, the source most frequently indicated by both teachers and pupils is television.

Among teachers in the four provinces studied, the highest index of knowledge, which means knowledge of environmental threats in Poland, the local pro-environmental economy (on the basis of their knowledge of the existence and types of wastewater treatment plants in the locality in which they work) and about species protected in Poland was displayed by those of Silesian province (25%), and the lowest by those of Warmian-Mazurian province (12%).

Among the localities with the schools tested that have wastewater treatment plants, the highest proportion of teachers who are aware of the type of treatment plant (mechanical, mechanical/biological or mechanical/biological/chemical) was in Silesian and Mazovian provinces (28% and 26%, respectively), whereas the lowest was in Malopolska province (only 9%).

This gives ground to the opinion, that teachers' knowledge depends more on the level of their province's degradation, rather than on environmental assets in the province. Environmental knowledge is highest in people older than 39, and among nominated teachers (most represented) rather than among apprentices. Neither the education level nor sex bore any influence on the results.

### **Attitudes of pupils, teachers, pre-school children and their parents to the natural environment**

The attitudes of most pre-school children, as determined from the questionnaire composed of drawings, were characterised as friendly to the environment. Some 90-95% of children declared their respect for animals, care for cleanliness in their surroundings and for saving water, and 80-85% declared that they re-use products, feed birds or other animals in winter and save energy. Some 50-60% indicated saving paper while only 30% indicated waste segregation.

The majority of children with the highest pro-environmental attitude came from localities in Silesia (67.3%) and Malopolska (63.4%), which had over 1000 residents, who attended municipal kindergartens in single-family housing areas. Also, children who declared a pro-environmental attitude in 4-5 types of the situations specified above were given a very high "eco-child" mark. In most cases such children attended rural kindergartens. By contrast, most of the children who less often declared pro-environmental attitudes (good or satisfactory attitudes) attended kindergartens in towns.

An anti-environmental attitude was ascribed to the group of conscious opponents to environmental protection or to persons who are aware of environmental protection issues, but at the same time declare they will

undertake to solve these problems only in the future. Persons of neutral attitude were defined as those who occasionally or seldom show support for environmental protection issues through their behaviour. Those parents who often or very often save electricity and water, who are interested in environmental protection, declare familiarising their children with topics related to nature, re-use various products and obey regulations in natural preserves, were classified as those with a pro-environmental attitude. Mothers much more frequently than fathers show such an attitude. The higher the parent's education level, the more frequent the declarations of a favourable attitude toward the environment without regard to the province in which they live, age, or financial status.

In the group comprised of pupils and teachers, their statements concerning their daily activities that are not neutral to the environment were analysed with respect to their main components. This helped identify most correlated types of behaviour and define pupils' and teachers' attitudes to the environment. Barlett's sphericity test result of 0.85 confirmed in both cases that the results could be treated as the effect of common factors.

In the group of pupils, the following attitudes were identified:

- Segregation, consisting of correlated statements: I segregate and throw away into separate containers plastic waste (e.g., plastic beverage bottles), glass waste (e.g., glass beverage bottles), metal waste (e.g., beverage cans), scrap paper (e.g., newspapers)
- Friendly attitude to nature, which is composed of the following statements: I watch films about nature, feed birds and other animals in winter, spend time in the open air (in the forest, park)
- Raw material conservation, which is composed of the following statements: I turn off the tap when brushing my teeth, turn off the light when leaving the room, avoid washing up in running water
- Re-use of products, composed of the following declarations: when taking notes, I write on both sides of the sheet, re-use products (e.g., jars, shopping bags, old newspapers).

In the group comprised of teachers, the following attitudes were identified.

- Waste segregation: plastic, glass, metal, hazardous waste, scrap paper and textile
- Environmentally friendly consumer choices associated with purchasing washing powders not harmful to the environment, paying attention to packaging recyclability, using canvas bags or baskets when shopping
- Raw material conservation, represented by turning off water when brushing the teeth, and avoiding washing up in running water
- Care for the environment, represented by waste segregation and composting of organic waste, avoiding pouring into the sink hazardous substances such as paints, drugs, solvents, re-use of metal products, such as those associated with gardening



- Participation in pro-environmental campaigns is correlated in pupils with behaviour representing a friendly attitude towards the environment, whereas in teachers, with pro-environmental consumer choices.

Segregation is least practised by pupils from Warmian-Mazurian province and by teachers from Mazovian province. Pro-environmental consumer choices are most frequent in Malopolska province and least frequent in Silesian and Warmian-Mazurian provinces. In Silesia, although the least number of persons are involved in saving resources, the highest number of teachers are involved in taking care of the surrounding environment and the highest number of children displayed a friendly attitude to nature.

In Malopolska and Silesian provinces, the number of children who segregate refuse in the group comprised of children with unemployed parents is markedly higher than the average. It could be that the reason for segregation is to earn money by delivering returnables to collection centres. In Silesian and Mazovian provinces a similar situation occurs with the re-use of products and in Warmian-Mazurian province, with saving resources. But the number of children with a friendly attitude to nature is greater in the group with at least one employed parent.

For the group comprised of teachers, another index was created, characterising self-perceived responsibility to protect the environment. This index takes into account the following.

- Perceiving a considerable relationship between one's actions and improvement in the condition of the environment
- Obtaining information about current environmental protection problems from courses, workshops, seminars, specialised literature or relevant magazines
- Acknowledging that every teacher with an environmental protection curriculum must permanently undergo training
- Undertaking these issues through environmental education
- Acknowledging school as one of three organisations with the greatest influence on shaping children's and young people's attitude towards the environment. The highest number of teachers with such an attitude comes from Warmian-Mazurian (35%) and Silesian (32%) provinces, almost twice as much as from Malopolska province (17%).

### **Influence of teachers' attitudes and knowledge on pupils' attitudes and knowledge**

After combining information from the teacher and pupil databases by means of a key – their school – the analysis involved checking whether teachers' knowledge and attitudes influence those of their pupils. By em-

playing concentration analysis with the K-mean method, small relationships were found between the following attitudes.

- Waste segregation practised by teachers and segregation and product re-use by pupils
- Teachers' care for the surrounding environment and their pupils' friendly attitude to nature
- Saving resources by teachers and saving resources and re-using products by pupils.

However, these relationships could result from the large size of the sample. Pupils from schools where teachers segregate waste have the highest level of environmental knowledge. Children with a high level of knowledge about nature are taught in schools where teachers segregate waste or take care of the surrounding environment. The least influence on pupils seems to be in the case of teachers who make pro-environmental choices or participate in environmental campaigns.

Analysis of the percentage distribution of knowledge in individual provinces reveals, however, different results in all provinces except for Silesian province.

In Malopolska province the distributions indicate that in schools where most teachers are in favour of caring for the environment, the number of pupils with good or very good knowledge regarding the environment is the lowest. An opposite dependence has been observed in Mazovian province where the greatest influence on raising environmental awareness have teachers representing the attitude mentioned above. In the Warmian-Mazurian province, however, the teachers' attitude of saving resources seems to have the smallest effect on their pupils' knowledge.

No influence was found of teachers' knowledge on their pupils' knowledge, except in Silesian province, where there are indications of a positive relationship.

It is only in Malopolska province that the attitude of teachers' responsibility results in pupils' higher knowledge regarding the environment and nature along with their positive attitude to conservation of resources. In Silesian province, teachers' attitude of responsibility results in more frequent occurrence of friendly attitude to nature among pupils, and in Mazovian province, this attitude is also related with pupils' attitude to the re-use of products. In Warmian-Mazurian province, although the highest percentage of teachers declares an attitude of responsibility, it has no effect on either the pupils' knowledge or attitudes.

### **Dependence of pupils' attitudes on their knowledge**

To investigate the effect of pupils' environmental knowledge on their attitudes, the average degrees of knowledge were compared in groups selected by factorial analysis. The use of single-component variance analysis made it possible to evaluate the probability of the fact that the differ-

ences between the average results in compared groups are not accidental. In groups selected through factorial analysis, the lowest level of knowledge regarding both the environment and nature was represented by pupils who conserve water and energy. This might imply, that a given attitude is not necessarily environmentally motivated. In other groups, the level of knowledge is comparable.

The higher the knowledge regarding nature, the less negative the attitude to observing regulations in national parks and natural preserves (I do not observe regulations and do not intend to do so in the future) and the higher the number of pupils declaring to observe the regulations.

### **Conclusion: Pre-school children and their parents**

- Almost all pre-school children declare respect for animals, care for cleanliness in their surroundings and saving water. Most children with a pro-environmental attitude come from Silesian and Malopolska provinces, from locations with over one thousand residents
- The higher the education level of pre-school children's parents, the more favourable the children's attitude to the environment.

### **Pupils and teachers**

- Knowledge in both gymnasium and lyceum pupils is high.
- The higher the education level of primary school children's parents, the greater the children's knowledge
- Pupils and teachers with high levels of knowledge more often than other groups attribute this knowledge to specialised journals
- Although the majority of teachers in Silesian province have a high level of environmental knowledge, most primary school pupils in this province have only a moderate or low level of knowledge about the environment. There are premises, however, allowing for the statement, that it is in this province where there is a relationship between teachers' and pupils' knowledge. This allows one to conclude that increased interest in, and even the sense of responsibility for the environment increases with the respondent's age and the average education in the region where the consequences of irrational economy are still clear. The more so that the highest percentage of teachers responsible for the environment can be found in this province. This results in pupils' friendly attitude to nature more frequently than elsewhere
- It is only in Malopolska province that the teachers' attitude of responsibility results in pupils' greater knowledge about the environment and nature and in their attitude to saving resources

- A pro-environmental attitude and a high index of knowledge is characteristic of children who have either one or both parents employed, except children from Silesian province
- Knowledge regarding nature is reflected only by the observation of regulations in national parks and natural preserves. The greater the pupils' knowledge, the more favourable their attitude to observing regulations.

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**EFFECTIVENESS OF AN INTERGENERATIONAL  
APPROACH FOR ENHANCING KNOWLEDGE  
AND IMPROVING ATTITUDES TOWARD  
THE ENVIRONMENT: STUDY IN THE US AND TAIWAN**

**Shih-Tsen Liu**

*Assistant Professor*

*Graduate Institute of Environmental Education  
National Taichung University, Taiwan*

**Matthew S. Kaplan**

*Associate Professor*

*Department of Agricultural and Extension Education  
The Pennsylvania State University, U.S.A.*

**Huei-Hsu Wu**

*Research Assistant*

*Graduate Institute of Environmental Education  
National Taichung University, Taiwan*

**Abstract**

A series of experimental design research was conducted in western and eastern countries in order to assess the effectiveness of intergenerational programs. Intergenerational programming, which brings children, youth, and older adults together for mutually beneficial interaction, represents a relatively new strategy for broadening the public's awareness and participation in environmental activities.

To explore the potential benefits of involving older adults and young people in joint environmental education experiences, a five-day long program was completed in an environmental education centre in Central Pennsylvania, USA. Senior volunteers in this study were utilized as teaching assistants. Another weekend long program was conducted in a nature research centre in central Taiwan. Senior adults volunteered to design the activities and to teach the lessons.

This paper presents the results of the study in USA. Senior adults were found to influence children to adopt an enriched sense of awareness and appreciation of the natural environment. Senior-student relations were influenced by staff facilitation styles, the roles taken by the seniors, and the intergenerational engagement format.

## **Introduction**

One of the most significant demographic changes of our time is the rapidly expanding number of older adults in the world population. In 2000, there was an estimated 605 million people aged 60 years or older. This number is projected to grow to almost 2 billion by 2050, when the population of older persons will be larger than the population of children (0-14 years) for the first time in human history (United Nations Department of Public Information, March 2002).

In the US, there is an active debate about whether this trend should be viewed in positive terms, e.g., as “an opportunity to be seized” (Freedman, 1999), or in negative terms, e.g., as a “demographic time bomb” (Peterson, 1999). A crucial factor in determining the impact of this demographic shift is the extent to which older adults are called upon, and enabled, to make contributions to family, community, and society (Henkin & Kingson, 1998/99).

Just what the growth in the older adult segment of the population means for the field of environmental education (EE) is not clear. For the most part, environmental educators have paid limited attention to this trend, nevertheless ways to involve older adults in the EE enterprise. Current patterns of funding, research, and program design tend to target young people as the primary audience. Accordingly, it is rare to hear about environmental centres and other settings, which educate people about the environment focusing on outreach to older adults. This represents a missed opportunity for strengthening environmental program community relationships (Ingman, Benjamin & Lusky, 1998/99) and establishing opportunities for older adults to learn about the natural environment as well as contribute to young people’s environmental learning (Benson, 2000; Kaplan & Liu, in press).

On a positive note, there are EE initiatives that incorporate practices that have implications for reaching out to older adults. One such practice involves assigning homework, which requires students to conduct environmental discussions with their parents and grandparents. Researchers have found that children can transfer their learning from schools to the adults at home (Ballantyne, Fien & Packer, 2001; Vaughan, Gack, Solorazano & Ray, 2003). However, the adults in these research designs were passive learners who were not designed to provide knowledge to their children and the researchers had little control over the learning process in home environments.

An alternative way of thinking about involving older adults in EE can be found in the realm of “intergenerational programming.” According to the International Consortium of Intergenerational Programs, intergenerational programs are “social vehicles that create purposeful and ongoing exchange of resources and learning among older and younger generations” (Kaplan, Henkin & Kusano, 2002). In this framework, an intentional effort is made to mobilize the talents, skills, energy and resources of older adults in service to children and youth. Accordingly, in intergenerational EE programs, older adults are enlisted as active education providers in environmental programs

with students. Emphasis is also placed on promoting shared learning experiences and intergenerational engagement between the generations in order to enhance that learning.

Older adults are increasingly joining volunteer initiatives of all kinds. According to a national estimate, older adults in the U.S. contribute about 3.6 billion hours of voluntary service to organizations every year (Marriott, 1991). With their flexible schedules and active interest in civic engagement, senior adults represent a valuable human resource for education (AARP, 1992; Kaplan, 2002) that could be used in EE. Besides giving their time, senior adults can serve as co-teachers to add enrichment and authenticity in EE curriculum. For instance, senior volunteers have advantages over other volunteers, and many teachers, when it comes to teaching history. Simply by recalling their own memories of times gone by, or by bringing photographs, old tools and so forth, older adults make natural history come alive for young people (AARP, 1992).

Researchers have also indicated a connection between environmental problems and today youth's materialistic lifestyles (Gigliotti, 1992; Russell, 1987). Utilizing senior volunteers in an environmental lesson that compares past life situations with current ones could be an effective way to stimulate critical reflection about the environmental consequences associated with lifestyle decisions.

Even without direct teaching roles, senior volunteers can contribute to the educational process by being role models to children (AARP, 1992; Henkin, Perez-Randal & Rogers, 1993; Ingman, Benjamin & Lusky, 1998/99). As Ballantyne (1995) has stated, senior adults have the motivation for undertaking action for the environment and the desire to protect it for the sake of future generations. Thus, who would be a better role model than those seniors who show their motivation and desire by contributing their time on a voluntary basis to an EE program? It is contended that the process of intergenerational programming whereby senior adults act as role models could be a powerful means to influence young participants' attitudes toward the environment.

Though there are some groups and organizations – whether local (e.g., Center in the Park in Philadelphia and Wildfriends in New Mexico), national (e.g., Environmental Alliance for Senior Involvement and Senior Environmental Employment) or international (e.g., New Senior Environmental Corps) – that aim to reach and involve older adults in environment-related initiatives, opportunities for seniors to engage in EE with children are still limited. The under-utilization of older adults in EE represents a missed opportunity for passing historical knowledge and promoting positive environmental attitudes on the part of young people. Also, despite the compelling rationale for integrating senior volunteers into EE endeavours, there is an absence of formal research conducted to provide empirical data as to the effects of intergenerational EE programs.

In cases where intergenerational EE initiatives are evaluated, the research design tends to not include comparison groups, hence questions re-



main as to which program impacts are due to intergenerational component (Kaplan & Liu, in press).

To further explore the concept and potential benefits associated with efforts to involve older adults and young people in joint EE experiences, a study was conducted of an intergenerational outdoor education program in an environmental centre in central Pennsylvania. An experimental research design was used to determine the effectiveness of this intervention for influencing student participants' environmental learning. The research results have implications for environmental educators who are seeking to increase their program impacts by integrating an intergenerational component.

### **Methodologies. Objectives**

The specific research objectives were:

- To evaluate the change in students' environmental attitudes occurring as a function of participating in an intergenerational monogenerational EE program
- To evaluate the change in students' environmental knowledge occurring as a function of participating in an intergenerational monogenerational EE program.

### **Program development**

The traditional Outdoor School program offered by Shaver's Creek Environmental Centre (SCEC) in Pennsylvania was chosen for this study. The basic model followed throughout the program's 50 year history entailed having schoolteachers from nearby school districts bring their fifth and sixth grade classes to participate in this residential, outdoor-based program. The program, which takes students four days to complete, offers six major lessons, including nature-discovery walks, lessons of resources and cycles, "living things," a natural history trip, and a civic development meeting.

The lessons are instructed by the Centre staff. In addition to the instructors, youth counsellors, who are usually college students, are also on hand to supervise activities and take care of children at night.

For the purpose of this study, the Outdoor School program was modified to include senior volunteers as complements to existing instructors and counsellors. The senior-student ratio was about 1:8. Senior volunteers were encouraged to participate fully in the program. Only those who attended at least one training session and two lessons over a two-week period were included as research subjects.

In addition to the senior volunteer training, the program instructors were also prepared to ask predetermined questions and to facilitate discussion among the young and older participants. Since the young and old participants can have a greater influence on each other with higher levels of

intergenerational interaction, the strategy used to promote interactions in this program was to train instructors to ask a question in each lesson. These questions called “discussion stimulators,” were tailor made for older adults insofar as they centre on natural and community history issues and historical lifestyle issues, thereby providing the seniors with opportunities to share their relevant experiences and literal stories in the discussion.

## **Research design**

A “non-equivalent control group” quasi-experimental design was used to compare two experimental (intergenerational) groups with two control (monogenerational) groups in the Outdoor School in fall, 2002.

Classes from the participating four elementary schools were previously scheduled for different weeks. The intergenerational treatment was assigned to the second and fourth weeks.

The experimental groups received the same kind of curriculum as the control groups, but the experimental groups added senior volunteers and the “discussion stimulator” approach noted above.

There were seven SCEC staff members, 17 senior volunteers, and 149 students from four schools involved in this study. One week prior to the program week, students in both the experimental and control groups were administered a pre-test.

A focus-group interview with SCEC staff members and personal interviews with senior subjects were also administered within one month prior to the program week. Within a two-week period after the program weeks, a similar post-test questionnaire was given to all students.

Similar post interviews with seniors and a post focus group with staffs were conducted within one month after the completion of the entire program.

Additionally, students in the intergenerational groups filled out a “worksheet” at the end of each lesson. Field observations were also conducted during the intergenerational weeks.

The research design and basic information about the participating students and seniors are listed in Table 1.

Notes:  $X_{inter}$  – Intergenerational treatment

$X_{mono}$  – Traditional monogenerational method

$O_{pre}$  – Pretest

$O_{post}$  – Post-test

\*Some senior volunteers participated in both intergenerational weeks.

Week	Research design	Grade level	Number of student subjects	Number of senior volunteers
1	O <sub>pre</sub> X <sub>mono</sub> O <sub>post</sub>	5 <sup>th</sup> /6 <sup>th</sup>	16	0
2	O <sub>pre</sub> X <sub>inter</sub> O <sub>post</sub>	6 <sup>th</sup>	46	12
3	O <sub>pre</sub> X <sub>mono</sub> O <sub>post</sub>	5 <sup>th</sup>	39	0
4	O <sub>pre</sub> X <sub>inter</sub> O <sub>post</sub>	5 <sup>th</sup>	48	14
Total			149	17*

Table 1. Research design, basic information about the participating students and senior volunteers, and time sequence Instrumentation

This study used a triangulation research approach that utilized five types of quantitative and qualitative data sources. First, the first part in the student questionnaires was designed to obtain students' environmental attitudes before and after the program. The 18 items in the first part, which measured students' attitudes, verbal commitment, and actual commitment, were modified from the "attitude questions" of the Children's Environmental Attitudes and Knowledge Scale designed by Leeming, Dwyer, and Bracken (1993). These attitudinal items were sampled from six content-dependent sub domains: 3R (reduce, reuse, and recycle), water, energy, pollution, animals and habitat, and general issues. The second part was designed to assess student's environmental knowledge level. Most questions were derived from the Outdoor School curricula, except three questions that were developed especially for assessing students' familiarity with people's lifestyles in the past. Few questions were designed only for the post-test to the students in the intergenerational groups.

Second, two open-ended questions were listed in the student worksheets at the end of each of the six lessons to further address the study's objectives. The students were asked to answer if the senior volunteer(s) "teach them anything" or "encourage them to feel or think differently" about the natural environment. Third, during the senior interviews, the senior volunteers were asked to rate and discuss what they viewed as their contribution to the participating students' environmental knowledge and attitudes. Fourth, during the focus group interviews, the environmental centre staff members were also asked to describe the senior adults' influence on children's environmental knowledge and attitudes.

Two questions that address the two present objectives were also asked during the focus group interviews. Fifth, in regard to the field observation, any statement or behaviour which indicated student interest or learning about the environment were recorded (e.g., statements indicating con-

cern about pollution, gestures toward elements in the natural environment such as a cluster of trees, and affirmative head nodding indicating acknowledgement of an environmental fact).

## **Data collection and analysis**

The researcher went to each of the participating elementary schools and administered the questionnaires directly in the classroom, within two weeks prior to and after the program. Each student was assigned an identification number to ensure that their identities would remain anonymous to others. All senior interviews and focus-group interviews were also completed within a one-month period before and after the IOS program. The interview sessions were audiotape recorded and transcribed later during the data analysis process.

The researcher (and research assistants) also recorded observation notes from the two intergenerational weeks. Generally, the researcher followed each group for about 30 minutes per lesson. Beyond the lessons, the researcher observed program participants' interactions and behaviours during free time, mealtime and whenever else senior volunteer(s) and students were present in the same place.

All quantitative data were analysed by using the SPSS 11.0 software program. Basically, descriptive statistics such as means and standard deviations as well as inferential statistics such as t-test and analysis of covariance (ANCOVA) were used to analyse the data.

Notes from the field observation and responses to open-ended questions from all questionnaires and interviews were analysed qualitatively. Data from interviews, which had been audio taped, were transcribed. Short responses to open-ended questions were categorized by the researcher and revised at least three times.

The final categories were reviewed by another expert with background in youth-adult programming. The percentages of agreement about the categories between the researcher and this expert were calculated as inter-coder reliabilities.

The long qualitative data such as the observation notes and transcribed interview text were analysed with the aid of the NVivo 2.0.

## **Results and Discussions**

The two research objectives were addressed by analysing data from the student questionnaires, student worksheets, senior interviews, focus-group interviews and field observations.

## Change in students' attitudes toward the Environment

The results of the Analysis of Covariance (ANCOVA) revealed a statistically significant difference in the scores among the four groups ( $F(3,129) = 11.546, P = .000$ ).<sup>3</sup>

Table 2 indicates that both intergenerational groups had a greater improvement in their environmental attitudes than the second control group. They also had higher scores than the first control group, although the difference in scores was not statistically significant.

Experimental groups	Control groups	Adj. mean difference
Experimental 1 (N=42, Adj. mean=14.39)	Control 1 (N=14, Adj. mean=13.25)	1.13
	Control 2 (N=34, Adj. mean=12.17)	2.22*
Experimental 2 (N=44, Adj. mean=14.40)	Control 1 (N=14, Adj. mean=13.25)	1.15
	Control 2 (N=34, Adj. mean=12.17)	2.23*
Notes: The range of possible scores was 0-18. A higher total score indicates better attitudes held by the student. Based on adjusted mean. Adjustment for multiple comparisons: Bonferroni. * $P \leq .05$ .		

Table 2. Pair wise comparisons of students' environmental attitude scores among groups

The results showed that 60% of the experimental group students ( $n=94$ ) checked "yes" to question 19 in the questionnaires. In other words, the majority of the students state that the senior volunteers did indeed influence their environmental attitudes. According to their responses to the open-ended part of this question, the most common responses centred on how the senior volunteers encouraged them to "be more caring about," and "feel more appreciative of" the natural environment. In regard to the students' worksheet, almost 70% of their responses confirmed the senior adults' contribution in improving their environmental attitudes.

From the senior interview responses, the seniors rated their own impact on participating students' environmental attitudes as somewhat positive (mean = 3.82,  $n = 17$ , min = 2, max = 5, S.D. = 0.809). Some responses in-

3. A higher total score of the first 18 items in the student questionnaires indicates better environmental attitudes held by a student.

icated that the seniors effectively drew upon their “past life experience” to reinforce what students were learning. For example, one senior stated:

I remember the discussion about how I was instrumental in my community in New Jersey when an airport was planning to expand. I shared that with the children about how I got a petition started so they were really excited that people could do this kind of thing and it actually persuaded the company from bringing the airplanes into that particular commuter service.

Another senior also cited how she promoted environmental citizenship:

I said I know you won't go out with petitions, but you can ask your parents and some other adults if they could do something with something that concerns you...

Some seniors also drew upon aspects of the children's life experiences to share their (seniors') views about nature. For example, one senior stated, “I talked to this one girl about the white fawns in her yard, and you don't want to shoot them cause they are very rare... (This helped) reinforce the fact that we need to protect something like that”.

Only one senior gave a negative reason as to not improving the participating students' environmental attitudes; he alluded to the need for more intensive interaction to influence the children. His response suggests that the lack of opportunity for interaction (perceived or actual) can delimit a senior volunteer's potential to influence student attitudes.

According to the focus group interviews, after the program, the SCEC staff members were more likely to note various assets that senior adults have which contribute to their ability to enrich the teaching content and to promote environmental citizenship.

### **Change in students' knowledge about the Environment**

The results showed that all groups gained knowledge after participating in the program, and both of the intergenerational groups had higher scores than the control groups, although the results of ANCOVA did not indicate a statistically significant difference in the scores among the four groups ( $F(3,137) = 2.336$ ,  $P = .077$ ). Nevertheless, some data indicated that the seniors did indeed have an impact on student's environmental knowledge. For example, in the children's answers to question 37 in the questionnaire, 84% of the students ( $n=94$ ) stated that the senior volunteers did enhance their knowledge about nature. In addition to several general comments (22 responses), the students indicated in this question that they

learned mostly about plants (34 responses), animals (28 responses), energy conservation and recycling (9 responses), and natural history (4 responses) from the senior adults.

The students' responses to the worksheet were also consistent with their answers to question 37. More than 80% of their responses indicated that they had indeed obtained knowledge from the senior volunteers. For instance, the students noted learning about hemlock from the nature-discovery walks, woodpeckers from the lesson of resources, how to make dolls from burs and so on from the senior adults in their learning groups.

During the interviews, the senior volunteers rated their contribution to the participating students' environmental knowledge as "somewhat" good (mean = 3.59,  $n = 17$ , min = 2, max = 5, S.D. = 0.939). They indicated that they had taught the students about animals, plants, composting and natural history; this was consistent with the students' responses. Additionally, some seniors tried to encourage the children to think and ask questions during lessons. However, there were a few seniors who were not satisfied with their contribution to the program. They commented that they need a different platform, such as a one-to-one situation with a child in order to get more involved.

Most responses in the focus group interviews disclosed the staff members' recognition of older adults' contribution to children's knowledge about the environment. The most frequently cited contribution was that seniors could offer historical facts, such as in relation to past lifestyles, past mistakes and landscape changes. After working with senior volunteers at the Outdoor School, most staff members were also more likely to express the point of view that the seniors provide broader and different views than they alone could offer students. This is a significant finding in that it attests to increased recognition, on the part of EE staff, of the distinctive contributions that senior adults can make to the educational process.

According to the field observation notes, the seniors taught the children about animals, plants, and historical events; this is consistent with all the other qualitative data.

## **Conclusions and Recommendations**

This study has suggested the effectiveness of an intergenerational approach for enhancing children's knowledge and improving attitudes toward the environment. The qualitative data from various data sources consistently indicated that the children who participated in the intergenerational outdoor education program were more appreciative of natural resources, expressed more determination to care for the environment, and gained more information such as plants, animals, and historical events than their counterparts who did not have access to senior volunteers.

The quantitative data also showed that the students who had the intergenerational treatment displayed greater improvement in their environmental attitude and knowledge scores than the students in the control groups. Although some differences were not statistically significant, this

could be explained by factors unrelated to the intervention program, such as the small number of subjects in one control group, and limitations of the questionnaire tool for detecting what the students actually learned from the senior adults. More specifically, many students in the intergenerational groups noted learning about changes in landscapes and lifestyles from the older adults, the student questionnaire in this study did not include enough items to assess students' knowledge in this area. This suggests that in future research, in constructing research tools to assess program impact, more focus should be placed on including items tied to subject matter related to natural history and past lifestyles.

When seniors provided negative responses regarding their potential to contribute to children's EE experiences, they were generally referring to factors related to the program structure. The recommendation forwarded here is to provide participants with choices of different formats for intergenerational engagement, including, for example, one-to-one as well as small and large group interaction. A more leisurely walking pace in a nature walk lesson is also suggested to provide young and older participants with more opportunities to interact with each other and to observe the natural surroundings. Another recommendation is to ensure that intergenerational EE programs incorporate activities, which promote an extensive amount of dialogue and sharing between participants. Using short questions, such as the "discussion stimulators" approach in this study, and assigning projects that require participants to work cooperatively to solve a local environmental problem, were found to be promising strategies for stimulating intergenerational exchanges.

The instructors' facilitating style was not a research factor in this study; however, the senior adults' actions, including their efforts to engage students, were found to change when paired with different instructors. Additionally, the senior volunteers in this study were observed to play a variety of roles, including those of observer, co-teacher, role model, and friend to the student participants. These different roles seemed to evoke different reactions from the students. It is therefore recommended that in future research, an effort be made to study how program effects varies as a function of (1) instructors' facilitation styles, and (2) the roles played by senior volunteers. Finally, considering the trend in current EE research of using students to educate adults at home, an additional idea for future research is to compare the knowledge gained by adults who volunteer in an intergenerational EE program with the knowledge gained by adults who work on environmental homework with their children at home.

Environmental educators are challenged to find ways to broaden and diversify the pool of people, who care about the environment, feel a sense of responsibility to improve it, and have the skills to take effective action. In this context, intergenerational programming could be seen as an effective strategy for broadening the public's awareness and participation in environmental activities. Also, as demonstrated in the research described in this article, infusion of an intergenerational component into a monogenerational



EE program is an effective way to promote senior involvement and enhance student learning in relation to the natural environment.

Hopefully, as intergenerational approaches to EE gain more attention, more environmental educators and intergenerational practitioners will be encouraged to try proven models and experiment with new ones. And, with this kind of work gaining traction in communities across the country (and beyond), we envision great strides in creating an environmentally informed, active, engaged, and united citizenry.

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# **ECOPOLITICS, FAMILIES AND INTERGENERATIONAL INFLUENCES: THE HOUSEHOLD AS A SITE OF ENVIRONMENTAL EDUCATION**

**Phillip Payne**

*Deputy Head of School (Research) in Education at La Trobe University, Bendigo. Member of the international editorial boards of Environmental Education Research and the Journal of Environmental Education.  
p.payne@latrobe.edu.au*

## **Introduction**

Findings from one component of a much larger, ongoing study of “environmental action and inaction” are reported below. The study of families and households combines the work of two Large grants. The first investigated the intergenerational environmental ethics/politics (or lack of) in 30 “non green” families in Bendigo, a regional city with a population of 100,000 in the State of Victoria in South Eastern Australia; the second investigated the environmental ethics/politics of 7 inner city Melbourne, a large city of 4 million people in Victoria and 6 Bendigo families who voted for, or are committed to the Greens.

This paper presents various findings from the Melbourne inner city study where at least one parent is a member of the Greens, or votes Green, and at least one child is between 8-16.

This qualitative/interpretive research seeks to describe how the family household acts as a site of environmental education.

The research problem relates to numerous unresolved questions about how parents and their children, individually and collectively, “socially construct” their environmental commitments and “behaviours”. This “situated/circumstantial” locus of everyday household actions, interactions, relations and associations must be seen in the broader context of the so-called “ecological crisis”, a popularised notion whose focus “out there” tends to exonerate the individual, social and political agency required “in here” if that “crisis” is to be understood and even remedied. It should come as no surprise that children and youth (and adults) express high “concern” about the environment and its prospects yet consistently feel “disempowered” and disengaged.

I aim, therefore, to shed some light on how environmental ethics and ecopolitics are enacted “everyday” in the home, “passed down” by parents, and negotiated and practiced with their children. Hence, intergenerational ecopolitics.

This study of the household praxis and the functioning of the family is different from much research in environmental education and education

for sustainable development. It is far less concerned with the customary “head/mind” stuff of (measurable) environmental beliefs, knowledge, attitudes and values of family members – although these rational “concerns” (a very common expression in env ed) do impregnate the habitual, routinized and pre-discursive “conventions” (rules/resources) of family functioning, (in)action, interaction and relations indicated above.

## **Why?**

Allegations that environmental education hasn’t lived up to its expectations and that the field might have “failed” in promoting environmental “literacy” and/or “pro” environmental behaviours (irrespective of the chronic dilution of environmental education in schools, in curriculum frameworks, in critical education discourses, in pre-service teacher education).

Such allegations rarely consider the powerful (everyday) influence of the family on the “baggage” those children bring to school. The influence of the family/household cannot be dismissed or underestimated when “evaluating/judging” the efficacy of the (contrived) school-based State intervention. This “lack of commonsense” in research and curriculum development also applies to other “human issues” type curriculum such as health ed, citizenship ed, drug ed. It is counter productive to not examine the relationship between the home and the curriculums/pedagogies we as educators contrive and discipline as ‘interventions’ in schools.

By listening to “green parents” and their children, about the everyday of the home, we might learn about versions of, arguably, “best practice”. If so, there might be valuable lessons for what schools and teachers could or should be doing in their environmental education efforts. Green parenting may, in fact, be an ideal model from which curriculum theory and pedagogical practices in environmental ed/ed for sustainability might proceed.

There has been very little research into how the home (de or re)constructs dominant “academic/theoretical” versions of environmental ethics and ecopolitics.

Then, there are worrying trends in Australian society. ABS data show declining household concern for the environment (to 62% in 2000 from 75% in 1992) plus the well known/documented view about youth “feeling powerless” to ‘make a difference’ despite high levels of concern. But, do those disempowered youth acknowledge or act upon the powerful opportunity they have at home and in their own lives to make a difference? Do parents/families enable or disable (environmental) practices? Hence, a study of inner city and regional families for comparative purposes and inclusion of 8-16 year olds.

## **The overall project research frame**

Two studies provided the framework for the research design summarized in Figure 1.

Thirty “ordinary” families in Bendigo were studied in 2002. Bendigo is a predominantly anglo-saxon, regional centre of 90.000 with a suburban like environment but easy access to the “bush”. The green vote in the 2004 election was 6.55% (+0.91% from the 2001 election). Held by Labor (marginal). Volunteer samples from two primary schools, year 6 students, at the extremes of the “Like School” index (socio-economic, geographical and language spoken at home) and two secondary schools, year 10 students, at the extremes of the same index.

Thirteen “green” families were studied in 2004. Seven lived in inner city Melbourne where the green vote at the recent federal election was 18.5% (+2.73%) and six in Bendigo. Self-selecting participants were members of the Greens party or vote/committed to Green with children between ages of 8-16.

STUDY 1		STUDY 2	
30 ‘Ordinary’ Bendigo Families		13 ‘Green’ Families	
15 from upper ‘Like School’	15 from lower ‘Like School’	7 Inner City Melbourne	6 Regional Bendigo
7/8 at year 6 level 7/8 at year 10	7/8 at year 6 level 7/8 at year 10	8-16 yrs old	8-16 yrs old
Parent = 1 -> 1.5 hour ‘conversational’ interview, 25 item household inventory, 134 item survey of environmental action/inaction ‘wisdoms’			
Child = 30 -> 45 minute conversational interview, 92 item survey of environmental action/inaction ‘wisdoms’			
“Grounded Theory” – inductive, interpretive, content analysis of “data” → emerging conceptual clusters → returned to “subjects” for verification and nego- tiation/elaboration → findings			

Researcher = Male, 50 year old, married, father of one eighteen year old daughter, mixed residence in inner city Melbourne and rural Mandurang (Bendigo), doctoral degree, academic, member of Greens with extensive “political” experience in a range of local environmental, social and educational issues.

Fig. 1.

## **General findings**

Intergenerational continuity across three generations of (pro) environmental practices is present in different versions of family ethics/politics according to changing social conditions, characterized by scarcity/financial need/circumstances (grandparents) → frugality/anti consumerism/low or counter materialism (parents) → “postmaterial” educated constraint (children).

The current cohort of parents’ environmental practices often mark a “return” to their own parents’ conserver “way of life” and “memories” of their values but is now a “retraditionalized” extension and form of social justice/equity commitments.

The majority of children intentionally rehearse or replicate their parents’ environmental practices and reconstitute a family ecopolitic/environmental ethic. All participants actively demonstrate conserver and/or pro-environmental practices to a high → moderate level.

## **Parents (current, 45-55 yrs old)**

Parents’ environmental ethics and ecopolitic is evolutionary with strong social justice and feminist influences, exposure to other cultures due to travel overseas during late secondary/university studies, often returning to community living arrangements and inner city orientation while incorporating environmental into social activism in domestic, local and national spheres.

Nature and nature experiences/endorsement are not prominent in parents’ formative development but home-based vegetable/fruit growing and family holidays (in outdoors) were viewed as important/memorable.

University studies and socio-political climate of late 60s/early 70s were highly influential and “enabling” or favorable; social and environmental activism prominent in 70s/80s and declining in 90s due to family obligations/priorities and work commitments.

Parents are anglo-saxon, highly educated and now work in a variety of professional human/social service settings with mothers more inclined to work part-time due to child raising commitments.

Parents agree to earn less income than what could be expected but maintain comfortable and conscientiously low consumption inner city lifestyles

Children/family “delayed”, often to mid/late 30s – “wiser” and more knowledgeable parenting philosophy and practices attributed to extended and varied life experiences.

## **Families**

Family functioning/parenting strategies are (strongly) socially “democratic” – participatory, communicative and responsive; are underpinned by “governing” principles that are strategically and “openly” practiced, sometimes “persuasively” or “manipulatively” and demonstrably modeled.

Family ecopolitic is increasingly “domestic”, more likely to occur indoor and is often food/diet related and critical of “consumer culture” practices but also reflected in ongoing/durable commitments to social-justice and community engagement.

Family ecopolitic and its values and practice bases are usually intensified/managed or sustained by mother.

All family members demonstrate high – moderate levels of “pro” environmental/conserver actions in five dimensions – water, energy, waste, travel and self. Travel/use of car is “weakest” ethic.

Green practices are “normalized” and habitualized, often through conscientious repetition, in household conventions and routines. Children often “remind” parents of conserver “rules” broken in household actions.

Many parents actively limit (younger) children’s access to electronic media (tv, computer, mobile, etc), restrict selection of content, and avoid/deflect consumer culture imperatives (fast food, fashion shopping, school tuck shop). Most families wish to “green” their older houses with solar equipment and other resources but are constrained by lack of finances.

Strong community/cooperative focus of families committed to inner city advantages of “green living” with nature often as “background” but occasionally sought for “endorsing” of values and/or “therapy” purposes → flow to children.

## **Children**

All children are intelligent, expressive, articulate and “feeling”/mature “beyond their years”. Children less than 10 have vague ideas about environmental problems, concerns, practices and solutions.

Strong uptake, little resistance, by children of parents’ pro-environmental actions and “voluntary” participation in parents’ interests/commitments Strong evidence of children’s “green” concerns, interests or commitments despite increasing peer/cultural “pressure”.

Most children are (self) aware and proud of their own “green” (and family) differences but can confidently negotiate/defend/teach such differences with their peers. Many children actively reconstitute green household practices. Most are highly aware of parents social, political and environmental views; “know” and have basic understandings of national/global environmental problems but have little environmental/ecological knowledge. Children enjoy limited and irregular contact with “local” nature (backyard, local parks/creeks and community farms) and “holiday” nature (beaches, bush).

## **Education**

Two children attend Steiner school; the majority attend state primary and secondary schools. Only one school actively demonstrates environmental education/conservation practices beyond the “normal” but irregular recycling activities/rubbish pick ups and school camps.



Parents reluctantly accept that (state) schools are limited in their capacity or ability to offer environmental education; most parents view environmental education as their own responsibility.

### Conceptual categories . Findings

<p>FAMILY BACKGROUNDS OF PARENTS</p> <p>Formative/ primary “shaping”</p>	<p>Mainly lower middle/working class nuclear and “extended” families; lack of wealth with some educated, professional people; some intellectuals</p> <ul style="list-style-type: none"> <li>– Depression/WW2 influences – Scarcity → economic</li> <li>– Strict/simple, frugal/miserly – make do/live within means/resourceful.</li> <li>– Varied geographical but Aust and UK only, city and rural</li> <li>– Traditional gendered families/parenting roles/expectations</li> <li>– Varied political affiliations – conservative→communist</li> <li>– Some families “odd” or felt “different” but accepting</li> <li>– Little concern about environment in overt environmental language but practiced economically – gardens, produce, holiday places</li> <li>– Elements of “early” feminism (in some mothers) and “racism”</li> <li>– Education supported, girls not encouraged</li> </ul> <p>Some highly influential parents – rights, gardens/outdoors</p>
<p>PARENTS ( 1 @ low 30s; most 43-53)</p> <p>Childhood/ youth identity and transitions</p>	<p>Normal/conventional but not necessarily traditional up-bringing</p> <ul style="list-style-type: none"> <li>– Mostly “cocooned”/parochial households but some with social exposure from education and cultural exposure from opportunities</li> <li>– Continuity of domestic frugality/domestic lifestyle linked to finances, not environmental concerns, eg vege gardens, clothing, cycling</li> <li>– Mainly state primary/secondary schools – secondary schooling less satisfactory but most achieve highly; no environmental education; relatively low levels of sport</li> <li>– Females react/rebel against parents, school, friends or community/society during later secondary school years → greater awareness of “independence” – desire for exploration/escape</li> <li>– Little overt/planned contact with “nature” – if so, through family holidays – varying in “significance”</li> </ul>
<p>EARLY WORK/CAREER (mainly 1980s)</p>	<p>Professional, mobile, creative of opportunity, oriented to social justice with blending in of environmental issues/concern/activism and membership</p> <ul style="list-style-type: none"> <li>– Continuities with university qualifications – usually f/t in social and community areas</li> <li>– Shared/collective, often alternative/activist households in older, inner city areas</li> </ul>

<p>Identity lifestyle consolidation and work transition</p>	<ul style="list-style-type: none"> <li>- Activism in work, pg studies and campaigns/movements (Cain Labour Govt.)</li> <li>- Continued strong influence of feminism on males and females – extended/fertilized by environmentalism</li> <li>- Anti consumerism supported by increasing organic living and community interest/solidarity</li> <li>- Strong friendships/networks with like-minded individuals/groups where current partner “identified”</li> <li>- “Weak” pursuit of fixed/planned career “aspirations”</li> <li>- Individual decision to live/earn less than “careerist” potential</li> <li>- Later/delayed commitment to partner</li> </ul>
<p>PARTNER</p> <p>Identity renegotiation/ affirmation</p>	<p>“Late” marriage, congruent partnership</p> <ul style="list-style-type: none"> <li>- Strong compatibility of values/lifestyle/politics with “chosen” future partner</li> <li>- Shared decision to live/earn less than “careerist” potential</li> </ul> <p>remain in inner city due to work/continued study commitments and existing networks/community → lifestyle</p>
<p>FAMILY (1990s)</p> <p>Family life- style/identity negotiation, transition and confirmation</p>	<p>Mainly nuclear (one blended, two single mother); 3 with only child; 4 with two children</p> <ul style="list-style-type: none"> <li>- “delayed” children (late 30s/early 40s): limit to larger family</li> <li>- “Upheaval” of personal identity (particularly for female) and lifestyle – “discontinuities” from 80s</li> <li>- Shared decision for f/t parenting – lower \$/less consumptive, often co-operative (with resources) in pre-existing networks</li> <li>- All mothers, one father, to p/t or no paid employment, some voluntary due to community/environmental commitments.</li> <li>- “Waning” political activism “evolves/replaced” with heightened “domestic/household” feminist/environmentalist activism</li> <li>- ‘De’politicization frustrating for mothers – hesitant/reluctant ‘acceptance’ re-directed where possible – particularly food</li> </ul>
<p>FAMILY FUNCTIONING/ DYNAMIC</p>	<p>Planned/strategic: importance of being “older”/far more extensive life experiences, communicative, negotiate differences, consensus, ‘worldview’ committed (equity, social justice, ecopolitical, environmentally and community ethic, low consumption)</p> <ul style="list-style-type: none"> <li>- Practice of values – ideals/rhetoric as reality → frugality (chosen/reaffirmed)</li> <li>- Household as “micro”community/democracy</li> </ul>

<p>Household ecology of (in)actions, interactions, communication, arrangements</p>	<ul style="list-style-type: none"> <li>- Greater/heightened intensity of mother</li> <li>- Importance of friends/cooperative to assist parenting models</li> <li>- Pragmatic when “forced” by work/social demands</li> <li>- “Parochial” when “pushed”</li> <li>- Contradictions recognized – older houses, “sustainable” household aspirations (eg solar) with “less income” decision, declining affordability of options</li> </ul> <p>“Subversive” but “naturalized” non-conformist/alternative</p> <ul style="list-style-type: none"> <li>- Constructive, supportive, nurturing</li> <li>- “Tension” of “imposition/control” and “independence” for/of children, including “intrusion” of peer pressure and school/consumer “cultures”</li> <li>- -Children (sometimes) “reminder” to parents</li> <li>- Conflict/resistance not (yet?) evident</li> <li>- Evidence of strong “uptake/rehearsal” of parents/values/actions but few kids yet at age where they might contest parents</li> <li>- Intergenerational “continuity/conflict” in face of cultural/consumer “challenge”</li> </ul>
<p>PARENTING Strategies</p> <p>Lifestyle/identity translation to children</p>	<p>Combination, mix but preference for a “constrained” “liberal” (rational, choice, “self” determining but “consequently” alert/aware)</p> <ul style="list-style-type: none"> <li>- Modelling/doing</li> <li>- Modelling and communicated, explained</li> <li>- Receptive, problem solving</li> <li>- Ongoing “modelling” from parents (mothers) networks</li> <li>- Expected, trained/instructed, habituated → “normalization”</li> </ul> <p>eg lights/showers/</p> <ul style="list-style-type: none"> <li>- Participatory, optional/persuasive, eg demonstrations</li> <li>- Restrictions eg tv, computers, food, clothes</li> </ul> <p>Sporadic use of rewards/punishments</p>
<p>GEOGRAPHIES/ NATURE/PLACE RELATIONS</p> <p>Inner/embodied</p>	<p>Mainly household and school, periodically but declining with age for community/environmental “farms”, local parks and (relatively) natural creek/river/bush inner city areas. Periodic holiday “escape/attraction” to nature for half of families for re-creational, perhaps “spiritual”, and family/social reasons, and for some potential/probable “down-shifting”</p> <ul style="list-style-type: none"> <li>- Food, meals, often organic, often resistance to “re-fined/produced” and “fast/packaged/commercial” and school canteen (nb “ecofeminist” domestic politic</li> <li>- Vegetable gardening (constant for some, sporadic/constrained for others) and pets – backyard</li> <li>- Clothing, often op-shop (mother)</li> </ul>

<p>Social/community</p> <p>Outer/culture-nature</p>	<ul style="list-style-type: none"> <li>- Household recycling (mother initiated/supervised)</li> <li>- Habituation (lights, doors) (father monitored)</li> <li>- Child “protection”, household “haven/security” from cultural/consumerist “penetration” (tv/computers, advertising) (shared)</li> <li>- Sporadic play/exploration of local park and creek/river/bush’</li> <li>- Supported/supervised introduction via bike riding of above (by fathers)</li> <li>- Regular/ongoing local organic shopping and consumer education (mother)</li> <li>- Periodic, declining with age local community/farm, but increasing green/war demonstrations, organizations (shared but probably mother)</li> <li>- Local state schools (one secondary), declining into secondary (shared)</li> </ul> <ul style="list-style-type: none"> <li>- 2 families own/share “nature/bush” retreats/places</li> <li>- Half families camp, visit national parks</li> <li>- Most holiday</li> <li>- All “belong” to city dwelling, with adaptation to realize more green advantages than disadvantages in inner city living when compared with “bush/nature” living.</li> <li>- All are “low” or anti-consumer city dwellers</li> </ul>
<p>CHILDREN</p> <p>Intergenerational/formative</p>	<p>All are intelligent, articulate, expressive, confident and achieving well at school. Most strongly involved in parent supported activities outside school – sport and music is very strong for most</p> <p>All are “rehearsing” parents’ commitments/values to a large extent but will reflect/challenge “back”.</p> <p>All are aware of their “difference” – all seem to be sufficiently self assured/comfortable to “deal/cope” with peer pressures or influences.</p> <p>All are “worldly” and know about environmental problems/issues but few have environmental/ecological knowledge.</p> <p>All feel they can choose but ‘know’ persuasion is used.</p> <p>All have other, connected “communities of support”</p> <p>Only one at 16 years old; majority 9-13.</p>

**Theoretical directions?**

**Curriculum theory.** The findings about Green households potentially provide an “ideal” model of education/training to which a school/state curriculum might aspire if serious about environmental ed/ed for sustainability. For example, recommended for teaching and schools is the fostering of strong and participatory democracy, confidence/resilience/assertiveness, normalization and habituation of green practices in the classroom, food growing/care, outdoors as indoor curriculum, community relations/awareness, etc.

**Implications.** Current approaches to environmental education for sustainable development must recognize their limitations and link to a broader array of family and social interventions.

Validation of the need for a “humanly constructive” embodied/domestic oriented curriculum (Payne, 1997) to precede and then scaffold to the socially critical perspectives, including (Fien (1993)

The SLE (Tanner, Palmer, Chawla) “body of knowledge” be qualified - the greening/eco activism of individuals is evolutionary, not revolutionary; difficult to establish a cause/effect relationship between “one off” significant experiences within an unfolding/evolving environmental sense/practice of self.

**Youth (dis)engagement.** The chronic sense of disempowerment expressed by or attributed to Australian youth is not something strongly evident in this study of green families and their household oikos. In fact, much can be learned about youth empowerment and youth transitions through the study of parenting practices, family functioning and their influence on child development. Constraint? These green parents are probably exceptional re level of education, political involvement, intellectual engagement, level of action (personal, community & wider political – past and present).

Child → Youth → Young adult transitions including sustainable consumption and young Australians (Fien et al, 2003). The nature of “post-modern” transitions is not well understood in relation to competing demands but its development will be enhanced by incorporating how child and youth identity identities are complicated by family history, functioning/dynamic and processes and how even very committed parenting strategies grapple with and negotiate “peer cultural consumer entertainment” imperatives.

Findings here are strongly suggestive of positive intergenerational continuity about the environment, conserving and consuming. Findings from the non-green family study are strongly, but in the negative sense, that non or “anti” environmental and consumer identities are sought, or/and enculturated, often unknowingly.

**Political functions of families.** Herring (2003) is critical of family scholarship that has failed to examine the full range of political functions of the family. According to herring, this limited scholarship dwells on one of three factors supporting the “reproductive” role of the power of the state – the production of competent, good citizens (others include, families reliev-

ing the state of having to care for dependent citizens, and families diminishing the power of other intermediate forms of social association that might challenge the state).

Herring's three "subversive" functions of families are indicated in the findings here:

- Families producing individuals with diverse opinions, passions and interests (most children studied here are acknowledged as different by their parents and already see themselves as different, often in spite of massive peer group pressure)
- Parents involving children in social settings that introduce them to other forms of associational relationship that (potentially) exist outside the state sphere (eg "voluntary" involvement in demos, CERES, CCF, workshops, green politics). Potentially these social models "check" state power b/c they provide/encourage intermediate/local forms of associational tolerance
- Necessary to create the conditions for the stronger functioning of a large pluralistic democracy

The development of the above possibilities (curriculum reform, youth empowerment, subversive families) would need to be tempered (theoretically/practically) by other empirical insights gained from this study.

**Socio-cultural conditions and formative experiences.** These current parents are legacies of their own parents' "scarcity" conditions (Depression era and WW2) and were participants/observers when they were young and (felt) supported by readily available/accessible social and political change conditions (Vietnam war, Hippies, feminism, environmentalism, Peder/Franklin, music).

Parents' frugality and anti-consumerism/materialism (and its own internal disciplines) has now been replaced in their children by a combination of "entitlement" and children's rights, consumer/entertainment and "post-material" imperatives that are far less conducive to feelings of (socio-cultural) support and alternatives. Intergenerational environmental/ecopolitical continuity and commitment may, therefore, be (severely) diminished/displaced by the affluence of the post scarcity cultural condition in which today's youth are growing up. There are far fewer youthful opportunities for the rebellious rites of passage enjoyed by their parents. Importance of studying these children longitudinally – in 5, 10, 15, 20 years for continuities/discontinuities, their relationships/family parenting, etc.

**Family functioning.** The current cohort of parents are having to work through numerous contradictions themselves about preferred individual and collective eco-identities/lifestyles and that emerging (see above) in their children.

**Nature orientation.** Families living in inner city (the relatively high Green vote in the recent Federal election) do not seem to be overly preoccu-

pied with nature in the “raw”, it is important but “background” and “confirming”. These green parents have evolved in their social justice/feminist/’left wing’ worldviews by including ecopolitics into their quest for a better world. Their children have less opportunities for ‘nature’ immersion, engagement, affiliation in the urban setting. Children like being outdoors, in gardens, parks, local creeks and holidays.

Will be interesting to compare inner city and regional samples where nature is more available.

### **Practical implications/recommendations for curriculum and pedagogical development .(See 1 above).**

What, then, are some of the key visible and invisible pedagogical processes found in the postmodern oikos practised by these families? What lessons for curriculum developers are to be learned from the (green) household and its ecologies that act as a doing and praxical site of environmental education? Are there some “best environmental parenting practices” that teachers might do in their classrooms and schools? For example:

- A commitment to environmental and social justice in both theory and practice where rhetoric is consistently matched by reality - an ecopraxis established communally, cooperatively, supportively and democratically with children
- The normalization, habituation and naturalization of such an ecopraxis through the regular thematization of the environment in the daily routines, actions and interactions and doing of family members
- The view that doing as an approach to learning and child development rests upon the (re)cyclical nexus of “doing” (by family members), informing/explaining (by parents) and communicating (by all) and, hence, meshing of “real/direct/active/embodied” experiences and learning for the environment in those daily routines, family functioning and household ecologies
- The development of trust, respect, support, care, reciprocity and mutualism in enabling children’s confidence and competence to be different about things environmental
- The fostering of an ethos or culture that a positive difference can be made through one’s everyday actions and interactions, even through little things like, for example, making one’s own bread rather than “buying” hundreds of plastic bags in which bread is consumed from the shop
- The willingness of parents to encourage resourcefulness in a range of domestic activities and interactions while limiting the availability or access of children to consumer/material goods, fashions, images and icons, and technological imperatives and, subsequently, children’s receptiveness to and acceptance of such “constraints”
- The considerable financial savings and, therefore, economic benefits to families of constructing an ecopraxis

- The realization that a bodily, domestic, local ecopraxis is inherently political, powerful, highly accessible and easily enacted
- Environmental and ecological knowledge are not crucially important aspects of an ecopraxis but a “consciousness”, awareness and sense of agency and resourceful and “lateral” power in sustaining it are
- Occasional appreciative contact with local and holiday versions of nature is of some value in the intergenerational ethic.

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## ENVIRONMENTAL EDUCATION AND CURRICULUM THEORY

**Phillip G. Payne**

*Faculty of Education - La Trobe University,  
Bendigo, Victoria, 3552 Australia  
p.payne@latrobe.edu.au*

### **Abstract**

Persistent concerns in the literature over the past 20 years about the efficacy of environmental education in schools might be traced to the way curriculum and pedagogical development has exaggerated the importance of the rational mind and conceptual abstractions in *school-based* learning while downplaying the significance of embodied and “real” nature of learners’ *everyday* experiences. The philosophical deconstruction of mind-body, culture-nature, and theory-practice “gaps” or dualisms asks postmodern curriculum theorists and reflective practitioners to find alternative ways of thinking about and practising environmental education and education for sustainable development.

This presentation outlines a novel but empirically qualified approach to curriculum that places the learner/inquirer at the embodied and everyday centre of local and global environmental issues.

The vitality now evident “globally” in environmental education research (Gough, 2004; Hart & Nolan, 1999; Lotz-Sisitka, 2004; Rickinson, 2001; Russell & Hart, 2003; Scott, 1999, 2000, 2003) has not been matched in curriculum theory for environmental education. Curriculum theory has fallen on hard times as neo-conservative ideology, centralized mandates, bureaucratic standards and accountability measures have subdued any (re)visionary impulse in schooling. To be sure, the decade-long rise of “education for sustainable development” has influenced educational policy developments at state, national, and international levels. Its blurring with environmental education has also been noted (McKeown & Hopkins, 2003).

By and large, the development of environmental education curricula have not kept pace with the issues generated in the increasingly fertile discourse of environmental education research or, for that matter, in environmental philosophy.

This presentation aims to rekindle educators’ and researchers’ involvement in “theorizing” the curriculum. It highlights how the renaissance of philosophical interest in the body and its embodiment, the phenomenology of place relations, and the questions environmental education researchers pose about the environmental “nature” of educational experience, converge in ways that mark out promising directions for curriculum developers.

Today, I can only provide the briefest of sketches of a curriculum theory *for* environmental education that I have been developing informally and formally for the past two decades as part of nearly three decades of professional and academic involvement in environmental education.

The sketch will be painted via a series of slides that only provide some conceptual signposts and highlight some curriculum and pedagogical issues about developing a postmodern theory of environmental education. In developing this curriculum theory, I draw more on empirical inquiries and evidence and less on rhetorical exhortation.

In short, this theory stresses an “ontological”, “phenomenological” and existential basis of making meaning about our *being, doing and becoming for the environment – both individually and collectively*. Only indirectly implied here, rather than addressed directly which would be far too time consuming, is my attempt to formulate an ecological theory of environmental education where the term ecological is used politically to signal a concerted effort to deconstruct the I-world, mind-body, theory- practice, text-lifeworld gaps that much modern and postmodern thinking have (re)constituted.

### **Trends in Western Environmental Thinking: The Subjective Experience of Contested Places**

Peter Hay’s (2002) comprehensive cross-disciplinary survey of the main strands of thought in the western environmental movement identified a number of vantage points from which the development of environmental education curricula might proceed. These include a variety of ecophilosophies, ecofeminism, religion and spirituality, the critique of science, the phenomenology of place, and the green politics of authoritarian, conservative, liberal and socialist traditions. Hay expresses surprise that the phenomenological literature of “place” has had so little influence on mainstream ecological thought. This “place literature” – he observes – is relevant to the wider concerns of ecological thought because it creates empathy, encourages a deep concern for the processes of life, stresses living in accordance with ethical precepts, and has a political edge. For those familiar with this genre, the writings of Barry Lopez and Gary Snyder are examples of evocative narratives about poignant experiences of various places, spaces and natures. Hay concedes the phenomenological literature is primarily concerned with wilderness type environments and should be accompanied by less romantic critiques of the commodification of space and our alienation from those very places in which most of us dwell. Bowerbank’s (1999) critique of “nature writing” illustrates Hay’s concerns, as does Cronon’s (1995) provocative text about the historical, social and cultural levels of human-nature-place relations.

If so, Hay believes the contribution of phenomenology to the environmental movement would be “*immensely valuable*”.

Prominent environmental philosophers like Eugene Hargrove (1998) lament their field’s lack of impact on education and policy. Few curriculum

scholars in environmental education have developed the rich conceptual links that exist between, for example, aspects of phenomenology and the ways in which environmental education curricula might be conceived and enacted pedagogically. Recently published exceptions include Gruenewalds' (2003) focus on the experiential and linguistic processes of human social development, Newbery's (2003) narration of carrying a canoe, Powers' (2004) evaluation of place-based education programs, and some largely rhetorical claims about a "deep ecology" pedagogy.

Marjorie O'Loughlin's (1997, 1998) neo-Deweyan educational appraisal of Merleau-Ponty's philosophical phenomenology of "lived experience" outlines a number of ideas that are crucially relevant to the aspirations many environmental educators have in "teaching" about the "relationships" of humans and their environments. O'Loughlin is critical of the emphasis placed on the acquisition of knowledge and facts whose "abstractions" are all-too-often removed from learners' "everyday experience". She observes that the human body is excluded from most curriculum discussions and documents. Drawing from the prominent social theorist Anthony Giddens (1984), O'Loughlin differentiates between the practical consciousness (i.e. embodied/tacit/intuitive habits, emotions, routines, traditions, conventions, patterns, norms, dispositions, rules/resources) and the discursive consciousness (reason, awareness, knowledge, logic, texts).

Notably, Giddens (1984, p. xx) argues social theory should be concerned,

...first and foremost with reworking conceptions of human being and human doing, social reproduction and social transformation...

for which the practical consciousness should be a leading focus for empirical inquiry.

O'Loughlin (1997) proposed the pedagogical development of "intelligent bodies" and "ecological subjectivities". Her recommended curriculum invites learners to differentiate between discursive and practical consciousnesses. She highlights the expressive aspects of individual and collective bodies. Learners should have multi-sensory experiences, not just "sight" experiences. O'Loughlin wants learners to explore "time-space dynamics". Her curriculum would offer and draw upon the many "situational encounters" learners have with both built and natural environments where learning should embrace the continuities and discontinuities of time, and the sensuality and desensitising qualities of places and spaces.

Such experiences should be "extended explorations" of those places that, she notes, are often "conflictual" and "contested", highlighting how such environments are 'social constructions', as well as being physical. Investigations should focus on the meanings of spatial behaviours, awareness of boundaries and territoriality, their histories in human affairs, and their current significance as environments of action, interaction and relations.

O'Loughlin (1998) concludes that the multi-sensory study of experiences of various environments should lie in the process of inquiry, discovery, and articulation by the group

...because it is only through the experience of embodied sociality that students may come to be aware of the deepest meanings generated in their common corporeal experience. (1998, p. 294)

### **Trends in Environmental Education Research: The “Nature” of Experience.**

Crucially important lessons are also to be learned from the most recent “meta-reviews” of the past decade’s environmental education research (Hart & Nolan, 1999; Rickinson, 2001). Rickinson’s analysis of the evidence-base about learners and learning identifies three “well established” nodes of students’

- Environmental knowledge
- Environmental attitudes and behaviours
- Environmental learning outcomes

and three “emerging nodes”, namely students’

- Perceptions of nature
- Experiences of learning
- Influences on adults.

The implications of the first two emerging nodes are almost self-evident. Learners do require diverse experiences of different environments and versions of nature so as to better inquire into, reflect upon and understand how they themselves perceive, conceive, construct, compare, act and relate to “nature” and the “environment”. Learners, teachers and researchers need, therefore, to understand the “natures” of the environmental experiences they have and the places in which they occur – at the home, school, playground, river, mall, and so on.

There are, however, risks for the curriculum theorist in not thinking seriously about the different “natures” and “places” of environmental learning experiences, noting the term “experience” is easily bandied about, not least of all by educators advocating its virtues. Perplexing questions rarely asked in environmental education include, “who owns the experience?” and “whose and what experience is being experienced – the learner’s, the teacher’s, the curriculum’s author, the policy’s maker?”

John Dewey (1938) anticipated the problem of “social control” in schools when he called for an intelligent theory of experience that, if neglected, would leave learners “at the mercy of every intellectual breeze that happens to blow”.

More recently, Robin Usher and Richard Edwards (1994) argued that the relationship of the postmodern and experiential learning is under-theorized. They added “meaning is constructed through experience rather than simply being conveyed by it” and is now too often associated with the practices of “guidance” and “counselling”.

Zygmunt Bauman (1997) asserted, “the bitter experience in question is the experience of freedom”. Says Bauman about the growing demands for “teachers of experience” that “experiencing” has become a “technical problem” for training “perfect consumers” by the “paragons and prophets” of the postmodern market place.

Hart & Nolan’s (1999) critical review of research in environmental education focused on the field’s methodological developments and diversification of approaches to inquiry. Their conclusions have strong implications for curriculum theorists and developers if we are to take seriously Dewey’s, Usher & Edwards, and Bauman’s observations. Hart & Nolan implore educators to “get right” the presuppositions they make about learners’ current activities and their *connections* in “daily life” to the complex “social structures” in which they live, act and relate to various environments. To not undertake such an “elementary” task, they rightly assert, renders pointless any common vision for environmental education. Hart & Nolan call for strategies that

...make it possible for teachers and students to work with and as inquirers to confront their own notions and ideas about the way the world works... (1999, p. 41)

where learning should be seen as an enabling process rather than mere knowledge acquisition.

The trend identified by Hart & Nolan, Rickinson, and O’Loughlin, while reiterating Hay’s views, is that learning should be a positive process of individual and collective inquiry. “Situated” investigations of one’s own and others’ (embodied) environmental experiences are required to reveal how we “live” and construct our problematic environmental relations with various places and spaces.

The durability and relevance of those 1970s United Nations commitments to experiential learning, holism, interdisciplinary inquiry, problem solving and participatory action (Palmer, 1998) persist but in ways that highlight the ordinary and enabling/constraining role of the everyday, the body, and place encounters. This trend also resonates with the latest developments in cognitive science, ecological psychology, and philosophy about the “embodied mind” as an interface of culture-nature experiences and relations (for example, Lombardo, 1987; Varela et al., 1991; Lakoff & Johnson, 1999; Petitot et al., 1999; Weiss & Haber, 1999).



There are, therefore, very good historical and contemporary reasons for educators to take seriously the possibilities of a “humanly constructive” approach to curriculum theory where learners (students, teachers, policy-makers, researchers) interrogate their own (and others’) embodied experiences of “places” and “spaces” whose contested terrains reflect the socially constructed and problematic nature of “human-environment-nature” relations.

### **A Humanly Constructive Environmental Education Background**

The formulation of the humanly constructive curriculum was a response to a series of chronic problems in environmental education, curriculum development, social theory, and environmental philosophy, namely

- Unresolved tensions between competing perspectives of environmental education – the applied science, practical/interpretive and socially critical approaches.
- Persistent concerns about the processes, materials, outcomes and “efficacy” of environmental education; allegations of theory-practice “gaps” and ongoing confusion about the nature of interdisciplinary and experiential learning. These problems hinged on a number of unexamined assumptions about the three approaches identified above, or were a reflection of the unrealistic expectations of the field to bring about “change”.
- Practical problems in schools presented by a non-conventional “subject” that demanded flexibility in timetabling, staffing, field visits, as well as other logistical, financial and legal issues.
- Developmentally inappropriate curricula that met the interests of “absent” experts while not addressing the “present” circumstances of learners and teachers.
- Limited progress in the ability of social theory, environmental philosophy, and geography to inform curriculum developers of how to bridge the dualisms of agency-structure, identity-spatiality, and local-global that, effectively, denied the possibility of plausible empirical insights into the nature of human-environment relations and, therefore, satisfactory explanations of socio-ecological life needed for the planning of meaningful curricula experiences.
- The need for “change agents” to acknowledge the ontologically enabling and constraining features of the body, the role of tradition, the force of power, and the contingencies of reason.

The nine questions devised for individual and group inquiries were derived from a range of theoretical sources (Payne, 1995, 1999a) and have been empirically qualified over the past decade (Payne, 1997, 1998, 1999, 2000, 2002a,b, 2003, 2004, in press).

## Defining features

The questions are *sensitisers* for inquiry by learners, or teachers (and researchers) to foster inquiry. The questions can be utilized individually and infused into existing curricula, flexibility permitting. Or they are a curriculum in their own right and can be developed over whatever time period is available. Some questions may be more developmentally appropriate than others. The latter questions hinge on meanings derived from the initial questions.

The “content” and “timetable” of the curriculum are the mundane, everyday experiences of the learner(s). The locus and focus, or “field-site” for inquiry is/are the human body(ies) and its/their variable and uneven embodiments of the “sediments” or “residues” of history, society, culture and nature. Self and group “reflective” inquiries are thematized here by deliberating about what is environmentally “enabling” and/or “disabling”. In so doing, the humanly constructive approach embodies an environmental ethic in that very few resources, costs and travel to outside sites are needed, as has conventionally been the case. This curriculum approach may also be adapted in other “human/social development/ issues” of education. The astute reader will note how these “related” issues about health, citizenship, gender, and ethnicity are embedded in the inquiry process and sequence of questions.

- In phenomenological terms, the humanly constructive curriculum is interested in revealing our individual and collective *being, doing* and *becoming* with an end-in-view of “for-being-for-the-environment”.
- It is concerned, therefore, with “real” human experiences of environmental actions, inactions and relations but it acknowledges that such experiences are many and layered, often in contradiction, “stretching” from the body, to the local, through many more layers of geography and culture to the “global”.
- It acknowledges that “real” experiences are not “authentic”, nor should the global problem be conflated, individualized and intensified to one’s own body, but that various experiences are temporally, spatially, socially, and symbolically mediated by a range of forces, including language, families, geographies, technologies, politics, economics and so on.
- It is, therefore, concerned with how human experience and embodied environmental actions and relations are “structured” and “constructed” in the “everyday” and actively “recycled” by actors, often unknowingly, as a re-packaged version of human-environment relations, many of which are troubling.
- It is, therefore, primarily concerned with interpreting what already *is* the case, in our individual and collective *being, doing* and *becoming*. Exposure to theories of personal, social, and environmental ethics and politics might assist learner(s) in judging

the merits or otherwise of the match of what they find *is* the case and what theory says it *could* or *ought* be.

- Another humanistic aim of this ecocentric inquiry *for-being-for-the-environment* is that it is “enabling”. Its “in here” focus *for being* highlights the need for solutions and hope to the problems and issues “way out there” whose overemphasis in environmental education reconstitutes a “disabling” paralysis. “Problems” might therefore be understood as temporary constraints on embodied agency. A judicious mix of “enablement” and “constraint” is pedagogically desirable in the way reflexive learners mount their individual and collective inquiries.

In sum, this approach to curriculum theory reflects an attempt to reclaim the “places” of human agency (Giddens, 1984; Archer, 2000) where “real” inquiries can be conducted by learners, teachers and researchers into their natural, material, social and symbolic experiences of what others refer to as the “ecological crisis”. The restoration of human agency, the “parent” of human action, through reflexive inquiries into everyday, (in)significant experiences is a positive response to the negative instrumental rationality enframed in modernist, positivist linear approaches to environmental education. Human agency, the “empowering” but elusive possibility of education, also needs rescuing from those postmodern perspectives of education that effectively reduce the self and his/her/our lifeworld realities to a disembodied and decontextualized form of textualism where language and discourses supposedly serve as a mirror in “reading” what it is to be a human being, doer and becoming.

- The defining features of this questioning, inquiry approach aim to be
- Critical (practical, non-idealist, socially scientific, ethico-political)
  - Ecological (embodied, intercorporeal, intersubjective, relational, glocalized, ecocentric)
  - Ontological (underlying agency structure mutually constituting “patterns” of human existence).

The questioning *for-being-for-the-environment* is outlined below.

Sensitizing means

- The questions can be reworded and/or modified according to learners’ needs
- Their pedagogical appropriateness that might range across informal discussions, role playing exercises, group problem solving, action research, extended individual, paired or group projects, a dissertation.

<b>Sensitizer/probe</b>	<b>Experiential dimension</b>	<b>Conceptual and/or empirical resources</b>
<p>In what ways might there be environmental problems and/or solutions “at work” in my/our acting body(ies)?</p> <p>What habits/routines and feelings do I have at home, in the neighbourhood, at the shops, in the playground, on the river, at school, at work that allow and/or limit these problems/solutions from continuing?</p> <p>How and from where “out there” do these “in me/us” problems and/or solutions come from, or go to, every-day? What are the local/global “pathways” of these problems in and out of my/our bodies?</p> <p>How do these problems and solutions converge and diverge for each and all of us?</p>	<p>Intelligent body(ies)</p> <p>Embodied reasoning</p> <p>Ecological subjectivities/ embodiment processes</p> <p>Intercorporeal/ Intersubjective social intelligence</p>	<p>Melucci (1996) Payne (1997, 1999a) Macnaghten (2003) Le Grange (2004)</p> <p>Payne (1998, 2002a, 2004) Kahn (1999) Lousley (1999) MacEachren (2000) Malone &amp; Tranter (2003)</p> <p>Fien (1993) Hart (1997) Berryman (1999) Payne (2000) Loughland et al. (2003)</p> <p>Stern (2000) Kaufman et al. (2001)</p>
<p>What household, school, local and social conventions, rules/norms, talk, pressures, technologies, recreations and media are most likely to allow and/or limit these problems?</p> <p>How are these embodied problems/solutions, pathways and conventions shaped by personal and family histories, geographical setting, living circumstances ethnicity, and social conditions?</p>	<p>Structuration of experience/ Governing/disciplining</p> <p>Tradition/ social structure/ geography/ culture</p>	<p>Payne (1998, 2002b, 2003b) Chawla (1998, 1999) Huckle (1995) Michael (2000)</p> <p>Hampel et al (1996) Brody (1997) Payne (1998, 1999b, 2004) Seidel (2000) Strandbu &amp; Krangle (2003) Sundstrom (2003)</p>
<p>What of my/our actions, interactions, and relations can be changed to “help” or not help the environment?</p>	<p>Embodied agency</p>	<p>Jensen &amp; Schnack (1997) Payne (1997) Jickling &amp; Spork (1998)</p>

What are the consequences of my/our proposed changes, or non change, for 'others' and for the future (people, environments/nature?)	Socio-ecological agency and ethics/ intergenerational ethics	Bentley et al. (2004) Walker (1997) Hicks (1998) Malone (1999) Connell et al. (1999) Payne (2004)
What insights, meanings, interpretations, explanations, or justifications are needed in responding individually and/or collectively to each of the above questions?	Environmental education: <i>for being for the environment</i>	Numerous, in various disciplines and interdisciplinary studies

Eating chemically-treated/imported/preserved or organically-grown/local/seasonal fruit or vegetables are examples of everyday experiences that can be examined (or compared) via individual and/or group inquiries using some, or all, of the above questions to reveal how those embodied experiences "actually" reconstitute certain environmental relations and local-global consequences. Or, where a learner sits at his/her desk/table in relation to available lighting and ventilation can be considered according to the lesser or greater demands for clothing, lighting and air-conditioning. And so on.

Young children already receive instruction in, for example, the need for fruit and vegetables for growth and good health; equally, chemistry and biology students can study the organic composting and pesticide residues of the apple varieties they already eat. Or, in geography, history or economics, learners might study the production, labour market, transportation and retailing of apples. Clearly, this type of curriculum approach endorses the frequent calls in education for "situated learning", "contextual knowledge", "reflective practice", "constructivist and socially-constructivist pedagogies", and "authentic" curriculum.

So too for "story(ies)", "narratives", "standpoints", and "autobiographies". There is also a deeper "worldview" issue encapsulated in the above curriculum's characterization as an education *for-being-for-the-environment*. The hyphens reflect the aim of phenomenologists to "reconstruct" the mutually constituting human-environment "duality" while "deconstructing" the Cartesian inspired "I  $\leftrightarrow$  World" separation and disconnection. Cartesian thinking, allegedly, invokes major epistemological and methodological assumptions about the nature of "reality", "knowledge", and "truth" upon which much of the positivist and post-positivist curriculum development and research in environmental education has proceeded and been legitimized (for example, Robottom & Hart, 1993). Critiques of its dominance have contributed to the current vitality in environmental education research, in particular the emergence of a range of interpretive approaches within qualitative approaches to inquiry. Moreover, many environmental philosophers and eco/feminists, in particular, are critical of the dualisms, binary lo-

gics, and values hierarchical thinking they associate with the positivist and patriarchal worldviews of western science and philosophy and their associations with the ecological crisis (Merchant, 1980; Plumwood, 1993).

## **Conclusion**

Trends in environmental education research, educational philosophy and environmental thought invite us to reconsider the embodied, situated, and practical nature of educative (environmental) experience. In light of the revelation that individuals, teachers, researchers and schools actively “construct” and “give meaning” to human-environment interactions and relations there is now a different role for curriculum theorists to play in “reconstructing” appropriate educational opportunities for those whom education purports to serve – the learner. There can be no doubt that individual and social agency requires resuscitation via “new” curriculum frameworks/approaches and pedagogical strategies that “engage” and breathe real “authentic” life into the processes of learning and the natures of educational experience.

The rescuing of agency, via inquiry into the everyday in which learners “really” live, is one strong possibility. To avoid the risk, in the full face of curriculum’s straightjacketing by bureaucratic and economic forces, risks even greater consequences for the conservation, protection and restoration of those few places and natures that contribute reciprocally to the integrity of the human condition and its intergenerational prospects.

A humanly constructive approach to reflexive inquiries by intelligently embodied learners, teachers, policy-makers and researchers, as outlined above in a *critical, ecological, ontology* of human experience, is one creative, practical, enabling, and non-idealistic solution curriculum theorists now need to pursue *for-being-for-the-environment*.

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**EVALUATION OF AN ENVIRONMENTAL EDUCATION  
MEASURE IN THE CONTEXT OF EDUCATION  
FOR SUSTAINABLE DEVELOPMENT.  
THE ASSESSMENT OF A PROJECT DAY  
FOR PRIMARY SCHOOL STUDENTS AT THE  
“ÖKOSTATION FREIBURG”**

**Svantje Schumann**

*Institute of Forest and Environmental Policy,  
University of Freiburg.*

*Phone: + 49 (0)761/ 4 53 66 69*

*email: Svantje.Schumann@ifp.uni-freiburg.de*

**Background and objective of the study**

The concept of sustainable development postulates a new global responsibility for the living conditions of present and future generations. It suggests also the possibility for a comprehensive steering of social development in the direction of sustainability.

The assumption made in the discussion of strategies for sustainable development is that, for sustainability to be achieved, the far reaching modification of human attitudes and ways of life is of fundamental importance. Environmental education measures are a building block, which should help to initiate such a change in mentality and handling. Environmental education outside of schools is growing in importance and is increasingly being used to supplement environmental education in schools.

In chapter 36 of *Agenda 21* on education an action plan was drafted containing a new orientation of environmental education in favour of education for sustainable development. Education for sustainable development aims to strengthen environmental awareness and to promote environmentally appropriate handling. It departs from a manipulatively created increase of knowledge and from the assumption of a “knowledge attitudes behaviour” chain of effects (de Haan 1998). Instead increasingly innovative knowledge is called for and a focus is placed on independently initiated developments and changes.

The current development shows that the political demands for environmental education are growing and are increasingly manifested in the education sector. This is subsequently followed by an increasing demand for the evaluation of environmental education measures and facilities. The leading objective of environmental education is to promote the appropriate utilisation of natural resources, or merely to highlight the need for this generally. An

evaluation of environmental education measures must therefore determine their effectiveness or demonstrate their effects in the main.

However, upon studying the literature, including research reports, it becomes evident that there is a severe dearth of empirical knowledge with respect to the assessment of the effectiveness of environmental education measures concerning environmental behaviour. Although general agreement in relation to the objective of education for sustainable development exists – even here there are conflicts between, among others, proponents of classical environmental education and supporters of the new education for sustainable development approach – only very few assessments determining whether certain existing concepts actually satisfy this objective exist. The drawing up of strategies and concepts for the attainment of this objective is only one step, however. Analyses investigating whether the effects of such concepts are really target oriented are urgently required, especially with a view to possibilities for improvement.

The objective of the study is therefore the documentation and evaluation of an extra curricular environmental education measure in the context of education for sustainable development.

## **Methods and procedure**

Assessments carried out to date have predominantly employed a subsumption logic approach, that is an environmental education event or facility was tested against predefined criteria (number of participants, duration of the event, proportion of female or male visitors). The problem with such a standardised approach is that the very features of an event that are special and unique, that are both novel and unusual, mostly fall through the net and are not taken into consideration. At the same time, however, it is this competition-based comparison between different environmental education facilities that illuminates directly the fact that it is the characteristics and contents and their value, which allows one facility to exceed another.

Given the problems related to subsumption logic research approaches in the field of evaluation research and effectiveness assessments it was decided to adopt a reconstructive method for this study as an alternative to the subsumption logic approach described. Reconstruction means that objects are provided the space needed to present themselves so that they can later be analysed. The data to be assessed was evaluated content analytically, in a manner closely based on the method of objective hermeneutics. The term objective hermeneutics stems from Freyer (1923), further to which Oevermann, Allert, Konau and Krambeck (1979) developed a procedure for the reconstruction of latent sensory structures. The method has since been constantly refined and optimised in terms of content and also from the perspective of research economy goals.

In accordance with the current definition and the procedure applied momentarily, objective hermeneutics – as with every hermeneutical approach – assumes that the social reality is reasonable. At the core of the

methodological procedure is the sequential analysis of text protocols. In the sequential analysis versions of a text are created initially and then successively dropped in an adductive process so that over time an explanatory hypothesis relating to the case structure results. This explanatory hypothesis can and must then be tested against other text excerpts (or other data where necessary) until either the original explanatory hypothesis is rejected and a new hypothesis subjected to the testing process, or the original explanatory hypothesis proves to be the one corresponding best to the data (or a new hypothesis if it proves untenable). The method of objective hermeneutics is designed to decipher typical or characteristic structures of phenomena to be researched or, according to Oevermann (1996) to “bring to light the objective laws operating behind the appearances”. The result of its application is the generation of hypotheses.

The Ökostation Freiburg was selected for the investigation. Since 1986 it has hosted a comprehensive extra curricular environmental education programme for Freiburg and the surrounding area. The Ökostation is financed by the Regionalverband Südlicher Oberrhein e.V. of the German Association for Environmental and Nature Protection (BUND). The Ökostation was built in Freiburg in 1986 as part of the state garden exhibition. The programme covers diverse environment and nature protection oriented topics and appeals to a varied participant group, in terms of age and level of education as well as career background. With the numerous events taking place (among other things, the Ökostation hosts more than 200 school classes and kindergarten groups annually) and the variety of the programmes offered (including green class rooms, project days, lectures, training, seminars, garden get-togethers, consulting), the Ökostation counts amongst the most renowned environmental education facilities in Baden-Württemberg. The Freiburg Ökostation is linked in various ways to many environmental education centres and initiatives regionally and beyond.

A project day held for the primary school children entitled “Curious about nature. Experiments in the subject-combination humans, nature and culture” was investigated. This sees the Ökostation take on compulsory instruction material from the primary school curriculum and attempt to exploit the trend seeing more and more schools availing of environmental education facilities to impart this compulsory experimental course material.

The sequence of the environmental education measure is as follows:

- Greetings
- Introduction to the Ökostation
- Introduction to the event
- Arrangement of groups
- Experiments and stations:
  - Experiment: “Water permeability of different soil types”
  - Experiment: “Soil erosion”
  - Station: “Plant growth”
  - Experiment: “Waste water treatment”
  - Station: “Observation of water birds”.

To assess the effectiveness of the event, the objective data relating to the event were presented and analysed first and then the text data. In addition, written ex-post surveys of the students were carried out.

This occurred once with a survey directly after and in the form of a delayed survey.

Under the term objective data were understood data principally determined externally and involving relatively little need for interpretation. A differentiation was made between the objective data of the environmental education measure itself (title of the event, sequence) and the objective data pertaining to the participant (age, gender).

To capture the event as a concrete individual case five recording media and techniques were employed: data collection with the aid of a digital camera, data collection with the aid of a digital video camera, data collection with the aid of recording devices, data collection with the aid of observation notes and ex-post analyses.

## **Results**

The results of the study derive from the analysis of the objectives and the overall concepts of the individual interest groups and in the generation of hypotheses through which positive effects from an environmental education perspective can be produced.

The examination of the objectives is particularly important for the evaluation, as the effects can only be interpreted in the context of the targets set originally. In the case of concrete examples of environmental education measures different objectives and concepts are linked. It is possible to name three principle targets (concepts): the education plan for primary schools, the objectives and concepts of the participating primary school and the objectives and concepts of the Ökostation. It was ascertained that all three interest groups named have a focus on the education for sustainable development concept. The targets are in harmony with one another, and as such there are no conflicts.

The hypothesis-forming generalisation of the results in this study led to the naming of elements and principles with a demonstrable potential to produce positive effects in the context of successful environmental education. The inference of influential factors was made possible by focussing on repeatedly evoked phenomena observed in the analysis of this individual case, and the conditions, which initiate them.

In the following the means of arriving at a reconstruction logic determination of the structure elements is presented on the basis of a selected text passage. The “plant growth” station was selected for this purpose, specifically the part pertaining to the potting of a runner bean. The generation of results at the station derives from the following steps:

- Ascertainment of makeup and materials
- Analysis of the content of the experiment
- Analysis of the characteristics of the experiment
- Analysis of the course of the experiment.

The makeup comprises a tray with pots, crayons; three soil types (sand, compost, garden soil) in three containers, a mixing bowl, beans, a filled watering can, stones, twigs and secateurs.

The desired procedure of the experiment is as follows:

- Mix the substrate from the three available soil types
- Cover the hole in the bottom of the pots with an appropriately sized stone
- Partly fill the pot with substrate
- Place beans on top of the substrate
- Cover the beans with substrate and press down gently
- Place a stick in the substrate to act as an anchor
- Moisten the substrate
- Place the pot in a suitable location.

With respect to the characteristics, as a process the procedure can be steered autonomously. It is both “comprehensible” and visible to the senses. The links tend to be familiar. The “experiment” can be reproduced, for example, at home, even without guidance, using other beans, seeds or saplings.

Above all, during the procedure the school children are required to anticipate the type of conditions the germinating and later the growing beans need; (for example, soil requirements, nutrient demands, water conditions, hold for twining shoots, etc.). The children can recognise that plants are living organisms requiring nutrients, sunlight and water to survive.

Plant growth can be seen as an entire process. The procedure means a direct assumption of responsibility on the part of the children for their plants. This personal duty to care for the plants can evoke according emotions and a valuation of the worth of the plant in the children. This nurturing role principally promotes the development of a sense of responsibility.

The course of events is presented on the basis of a selected exemplary text sequence. The text sequence is from the opening phase of the station, as the school children are sitting in the Ökostation’s garden shed. The supervisor is giving the children the task of using the crayons to draw on the clay pots into which the beans will later be planted so that they can recognise their own pots again later on. The following text sequence ensues:

Girl: “Should we take off the price tags?” Supervisor: “You can draw over them.” Girl: “No, I’ll take it off.” Boy: “Oh, look how nicely she’s doing it.” Other boy: “Really nice.” Other boy: “I’ll do it as well as I can.” Girl: “I’ll make it match, so that it suits the colour of the clay.” Boy: “I can’t get the price tag off.” Other boy: “Me neither, but I’ll keep trying.” Girl: “Maybe it’ll be easier with water”. Boy: “But we don’t have any water.” Other boy: “This stupid price yoke.” Boy: “With stupid stripes.” A minute of silent drawing. Boy: “This is taking me a long time.” “May I use different colours?” Teacher: “That’s yours.” Boy: “Can I use that colour?” Teacher: “Yes, they’re your pots.” “Cool project.” “Cool.” “I think so, too.” “The main thing is



that it's fun." "Yes, just because you can draw now you think it's cool." "But we're not just drawing." "Now it's your turn to write." "But I've already written." Teacher: "You can draw for now." "And why are we colouring these again?" "So that we can recognise them." "Can I plant something in it at home then?" Supervisor: "We're going to plant something here, soon." "Cool." "Yes." [...] "And why are we colouring them in again?" Teacher: "So that we recognise them."

At this point it becomes quite clear that the children behold the station as a holistic aesthetic experience. They perceive the colouring of the pots structurally as an aesthetic element (*Girl: "I'll make it match, so that it suits the colour of the clay"*); and the irritating price tags are only disruptive from an aesthetic perspective, but not, for example, in relation to the growth of the beans).

It also becomes clear, however, that for the school children such a holistic aesthetic experience is an exception rather than the rule. This means it is evident that during their school lives the children have made the experience that aesthetic experiences tend to be deemed as being more superfluous than strongly cognitively structured subjects. Aesthetic experiences require a degree of leisure (Boy: "This is taking me a long time"). In the present day, leisure appears to be something almost requiring justification, just as is increasingly the case with aesthetic experiences. This is why some children imitate the role of adults: "The main thing is that it's fun." "Yes, just because you can draw now you think it's cool." "But we're not just drawing." These sentences mirror statements made by adults. They feel it necessary to emphasise that they are "not just drawing" and that not only "fun" is important. The assumption is that if this were the case the activity would not be justifiable. The aesthetic experience is obviously something that is continuously declining in terms of legitimacy, which is why it seems it requires explanation. The children have plainly internalised this point of view.

The indispensable precondition for aesthetic experiences, the ability to make decisions for one's self, is something to which the school children are clearly unaccustomed. Some of them need to reassure themselves on a number of occasions ("*May I use different colours?*", "*Can I use that colour?*"). At the same time it becomes apparent that this type of experience has a notably stabilising effect ("*I'll do it as well as I can*").

While colouring certain of the school children realise that they should be taking minutes ("Now it's your turn to write", "But I've already written"). The contrast between colouring and minute taking reflects clearly the contrast between aesthetic and cognitive education processes. Only when the teacher says to the children that they "can draw for now" are they reassured and their consciences stilled, that they can view and engage in colouring as a legitimate activity.

The subsequent generation of potential positive effect elements in the context of education for sustainable development provided the following structural elements:

- Immediacy of the experience

Positive effects were generated by the facilitation of an “experience”. The study showed that suspense inducing moments flow into curiosity, excitement and astonishment, with the emotional states mentioned indicators of experience processes and constituent parts of these experiences. Experiencing, especially direct experiences, have profound and impressive effects and, therefore, produce lasting impressions.

The “experiencing” hypothesis coincides with the hypotheses of Oevermann (1996, 1998). According to Oevermann education processes in the form of experiences present critical situations, the overcoming of which leads to the stabilising of the individual concerned. Such a stabilisation can be valued as a useful precondition for the sustainable handling of nature.

- Independence in the development process

Positive effects can result from the provision of opportunities to gain insight into natural phenomena independently. The provision of as authentic a natural experience as possible, that is an immediacy of the experience free of pedagogic guidance, is a constituent of independent learning processes, in other words the self steering of the handling is integral to the discovery process. A useful precondition for successful development exists when children are put in or find themselves in a situation where the difference between merely suspecting associations and the intellectual unveiling of the associations is possible.

- Leisure

Positive effects can be evoked by the facilitation of a degree of time and leisure. This hypothesis concurs with the findings of Reheis (1997). From his investigations Reheis came to the conclusion that people are especially keen to act in an environmentally friendly manner when they have “in their past education processes had enough time for the processing of impressions, the formation of motives and the growth of perseverance”. Reheis (1997) considers the time factor to be the decisive component of ecological education processes. This hypothesis concurs with Oevermanns (1996, 1998) “crisis of leisure” hypothesis, which he deemed fundamental to development processes.

These findings lead, in the context of practical environmental education, among other things, to the conclusion that “less is often more”. The special significance of the factor leisure should always be accorded consideration. The observance of this notion also impacts upon the type of content selected. Dealings with the “unconventional” development processes are as a result also determined differently. By employing open approaches it can happen that a different answer or a different approach to that or those origi-

nally planned arises. In accordance with the leisure principle it would be correct in such cases to accept this in place of the favoured solution of “unwanted” trains of thought. An enrichment in the context of the generation of new and possibly innovative ideas is more likely than would be the case through the employment of conventional approaches. In this case one cannot speak of the failure of a development process as all solutions are perceived as equal and legitimate.

- Primary, individual (nature) experiences/primary, individual knowledge

Repeatedly during this study moments arose in which primary, individual knowledge and primary, individual experiences flowed from the school children into the discussions. The school children’s participation was especially great when a connection to the fundamental aspects of their lives could be established, that is a thing that fall within the sphere of their individuality. Considerations on the extent to which an observed experiment process, possibly in an altered form, could be re-observed in every day life, is to a certain extent relevant to the school children and partly irrelevant. During the course of this study one comes to the conclusion that the decoding processes are in part simplified by the individual experiences and the individual knowledge of the children and at other times complicated (as they deliberate in a direction contrary to that which is “desired”). An “adequate” nature protection orientated mode of handling does not appear to be guaranteed by such knowledge but provides a means to evoke a motivation to act with care, that is the linking with elementary things associated with the identity-forming daily life of each individual impacts positively on the motivation for nature protection orientated modes of handling.

- Drawing of comparisons/structuring

The drawing of comparisons in the context of a classification or structuring is a means frequently used by the school children. Here it is also the case that such attempts at comparing and structuring, partly simplify and partly complicate the deciphering process. From the didactic perspective it would be worth arranging the experiments or programme points of an environmental measure, which resemble the format of the event presented in this study, according to the rule of maximum contrast. As the various stations differ noticeably from one another confusion is avoided, because certain experiments appear similar but target entirely different contents. Additionally, the exploring and experiencing of certain strongly contrasting “extremes” provides a very efficient means of comprehensively defining and projecting a specific area of experience.

Overall the drawing of comparisons is something that provides a valuable support to schoolchildren in order to classify that, which they have experienced (es., the size or speed of birds). It is recommended, therefore, that in practice this need is integrated into the planning and implementation of such measures.

– Aesthetics

It was revealed time and again in this study how memorable, but also how increasingly rare the aesthetic form of experience is. It repeatedly became clear that an initiated experience, and particularly an initiated aesthetic experience, represented an exception for the students, rather than the rule. It is evident that the school children have already experienced for themselves that aesthetic experiences are generally perceived as “superfluous”, and certainly more “in need of justification” than strongly cognitively structured subjects. The artistic-aesthetic experience had a direct positive effect on the school children, which could be readily observed.

Strongly “aesthetically” and “artistically” orientated experiences were a great motivation factor for the children. This fact correlated with the moment of experiencing and the personal experience (Oevermann 1998). Aesthetic experience necessitates a degree of time and leisure. For practical environmental education this means primarily that it is worthwhile to encourage aesthetic moments and provide for the necessary leisure component.

– Ethics

Ethical moments and questions played a central role in this study time and again. Above all, the often observed exchange between wariness and curiosity belong to this, but also the moments of sympathy, consideration and assertiveness. The interplay between wariness and curiosity was found in this study to be an especially typical structure of the process of environmental education. In this structure lies a strong association with environmentally correct dealings, that is a cautious approach is equivalent to responsible environmental actions, but an explorative, conservative, controlled curiosity can also lead to environmentally appropriate behaviour.

The interplay poses a particular challenge for practical environmental education. During the study it was shown that not all school children evidenced a desirable balance between the elements curiosity and wariness. The sphere of the independence must, therefore, be set an external boundary at the point where it loses equilibrium. At the same time, it can be attempted to provide impulses in favour of mindful behaviour or to extol the mindful behaviour exhibited by the school children, and also to channel curious behaviour in favour of environmentally correct attitudes.

Finally, the proposed hypotheses on the fundamental structural elements form a type of *foundation for a new recognition theory*, including *tenets for recognition theory didactics*, meaning that the didactics must also ally with the phenomena of such an elementary recognition theory.

In the prevailing school didactics of today the predominant approach involves, among other things, the standardised description of an object or phenomenon according to a specific formula and using technical terms.

In accordance with the results of this study, it becomes evident that such an approach cannot represent a lasting and sustainable education process. An education process is only initiated when the experience is a

structural experience, that is when the opportunity to expose links and associations lying beneath that, which is visible employing an unravelling process, exists.

In this case the result is the explanation of observed phenomena and objects, which is the objective of such a recognition theory.

## **Discussion**

The *discussion of the methods* revealed that the method of objective hermeneutics applied in this study, characterised by its qualitative, adductive reasoning, was very beneficial to the evaluation. When evaluating extra-curricular environmental education measures the content-related procedures must be analysed. Pure “facts” and “numbers” are not sufficient to portray the quality of an event. Alone the fact that, for example, the number of projects taking place at a particular environmental education centre or the number of children that participated in a specific measure are not enough to determine the value of an event. The fine analytical-reconstructive perspective is required to facilitate the definition of the potentially “new” (new contents or structures) offered by an environmental education facility and to assess whether these innovations have been successful or not. In the case of environmental education measures quality is to be expected when the innovations successfully achieve sustainable future dealings with natural resources.

The *discussion of the objectives* showed that, in the case of the teaching plan, the targeting of competence has received increasing attention in recent years. In the teaching plan studied here there is a clear focus on environmental handling and the associated competences (problem-solving competence).

Behind the objectives of the school lies the assumption that the effectiveness of schooling, at least in the traditional sense, in other words frontal instruction, is limited. It is implicitly assumed that the primary experience cannot be substituted in a secondary didactic manner, certainly not entirely. The assumption draws especially on the limited effectiveness of fields which concern attitudes and attitude changes as well as behaviour/handling and altering behaviour/handling.

The Ökostation aims primarily to create environmental awareness and explicitly the evocation of environmentally correct and nature protection behaviour. The predefinition of objectives, both the general and the specific objectives, corresponds to the greatest possible extent to the guiding example provided by the education for sustainable development approach. A particular emphasis lies on the intention to motivate environmentally appropriate handling. Above all, the factors “experience” and “experiencing” are held as the most suitable means of translating this intention. This makes evident a degree of understanding operating behind the objectives, namely the perception that primarily the independent and authentic experience, that experiencing for one’s self, are most likely to generate the desired effect. It is assumed that as a matter of principle only the primary appropriation of

experience of nature leads to a responsible handling of natural resources. Accordingly, “knowledge transfer” (in contrast to “experience”) is attributed a significantly lower weighting. This assumption corresponds with the hypotheses of Oevermann, who argued for education processes instead of knowledge training, and in doing so for crisis experience instead of routine procedures (Oevermann 1996, 1998).

With respect to the *effects of environmental education measures*, positive outcomes arose particularly from the opportunity for direct experiencing, the opportunity for independent re-cognition processes, the facilitation of moments of leisure, the opportunity to connect individual (nature) experiences or individual knowledge, the opportunity to draw comparisons and to structure, and the facilitation of aesthetic moments and moments of ethical awareness.

As expected, it proved to be especially difficult to demonstrate effects in the area of sustainable environmental handling. This difficulty is well known (Langeheine and Lehmann 1986, Braun 1983, Lehmann 1999, Bögeholz 1999).

The discussion of the effects in the context of the concept of formative competence put forward by de Haan and Harenberg (2001), as one of the best known educational models of the education for sustainable development approach, should present in conclusion whether or to what extent the results of this study correspond with the demands of the concept.

The concept is understood as an approach not just concerned with placing the transfer of natural science knowledge, the specified reorientation of environmental attitudes and the modification of environmental behaviour to the fore, but attempts to promote the development of competence aimed at the recognition of environmental problems and the development of proposals for solutions. To attain formative competence means to possess capacities, skills and knowledge facilitating changes in the areas of economic, ecological and social handling, without these changes always being merely a reaction to problems previously created. “Sustainable development does not refer to a stabilisation or reversal of the status quo but signalises a complex social formation task in which global and local dimensions of the shaping of the future merge” (de Haan and Harenberg, 1999). Design competence, therefore, focuses attention onto the future, the variation of that which is possible and active modelling. This constitutes aesthetic elements as well as the question of the shape that economics, consumption and mobility might and should take, or the manner in which leisure time and everyday life is spent, the shape of communal policy and international relations, etc. Overall, formative competence for sustainable development can be characterised by a number of social, cognitive and emotional competences. The differentiation of sub-competences is an analytical action used to emphasise the target and the importance of individual elements. In the realisation, and attainment, of competences such a disentanglement of individual elements is barely imaginable. According to de Haan and Harenberg (1999) sub-competences include:

- Forward thinking, knowledge and skills in the field of future scenarios and projections
- Capacity for interdisciplinary approaches to problem solving and innovation
- Networking and planning competence
- Capacity for community spirit and solidarity
- Capacity for transfer of ideas and cooperation
- Capacity for motivation
- Competence for critical reflection upon individual and cultural models.

Overall it is apparent that the sub-competences proposed by de Haan and Harenberg (2001), generally conceived very broadly and at a high level, namely that of the ideal state, cannot be directly transferred to environmental education measures. Nevertheless, individual elements can certainly be discovered during the course of a measure, in the small details. Above all, the opportunity for independent discovery, with the emphasis on independent, and the feelings induced by the accompanying sense of excitement, contribute towards the fundamental contents of the sub-competences and render the environmental education measures at the Freiburg Ökostation a success in the context of the education for sustainable development approach.

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## **Sub-session 1.2**



# **ÉDUCATION A L'ENVIRONNEMENT EN TUNISIE : CONCEPTIONS ET CHANGEMENTS CONCEPTUELS CHEZ DES LYCÉENS (CAS DE LA 2<sup>ÈME</sup> ANNÉE SECONDAIRE)**

**Alaya Alaya**

*ISEFC de Tunis et LIRDHIST -Université Claude Bernard Lyon 1*

**Pierre Clément**

*LIRDHIST -Université Claude Bernard Lyon 1*

## **Résumé**

Cette recherche s'intéresse aux conceptions de lycéens tunisiens sur la nature et sur l'environnement, et analyse leur évolution à l'issue d'une année qui comporte un enseignement sur l'environnement. L'échantillon est constitué de 69 lycéens de 15-17 ans (trois classes de la 2<sup>ème</sup> année du secondaire dans trois régions de la Tunisie : Nord, Centre et Sud). Pour l'essentiel, il n'y a pas eu de différences significatives dans les conceptions des élèves de ces 3 classes.

Nous avons utilisé un questionnaire dont la validité avait été testée sur des échantillons d'étudiants dans divers pays : il comprend des questions relatives soit à certaines connaissances, soit à des jugements de valeurs sur la nature et l'environnement.

Les résultats montrent que les conceptions des élèves évoluent plus facilement en ce qui concerne l'acquisition de connaissances scientifiques, que lorsqu'il s'agit de valeurs à fort ancrage culturel.

Cependant les raisonnements linéaires (tels que les chaînes alimentaires) s'acquièrent plus aisément que conceptualisations avec cycles ou régulations.

## **Introduction**

Ce travail analyse les conceptions de lycéens tunisiens avant et après les quelques mois durant lesquels ils ont suivi une éducation à l'environnement (2<sup>ème</sup> année du secondaire, élèves de 15-17 ans), afin d'évaluer leurs éventuels changements conceptuels sur la nature et l'environnement.

Les conceptions seront analysées en tant qu'interactions entre 3 types de paramètres (KVP) : connaissances scientifiques (K), valeurs (V) et pratiques sociales (P). (Clément 1998, 2001).

Notre recherche essaie de répondre aux questions suivantes :

- Quelles sont les conceptions des élèves tunisiens de 2<sup>ème</sup> année secondaire sur la nature et sur l'environnement ? Varient-elles d'une région tunisienne à une autre ?

- Ces conceptions changent-elles après une année durant laquelle ils ont suivi un enseignement sur l'environnement ? Si oui, quelles sont les composantes des conceptions (K, V, P) qui ont le plus évolué chez ces élèves ?

## Méthodologie

Les conceptions des élèves sont analysées à partir de leurs réponses à un questionnaire, validé par des recherches antérieures, sur les conceptions d'enseignants français, portugais et allemands (Forissier et Clément 2003a, 2003b, Forissier 2003). Ce questionnaire de quatre pages ne peut être reproduit ici. Il a été proposé aux élèves d'une part avant les enseignements sur l'environnement (pré-test en février), ensuite à l'issue de ces enseignements (post-test en mai). Trois classes du même niveau (2<sup>ème</sup> année secondaire), mais localisées dans trois régions différentes de la Tunisie ont été choisies : Région Nord, à Borj-Cédria, « classe C », n = 28 ; Région Centre, à Fériana, « classe F », n = 16 et Région Sud, à Jemna, « classe J », n = 25.

Les réponses sont comparées par analyse statistique classique (test de Khi2) puis par analyse multivariée (AFC : Analyse factorielle des correspondances), en utilisant le logiciel ADE-4 (disponible sur Internet). Ne sont présentés ici que certains de ces résultats.

## Résultats.

### Evolution des conceptions des élèves sur le schéma d'un écosystème

Une question demandait aux élèves de relier par autant de flèches que possible les éléments (énumérés) de l'écosystème prairie, en indiquant la signification de chaque flèche: soleil, sol, herbe, O<sub>2</sub>, CO<sub>2</sub>, bactéries, lapins, renards.

Plusieurs types d'interactions étaient *a priori* envisageables, mais les élèves n'en ont schématisé que deux (le réseau trophique et la respiration/photosynthèse), que nous analysons séparément bien qu'ils soient présents sur le même schéma (nous utilisons les mêmes catégories que Forissier & Clément 2003a).

Aucune différence significative n'ayant été mise en évidence entre les 3 classes, leurs résultats sont regroupés dans les deux tableaux qui suivent.

Réseau trophique	Pré test	Post test
chaîne trophique linéaire	31 (45,0%)	52 (75,4%)
chaîne linéaire avec dégradation	1 (1,5%)	5 (7,2%)
cycle de la matière	3 (4,3%)	7 (10,1%)
pas de schéma -incompréhensible	34 (49,3%)	5 (7,2%)

La différence est très significative entre les deux tests (Khi2 = 31.14) : le nombre des élèves ayant effectué un schéma avec des liens trophiques est passé de 35 à 64 sur les 69 élèves. Cependant, parmi ceux qui

ont répondu à la question, la proportion de ceux qui ont effectué un schéma linéaire, sans décomposeurs ni cycles, reste très majoritaire (passant de 89% à 81%), et la proportion de ceux qui ont représenté des cycles de la matière reste très faible (passant de 9% à 11%).

<b>Respiration/photosynthèse</b>	<b>Pré test</b>	<b>Post test</b>
O2 et CO2 non reliés	2 (2,9%)	12 (17,4%)
O2 et CO2 reliés de manière linéaire	9 (13,0%)	17 (24,6%)
O2 et CO2 inclus dans un cycle	1 (1,5%)	4 (5,8%)
pas de schéma -incompréhensible	57 (82,6%)	36 (52,2%)

Pour la « respiration/photosynthèse », la différence est également très significative entre pré et post-test ( $\text{Khi}^2 = 16.14$ ) : le nombre des élèves ayant schématisé des liens incluant O2 et CO2 est passé de 12 à 33 sur les 69 élèves. Cependant, parmi ceux qui ont mis ces éléments dans leur diagramme, la proportion de ceux qui ont indiqué un cycle (par exemple le CO2 rejeté par la respiration est utilisé pour la photosynthèse, ou inversement pour l'O2) est restée très faible (de 8 % à 12 %).

Au total, en ce qui concerne ces connaissances sur un écosystème, il y a à la fois une évolution significative des élèves, qui sont plus capables de répondre en fin d'année, mais cette évolution ne remet pas en cause la prédominance d'une pensée linéaire : seuls 4 élèves sur 69 passent de la chaîne alimentaire à des cycles trophiques, et seuls 3 de plus introduisent en fin d'année des cycles pour la respiration/photosynthèse.

### **Evolution des conceptions des élèves sur la nature et l'environnement**

#### **Les termes associés à « nature » et « environnement »**

Les réponses des élèves ne diffèrent pas dans les trois classes ni entre pré et post-test, par rapport au principal critère utilisé ici : les mots associés relatifs à l'homme ou ses activités. Ils restent très rares dans les deux tests (1 à 5 fois selon la classe). Sans différence entre nature et environnement.

Pour ces élèves, l'opposition homme/nature est dominante. Dans les dictionnaires de la langue arabe tels que « Alkamous Almadrassi » (BeLhaj Yahia et al, 1999), l'homme souillerait la nature : c'est pourquoi il ne lui est pas associé. L'homme est « attabaou » ou sans scrupules (Lissan el arab d'Ibn Mandhour, 1995). Pour ce critère, l'environnement semble considéré comme la nature.

## **Le différenciateur sémantique appliqué aux termes « nature » et « environnement »**

Une AFC a été réalisée, avec la même méthode que celle utilisée par Clément *et al* (1988) :

- La nature est caractérisée par les 9 adjectifs suivants : sauvage, agréable, secrète, pure, généreuse, à préserver, donnée, propre et bonne ;
- L'environnement est caractérisé par les 9 adjectifs antonymes : artificiel, désagréable, dévoilé, impur, exigeant, à aménager, construit, sale et mauvais.

Les conceptions sur la nature et l'environnement diffèrent donc par rapport à ces critères, mais n'évoluent pas, ou guère, entre pré et post-test.

Lorsque les jugements étaient catégoriques avant l'enseignement, celui-ci ne les a pas modifiés (classes J et F). En revanche, lorsqu'ils étaient moins tranchés au départ (conceptions relatives à la nature pour la classe C), ils ont un peu évolué suite à l'enseignement mais en restant peu tranchés.

## **Les OGM, et l'ESB, sont-ils « contre-nature »?**

Le nombre des élèves qui pensent que les organismes génétiquement modifiés (OGM) sont contre-nature est resté sensiblement le même dans les pré- et post-tests. Il en est de même pour l'encéphalopathie spongiforme bovine (ESB) qui pour la moitié des élèves est une punition de Dieu car l'homme a fait ce qu'il ne faut pas faire (nourrir des herbivores avec des farines animales).

## **Conclusion**

Au total, les conceptions des élèves sur la nature et l'environnement ont peu ou pas évolué, alors que leurs connaissances sur un écosystème ont évolué, même si pas suffisamment par rapport aux objectifs espérés. Plusieurs hypothèses sont possibles, sans être exclusives l'une de l'autre.

Le fait qu'il n'y ait quasiment pas de différences entre les 3 classes testées suggère soit que la façon dont les enseignants ont pris en charge l'éducation à l'environnement est voisine, soit que le programme et les manuels ne concernent guère ces évolutions (nous analysons en ce moment les programmes et manuels dans cette optique), soit enfin qu'il s'agit de conceptions fortement ancrées culturellement.

Par ailleurs, les connaissances (K) sur un écosystème évoluent relativement plus facilement que les conceptions sur la nature et l'environnement plus enracinées dans la culture des élèves (leurs systèmes de valeurs V, et leurs pratiques sociales P). Une telle opposition entre connaissances et opinions a été notée par plusieurs auteurs (Simonneaux 1995, Abou Tayeh et Clément 1999).

Enfin, la difficulté pour des étudiants et enseignants à assimiler et mobiliser des conceptions systémiques (avec cycles, boucles de rétroactions) dans un écosystème, a déjà été notée par Forissier & Clément (2003a) en France, en Allemagne et au Portugal. Des recherches sont en cours pour analyser les conceptions des enseignants tunisiens sur la nature et l'environnement, ainsi que celles qui sont exprimées par les programmes et manuels scolaires.

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## **ROLE, METHODOLOGIES AND STRATEGIES LABORATORIES FOR ESD OF THE PROVINCIA DI ROMA: RESULTS OF AN ASSESSMENT PROCESS ON FIVE YEARS OF PRACTICE**

**Antonella Arcangeli**  
*LEA Provincia di Roma*

### **Abstract**

In 1995 the Italian Ministry of Environment and the Ministry of Education endorsed a Programme called INFEA, funding the establishment of a National System of Laboratories for Environmental Education. The initial aim was linking, promoting and strengthening local experiences and national programmes of Environmental Education in an effective strategy based on a continuous comparison of models, approaches and methods.

The Local Authority of the Rome district (Provincia di Roma), from 2000 to 2005, established seven Laboratories (leas) spread over its territory; leas are run through local, or national, ngos and are supervised by the Environmental Department of Provincia di Roma. In this framework, in the last five years, leas focused their role on different levels:

- Operating at local level.
- Managing at district network level.
- Maintaining the connection with national INFEA system.

At present, the challenge for the INFEA National System is its new organization on a Regional scale, and therefore, in different Departments of Provincia di Roma, like elsewhere in Italy, this re-organization has generated a debate about the role, the strategies and the resources for local LEAs.

Thus, our LEAs network tried to review the first five years of practice, through an assessment/self-assessment of strength-weakness analysis, rethinking and rebuilding the “mission”, the methodologies and the strategies of the seven LEAs. Furthermore, which should be, according to each specific role, the best “body” – if NGOs or directly the Public Authority – able to run the LEAs’ mission was deeply examined.

This paper introduces different paths along which LEAs are moving, displaying the results of the assessment process, started in 2004 also in view of the UNESCO Decade for ESD.

## Background: INFEA

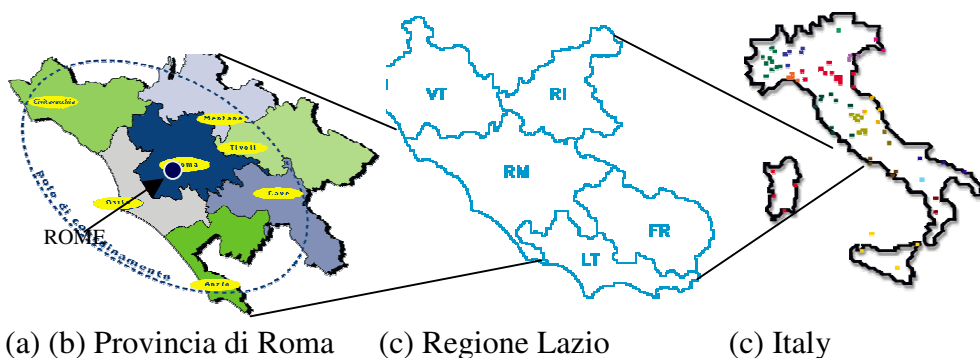
In 1992 the Rio conference definitely defined the meaning of Sustainable Development, giving to Environmental Education the key role of promoting Sustainable Development related principles.

In the following years the Italian Ministry of Environment and the Ministry of Education endorsed a Programme called INFEA (Environmental Information, Education and Training Programme) to promote a National System for Environmental Education. INFEA programme funded the establishment of new structures, called Territorial Laboratories of Environmental Education, Information and Training (LEA and LABTER). The aim of the National system of Laboratories for Environmental Education was linking, promoting and strengthening local experiences and national programmes of Environmental Education in an effective strategy, based on a continuous comparison of models, approaches and methods.

Following the Ministry indication, in 2000 the Local Authority of the Rome District – Provincia di Roma – in agreement with the Regione Lazio, established five Laboratories (LEAs) spread over its territory; in 2003 other two new LEAs are been established to cover the entire territory.

In the last five years, LEAs focused their role on different levels:

- (a) Operating at local level
- (b) Managing at district network level
- (c) Maintaining the connection with National INFEA System.



LEAs Provincia di Roma experience a mixed management between public and private sector organizations: they are run through local, or national, NGOs and are supervised and coordinated by the Environmental Department of Provincia di Roma (Tab.1).

National NGO	Regional NGO	Local NGO
Accademia del Leviatano	Terranostra	Associazione Amici dell'Inviolata

Acli Anni Verdi	Umana Dimora Lazio Onlus	Archeoclub d'Italia – Sezione Mentana Monterotondo
Cyberia idee in rete	WWF Lazio	Associazione Pan Nomentum Onlus
CTS Centro Turistico Studentesco		Associazione Socio Culturale Progetto XIII
Umana Dimora Onlus		Centro Culturale 25 Aprile Onlus
		Circolo Armonia di Legambiente Onlus
		Circolo Legambiente “Le Rondini” Anzio-Nettuno
		Circolo Legambiente di Tivoli
		Italia Nostra Sez. Aniene e Monti Lucretili
		WWF Sez. Valle dell' Aniene e Monti Lucretili

Table 1. Most of the NGO running the LEAs are local organization, to guarantee a strong relation to the local territory.

At present, the scenario of environmental education in Italy is changing: new structures and new networks have been set up without any connection between them, INFEA programme is no longer funded by the central authority and the new challenge for a National System of Environmental Education seems to be a new re-organization on a Regional scale with an interregional coordination.

Therefore, in the Provincia di Roma LEAs' system, like in all the organizations and governmental departments responsible for the INFEA programme present in Italy, this re-organization has generated a debate about the role, the strategies and the resources for local LEAs operating in Italy. The key questions are:

- How are the LEAs doing? Is there still need of something like the LEAs organizations?
- If yes: what are the characteristics of a skilful working LEA?
- Furthermore, could the “LEA Provincia di Roma network system” be a model of good practice to correctly address sustainability in a fast changing millennium?

### **The self assessment process “Punto a capo”**

To answer to these this questions we began, in 2005, an assessment/self-assessment process on the previous five years of practice of LEAs called “Punto a capo”. At the assessment process took part the entire

staff of LEAs, the responsible for the 19 NGOs running the seven LEAs and the responsible of the Environmental Department of Provincia di Roma.

In this process we worked on:

- A review of the first five years of work.
- An analysis of strength and weak points.
- A review of major documents about sustainability and INFEA programme.
- A re-examination of the “mission”, the methodologies and the strategies of the seven LEAs.
- A re-consideration of which should be, according to each specific role, the best “body” (if NGOs or directly the Public Authority) able to improve the running of the LEAs’ mission.

We decided to start our process analysing directly from the meaning of the name, LEA, which in fact means “Territorial Laboratory of Environmental Education, Information and Training”. In addition, we also investigated the best way to manage the LEA and the meaning of network in a LEA.

## **Results**

Being a “Laboratory” means that LEA is a dynamic project: primarily because, in a changing scenario, it must continuously redefine actions and priorities and, secondly, because working in cooperation means being able to change and re-organize after confrontation and knowledge exchange. Being “Laboratory” also means that LEA must do research on Environmental Education. Consequently, methodologies have always to include a cycling process of analysis of the situation, work hypothesis, planning, experimentation, assessment and exchange of achievements.

Being “territorial” means:

- Knowing and participating the territory and its needs, the cultural heritage, the history as well as its problems.
- Acknowledging the community groups that operate and live in the territory.
- Promoting the sharing of interests and actions between the different groups that act in the territory.
- Having the competence and the experience required to become a recognized structure also capable of managing the conflicts in action.
- Strengthen cooperation and partnership between the LEA and the territory and between the parts that act in the territory.
- Supporting and valuing the diversity.
- Acting to promote sustainability starting from the local territory.

Working on “education, information and training” means to promote Sustainable Development not only through formal education in schools but also through non formal and informal learning processes, to plan actions in

order to involve the civil society and to endorse training programme in order to equip educators and teachers with the competence to promote Sustainable Development principles in their teaching.

About the meaning of “environmental”, we agreed with the comprehensive meaning of environment that obviously includes social, cultural, economic, politic, ethic and natural environment.

Relating to the best way to manage the LEA, we agree that LEA needs to belong to the public sector, so that to be able to keep its *super partes* (impartial) role of coordination and stimulation. Furthermore, belonging to the public sector will guarantee the possibility of a long run process. Nevertheless, to be able to rapidly adapt to changing scenarios, to be able to follow innovations and to keep updated, LEA needs to have an “agile” and “low bureaucracy” management. However still remain crucial the possibility to inter exchange with the NGO.

Networking in LEA means that LEA is not only part of different networks but it always acts to build up new cooperation chances, in order to increase the possibility of comparison and exchange of experiences. In this view each action became a good reason to set up a new net and each programme focus also on promoting cooperation chances.

Looking at some examples of LEA best practices, as it is shown in the figure below, we work on a continuous cycles of:

A) Analysis of situation” as the assessment on student environmental perception.

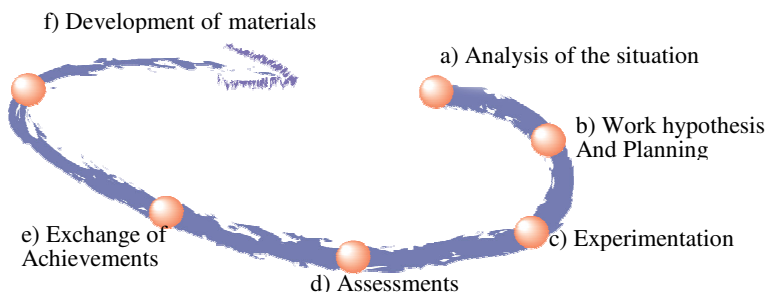
B) “Work hypothesis” and “Planning” going from a problem analysis to a priority action plan.

C) “Experimentation” as the research on effective communication that also explores arts, literacy, and emotional experiences; experimentation of new methodologies as simulation games; support to local projects or training courses planned also as cooperation opportunities between responsible of private and public organisations, teachers and students.

D) “Assessment” of all activities.

E) “Exchange of achievements”.

F) “Development of materials” as cooperation occasions and as support for other ESD programmes.



## Discussion

So, “Is there still need of something like the LEAs?” From our assessment emerges how there is still need of something like LEA’s system, especially if it maintains a *super partes* role of coordination and stimulation, it is managed in a way to guarantee a long term planning and, at the same time, in a way to reduce bureaucracy in order to maintains the necessary flexibility to adapt programmes and actions to fast changing conditions.

“Which are the characteristics of a good working LEA?”: according to our assessment, a skilful LEA deeply knows the territory in which it acts, it elaborates strategies based on the real priorities, it knows and gives a contribute to evaluate the structures that operate in the territory, it creates occasions of comparison and exchange, it looks for the best practices to experiment and to diffuse.

To answer the last question “Could the LEA net system be a model of good practice to correctly address sustainability?” we opened a yahoo group to extend the discussion to all that are interested in the topic.

For this reason we profoundly hope you to join us at “the [informaLEAdiscussion@yahoogroups.com](mailto:informaLEAdiscussion@yahoogroups.com)”.

## Acknowledgements

This review is a first step of a process built up thanks to the passion and the work of the many people that, trying to manage the differences existing between the seven LEAs of the Provincia di Roma, are looking for a way to work together on the same goal, moving towards a sustainable future:

We thanks the support given from all people directly or indirectly involved in LEA's “Punto a capo” review process, the Environment Department of Provincia di Roma, particularly the direct support of Tullio Marcotulli and Paolo Barone, and the Regione Lazio.

**LEA POLO DI COORDINAMENTO**  
pololab@provincia.roma.it

**LEA ANZIO**  
leanzio@provincia.roma.it  
S. Bonaventura, F. Manzone,  
C. Forcina, S. Guglielmi

**LEA CAVE**  
leacave@provincia.roma.it  
E. Ferretti, A. Di Renzo, D. Gramiccia

**LEA CIVITAVECCHIA**  
leacivitavecchia@provincia.roma.it  
F. Paglino, S. Volpi, F. Marotta

**LEA MENTANA**  
leamentana@provincia.roma.it  
U. Calamita, P. Grandi,  
L. Corbelli, R. Milozzi

**LEA OSTIA**  
leaoestia@provincia.roma.it  
F. De Sanctis, A. Rinelli, S. Bianciardi

**LEA ROMA**  
learoma@provincia.roma.it  
A. Arcangeli, E. Mitrovic, B. Puratich

**LEA TIVOLI**  
leativoli@provincia.roma.it  
A. Bunone, V. Ippoliti, P. Ramondo,  
E. Di Giacomo

[www.provincia.roma.it/ServizioAmbiente/index.asp](http://www.provincia.roma.it/ServizioAmbiente/index.asp)

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**SCUOLA 10 E LODE.  
AN ENVIRONMENTAL-CERTIFICATION PROJECT  
FOR SCHOOLS  
IN THE EMILIA ROMAGNA REGION (ITALY)**

**Antonella Bachiorri**

*Italian Centre for Research  
and Environmental Education (CIREA)*

*Department of Environmental Science – University of Parma*

**Cristina Bondavalli**

*Legambiente Emilia Romagna*

**Alessandra Puglisi**

*Italian Centre for Research  
and Environmental Education (CIREA)*

*Department of Environmental Science – University of Parma*

**Silvia Selmi**

*Legambiente Emilia Romagna*

## **Introduction**

The project “Scuola 10 e lode” endorses a view of Environmental Education that reflects the issues debated at the Rio de Janeiro Summit (1992) and found a wide implementation in the framework of the United Nations Decade of Education for Sustainable Development (2005-2015).

“Scuola 10 e lode” has been promoted by Legambiente Emilia Romagna, a non-governmental organisation established to protect the environment; recently, the Italian Centre for Research and Environmental Education (CIREA) of the University of Parma joined the project as a partner. Main goal of the project is to develop an “environmental certification” approach addressed to schools, to support the improvement of their environmental performances (impacts reduction) and to integrate sustainability principles in schools *curricula*. The certification procedure has been designed according to international standards (Emas, ISO 14001, etc.). The project roots in the dynamic assumptions of international certifications, including: a) periodical evaluations of the “state of the art”; b) constant improving of performances. This can be achieved through projects, which aim to integrate the often-fragmentary activities characterizing school context. The recent objectives pursued by the Emilia Romagna Region within the third regional program INFEA (Information, Formation and Environmental Education) 2005-2007 (Regione Emilia Romagna, 2005) provide the framework for an innovative approach whose cornerstones are: 1) promoting the ability of school to activate links and multiple interactions with its “social” environ-

ment; 2) taking care, in cooperation with other stakeholders, of specific environmental problems; 3) integrate internal and external human resources in a more efficient School Educational Offer (POF).

The active role, the students and all the stakeholders within the school framework are requested to play in the project, would greatly enhance the educational function of this experimental approach and contribute to develop dynamic and useful interactions between the school and the local community.

## The project

The main tool characterizing the project, upon which it has been assembled and organized, is the sustainability Decalogue (Figure 1). It lists a series of issues that relate to aspects for which schools should improve their environmental performances. This in turn can be obtained melting together awareness-oriented initiatives and concrete structural modifications.

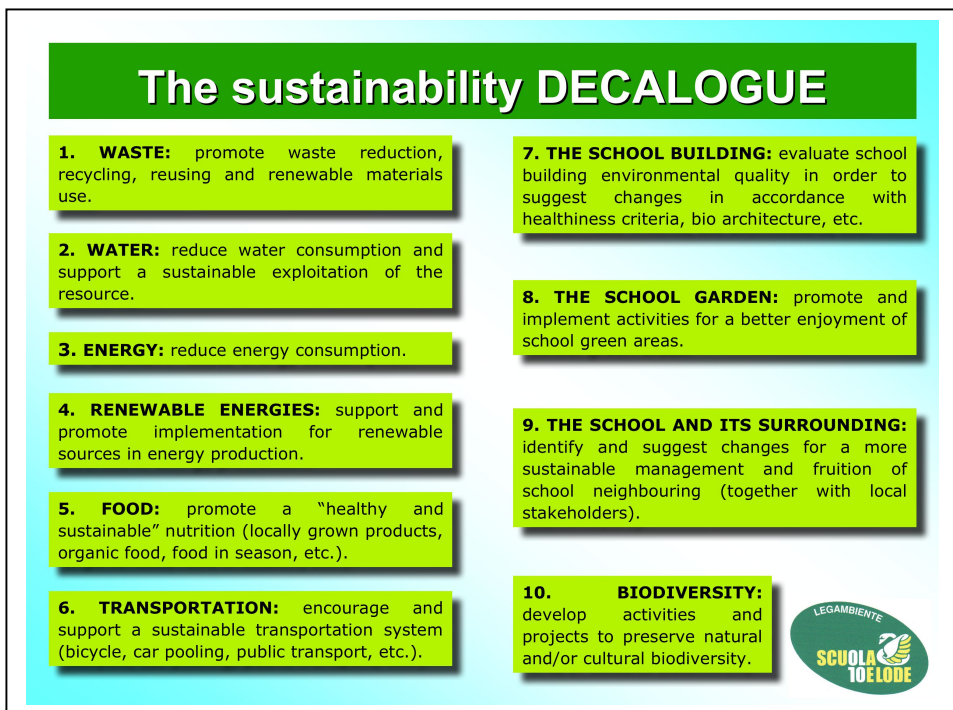


Fig.1. The Decalogue

The stakeholders' involvement has been achieved through the Commission, an organism in which all the school subjects are represented (students, teachers, parents, administrators, etc.). It constitutes the "melting pot" in which all ideas, projects and needs of school and extra-school actors converge. It also represents the benchmark for organizing and coordinating all actions related to the project.

According to the ten items included in the Decalogue, schools performed an Audit, that is a questionnaire conceived and designed to investigate school baseline environmental performances. The Audit yields the "state of the art" from which one evaluate impacts and identify priority actions. Moreover, it represents the opportunity for the acquisition of an historical dataset, useful for a quantitative monitoring of long-term changes in school performances.

Audit results allowed schools to elaborate the School Project, the action plan to implement sustainability in practice. It comprises of two separate sub-projects:

- A short-term project, to be completed within one school year, that must deal with all the different subjects listed in the Decalogue. It implies a minimum level of action, such as increasing environmental awareness through every-day class activities
- A long term project, to be completed within three school years, that must bring to a completion at least one point of the Decalogue, producing concrete changes.

The School Project provided also to list short and long-term targets together with actions useful for their fulfilment, for each of the ten points/topics identified in the Decalogue.

A further action toward certification is Monitoring. Each single school underwent a critical evaluation, based on the results achieved, project timing, and coherence between actions and results within the framework of project aims and certification requirements.

In details, Monitoring includes:

- Student questionnaires, conceived to obtain clues about their perception and practical involvement in relation to the Decalogue issues.
- School inspections, to assess the progress of the projects.
- Critical analysis of each single school project, to check the results obtained in terms of environmental awareness and practical implementation of initiatives.

Schools, which accomplished all the requirements, working for three years on a project, received the "Scuola 10 e lode" certification..In details, at the end of the school year 2004-2005 the certified schools were:

- Istituto Comprensivo di Grizzana Morandi (BO) (elementary school)
- Direzione Didattica di Bomporto (MO) (elementary school)
- Scuola Media Statale "A. Pio", Carpi (MO) (middle school)
- Scuola Media Statale "M. Buonarroti", Fabbrico (RE) (middle school)

- Istituto Tecnico Commerciale Statale “R. Luxemburg”, Bologna (high school).

## **Discussion and Conclusions**

Results obtained during this first period of testing are useful to highlight strong and weak aspects of the project, and provide clues for improving it in view of its future implementation. The major strength of the project lies in its scientific methodological basis, which broadens the traditional idea of a nature-oriented environmental education including participative and systemic approach toward sustainability. The project, in fact, has grown and developed along educational trajectories in which practical activities play a central position.

Through active participation and reciprocal interactions, all the stakeholders within the school framework created a beneficial synergism, which amplified the educational value of this project, with positive effects in terms of development of a new and dynamic connection between school and local community. All of this has stimulated a broader, highly integrated approach to school activities that usually are characterized by high fragmentation..Thanks to this approach, single-class activities become a spin-off for the entire school involvement, supporting and facilitating the idea that environmental education is a permanent element in every single aspect of everyday school life.

At the same time, this first period of implementation has revealed some difficulties in putting into practice entirely the methodological and conceptual *apparatus* that constitute the backbone of the project. In particular, we emphasize the following aspects:

- Not all the issues listed in the Decalogue, the main tool characterizing the project, could be addressed practically in every different local context. Therefore, the Decalogue should be adapted to specific needs and characteristics of every single school
- The Commission, conceived as an operative-working tool, often became a pure formal and bureaucratic institution. Its main function, that is integrating all the stakeholders points of view and using this synthesis for planning new strategies for actions, has remained in many cases a pure desire
- The Audit too often came out to be a spoil list of data and notions, without any positive impact in terms of motivation for planning and action
- In several schools, it has been very difficult to work at the same on short and long terms projects, both from the practical and educational point of view. In fact, they represent two different scales of action and have created both logistic and conceptual problems
- The Monitoring represents an important phase; sporadic school visiting, as it has been done, did not provide enough knowledge about the level of performance (both practical end educational)

that each school reached after project completion. Accordingly, the logistic of visiting should be completely re-defined, with a higher number of meetings for each school. As for the questionnaires, teachers erroneously considered them as instruments through which their activity was evaluated. A proper view of the function of these tools is one that considers them as simple indicators of student perception of the problems addressed during the project. To this end a drastic reshaping of the questionnaire seems necessary.

According to the above issues, the whole project has been re-examined and substantial modifications have been introduced as for the single aspects. Such review was necessary to render the project: a) more coherent with the fundamental requirements of environmental education toward sustainability and b) more flexible in relation with the special needs and requirements of every single school environment. On this basis the auspices are that an ever-increasing number of schools would take part in the project, with new approaches that could improve the original idea that has inspired the initiative discussed in this paper.

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## **SCUOLA 10 E LODE UN PROGETTO PER LE SCUOLE DELL'EMILIA ROMAGNA**

**Antonella Bachiorri**

*Centro Italiano di Ricerca ed Educazione Ambientale (CIREA)  
Dipartimento di Scienze Ambientali.  
Università degli Studi di Parma*

**Cristina Bondavalli**

*Legambiente Emilia Romagna*

**Alessandra Pugliesi**

*Centro Italiano di Ricerca ed Educazione Ambientale (CIREA)  
Dipartimento di Scienze Ambientali  
Università degli Studi di Parma*

**Silvia Selmi**

*Legambiente Emilia Romagna*

### **Introduzione**

“Scuola 10 e lode” è un progetto che vuole far propria un’idea di educazione ambientale coerente a quanto elaborato a partire dalla Conferenza di Rio de Janeiro (1992) e che trova un’ampia implementazione nell’ambito della Decade dell’Educazione per lo Sviluppo Sostenibile proclamata dalle Nazioni Unite per gli anni 2005-2014. Il progetto è stato promosso da Legambiente Emilia Romagna; recentemente si è unito, quale partner, il Centro Italiano di Ricerca ed Educazione Ambientale (CIREA) dell’Università di Parma.

Obiettivo del progetto è quello di sperimentare un sistema di “certificazione ambientale” rivolto alle strutture scolastiche, coerente all’idea di integrare i principi della sostenibilità all’interno dei curricula ed ai principi delle certificazioni internazionali, supportando un sistema in grado di migliorare le prestazioni ambientali delle scuole (riduzione degli impatti).

Il progetto si muove coerentemente con i presupposti dinamici delle certificazioni, che prevedono verifiche periodiche di mantenimento e di continuo miglioramento, sviluppando progetti in grado di integrare le attività spesso frammentarie che caratterizzano il contesto scolastico.

Le valenze innovative del progetto si collegano ai più recenti obiettivi perseguiti dalla Regione Emilia Romagna nell’ambito del Terzo Programma regionale INFEA (2005-2007), quindi alla promozione di una “scuola laboratorio” in grado di attivare reti e relazioni “con il suo territorio, facendosi carico con gli altri attori sociali dei suoi problemi e... in grado di accogliere le competenze e le risorse esterne che possono utilmente integrar-



si con il suo Piano dell'Offerta Formativa". Il coinvolgimento degli studenti e dei soggetti che operano nel contesto scolastico valorizza inoltre significativamente il ruolo educativo della sperimentazione e, allo stesso tempo, supporta un rapporto nuovo e dinamico tra scuola e territorio.

## Il progetto

Lo strumento relativamente al quale si è articolato il progetto è rappresentato dal *Decalogo* (Figura 1), che individua le tematiche sulle quali la scuola è chiamata a migliorare le proprie prestazioni, coniugando inscindibilmente le iniziative di sensibilizzazione a percorsi in grado di tradursi in interventi concreti.

Il coinvolgimento di tutti i soggetti che operano nel contesto scolastico si è realizzato attraverso l'istituzione del *Comitato* (composto da insegnanti, studenti, non docenti, genitori, amministratori scolastici e autorità locali) che ha costituito il principale punto di riferimento delle attività relative al progetto e ne ha coordinato lo sviluppo.



Fig.1. Il Decalogo

Sulla base delle tematiche indicate nel Decalogo, le scuole hanno effettuato un *audit iniziale*, utile a documentarne lo stato dell'arte e finalizzato all'individuazione degli impatti e delle azioni da intraprendere. Ciò è risultato utile, inoltre, per l'acquisizione di una serie storica di dati relativi alla realtà scolastica, funzionale a monitorare anche quantitativamente i cambiamenti nel lungo periodo.

I risultati dell'audit hanno permesso quindi alle scuole di elaborare un *Progetto d'Istituto* suddiviso in due sottoprogetti:

a) un progetto realizzabile *a breve termine* che prevede attività minime (semplice sensibilizzazione nell'ambito delle attività curricolari) su tutte le tematiche indicate nel decalogo, da svilupparsi nell'anno scolastico in corso

b) un progetto *a lungo termine* che può riguardare anche solo un punto del decalogo, ma che deve portare a cambiamenti delle prestazioni ambientali e che deve concludersi nell'arco di tre anni, al termine dei quali è prevista la certificazione.

Nel Progetto d'Istituto sono stati inoltre indicati, per ogni punto/tematica del Decalogo, obiettivi a breve e lungo termine ed azioni utili al loro raggiungimento.

Una fase ulteriore del percorso di "Scuola 10 e lode" è quella del *Monitoraggio*, durante la quale il progetto elaborato da ogni singola scuola, e quindi i risultati ottenuti dalla stessa, sono stati analizzati criticamente, anche attraverso una valutazione dello stato di avanzamento del progetto e dell'idoneità delle azioni intraprese per il raggiungimento degli obiettivi.

Il monitoraggio si è quindi articolato attraverso:

- Somministrazione di *questionari* agli studenti allo scopo di ricevere indicazioni sulla percezione e sul vissuto degli stessi relativamente alle tematiche correlate al decalogo
- *Sopralluoghi* nella scuola al fine di verificare l'andamento dei progetti e le azioni attuate
- *Analisi critica dei progetti* delle singole scuole.

Alle scuole che hanno concluso il percorso triennale del progetto, superando positivamente la valutazione della loro sperimentazione, è stata attribuita la certificazione di "Scuola 10 e lode".

In particolare, al termine dell'anno scolastico 2004-2005 sono state certificate le seguenti scuole:

- Istituto Comprensivo di Grizzana Morandi (BO)
- Direzione Didattica di Bomporto (MO)
- Scuola Media Statale "A. Pio", Carpi (MO)
- Scuola Media Statale "M. Buonarroti", Fabbrico (RE)
- Istituto Tecnico Commerciale Statale "R. Luxemburg", Bologna.

## Discussione e conclusioni

I risultati emersi dal periodo di sperimentazione effettuato hanno permesso di mettere in luce i punti di forza e di debolezza del progetto e quindi di porre le basi per una sua futura implementazione. I principali *punti di forza* evidenziati sono riconducibili ai presupposti scientifico-metodologici coerenti con le linee guida dell'educazione ambientale per la sostenibilità (es. approccio partecipato e sistemico e continuità delle azioni) che catalizzano il superamento di un'idea di educazione ambientale puramente di tipo "naturalistico". Il progetto si è conseguentemente sviluppato intorno a pratiche didattico-educative in grado di tradursi in azioni e comportamenti quotidiani per la sostenibilità, visibili e condivisi nell'ambito delle differenti realtà.

Il coinvolgimento dei diversi soggetti che operano nel contesto scolastico, o che si trovano a interagire con esso, ha permesso di sviluppare o di potenziare le sinergie tra gli stessi, valorizzando il ruolo educativo della sperimentazione ed allo stesso tempo contribuendo a sviluppare un rapporto nuovo e dinamico tra scuola e territorio. Ciò è risultato funzionale all'integrazione ed alla formulazione di una visione più ampia delle attività spesso frammentarie che caratterizzano le proposte elaborate entro la scuola.

Questo approccio risulta traducibile in una ricaduta delle esperienze/attività svolte anche da singole classi, sull'intera scuola e in un'idea di educazione ambientale quale componente permanente di ogni aspetto della vita scolastica.

Alla luce dei risultati ottenuti dai primi anni di sperimentazione, sono stati inevitabilmente individuati anche alcuni *punti di debolezza*, spesso riconducibili alla difficoltà di tradurre nella pratica i presupposti qualificanti il progetto. In particolare, si evidenzia:

- Il *Decalogo*, elemento cardine attorno a cui si sviluppa il progetto, ha presentato alcuni punti difficilmente traducibili in azioni positive e progettuali nella pratica di alcuni contesti. Alla luce di ciò sembra quindi importante proporre una sua contestualizzazione, al fine di garantire che le azioni individuabili siano significative e in stretto collegamento con le realtà delle singole scuole
- Il *Comitato*, pensato come importante strumento operativo-progettuale, nella realtà è stato sottostimato, diventando quasi esclusivamente una imposizione di carattere burocratico-formale. Ciò ha quindi portato al mancato utilizzo, a livello di progettazione, dei punti di vista e delle competenze delle componenti in esso rappresentate
- L'*audit* troppo spesso è risultato essere uno sterile elenco di dati e informazioni non utilizzati ai fini dell'individuazione delle criticità della scuola e, conseguentemente, della progettazione didattica
- La realizzazione contemporanea dei progetti a breve e a lungo termine, che hanno costituito i singoli *Progetti d'Istituto*, è risultata particolarmente problematica in quanto difficilmente gestibi-

le sia dal punto di vista organizzativo, che da quello didattico. A ciò si è aggiunta una certa difficoltà a tradurre i percorsi effettuati in azioni concrete, finalizzate al miglioramento delle prestazioni ambientali della scuola

- Il *monitoraggio* rappresenta una fase importante nell'ambito dell'intero progetto, dal momento che i singoli sopralluoghi effettuati al suo termine non hanno permesso di rapportarsi in modo continuativo con le diverse realtà. Alla luce di ciò sarebbe opportuno prevedere un numero maggiore di incontri da svolgersi durante l'intero corso dell'anno scolastico. Relativamente ai questionari somministrati è emersa la tendenza dei docenti a considerarli erroneamente come strumenti di valutazione dell'efficacia del loro operato, piuttosto che, come chiaramente esplicitato, semplici indicatori del vissuto degli studenti relativamente alle tematiche affrontate. Gli stessi questionari hanno peraltro evidenziato la loro non completa rispondenza a questo obiettivo e pertanto è prevista una loro significativa modifica.

Alla luce delle criticità emerse al termine di questa fase preliminare di sperimentazione, il progetto è stato quindi rivisto nella sua globalità apportando modifiche anche sostanziali ai singoli elementi costitutivi. Tale revisione è stata ritenuta funzionale all'obiettivo di "far crescere" il progetto, in modo da renderlo da un lato sempre più coerente ai presupposti dell'educazione per la sostenibilità sopra richiamati e dall'altro sempre più flessibile – e quindi adattabile – alla realtà scolastica. Si auspica infine di riuscire a coinvolgere un numero sempre maggiore di scuole, proponendo un progetto in grado di catalizzare e di rendere visibili le azioni che le stesse vorranno intraprendere verso la sostenibilità.



## **KINDERGARTEN AND PRIMARY SCHOOL STUDENT TEACHERS' CONCEPTIONS OF ENVIRONMENT**

**Anastasia Dimitriou**

*Assistant Professor*

*Laboratory of Research and Communication for the Environment  
and the Environmental Education,*

*Department of Education Sciences in Pre-School Age,*

*Democritus University of Thrace, Greece.*

*e-mail: anadim@otenet.gr*

### **Introduction**

Kindergarten and primary school teachers play a significant role in the educational process for the achievement of the goals of environmental education, while they are those who would inspire young pupils for caring about environmental issues and respond to the challenge of sustainable development.

A key element to achieve environmental education goals is the concept of environment that is liable to many different personal interpretations (Alerby, 2000; Flogaitis & Agelidou, 2002; Loughland et al, 2002; Loughland et al, 2002; Shepardson, 2005).

Therefore, teachers' conception of environment is a key concept in environmental education while it impacts their approaches in environmental education in schools. In this frame a research project was carried out among kindergarten and primary school student teachers, which aim to record and interpret their conceptions about the term environment and study the factors influencing them.

In this paper, the findings concerning student's conceptions are presented and discussed their implications in the frame of environmental education.

### **Method. Sample**

Four hundred Greek students in the department of Education Sciences in Pre-School Age of Democritus University of Thrace and the department of Primary Education of the University of Aegean, who had not attended any environmental education module, participated in the study that was carried out during the academy years 2002-2005. The 52.5% and 47.5% of them were kindergarten and primary school student teachers respectively.

The participants' demographic characteristics are presented, in table

Gender		Age (years)					Region of residence		
Male	Female	18	19	20	21	22	Urban	Suburban	Rural
20	80	10.3	37.3	23.5	24.8	4.9	55.8	24.8	19.5
Educational grade				Study field					
A	B	C	D	Primary student			Kindergarten student		
27.3	24	24.8	24	47.5			52.5		
Participation in an environmental education program									
Primary student				Kindergarten student					
24.7 27.6				27.6					

Table 1. The participants' demographic characteristics (%)

## Data collection and analysis

The data of the study were collected by the use of a questionnaire, where, apart from the initial questions concerning their demographical characteristics, all participants were asked to provide a definition of the term environment.

The method applied for data analysis was a qualitative one (Cohen and Manion, 1980). The empirical data were condensed and grouped according to the comments of each. The different responses were compared and a limited number of categories were produced.

## Results and discussion

Analysis of the students' definitions revealed nine distinct types of conceptions of the environment that are placed between the following two major categories:

- A. The environment as a place with various elements: these conceptions revealed the idea that the environment is a place that contains human beings and/or organisms, natural and/or constructive or social elements. Five different conceptions are associated with this idea expressing the majority of the participants (56.6%).
- B. The environment as a place with various elements that are in relationships: these conceptions revealed the idea that environment is a place that contains human beings and/or organisms as well as natural and/or structural or social elements, that are in some sort of relations. Four different types of conceptions are associated

with this idea that was expressed by a percentage of 43.4% of the participants.

In Table 2, the nine distinct types of conceptions of the environment that place between the above-mentioned two major categories as well as typical examples of student's responses are presented.

### **A. The environment as a place with various elements**

As it shown in Table 2, a percentage up to 9.5% identified the environment with nature. Most of them (28.5%) recognized only the natural (biophysical) environmental dimension while a small percentage recognized both natural and structural environmental dimensions (8.5%). A small percentage (5.8%) recognized the natural and social environmental dimensions while an even smaller percentage (4.3%) recognized three environmental dimensions, the natural, structural and social one.

### **B. The environment as a place with various elements that are in relationships**

The conception of the environment as “a place that provides conditions for human life, activation and development” represented the 24.5% of the participants while the conception of “a natural environment in an interaction relationship with human beings” represented the 10% of them. The environment as “a place that people are responsible for” represented the 5% of the participants while 4% of them expressed the environment as “a place that support the living organisms development”.

A. The environment as a place with various elements	6.6
A1. The environment contains living organism and natural elements that surround people “Is everything around us, trees, animals, air, sea, atmosphere”	8.5
A2. The environment is the nature “Is the natural world”, “is the nature”	5
A3. The environment is both natural and structural place “Is everything around man, trees, air, cities, buildings, houses”	5
A4. The environment is a natural and social place “Is a place that contains trees, animals, plants, oceans, and people... is also the social environment”	8
A5. The environment is a natural, structural and social place “Is a place that contains fauna and flora, the air, seas, houses, Buildings as well as people, families”	.3
B. The environment as a place with various elements that are in relationship	3.4



B1. A place that provides conditions for human life, activation and Development "Is a place where human beings breath, live it's the place of man Activation and development" "Is the place that provides oxygen for man to live"	4.5
B2. A natural environment in an interaction relationship with Human "Is a place that contains living or non living things and people that are in a relationship of interaction" "Is the place that surround us and contains things such as plants, Trees, the sky, rivers, the air that affect us and that we affect"	0
B3. A place that people are responsible for "Is everything around us, animals, air, trees. The environment is necessary for the continuation of life therefore we are responsible to keep it clean and safety"	
B4. A place that support the living organisms development "Is the place where living organisms are born and are supported To live and develop"	

Table 2. Types of conceptions of the term "environment" and typical examples of student's responses.(%)

The results of this study suggest that:

- The dominant conception is related to the biophysical dimension of the environment even though participants consider environment as a rational place. This finding shows that they do not conceptualise the multidimensional character of the environment and agrees with the findings of other relevant studies concerning either teachers' (Flogaitis & Agelidou, 2002) or primary-aged children conceptions about the environment (Alerby, 2000; Loughland et al, 2002a; Shepardson, 2005).
- Students that conceptualise environment as a relational place are more likely to consider these relationships for the benefit of human beings than for the benefit of the other living or not living components.
- Students do express in some way the concept of sustainability even though they do not recognize its core principles.

## Education implication and suggestions

The results of the study suggest that the majority of the students, participated in this study, do have a limited understanding of the environment. This understanding can be expanded in the frame of environmental education so as students could be able to deal with environmental issues in the perspective of sustainability. Educational programs need to develop for empowering students to study environment in a global consideration, to reveal its multidimensional character and recognize the webs of relations

and connections between the components that environment consists of (UNESCO, 1977; Hungerford & Peyton, 1986; UNESCO, 1997; Gomez & De Puig, 2003). Discussions in the frame of the environmental education need also to develop for empowering students to participate in conversations for both investigating and conceptualising the role that personal or social values, beliefs, cultural ideas and personal desires play in environmental issues in the perspective of sustainability.

## **Acknowledgements**

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## **PARK, YES OR NO? A TEACHING EXPERIENCE ON A SOCIO-ENVIRONMENTAL CONFLICT. INTRODUCTION AND THEORETICAL GUIDE-LINES**

**Elisabetta Falchetti**

*Headmaster of Educational Department,  
Museo Civico di Zoologia di Roma  
Via Ulisse Aldrovandi 18, 00197 Roma  
e.falchetti@comune.roma.it*

**Nicola Margnelli**

*Member of the Educational Department Team,  
Museo Civico di Zoologia di Roma  
Via Ulisse Aldrovandi 18, 00197 Roma*

New cultural trends, new philosophy and ethics are introducing powerful incitements in the educational domain. These influence also the Environmental Education and induce to reconsider it (Mortari, 2001; Falchetti e Caravita, 2005). The E. E. could play a crucial role for developing *ways of thinking* able to confront the present socio-ecological problems (Colucci-Gray, Camino, 2003) and could give a valuable opportunity to propose objectives and reflections aiming at sustainability, responsibility and justice on the earth.

At the Civic Museum of Zoology of Rome, we are introducing in the educational projects for the schools, themes and methods consistent with these new perspectives of the E. E.. In this paper we present schematically the topics, methodologies and results of a didactical annual project, experimented with two classes of the junior high school, aged 14-15 (the projects for the School are tested primarily on small samples of classes). By this project we involved the students in a “real” environmental issue and we committed to them the search of adequate solutions. The central theme of the issue was the contention among citizens, scientists and public administrators for the realization of a regional park in an area of great naturalistic interest.

The park under debate is that of the territory “Monti della Tolfa”, near Rome (Lazio), which is one of the best preserved and rich of environmental-naturalistic, historical and archaeological resources of the whole region. Since more or less 20 years, scientists and environmentalists have been proposing different plans for the conservation of this area, but they have always encountered a strong local opposition. A complex inflamed dispute exists between on one side various categories of local citizens and on the other side, the Regional/Provincial Institutions, that support the idea of the park. Still now, the realisation of the park seems impossible. Up to now, no one co-operative and shared solution has been considered.

The educational field of our project include/is the socio-environmental sustainability, particularly the involvement of the local communities, the environmental conservation, the conscious-reasoned use of the resources and the management of the conflicts.

### **Educational strategies**

The crucial aspects of this experience (that from various aspects remind the “Life Skills Education” - WHO,1992) were the following ones:

- to involve the students in an strong debate (park yes, park no, why a park, the alternatives to a park, who is involved in the dispute, etc.
- to introduce the students/them to the problems of equity, democracy and rights (who has the right to decide, which parameters are to be used to take a decision, what are the personal interests involved...)
- to attribute to the students/them tasks and responsibilities (to carry on the research-inquiry, to plan settlements of the dispute, to find a “shared” solution and to support it by valid arguments)
- to approach the dynamics of the conflict by the self-identification into the stake-holders (playing the role of the citizens of the Monti della Tolfa, scientists, etc.)
- to attribute to the students responsibility for operating and "caring" for a territory (to make proposals for the future of that territory).

The planning of the educational paths and activities was democratically negotiated with the students; this was part of the educational strategies too, aiming at the students' participation, involvement and responsible ness.

We have thought this experience also as an exercise for the students to approach environmental problems in a global and complex perspective. And just the “complexity” (Morin, 2000; Morin 1999) was (explicitly or implicitly) the focal educational point, the core of the entire path. The complexity was in the contents and methods: we proposed a complex problem regarding a complex territory, a problem previously unknown, dynamic, open, comprehensible only through a complex multi-perspective approach and an interdisciplinary analysis.

We adopted procedures and work methods that promote self-construction of knowledge, starting from the pre-knowledge and interests of the students (Falchetti, Margnelli, 2004). The *active learning*, inspired to neo-constructivist cognitive models, was the basic methodological line. We thought that the best way to stimulate attention, participation and reflection was to go on “by asking questions” (how to identify the problem and its causes? How to find information? How to inquire? How to determine the stake-holders? How to find any solutions? Etc.). Our educational path was adaptable and “elastic”, open to the interests, suggestions and enterprises of the students. We allowed them the time they need to discuss, find information and to plan researches. Our role was simply to organize the educational

experiences; we operated as “mediators” and chairs in the *focus groups*; we helped the students in their knowledge path, but our role was mostly to arouse questions, to suggest ideas for researches and to incite critical and large views. We played also the role play, as “Experts”. The atmosphere, during the work, was very friendly, constructive and equal.

Our methodologies were: *focus groups* (debates, analysis of the problems and planning of the work), *research-action* (field surveys and bibliography, planning of the scenarios) and *role-playing game* (to determine the various aspects of the conflict, to design the role cards and public Forum ). We meet many times teachers and students, at the Museum and school, to know the pre-existing knowledge, opinions and personal attitudes as well as to introduce the theme, to study the documentation, to plan the activities, to build up the research methodologies, to study roles and tasks, to plan field experiences and to discuss the information collected in the field or in the bibliography.

Three field visits have animated the educational dynamics, through the direct contact with the nature and culture of the territory and with the “local” view of the problem (a lot of stake-holders are been interviewee); the visits provided the student with the opportunity to verify the reliability of their assumptions and expectations. We visited localities rich of naturalistic, historical and archaeological values; we analysed economic resources, territorial cases/examples of conservation or degradation, local traditions and habits, social institutions (elders centres, schools, municipality...) and economic activities (shops, animal farming, etc.). The quantity and the complexity of the interactions and dynamics that the park could create or modify should issue from the visits.

After the excursions, we meet still the students and teachers to discuss on old and new strategies for the conservation, on the settlements for the conflict. We asked the students a *portfolio* to document their ideas, important events, researches and conceptual changes and a **report** to discuss in a “public Forum”.

For the role-playing game we took inspiration from the experiences of E. Camino, C. Calcagno and L. Colucci (1994; 2000), who introduced in the school controversial issues and great problems of the earth by means of role-playing games. These Authors/Authorress had the objective to build up new ways of viewing the conflict, as a “natural process”, as component/part of the decisions concerning environmental matters and as element that generate fundamental cultural differences in the interpretation of the environmental problems. In the role-play we let the students free to build their own *role cards* as well as to choose the arguments to support their decisions and to plan their research directions. In fact, we wanted to explore the students’ ability to understand the elements generating a socio-environmental event, through their personal paths of knowledge.

The teachers were actively involved in the role-play, as “Supervisors” of the European Community, in charge of updating and writing down a Works Agenda.

The students worked in *interest groups*, that they had verified existing in the area (hunters, dealers, unemployed, students, teachers, game-keepers...); each group prepared its report, with arguments supporting its own opinion about the park realization. The various points of view were explained in a final public Forum, at the conclusion of the project.

During the public Forum the students in some ways gave voice to the real actors of the issue; they supported the park realization and proposed various solutions aiming to meet the citizens' requirements and the conservation needs.

### **Some evaluation of this experience**

From the initial debates with the students emerged a simplified view of the problems and some predictable stereotypes inspired to and by the media, mostly as to the conservation (generally consisting in avoiding to pollute... to drop litter...to dirty up less...to avoid cutting too many trees...). In general, the students' attitude was in favour of the park or regardless towards the problem; but all the students didn't understand why such a conflict existed (Margnelli, 2005).

The final reports evidence that many stereotypes were over. The contact with the territory and the confrontation with the stakeholders produced significant changes in the students' ideas. They have acquired a considerable skill to connect territorial problems/events and social life and a more critical view of the environmental conservation. It appears also a inclination to accept and understand the conflicts.

We experimented a complex evaluation by the analysis of the portfolio, final conclusions, role cards and research documents of the students; we analysed also the changes of ideas, the acquisition of abilities (checked by some repeated tests) and the evolution of the work strategies. From the evaluation it emerges:

- an increase of knowledge and awareness of the conservation policy
- an acquisition of abilities of planning and carrying on research
- a significant and motivated competence in proposing analysis methods, hypothesis and scenarios
- the awareness of the presence of environmental conflicts and a certain trust in their management
- an increased ability to construct relations, to associate different or unknown phenomena/events and to "re-place" the problems in the reality
- an increase of systemic, complex and relational view.

Many attitudes appeared changed too: the students had at the beginning rigid position (*the park must be realized, in spite of the citizen opposition...* or the contrary) or frequently they were indifferent (*this question does not concern us...*). Finally they were inclined to propose mediate solutions of the dispute; they showed interest, sense of responsibility and a

growing confidence in their own abilities of planning and intervention. At the beginning the teachers were confused, because the didactic pathway was structured only approximately; the pathway was dynamic and frequently unpredictable, mostly in the management of the requests and initiatives of each student. The teachers were in difficulties also in the evaluation of the students' progresses. For this reason, we needed constantly explanations, encouragements, assurances. At the end, the "Works Agendas" of the teachers testifies a positive opinion of the entire experience.

The students too, at the beginning were confused and met a lot of difficulties in the changing their ways of thinking and "living" a scholastic experience; but they quickly taken pleasure in planning freely new paths of knowledge, in working together, in looking for feasible, realistic solutions, in utilizing various and unusual research tools, in expressing their thoughts freely...

All the students appreciated this experience (mostly Forum, field surveys and the focus groups), to which they assigned the offers/presents new incitements and perspectives to the teachers, students, but even to us "educators". In fact, we were stimulated all the time and obliged to practice really new approaches of thinking and acting. We have considered very positively the dynamism and the unpredictable elements of a planning "really shared" with students.

We have planned to repeat this experience with the students of the territory interested in the conflict.

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## **EDUCAZIONE AMBIENTALE IN UN'AREA PROTETTA DEL TERRITORIO PIEMONTESE IL PROGETTO “LA FORESTA RITROVATA”**

**Elena Ferrero, Daniele Gimigliano**

*Università di Torino, Dipartimento di Scienze della Terra,  
Istituto di Ricerche Interdisciplinari sulla Sostenibilità (IRIS).*

**Antonella Pogliano**

*Regione Piemonte, Ente di gestione del  
Parco Regionale La Mandria e  
dei Parchi e delle Riserve Naturali delle Valli di Lanzo*

Le aree protette della Regione Piemonte sono zone privilegiate in cui da anni si svolge selettivamente una vasta serie di iniziative dedicate alla conoscenza dell'ambiente e alle relazioni educative con le scuole del territorio. La presenza di emergenze naturalistiche significative, che spesso suscitano senso di meraviglia e necessitano di una tutela specifica, rappresenta un'opportunità da valorizzare, un'occasione da cui partire al fine di aumentare la consapevolezza della popolazione, in particolare nella fascia scolastica dell'obbligo, rispetto a situazioni in cui l'ambiente, con le sue componenti biotiche e abiotiche e i processi che le interconnettono, interagisce con le attività antropiche e con il quotidiano degli allievi.

Queste finalità sono state perseguite nel Progetto biennale “La foresta ritrovata”, finanziato dalla Regione Piemonte, Direzione Tutela e Risanamento ambientale, Programmazione e Gestione rifiuti, rivolto alle scuole e alle comunità locali con l'obiettivo di migliorare conoscenza, tutela e valorizzazione della foresta fossile affiorante lungo il torrente Stura di Lanzo.

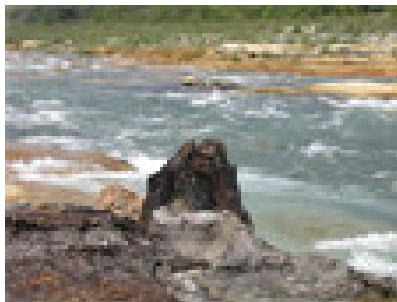


Fig.1. Il torrente Stura di Lanzo: in primo piano una delle ceppaie fossili riaffiorate

Il progetto nasce dalla collaborazione fra Parco Regionale La Mandria, Dipartimento di Scienze della Terra dell'Università di Torino e CNR –

IRPI (Istituto di Ricerca per la Protezione Idrogeologica) di Torino e costituisce una delle iniziative promosse dal Gruppo di studio per la valorizzazione e la tutela della Foresta Fossile dello Stura di Lanzo.

Teatro del progetto è un interessante affioramento di resti vegetali fossili lungo il torrente Stura di Lanzo, all'altezza dei comuni di Nole e Villanova, da circa un decennio oggetto di ricerche e meta di escursioni per appassionati e scolaresche della zona. Il grande interesse scientifico del sito deriva dal rinvenimento di strati ricchi di tronchi, rami, foglie e coni fossili e soprattutto dalla presenza di ceppaie fossili di gimnosperme in posizione di vita, risalenti a circa 3 milioni di anni fa – Pliocene – (Martinetto & Farina, 2005; Martinetto, 1994).

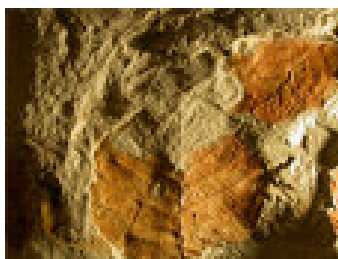


Fig. 2. Fillite di *Alnus cecropiaefolia*, forma estinta di ontano, rinvenuta nelle peliti in alveo

Il progetto didattico coinvolge 33 insegnanti e circa 500 studenti delle scuole primarie e secondarie dei comuni limitrofi all'area protetta (Ciriè, Nole, Villanova, San Carlo e Lanzo).

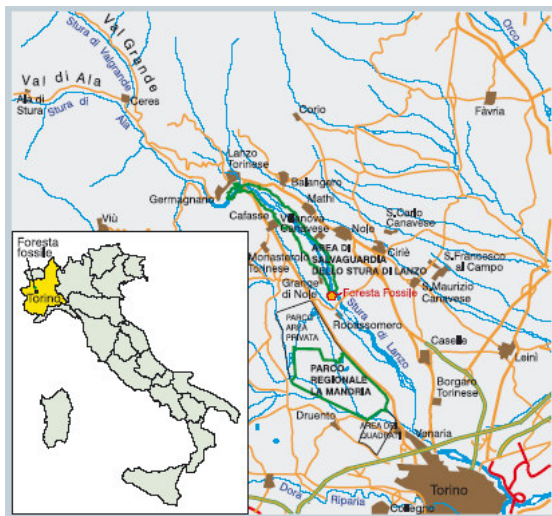


Fig. 3. Ubicazione del sito della Foresta Fossile e delle scuole che hanno aderito al progetto di educazione ambientale

Queste le fasi del progetto:

*Fase 1.* Rilevazione e studio delle iniziative finora realizzate per quanto riguarda gli aspetti di fruizione dell'area. Acquisizione della documentazione scientifica esistente.

*Fase 2.* Elaborazione di un "progetto pilota" con modalità di lavoro partecipativa. Individuazione di un percorso di scoperta dell'area e realizzazione di un opuscolo-guida.

*Fase 3.* Sperimentazione del progetto con classi delle scuole dell'infanzia, primaria e secondaria. Presentazione del materiale prodotto presso locali del Parco.

*Fase 4.* Valutazione dei risultati conseguiti e confronto con quelli attesi. Modifiche e integrazioni. Divulgazione dell'iniziativa con articoli su riviste e presentazioni scientifiche in ambito di incontri e convegni.

Nell'ambito del progetto è stata attivata una Borsa di Studio per un esperto nella ricerca didattica delle Scienze della Terra che ha seguito tutte le fasi di realizzazione.

Nel corso di 6 incontri con gli insegnanti che hanno aderito al progetto sono stati affrontati i diversi temi che hanno permesso di arrivare all'elaborazione del "progetto pilota"; sono stati offerti riferimenti bibliografici, indicazioni e materiali utili oltre ad un'uscita didattica al sito della Foresta Fossile.

Il lavoro di progettazione svolto durante gli incontri comprende:

*Analisi delle attività didattiche precedenti.* Gli insegnanti che hanno svolto in passato attività didattica sulla Foresta Fossile hanno esposto ai colleghi le metodologie utilizzate, nonché i materiali prodotti (cartelloni, CD-Rom, ecc...). Agli insegnanti sono state poi rivolte alcune domande specifiche sulle attività presentate al fine di valutarne l'efficacia e la riproducibilità.

*Analisi sulle concezioni spontanee degli insegnanti.* Sono state poste alcune domande esplorative sul concetto di fossile e fossilizzazione al fine di sensibilizzare gli insegnanti sull'utilità di svolgere un'indagine riguardo alle concezioni spontanee degli studenti prima di cominciare l'attività didattica sulla Foresta Fossile. Si è successivamente proposta un'osservazione guidata di alcuni campioni fossili con l'utilizzo di una scheda semistrutturata che ha permesso di raccogliere dati utili anche per l'indagine delle preconoscenze degli insegnanti (Ferrero, Provera & Tonon, 2004 a).

*Riflessione sugli ostacoli concettuali.* Il test sulle preconoscenze e l'attività sui fossili hanno messo in evidenza la presenza di ostacoli concettuali nello studio della paleontologia e, più in generale, delle Scienze della Terra (ad esempio la difficoltà di distinguere il fossile dalla roccia, la difficoltà di percepire il tempo geologico, ...). Tali ostacoli concettuali vanno presi in considerazione nella pianificazione di attività didattiche poiché essi possono generare la formazione di concezioni difformi nei riguardi di quegli

argomenti per i quali non si è in grado di dare una spiegazione coerente con la concezione scientifica accreditata (Alfieri, Arca' & Guidoni, 1995; Guidoni, 2000; Camino, 1998; Camino & Perazzone, 1994).

*Definizione degli obiettivi didattici.* Gli obiettivi individuati dagli insegnanti sono stati accorpati in 3 tipologie: obiettivi generali (capacità di formulare ipotesi, raccogliere dati, osservare il territorio, ...), obiettivi specifici (capacità di riconoscere e analizzare un fossile, comprensione del tempo geologico, ...), obiettivi comportamentali (dimostrare interesse per l'ambiente circostante, assumere un comportamento responsabile, ...) (A.A.V.V., 1998; Colin, 1989; Showell, 1981; Thouin, 1996).

*Costruzione di percorsi didattici.* Al termine degli incontri gli insegnanti hanno acquisito gli strumenti per elaborare autonomamente delle ipotesi di attività prevedendo tempi, strumenti ed risultati attesi dei vari percorsi didattici. Tutte queste proposte fanno riferimento ad uno schema generale, elaborato a partire dal lavoro collettivo che si è sviluppato nel corso degli incontri, il "progetto pilota".

È seguita la sperimentazione dei percorsi didattici elaborati, che si sono sviluppati dalla primavera all'autunno del 2005. Elemento comune a tutte le attività delle scuole è stata l'escursione alla foresta fossile, durante la quale gli studenti, a partire dall'osservazione del territorio guidata da una scheda di campagna, hanno formulato ipotesi sulla ricostruzione degli eventi che hanno portato all'affioramento dei resti vegetali lungo il torrente (Baillet, Francoise & Maglione, 1989; Battistin, Bezzi, Massa & Pedemonte, 1982; Ferrero, Provera & Tonon, 2004b; Jacob, 1989).



Fig. 4. Escursione al sito della foresta fossile, scuole secondarie inferiori

Uno dei momenti più coinvolgenti e emozionanti dell'escursione è stato l'esperienza di esplorare gli strati delle rocce sedimentarie alla ricerca di tracce fossili dell'antica foresta pliocenica.

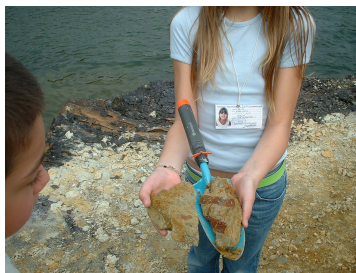


Fig. 5. Momenti di scoperta delle filliti durante l'escursione lungo il torrente Stura di Lanzo

Il lavoro in aula ha avuto come matrice unificante l'osservazione di campioni fossili e la ricostruzione dell'evoluzione del paesaggio: dalla palude costiera in cui vegetava la foresta di conifere nel Pliocene, al seppellimento nei sedimenti deltizi fino all'incisione del terrazzo da parte dello Stura e al successivo affioramento delle ceppaie fossili.



Fig. 6. Attività di analisi e confronto di fossili svolta in aula

Ogni classe ha poi arricchito il lavoro con attività ed elaborazioni originali seguite direttamente degli insegnanti (rappresentazioni teatrali, cartelloni, giochi dell'oca...).



Fig. 7. Rappresentazione della foresta fossile, alunni dei primi anni della scuola primaria.



Fig. 8 Rappresentazione della foresta fossile, alunni della scuola primaria.

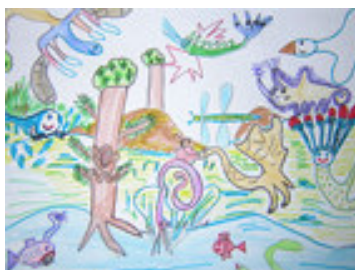


Fig. 9 Rappresentazione della foresta fossile, alunni della scuola primaria.



Fig. 10 Rappresentazione della foresta fossile, alunni della scuola primaria.



Fig. 11 Il sito della foresta fossile oggi e in epoca pliocenica nella ricostruzione di un alunno della scuola primaria.

A completamento del progetto, che si chiuderà nell'anno scolastico 2005-2006, è stata prevista la realizzazione di materiale illustrativo e didattico, in particolare la redazione di un opuscolo-guida che suggerisca un percorso di scoperta dell'area e l'esposizione del materiale prodotto dagli studenti presso locali del Parco e nei comuni di Nole e Ciriè.

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# **CONCEPTIONS OF THE ENVIRONMENT AND OF ENVIRONMENTAL PROBLEMS AS SOCIAL ISSUES AMONG GREEK STUDENTS OF EARLY CHILDHOOD EDUCATION**

**E. Flogaitis**

*Associate Professor.*

*National and Kapodistrian University of Athens*

**M. Daskolia**

*Research Fellow.*

*National and Kapodistrian University of Athens*

**Chatzifotiou**

*Research Fellow.*

*National and Kapodistrian University of Athens*

**G. Liarakou**

*Lecturer. Aegean University*

## **Preamble**

This paper is part of an on-going research project that aims to investigate how Greek teachers and university students of early childhood education perceive environmental concepts and issues, which are central to environmental education (EE). The article reports on the way university students envisage environment within the remit of current major social issues and whether they perceive different levels of gravity among various environmental problems. This can then enlighten their training preparation for EE as perspective teachers. In the first part of the paper we discuss the relevant research literature and we outline the rationale of the study. In the second part we describe the methodology and the sampling procedure for the study. Finally, in the last part we present the findings of the study and discuss them in relation to their implications for EE.

## **Research literature and rationale of the study**

Education is acknowledged as a major factor in bringing about changes in society and thus in the current environmental status (Robinson and Shallcross, 1998). In 1990 teacher environmental education was regarded as the 'priority of priorities' (UNESCO-UNEP, 1990). Currently, EE is included in the national *curricula* of most countries without though being a statutory subject (Palmer, 1998). This leads to a question concerning the standing of EE in higher education and especially in the departments that train future teachers. One such department is the early childhood education,

an educational area identified with a scarcity of theories, practices and approaches on EE perspectives (Davis, 1998; Garbett, 2003).

There are few studies, which have examined pre or in-service teachers' conceptions of environment and environmental problems in relation to other social issues. In Greece studies, which have investigated pre- and in-service teachers' perceptions about environmental problems (Dimitriou, 2001; Dimitriou and Chatzinikita, 2001; Dimitriou and Kostopoulou, 2004; Scanavis et al, 2005), have shown that teachers were aware of environmental problems and considered themselves fairly informed on these issues. Flogaiti and Aggelidou (2003) who examined early childhood education in-service teachers' conceptions about the notions of nature and environment found that these were romantic and lacked any social dimension. Corney (1998) delved into the thinking and practice of student geography teachers in the teaching of environmental issues. There is also a number of other studies, which examined students' knowledge of particular environmental issues (i.e. Spellman, Field and Sinclair, 2003; Boyes et al, 1995), specific ways of delivering EE (Corney, 1998; Summers, Corney and Childs, 2003) and their general thoughts about the environment and EE (Jeronen and Kaikkonen, 2002).

Since 1998 G. Singh called EE researchers to investigate how EE fitted with teachers' "vocation in life", their "political commitments" and "environmental interests" rather than examine how teachers fit into an EE research project. The above literature review, which is not exhaustive, indicates a lack of studies on pre-service teachers' conceptions regarding the "social dimension" of the environment and environmental problems. With the current study our aims were to record such conceptions among pre-service kindergarten students. This, we believe, can describe whether or not they perceive environment to be among current social issues, and which environmental problems appear to be more important.

Consequently, this will illuminate:

- The degree in which their previous participation in school environmental projects has influenced or not their opinion about the environment as a social issue.
- How their pre-service training can be updated.

## **Sample**

Our targeted population was the students in the department of Early Childhood Education at the University of Athens. More specifically, we were interested in students who had not attended any environmental education module up to this time these modules are elective units, which students can choose from a range of various modules. Participating students filled the questionnaire before the semester started.

The collection of the data was realised at the end of February 2005. Participants were in their majority women (98.1%), in their first and second year of study (53.7% and 29.8% respectively). Most of them (45.3%) came

from Athens or other big cities (18.2%), agricultural districts (14.8%) and towns (13.8%). Only a small percentage (26.9%) had attended EE programmes while in secondary education.

## **Methodology**

The questionnaire (Appendix 1) was the main instrument of the study and it comprised seven questions with more than one leg at a time. These were not all closed-ended ones. For instance, the first question, using the technique of the free word association, asked students to write down at least five important issues, which concern contemporary societies. With this question we aimed to establish whether “environment” constituted an important enough issue for these students to mention it. The second question asked students to rate 12 social issues according to their degree of importance. These included the following issues: hunger, terrorism, aids, unemployment, racism, environment, absence of democratic regimes, drugs, social inequalities, war, poverty and criminality. Therefore, our second question aimed to reveal how high or low the environment stood in the students’ priority list of significant social issues. A second set of questions asked students to write down as many environmental problems that came to their mind as possible (again using the technique of free word association).

Then, they were asked to rate these as very serious, serious or less serious. The qualitative character of these questions gave us an overall insight of students’ alertness to environmental problems and their significance. Other two questions asked students whether EE was delivered in their secondary school and, if yes, whether they had attended any EE programmes and activities. Taking into consideration the young age of our sample (eighteen to twenty years of age) we thought it was likely they had received EE since it was already established as part of the school curriculum when they entered high school. Additionally, students were asked to declare if they were members of any environmental organisation, group or club and, if yes, which were these.

This question aimed to unveil students’ commitment to and action for environmental issues.

## **Findings and discussion. The environment as a social issue**

The first question asked students to write down issues that concern contemporary societies. Twelve issues accrued the highest percentages (Table 1). Environment scored quite high (54.9%) being third in students’ list of significant social issues. The issues that scored the highest, before environment, were unemployment (96.1%) followed by drugs (75.2%). It is clear that environment is established as a significant social issue since students rated it in third place. The fact that unemployment and drugs were established higher can be accounted for by the stronger likelihood these issues have than any other social issue to affect young people in their near future.

Students seem to experience the significance that society has attributed to these issues. They read and hear almost daily about young people's professional impasses and drug related deaths. Thus, one can argue that these two issues (unemployment and drugs) are the ones that make students feel apprehensive for life after and during university, respectively.

<b>ISSUES</b>	<b>Frequency of references (%)</b>
Unemployment	96.1
Drugs	75.2
Environment	54.9
Criminality	53.9
Poverty	42.7
Education	22.3
Health	21.8
Economy	18.4
Racism	16.0
Terrorism	15.5
Violence	15.0
War	13.6

Table 1. Contemporary Social Issues mentioned by the students.

However, when students were given a list of 12 social problems asking them to rate the degree of their importance, environment scored a lot lower (with a mean of 8.15) than other issues such as war (with a mean of 3.40), poverty (with a mean of 4.86), hunger (with a mean of 4.41), unemployment (with a mean of 5.03), etc. Table 2 exhibits the 12 issues students were asked to rate along with their mean scores.

<b>ISSUES</b>	<b>Means</b>
War	3.40
Unemployment	5.03
Hunger	4.41
Environment	8.15
Drugs	5.77
Poverty	4.86
Criminality	5.83
AIDS	6.70
Lack of Democracy	7.72
Terrorism	6.75
Social Inequalities	8.56
Racism	9.58

Table 2. Importance of Contemporary Social Issues

It seems that students considered the environment to be an important social issue but not as important as war, poverty, hunger and unemployment. Such a finding makes sense since war incidents have been monopolising the media's interest at a continuous basis and certainly the deaths of so many people cannot but rate as more significant than any environmental issue.

It appears that the degree of importance students attribute to "war" depends on the direct consequences this issue has on human life itself. Poverty and hunger are closely related to the human degradation in developing countries and in many modern societies of our western world as presented in the media along with dramatic requests for humanitarian aid.

Unemployment is maybe the only social issue which students feel it threatens them the most. It is more obvious how unemployment can affect a 20-year-old student in two or three years time rather than global warming in the years to come.

What is furthermore quite interesting is that when we further tested (t-test) students' ratings of the social issues, we found that their participation in EE activities had influenced notably their perceptions of importance about the environment ( $p < 01$ ) compared to other issues.

### **Students' commitment to and knowledge of environmental issues**

Students were asked to write down, using the free word association technique, any environmental problems that came to their mind. They mentioned a variety of different issues as seen in table 3. Students were aware of the most well known environmental problems, such as the ozone hole, acid rain, deforestation, pollution, etc. Similarly, when they were asked to rate the significance of these issues, the most important ones were presented again in a similar order.

Table 3 illustrates the degree of importance that students attributed to environmental problems. This accordance between the environmental issues mentioned by the students spontaneously and their rating as more or less important following the same order exemplifies the environmental issues that either have a prominent exposure through media or the students experience them.

<b>Environmental Problems</b>	<b>Frequency of reference (%)</b>	<b>Degree of Importance (%)</b>
Ozone Hole	60.2	51.5
Air pollution	51.0	40.8
Greenhouse Effect	47.6	37.4
Water Pollution	46.6	32.5
Pollution	29.6	22.3
Noise Pollution	26.7	23.3
Forests	26.2	15

Endangered Species	21.8	12.1
Acid Rain	20.4	12.1
Gas fumes	18.0	8.3
Litter	16.0	5.8
Smog	16.0	9.2
Deforestation	15.0	13.1
Fires	14.6	8.3

## Conclusions and implications

In relation to the aspects we were investigating we have the following two general conclusions.

- The environment certainly constitutes an important social issue among these young students but not the most important compared to war, poverty, hunger and unemployment.
- Students' knowledge includes most major well-known environmental issues (e.g. ozone hole, global warming, deforestation, etc.).

The students of early childhood education in this study were aware of significant social issues, which concern contemporary societies. Environment has certainly been recognized as one such major social issue. All issues included in the questionnaire (e.g. drugs, unemployment, environment, poverty, terrorism, etc.) are presented and discussed almost daily in newspapers and television. Furthermore, most of the environmental issues (e.g. pollution) can be experienced in Athens and other big cities in Greece where the majority of our population sample came from. Even though the study did not enquire about the sources of information students had, it is simple enough to consider that these young people are exposed both to mass media and the issues they put forward and to the pollution they experience themselves living in cities.

Admittedly, media assist in popularising issues and this can lead to further support for these issues. The question though emerging concerns the role of formal education both in schools and in universities. Even though environmental education has been part of the Greek school *curriculum* since the 1990s, the participant students in the research did not mention any particular environmental school activities nor had any environmental commitments in terms of participating in environmental groups and organisations. Awareness of environmental issues and other social issues for that matter seems to be depended on the media and on people's personal experiences. Arguably, these can be important sources of information but not enough for future teachers who may wish to include such issues in their teaching. Many problems can arise from introducing issues like these into their teaching. Oulton et al (2004) have highlighted such difficulties when researching into the teaching of controversial issues, education for sustainable development being one of them. Teachers in England appeared under-prepared and felt constrained in

their approach towards this aspect of their work. Flogaiti and Aggelidou (2003) also demonstrated that in-service kindergarten teachers had a limited perception of nature and this was enriched with romantic elements centred around biophysical traits while any socio-political dimensions were absent. Furthermore, there can be more contentious issues arising when for instance, the structure of the curriculum may not support fully the instruction and philosophy of such aspects like environmental education or education for sustainable development (Chatzifotiou, 2002).

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## **APPENDIX 1: The Questionnaire**

1. Write down 5 social issues, at least, which concern contemporary societies.

- .....
- .....
- .....
- .....
- .....

2. Prioritise the following 12 contemporary social issues according to their degree of importance where 1=most important.

- |                          |                          |
|--------------------------|--------------------------|
| Hunger .....             | <input type="checkbox"/> |
| Terrorism .....          | <input type="checkbox"/> |
| AIDS .....               | <input type="checkbox"/> |
| Unemployment .....       | <input type="checkbox"/> |
| Racism .....             | <input type="checkbox"/> |
| Environment .....        | <input type="checkbox"/> |
| Absence of               |                          |
| Democratic Regimes....   | <input type="checkbox"/> |
| Drugs .....              | <input type="checkbox"/> |
| Social Inequalities..... | <input type="checkbox"/> |
| War.....                 | <input type="checkbox"/> |
| Poverty .....            | <input type="checkbox"/> |
| Criminality .....        | <input type="checkbox"/> |

3. Was there EE in your secondary education?

Yes ☐ No ☐

4. Did you participate in any EE activities in your school?

Yes ☐ No ☐

4<sup>a</sup>. If yes, which? .....

5. Do you belong in any environmental organisation, club or group?

Yes ☐ No ☐

5<sup>a</sup>. If yes, in which? .....

6. Write down as many environmental problems you can think of as possible. It doesn't matter how many you know or how many you can remember. Try to mention each environmental problem

- .....
- .....
- .....
- .....
- .....

7. Insert the aforementioned environmental problems in the table below according to their degree of importance.

Very Important E.P.	Important E.P.	Less Important E.P.

**CHILDREN'S ATTITUDES TOWARDS PRIMARY  
SECTOR ECONOMIC ACTIVITIES  
AND ECOTOURISM IN A PROTECTED WETLAND,  
AND IMPLICATIONS  
FOR ENVIRONMENTAL EDUCATION**

**Konstantinos Korfiatis**

*Lecturer, Dept. of Education, University of Cyprus, Cyprus*

**Tasos Hovardas**

*Researcher, University of Thessaloniki, Greece*

**Elissavet Tsaliki**

*Environmental Educator, Greece*

**Joanna Birch**

*Research Associate, Centre for the Study of  
Childhood and Youth, University of Sheffield U.K*

**Joy Palmer**

*Professor and Director of the Centre for Research on Environ-  
mental Awareness and Management,  
University of Durham, U.K.*

Economic activities are central topics in every discussion for the sustainable future of protected areas (Counsell & Garreth, 2002). Specifically, primary sector activities (agriculture, fishing, farming and lodging) are treated as activities that have to be transformed in order to satisfy the criteria of sustainability, while ecotourism is suggested as an alternative option for the development of protected areas (Weinberg, Bellows & Ekster, 2002; Kneafsey, 2000).

Within the above framework, local people's and especially the younger generation's support for sustainable activities should be considered as an important prerequisite for sustainable management of protected areas (Trakolis, 2001).

The success of such sustainable management is linked with local people's feelings and sensibility towards environmental surroundings. (Fried, 2000; Jorgensen & Stedman, 2001). Furthermore, the investigation of the ways environmental knowledge, awareness and concern are acquired and developed is of great importance for integrate management planning (Palmer & Suggate, 2004).

Key questions addressed in this paper, as part of a wider study – see below – concern:

- The level of understanding of pupils aged between 4 and 10 years old about activities in the primary economy sector and ecotourism
- Children's dispositions towards these activities
- Children's attitudes towards nature and human society
- Attitudes towards social or environmental changes in the area

- Factors (especially information sources and demographic parameters) affecting the development of the above attitudes and dispositions.

## **Study area**

The research discussed here was undertaken within the framework of the European project “Integrated Management of European Wetlands”, in an area protected under the Ramsar Convention: Kerkini Lake.

Hosting more than 300 bird species, Lake Kerkini is one of the most important wintering sites for waterfowl such as ducks, geese and pelicans.

The total population of the twenty-three villages lying within the protected area around the lake is approximately 25.000.

Tourists visit the area for bird watching and boat tours and tourist numbers have increased considerably over the last decade. Ecotourism activity is more pronounced along the west bank; in the village of Kerkini, an Information Centre provides baseline information to visitors.

## **Sample selection**

Semi-structured interviews were conducted with children living around Lake Kerkini. Participation in the study was voluntary and children’s identities were protected through anonymisation of interview scripts. All interviews were conducted at the children’s schools. Once the survey scope was explained to children, interviewers requested their participation. About 10% of children approached refused to take part in the study, which resulted in a response rate of approximately 90%. In total, 200 children participated in the study. The sample was evenly distributed across sexes (51.5% female and 48.5% male) and age- categories (4-, 6-, 8-, and 10-year categories , including each 25.0% of the sample). The sample selected was proportional to the population of the villages around the lake.

## **Interview schedule**

As part of the interview schedule, children were shown two photographs of primary sector activities, namely fishery and arable crop harvest, as well as two photographs of ecotourism activities, namely bird watching and a boat tour. They were first asked to identify and explain the reason for these activities; afterwards, they were requested to provide their overall disposition towards the above-mentioned activities, that is, whether they perceived them as “good” or “bad”. Responses were coded in the following categories: (1) just “good” or “bad”; (2) “good” or “bad” for humans; (3) “good” or “bad” for “animals”/”nature”.

Children were then requested to state their likes/dislikes concerning their own place of residence; responses were coded in the following categories: (1) likes/dislikes concerning people (i.e. “social life” and “leisure”); (2) likes/dislikes concerning “animals”/”nature” (“landscape”/”setting”; “crea-

tures”; “environmental degradation”; “hunting”). Afterwards, children were asked to suggest desirable and anticipated changes in their place of residence. Responses to anticipated changes were coded in the following categories: (1) positive or negative changes affecting people; (2) positive or negative changes affecting “animals”/“nature”. Finally, children’s gender, age, and place of residence were recorded and children were asked to state their information sources (i.e. school; social network, namely friends and relatives; experiences in the local area).

## **Data analysis**

We conducted chi-square tests to examine differences between primary sector and ecotourism activities in description, reasoning, and children’s dispositions. The likelihood ratio chi-square for categorical data was calculated. The Cramer’s V measure of association was calculated for significant cross-tabulations of description, reasoning, and children’s dispositions towards primary sector and ecotourism activities as well as likes/dislikes and desirable/anticipated changes concerning children’s place of residence by demographic variables and information sources.

## **Results**

Children were more able to correctly describe and present reasons for activities concerning fishing and bird watching than harvesting or boat-touring. This would suggest that children had a better understanding of activities that more explicitly involve interaction with fauna, than those that are only indirectly related to fauna (See APPENDIX, Table 1). Overall, children were able to describe ecotourism activities more effectively than primary sector ones, but they were more competent in providing reasoning for primary sector activities.

Children reacted more positively towards ecotourism activities than towards the primary sector activities, fishing in particular elicited negative attitudes (see APPENDIX, Table 2). These attitudes reflect changes of the educational priorities in protected areas, which are now more in favour of alternative economic activities. Justification of positive dispositions towards both primary sector and ecotourism activities refer primarily to humans (i.e. these activities were thought to be “good for people”: 36.5, 35.0, 33.5, and 30.0% for fishing, harvesting, bird watching, and the boat tour, respectively). Concerning negative dispositions, there was a distinct percentage of children who attributed a negative stance towards fishing being bad for “animals”/“nature” (44.0%).

Likes attributed to “people” and “animals”/“nature” were much more pronounced compared to dislikes. However, there was a relatively high percentage of dislikes pertaining to “animals”/“nature”. Respondents tend to have ambiguous feelings towards natural elements (Table 3).

Desirable changes *vis-à-vis* “people” were more pronounced compared with anticipated changes (Table 3). On the other hand, there was no significant difference between desirable and anticipated changes referring to “animals”/“nature”. The percentage of children who anticipated negative changes affecting “animals”/“nature” was three times greater than the percentage who perceived positive changes. This finding is quite important since attitudes towards changes are linked with attitudes towards economic activities.

Gender, age and place of residence are factors often significantly associated with both children’s correct descriptions and reasoning of local economic activities, as well as with positive dispositions towards these activities (Table 4). There was low statistical significance for the relationship between positive dispositions towards economic activities and the sources of children’s understanding of these activities. In particular, school was found to have almost no impact.

Children’s views of changes anticipated affecting people increased with children’s age. Desirable and anticipated changes concerning “animals”/“nature” were more numerous for children residing on the west bank of the lake; in the latter case, anticipated changes also increased with age (Table 5). Dislikes pertaining to “people” were more pronounced for those who cited their school as an information source (Table 5).

## Conclusions and implications for Environmental Education

Positive attitudes towards nature, as well as towards environmentally friendly human activities, were certainly present among young children participated in the survey. However, it was also obvious that many children hold misconceptions, gaps in knowledge and possess ambiguous feelings towards natural elements. Environmental education programmes in the wetland of Kerkini should help those involved to gain understanding of the interrelationships in a wetland, as well as of their personal association with their wetland. Moreover, they should support the ability of children to engage in increasingly sophisticated types of reasoning as they mature.

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## APPENDIX

	Description				Reasoning			
Activities	Correct Replies (%)	Incorrect replies (%)	'Don't Know' (%)	$\chi^2$	Correct Replies (%)	Incorrect replies (%)	'Don't Know' (%)	$\chi^2$
Primary sector				95.74***				69.90***
Fishing	99.0	1.0	-		95.5	2.5	2.0	
Harvest	65.0	29.0	6.0		63.5	20.5	16.0	
Ecotourism				22.60***				4.83*
Bird watching	97.0	1.5	1.5		75.5	3.0	21.5	
Boat tour	83.5	16.0	0.5		65.5	17.5	17.0	
Overall				11.54***				8.68**
Primary sector	82.0	15.0	3.0		79.5	11.5	9.0	
Ecotourism	90.3	8.8	1.0		70.5	10.3	19.3	

Note: \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$

Table 1. Description and reasoning provided for primary sector and ecotourism activities

	Positive dispositions (%)	$\chi^2$	Negative dispositions (%)	$\chi^2$
Primary sector		0.01		144.00*
Fishing	60.0		47.5	
Harvest	51.5		1.0	
Ecotourism		6.40*		2.27
Bird watching	71.5		4.5	
Boat tour	59.5		7.0	
Overall		7.98**		57.15***
Primary sector	55.8		24.3	
Ecotourism	65.5		5.8	

Note: \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$ .

Table 2. Positive and negative dispositions towards primary sector and ecotourism activities

	<b>“People” (%)</b>	<b><math>\chi^2</math></b>	<b>“Animals”/“nature” (%)</b>	<b><math>\chi^2</math></b>
Likes/dislikes		51.44***		59.92***
Likes	37.0		64.0	
Dislikes	8.0		26.0	
Changes		8.01**		1.39
Desirable	18.0		20.0	
Anticipated	8.5		15.5	
Positive	4.0		3.0	
Negative	4.5		12.5	

Note: \* =  $p < 0.05$ , \*\* =  $p < 0.01$ , \*\*\* =  $p < 0.001$ .

Table 3. Likes/dislikes and desirable/anticipated changes referring to “people” or “animals/nature”

	<b>Fishing</b>	<b>Harvest</b>	<b>Bird watching</b>	<b>Boat tour</b>
<b>Description</b>				
Gender	NS	0.27**	NS	NS
Age	NS	0.46***	NS	0.40***
Place of residence	NS	0.24**	0.30***	NS
School	NS	NS	NS	NS
Friends/relations	NS	NS	NS	NS
Experiences	NS	NS	NS	NS
Reasoning				
Gender	NS	0.32***	NS	NS
Age	0.24**	0.33***	0.21*	0.41***
Place of residence	NS	NS	0.26**	NS
School	NS	NS	NS	NS
Friends/relations	NS	NS	0.14*	NS
Experiences	NS	NS	NS	NS
Positive dispositions				
Gender	NS	0.30***	NS	NS
Age	NS	0.50***	0.25**	0.42***
Place of residence	NS	0.22*	0.20*	NS
School	NS	NS	NS	NS

Friends/relative s	NS	NS	NS	0.15*
Experiences	0.15*	NS	NS	NS
Negative dis- positions				
Gender	NS	NS	NS	0.17*
Age	0.28**	NS	NS	0.25**
Place of resi- dence	NS	NS	NS	NS
School	NS	NS	NS	0.23**
Friends/relative s	NS	NS	NS	NS
Experiences	NS	NS	NS	NS

Note: NS = non significant; \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$ .

Table 4. Cramer's V measures of association for significant cross-tabulations of description, reasoning and dispositions towards primary sector and ecotourism activities by demographic variables and information sources.

	Likes	Dislikes	Desirable changes	Anticipated changes
<b>“People”</b>				
Gender	NS	NS	NS	NS
Age	NS	NS	NS	0.31***
Place of resi- dence	NS	NS	NS	NS
School	NS	0.15*	NS	NS
Friends/relatives	NS	NS	NS	NS
Experiences	NS	NS	NS	NS
<b>‘Animals/nature’</b>				
Gender	NS	NS	NS	NS
Age	NS	NS	NS	0.39***
Place of resi- dence	NS	NS	0.25**	0.24*
School	NS	NS	NS	NS
Friends/relatives	NS	NS	NS	NS
Experiences	NS	NS	NS	NS

Note: NS = non significant; \* =  $p < 0.05$ ; \*\* =  $p < 0.01$ ; \*\*\* =  $p < 0.001$ .

Table 5. Cramer's V measures of association for significant cross-tabulations of likes/dislikes and desirable/anticipated changes referring to “people” or “animals/nature” by demographic variables and information sources.

## LEARNING TO SHAPE LIFE

**Klaus Hübner**

*Head of Department for Leisure Time  
and Environmental Education*

### **Project history. Landesbund für Vogelschutz in Bayern e.V.**

The *Landesbund für Vogelschutz e.V.* (The Bavarian Association for the Protections of Birds – hereafter referred as LBV) is the oldest nature-conservation organisation in Bavaria and has been involved in environmental education for more than twenty years. Since 1996, the LBV has been the only German nature-conservation organisation, which operates its own kindergarten.

This kindergarten, the “*arche noah*” (Noah’s Ark) kindergarten, is an integrated, ecologically oriented one based on the principles of Agenda21. The experiences gained in seven years working on the elementary field of environmental education created the basis for our project “*leben gestalten lernen* – learning to shape life”. The project also is based on the programme of action for the 21<sup>st</sup> century, which was adopted in 1992 in Rio de Janeiro by 180 countries. This Agenda21 should lead to a just and equal distribution of opportunity all over the world and should see to it, that also future generations can take their opportunities as we do now.

Teachers, educators and other people working on education are asked to make their contribution to our society’s sustainable development.

The background for this project is the experience gained in our daily kindergarten work. Therefore, in the following, we would like to shortly present our kindergarten to you.

### **The “arche noah” kindergarten.**

#### **Some basics concerning upbringing and education**

Education and upbringing play an important role in the process of Agenda21; they are essential requirements to support sustainable development and to improve human’s ability to cope with environmental and development tasks. They also are of decisive importance to create an ethnic and ecological consciousness as well as values and attitudes, skills, competences and behaviours that are consistent with a sustainable development. These requirements are also important for the public to effectively participate in the decision-making process.

Especially in the elementary field, at kindergarten age, skills and competences that will create the conditions for children to be up to the demands of the 21<sup>st</sup> century can be initiated and decision patterns are formed. Therefore, we like to support one of the demands of Agenda21: to develop

an environmental and development consciousness at the earliest possible time everywhere in the world and in all fields of society.

With this kindergarten, the LBV makes his contributions to locally put Agenda 21 into action and we not only want to show new possible solutions how to change our day to day habits but also how to put these solutions into action. Additionally, we do not want to restrict the daily ecological-oriented work at the kindergarten with many rules but to create a positive feeling towards this topic and to highly motivate parents and educators with this eventful and environmental education based program to try something similar in private at home.

### **Principles of the “arche noah” kindergarten**

We want to make children sensitive to the diversity and beauty of nature by experiencing nature. Conscious and highly esteeming interaction with oneself, our fellow human beings and nature is one basic principle of our work at the kindergarten. Inclusive learning possibilities differentiated sensory perception and filtering out important information supports children to develop a good orientation in their environment, in time and space. Healthy nutrition, waste avoidance and separation, conscious use of resources and a motion-oriented outdoor area are additional parts of our work at kindergarten. We plan seasons and topics according to the situation and the children. Regarding the sensible periods in learning, we want to allow a living and learning that enables children to gain the utmost independence because of doing things themselves.

Integration is a general principle in the “arche noah” kindergarten thus children of any nationality, religion, of any physical, psychic and mental individuality live together.

### **4000 waking hours in kindergarten**

Children’s abilities and competences can be ideally developed through issues of sustainability. Our goal is to enable children to actively affect their future within their sphere of activity. For this goal, we have 4.000 waking hours during which the children are at nursery school. 4.000 waking hours, during which we can involve the children in the preparation, organisation and realisation of projects and daily routines, 4.000 waking hours, during which we can adjust these daily routines to the children’s needs. We can also change the daily routine and thereby achieve ideal cooperation between teachers, parents and children.

This wealth of experience, these seven years of ecological-oriented and integrated work at kindergarten created the basis for our project “*leben gestalten lernen* – learning to shape life”.

We want to enable other institutions, educators and teachers to foster children’s competences by practical environmental education.

“*leben gestalten lernen* – learning to shape life”.  
Environmental education supports children’s abilities!

This conclusion is the result of our team after having worked on this project for more than one and a half year. Our games, activities and projects were tested by about 250 multipliers from all over Bavaria taking part in a workshop called „4.000 hours awake“. During our research we have found out that there are seven abilities which can be optimised by the contents and methods of environmental education: positive identification with oneself, communicative competence, gross and fine motor skills, conscious interaction with oneself and other living beings, emotional competence, social competence and *Gestaltungskompetenz* (the ability to modify and shape the society and its future). Now, we would like to describe these seven competences in more detail.

### **Positive identification with oneself**

When children see themselves as strong, brave, attractive or friendly, they are capable of changing the world.

This self-esteem must not only be encouraged daily at kindergartens by educators, but rather we must also encourage parents time and again to show high regard for their children. Of course, this is also valid for evidence of high regard among the children themselves. Therefore, the educator has to create many situations and possibilities in his or her daily work in which children can be proud of what they achieve. If a child continuously experiences the changing effect of his or her actions on the community, he/she will be ready and powerful to tackle new challenges.

Positive identification with oneself is an essential requirement for successful learning, the ability to succeed, and powers of self-assertion.

### **Communicative competence**

Those who are listened to feel that they are taken seriously. Those who can communicate are listened to. Although this sounds so simple, it must continuously be tested and practiced. As our most important means of communication, language must be developed and cultivated and is therefore an essential part of the educators’ task during the elementary stage of education. Communication is not only absolutely essential as a bridge between thinking and taking action, but also because sharing ones thoughts, feelings and opinions with others is an indispensable requirement for successful action within a group. Successful communication is the most important medium for constructive problem solving. However: successful articulation starts with listening to others. Vocabulary and language usage are broadened by educators’ reading aloud and storytelling, as well as through encounters with the other children’s language variations, new words, new picture books

and new stories. The kindergarten's potential in this area has to be supplemented with a positive attitude towards language, reading, and books at home.

### **Motor activity competence**

“All human organs are designed for movement”. Hugo Kükelhaus, the initiator of the multi-sensory educational exhibit “Exposition of the Senses”, made this statement, which could be supplemented by the conclusion that “those who do not move their organs let them waste away.” We know from developmental psychology how significant the connection between physical and intellectual development is. For this reason, it is necessary to offer children a wide spectrum of possibilities for physical activities, either in a room especially designed for creative physical activities, or in an outdoor space, which includes highly challenging playing equipment, or in nature itself. If there are enough possibilities for physical activity, every child will choose, according to his or her personal stage of development, the challenges which are necessary for ideally developing fine and gross motor skills, and therefore also lay down the basis for language and integrated thinking. Finding a rhythm between doing and relaxing during physical activity is also of great importance. Finding a rhythm is also an important basis for enabling children to cope with stress situations.

### **Gestaltungskompetenz**

Children should learn that they can influence the course of events in the group and in their surroundings actively, through cooperative discussion, and with an end result that they can be proud of. Whether creating pictures, making up rhymes, telling imaginative stories, creating imaginary animals from natural materials, playing an instrument, or deciding together in a group which living space – water, forest or meadow – should be visited that day: in every situation children are given the opportunity to see themselves as people who can cope with the tasks at hand.

The more personal freedom and influences we grant our children, the more they are qualified to deal with groups or act in different spheres of action.

At kindergarten the world is depicted on a small scale where children of different nationalities and religions live together. The children thereby get to know foreign cultures, attitudes and customs. This fosters their farsightedness, their understanding and their tolerance.

### **Emotional strength**

Whether sad, furious, funny, balanced, quiet or calm: feelings play an important role for children. As a result, it is important for children to experience that the society they live in is interested in their thoughts and feel-

ings. But it is just as important for a child to feel for him or herself what he or she is feeling and how a feeling – for example anger – feels.

Therefore the child is able to react true to him or herself, but also according to the social setting. Through the reaction of those in his or her surroundings, the child realizes that it is not alone, but gets support and consolation, and also notices that those in his or her surroundings take an interest in the child's joy and happiness.

A positive gateway to one's feelings enables a self-assured manner and the ability to communicate those feelings. Anger can then be expressed, instead of being turned into physical actions, fear can lead to assistance, and joy can infect others. If the child experiences its parents, educators and other children as they truly are, he or she can differentiate his or her own expressions, and therefore can empathise with others and can react more truly to him or herself.

### **Social competence**

Often kindergarten is the place where children have their first experiences as part of a social group, outside of the family. He or she experiences new and familiar behaviour and recognizes whom he or she likes and whom he or she dislikes.

However, the child also realises that he or she is always a part of the group and takes on different roles. This is important because we shape our whole life into social systems. Therefore, children should also experience that together they can change things, that many things are much easier to cope with in a group, and are often much more fun when done together.

Children need room to try things out in order to experience themselves in numerous ways and in relation to their social environment. However, they also need the most varied social experiences possible, to learn to understand their social environment.

### **Conscious interaction with oneself and with one's surroundings**

If we want to give children the ability to recognise, know, understand and interpret our natural and social environments, this can only be facilitated upon the basis of feeling and motivation for conscious interaction with oneself and with one's surroundings: curiosity, amazement and admiration for creation and cultural achievements; gratitude to those people who have created everything that is of importance to us, keeping and maintaining them; humility, modesty and love, because all of one man's achievements depend on advanced achievements of people before and next to him, and we are only one "drop in the great sea of human culture"(Maria Montessori).

Children are thereby led to gradually take over responsibility in the sense of feeling responsible for something, and at the same time for developing standards for the assessment of their own behaviour and that of others, and also for occurrences and proceedings in nature and society.



We have compared these seven competences with Agenda 21's fields of action:

- mobility
- building and living
- health and nutrition
- group skills
- *gestaltung*
- culture and customs
- climate and resources
- orientation in space and time
- biodiversity.

## **Mobility**

Mobility is of fundamental importance for our lives. It burdens our environment in numerous ways, though. Contaminants, noise, raw material consumption, and covering natural expanses with concrete are ever more serious problems in our society. Here, we pick up the topic of mobility with different action units, and include the broad field of movement in our suggestions: animal mobility, movement with water and wind, above all we take care that all of the activities that we offer can be reached on foot. From our point of view, experiencing the possibility of walking to, from, and around from all of the places of action is one of the foundations for handling the topic of mobility in the elementary field properly.

## **Building and living**

How people live, the places they choose for their homes, the materials they use to build their own four walls, how they plan cities: all of these things have enormous consequences for nature, the environment, and us. From the point of view of a three to six year old, the competence area "Building and Living" is not only limited to the *Gestaltung* possibilities within the kindergarten's building and garden, but also extends to dwellings for animals in the surroundings. Therefore, we have broadened the competency area "building and living" to include such possibilities, and of course, to involve creative work and projects with natural materials.

## **Health and nutrition**

This topic is of eminent and day-to-day importance, especially in kindergarten, as an important course for nutritional habits can be set here. With the proper nutrition we can not only promote children's health, but with the right product selection, we can also shorten transport routes and strengthen the regional agriculture and economy. With our suggestions for games, we also turn our attention to the important fact that nature is, in the truest sense of the word, precious. We have collected many recipes that our

grandparents were familiar with, but which have increasingly become lost in recent years. These culinary strolls through nature stimulate another look at the season, and of course, another look at the variety of the herbs and plants that can enrich our menus.

## **Group skills**

Feeling secure in the group, experiencing the strength of the group, seeing how one's own contribution enriches the group's work as a whole: these are elementary experiences. Groups characterize our society, and teamwork and mutual help are indispensable conditions for successful decision-making and influencing one's surroundings.

## **Gestaltung**

Being creative is surely one of man's most elementary needs. Creating a whole from various parts, moving something inconspicuous into the right light; with feather and ink, play-dough or clay.

Our natural surroundings offer countless possibilities for performing originally and creatively time and again.

## **Culture and customs**

Many religious celebrations and regional traditions are integral parts of the yearly course of events in our kindergartens. We supplement these customs by looking at other cultures, including natural materials in the rhythm of the seasons, and direct the children's gaze towards our own roots, but also beyond the end of our own noses.

## **Climate and resources**

The imminent climate change, which is certainly in part caused by us and by our unrestrained CO<sub>2</sub> emissions, as well as our even now, much too wasteful dealing with our resources, are very important fields of reference for Agenda 21. Ensuring that materials are dealt with more carefully, that solar energy is used properly, and gaining insight into the production of play materials are therefore urgent fields of action in our child agenda.

## **Orientation in space and time**

Our demand for high-speed transportation in all areas, and quick accessibility to all of the places in our country and across continents has made our daily lives more and more hectic. This also affects the daily lives of our children: poorly planned days and weekends, one more thing to do here, another event there: our children's daily lives are becoming ever more restless. And yet, children especially need time to be able to grow up. It's high time

that we slow down our daily lives, and those of our children, make our cities and towns worth living in, instead of more car-friendly, and finally get some peace and quiet. Please join us on a trip through the three luxury goods of our time: quiet, nature and time for each other.

## **Biodiversity**

The birds' chirping, colourful, flower-rich meadows, mixed forests with varied forest edges; diversity of species means quality of life. Maintaining biodiversity isn't only necessary for ensuring an environment worth living in, but also recognizes the natural value of every animal and plant species. It is only possible to successfully protect plants and animals if we maintain their habitats; therefore, promoting diversity of species is both definitive and necessary for fertile land, clean water, pure air, and climate preservation. In addition to that, many species are irreplaceable as renewable resources and as raw materials for medications. It is our aim, with these suggestions, which are based on the connection between the topics of Agenda 21 and the fostering of children competences, to enable children to actively take part in shaping their future in their sphere of action.

The magic word is participation: involving children, taking them seriously, and creatively structuring the days at nursery school together. Children should maintain their own opinions, accept those of the others and should feel that they can achieve much more together than alone.

You can have a look at our results on a video and a file, where you can find background information, a big part showing practical exercises, opinions of experts and further literature. The practical exercises are subdivided into five big topics: Insects, treasure chest, stones, leaves and wild cuisine. The respective games, recipes, and construction manuals are categorized according to season, Agenda21' fields of action and the rooms in which they can be carried out.

Another important point is the parents' involvement. How parents can be involved in decision-making, planning, and carrying out smaller and bigger projects, is shown through a concrete example.

The file including DVD/Video is available in English and German.

For more information contact:  
Landesbund für Vogelschutz in Bayern e.V.  
Klaus Hübner  
Eisvogelweg 1  
D-91161 Hilpoltstein  
0049 – (0)9174 – 47750  
[www.lbv.de](http://www.lbv.de)

## **LEBEN GESTALTEN LERNEN**

**Klaus Hübner**

*Leiter des Referats Freizeit und Umweltbildung  
Landesbund für Vogelschutz in Bayern e.V.*

### **Projektgeschichte. Der Landesbund für Vogelschutz in Bayern e.V.**

Der Landesbund für Vogelschutz in Bayern e.V. – Verband für Arten – und Biotopschutz (LBV) ist der älteste Naturschutzverband Bayerns und befasst sich seit mehr als 20 Jahren mit dem Thema Umweltbildung. Seit 1996 ist der LBV als einziger Naturschutzverband Deutschlands Träger eines ökologisch-orientierten, integrativen Kindergartens (des „arche nah“ Kindergartens), der auf den Prinzipien der Agenda 21 aufgebaut ist. Durch die Erfahrungen die sich in sieben Jahren Umweltbildung im Elementarbereich gesammelt haben, wurde der Grundstein zu unserem Projekt „leben gestalten lernen“ gelegt.

Das Projekt basiert ebenso auf dem Aktionsprogramm für das 21. Jahrhundert, das 1992 in Rio de Janeiro von 180 Staaten dieser Welt verabschiedet wurde. Diese „Agenda 21“ soll zu gerechter Chancenverteilung zwischen den Völkern führen und dafür sorgen, dass auch künftige Generationen ihre Entfaltungsmöglichkeiten so wahrnehmen können wie wir. Auch die Verantwortlichen im Bildungsbereich sind gefordert, ihren Beitrag zur nachhaltigen Entwicklung unserer Gesellschaft zu leisten.

Hintergrund dieses Projektes sind die Erfahrungswerte aus unserer Kindergartenarbeit. Deswegen möchten wir Ihnen den Kindergarten im Folgenden kurz vorstellen.

### **Der „arche nah“ Kindergarten. Grundsätzliches zu Erziehung und Bildung in der Agenda 21**

Bildung und Erziehung spielen im Agendaprozess eine entscheidende Rolle, sie sind „eine unerlässliche Voraussetzung für die Förderung einer nachhaltigen Entwicklung und die Verbesserung der Fähigkeit des Menschen sich mit Umwelt- und Entwicklungsfragen auseinander zu setzen. Sie sind auch von entscheidender Bedeutung für die Schaffung eines ökologischen und ethischen Bewusstseins sowie von Werten und Einstellungen, Fähigkeiten und Verhaltensweisen, die mit einer nachhaltigen Entwicklung vereinbar sind, sowie für eine wirksame Beteiligung der Öffentlichkeit an der Entscheidungsfindung“.

Gerade im Elementarbereich, im Kindergartenalter, werden Fähigkeiten und Fertigkeiten grundlegend angelegt und Entscheidungsmuster maßgeblich geprägt. Deshalb schließen wir uns auch gerne einer der Forderungen der

Agenda 21 an, die besagt, „zum frühest möglichen Zeitpunkt überall in der Welt und in allen gesellschaftlichen Bereichen ein Umwelt- und Entwicklungsbewusstsein zu entwickeln“.

Mit diesem Kindergarten leistet der LBV seinen Beitrag zur Umsetzung der Agenda 21 auf lokaler Ebene und will neue Lösungsansätze für die Änderung der Lebensgewohnheiten nicht nur zeigen, sondern auch mit Leben füllen. Außerdem wollen wir die ökologisch – orientierte tägliche Kindergartenarbeit nicht im Sinne einer "Öko-Reglementierung" betreiben, sondern das Thema positiv besetzen und mit einem erlebnis-orientierten, umweltpädagogisch-fundierte Programm eine hohe Motivation schaffen, im privaten Bereich ähnliches zu versuchen.

### **Grundsätze des „arche nah“ Kindergartens**

Durch direkte Naturbegegnungen sollen die Kinder für die Vielfalt und Schönheit der Natur sensibilisiert werden. Achtsamer und wertschätzender Umgang mit sich selbst, seinen Nächsten und der Natur sind ein elementarer Grundsatz unserer Kindergartenarbeit. Ganzheitliche Lernformen und differenzierte Sinneswahrnehmung, das herausfiltern von wichtigen Informationen helfen den Kindern zu einer guten Orientierung in ihrer Umwelt, in Zeit und Raum. Gesunde Ernährung, Müllvermeidung und –trennung, sorgsamer Umgang mit Ressourcen sowie ein bewegungsorientiertes Außengelände sind weitere Bausteine unserer Kindergartenarbeit. Die Jahreszeiten und Themen planen wir situationsorientiert und kindorientiert, um unter Berücksichtigung der sensiblen Phasen ein Leben und Lernen zuzulassen, dass größtmögliche Selbstständigkeit durch Selbsttätigkeit zum Ziel hat. Integration ist ein durchgehendes Prinzip, so dass im „arche nah“ Kindergarten Kinder jeder Nation, Religion, jeder körperlichen, geistigen und seelischen Individualität miteinander leben.

### **4000 wache Stunden im Kindergarten**

Kindliche Fähigkeiten und Fertigkeiten lassen sich mit Themen der Nachhaltigkeit in idealer Weise entwickeln. Ziel dabei ist es, die Kinder zu befähigen, ihre Zukunft in ihrem Wirkungskreis aktiv mitgestalten zu können. Dazu haben wir 4.000 wache Stunden während der Zeit im Kindergarten. 4.000 wache Stunden, in denen wir die Kinder einbeziehen können in Vorbereitung, Planung und Durchführung von Projekten und Tagesabläufen, 4.000 wache Stunden, in denen wir diese Tagesabläufe den kindlichen Bedürfnissen anpassen können, sie abändern und so ein optimales Miteinander von Erzieherinnen, Eltern und Kindern erreichen können.

Aus diesem Erfahrungsschatz, diesen 7 Jahren ökologisch-integrativer Kindergartenarbeit, entstand das Projekt „leben gestalten lernen“ mit dem wir anderen Einrichtungen, Erziehern und Lehrern die Möglichkeit geben wollen, durch praktische Umweltbildungsarbeit die kindlichen Kompetenzen zu fördern!

Leben gestalten lernen. Umweltbildung fördert kindliche Kompetenzen!

Dies ist der Schluss, den unser Projektteam nach 1½ jähriger Arbeit ziehen kann. Erprobt und weiterentwickelt wurden unsere Spiele, Aktionen und Projekte mit Hilfe von ca. 250 Multiplikatorinnen aus ganz Bayern, die an einem Workshop zu den 4.000 wachen Stunden teilgenommen haben. Wir sind durch unsere Arbeit der festen Überzeugung, dass sich im Kindergarten Kompetenzen anbahnen lassen, die Voraussetzungen schaffen, um den Anforderungen des 21. Jahrhunderts gewachsen zu sein.

Wir haben in unserem Projekt herausgefunden, dass sich sieben Kompetenzen mit den Inhalten und Methoden der Umweltbildung optimal fördern lassen: positive Identifikation mit sich selbst, kommunikative Kompetenz, grob - und feinmotorische Fähigkeiten, achtsamer Umgang mit sich selbst und mit anderen Lebewesen, emotionale Kompetenz, Sozialkompetenz und Gestaltungskompetenz. Diese sollen im folgenden etwas näher erläutert werden.

### **Positive Identifikation mit sich selbst**

Kinder, die sich selbst als stark, mutig, attraktiv oder freundlich erleben, können die Welt verändern. Dieses Selbstwertgefühl muss nicht nur durch die Erzieherinnen in der täglichen Kindergartenarbeit unterstützt werden, sondern wir müssen auch die Eltern immer wieder ermutigen, ihren Kindern gegenüber Wertschätzung zu zeigen. Dies gilt natürlich auch für die Wertschätzung der Kinder untereinander. Das heißt, die Erzieherin muss in der täglichen Arbeit viele Gelegenheiten schaffen, die es den Kindern ermöglichen, stolz auf das zu sein, was sie können. Wenn das Kind immer wieder erlebt, dass es in der Gemeinschaft etwas bewegen kann, wird es bereit und stark sein, neue Herausforderungen anzugehen. Positive Identifikation mit sich selbst ist eine wesentliche Voraussetzung für erfolgreiches Lernen, Leistungs - und Durchsetzungsfähigkeit.

### **Kommunikative Kompetenz**

Wem zugehört wird, der fühlt sich ernst genommen. Wer sich mitteilen kann, dem wird zugehört. Was sich so einfach anhört, muss aber immer wieder erprobt und geübt werden. Unser wichtigstes Kommunikationsmittel, die Sprache, zu entwickeln und zu pflegen, ist aber auch ein wesentlicher Bestandteil der Arbeit im Elementarbereich. Nicht nur als Brücke zwischen Denken und Handeln ist Kommunikation unverzichtbar, auch das Teilhaben lassen von anderen an seinen Gedanken, seinen Gefühlen und der eigenen Meinung ist unabdingbare Voraussetzung für erfolgreiches Handeln in der Gruppe. Erfolgreiche Kommunikation wird dabei zum wichtigsten Medium konstruktiver Konfliktlösung. Erfolgreiches Artikulieren fängt aber beim Zuhören an. Regelmäßiges Vorlesen oder Erzählen der Erzie-

herinnen erweitern den Wortschatz und Sprachgebrauch der Kinder ebenso wie die Begegnung mit den Sprachvarianten, neuen Worten, neuen Bilderbüchern und neuen Geschichten der anderen Kinder. Dieses Potential in der Einrichtung muss aber ergänzt werden durch eine positive Einstellung zur Sprache, zum Lesen oder zu Büchern im Elternhaus.

### **Motorische Kompetenz**

„Alle Organe des Menschen sind auf Bewegung hin ausgelegt“, dieser Satz von Hugo Kükelhaus, dem Initiator des Erfahrungsfeldes zur Entfaltung der Sinne, könnte noch ergänzt werden mit der Schlussfolgerung „wer seine Organe nicht bewegt, lässt sie verkümmern“. Aus der Entwicklungsphysiologie wissen wir auch wie eng der Zusammenhang zwischen motorischer und geistiger Entwicklung ist. Deshalb ist es notwendig, den Kindern ein breites Spektrum an Bewegungsmöglichkeiten zu bieten, sei es in der Bewegungsbaustelle, dem Außengelände, mit Spielgeräten mit hohem Aufforderungscharakter oder in der Natur selbst. Sind genügend Gelegenheiten zur körperlichen Betätigung vorhanden, so wird sich jedes Kind je nach seinem Entwicklungsstand die Herausforderungen suchen, die es braucht, um grob- und feinmotorische Kompetenzen optimal zu entwickeln, und damit auch Grundlage für Sprache oder vernetztes Denken zu legen. Wichtig bei jeder körperlichen Anstrengung ist auch der Rhythmus zwischen Tun und Entspannung. Eine solche Rhythmisierung ist auch wichtige Grundlage für die Kinder, Stresssituationen positiv zu bewältigen.

### **Gestaltungskompetenz**

Die Kinder sollen erfahren, dass sie in der Gruppe und in ihrer Umgebung Vorgänge beeinflussen können – aktiv, gemeinsam abgesprochen, mit einem Ergebnis, auf das man stolz sein kann. Ob beim Gestalten eines Bildes, dem Erfinden von Reimen, dem Erzählen von fantasievollen Geschichten, dem Basteln eines Fantasetiers aus Naturmaterialien, dem Spielen eines Musikinstrumentes oder der gemeinsamen Entscheidung der Gruppe, ob an diesem Tag der Lebensraum Wald, Wasser oder Wiese besucht werden soll – in all diesen Situationen lernen Kinder sich als Personen zu erleben, die Aufgaben meistern können. Je mehr Freiräume und Mitbestimmungsmöglichkeiten wir den Kindern dabei zugestehen, umso kompetenter werden sie im Umgang in der Gruppe oder beim Tun in unterschiedlichsten Aktionsräumen.

Im Zusammenleben von Kindern unterschiedlicher Nationen und Religionen bildet sich im Kindergarten die Welt im Kleinen ab. Dies ermöglicht den Kindern das Kennenlernen fremder Kulturen, Einstellungen und Bräuche und fördert so ihren Weitblick, ihr Verständnis und ihre Toleranz.

## **Emotionale Kompetenz**

Traurig, wütend, lustig... zu sein, aber auch ausgeglichen, ruhig oder gelassen: Gefühle spielen für Kinder eine ganz wesentliche Rolle. Dabei ist es für Kinder wichtig zu erfahren, dass ihre Mitwelt sich dafür interessiert, wie sie denken und fühlen. Genauso wichtig ist aber, dass das Kind selbst spürt, was es fühlt und wie sich das Gefühl - Wut zum Beispiel - anfühlt. Es kann so im Kontakt mit anderen authentisch, aber dem sozialen Rahmen entsprechend, angemessen agieren. An der Reaktion der Umgebung auf sein Verhalten erlebt das Kind, dass es nicht allein ist, sondern Unterstützung und Trost oder aber auch Teilnahme an seiner Freude erfährt.

Ein positiver Zugang zu seinen Gefühlen ermöglicht ein selbstsichereres Auftreten und die Fähigkeit seine Gefühle zu kommunizieren. Ärger kann ausgesprochen werden, anstelle sich in körperliche Aktion umzuwandeln, Angst kann in Hilfsangebote münden, und Freude andere anstecken. Erlebt das Kind seine Eltern, Erzieherinnen und andere Kinder in ihrer Authentizität, kann es seine eigenen Ausdrucksformen weiter ausdifferenzieren, sich wiederum besser einfühlen, und echter reagieren.

## **Sozialkompetenz**

Im Kindergarten erlebt das Kind sich oft zum ersten Mal in seinem Leben als Teil einer sozialen Gruppe, außerhalb seiner Familie. Es erfährt neue und bekannte Verhaltensmuster und spürt, zu wem es sich hingezogen fühlt und wen es nicht so mag. Es erlebt aber auch, dass es selbst immer ein Teil dieser Gruppe ist und gewisse Rollen einnimmt. Das ist wichtig, denn wir gestalten unser ganzes Leben in sozialen Systemen. Deshalb sollen Kinder aber auch erfahren, dass sie gemeinsam mit anderen etwas bewegen können, dass viele Dinge gemeinsam einfacher gelingen und oft mehr Spaß machen. Kinder brauchen Erprobungsräume, um sich vielfältig wahrzunehmen und in Bezug zu ihrer sozialen Umwelt zu erleben. Kinder brauchen die vielfältigsten Sozialerfahrungen aber auch, um ihr soziales Umfeld verstehen zu lernen.

## **Achtsamer Umgang mit sich selbst und mit anderen Lebewesen**

Wenn wir dem Kind das Erkennen, Wissen, Verstehen und Deuten der natürlichen und sozialen Umwelt ermöglichen wollen, so geschieht das auf der Grundlage von Gefühlen und Motivation für den achtsamen Umgang mit sich selbst und seiner Umgebung: Neugier, Staunen und Bewunderung über die Schöpfung und kulturelle Leistungen; Dankbarkeit gegenüber den Menschen, die alles für uns wichtige geschaffen haben, erhalten und pflegen; Demut, Bescheidenheit und Liebe, weil alle Leistungen eines einzelnen Menschen auf den Vorleistungen von Menschen vor und neben ihm beruhen und wir nur ein „Tropfen im großen Meer der Kultur der Menschheit“ (Maria Montessori) sind. Dabei werden die Kinder angeleitet, schrittweise Verantwortung in dem Sinne zu übernehmen, sich für etwas zuständig



zu fühlen und gleichzeitig Maßstäbe für die Bewertung des eigenen und fremden Handelns sowie den Vorgängen in Natur und Gesellschaft zu entwickeln.

### **Diesen Kompetenzen haben wir die Handlungsfelder der Agenda 21 gegenübergestellt**

Nicht, um die politischen Auseinandersetzungen in den Kindergarten zu verlagern sondern um die Pädagogik, die ja vom Menschen ausgeht, aus der Theorie in die konkrete Praxis/ Realität zu holen. Die Agendabereiche, denen wir unsere Aktivitäten zugeordnet haben sind:

- Mobilität
- Bauen und Wohnen
- Gesundheit und Ernährung
- Soziales
- Gestaltung
- Kultur und Brauchtum
- Klima + Ressourcen
- Orientierung in Raum und Zeit
- Biodiversität.

### **Mobilität**

Mobilität ist von grundlegender Bedeutung für unser Leben. Allerdings belastet der damit verbundene Verkehr unsere Umwelt in vielfacher Weise. Schadstoffe, Lärm, Rohstoffverbrauch und die Zubetonierung natürlicher Flächen sind ein immer gravierenderes Problem in unserer Gesellschaft.

Wir greifen das Thema Mobilität mit verschiedenen Aktionseinheiten auf, beziehen auch das weite Feld Bewegung in unsere Vorschläge mit ein: Mobilität von Tieren, Bewegung durch Wasser und Wind vor allem aber achten wir bei allen Aktivitäten, die wir anbieten, dass sie für die Kinder zu Fuß erreichbar sind.

Diese „Fußläufigkeit“ aller Aktionsräume zu erleben, ist aus unserer Sicht einer der Grundsteine überlegten Umgangs mit Mobilität.

### **Bauen und Wohnen**

Wie der Mensch wohnt, welchen Ort er sich für sein Zuhause aussucht, welche Materialien er für den Bau seiner eigenen vier Wände verwendet, wie er Städte plant – all dies hat immense Auswirkungen auf Natur und Umwelt.

Aus Sicht der 3 bis 6jährigen haben wir Bauen und Wohnen nicht nur auf Möglichkeiten der Gestaltung von Haus und Garten der Einrichtung, sondern auch auf Behausungen der Tiere in unserer Umgebung ausgeweitet und selbstverständlich auch kreative Arbeiten mit Naturmaterialien in das Thema mit einbezogen.

## **Gesundheit und Ernährung**

Dieses Thema ist gerade im Kindergarten von eminenter Bedeutung, da hier wichtige Weichen für ein Ernährungsverhalten gestellt werden können, das nicht nur unsere Gesundheit fördert, sondern auch durch die richtige Auswahl von Produkten sensibilisiert für regionale Angebote, jahreszeitliches Reifen und im wahrsten Sinne des Wortes „kostbare“ Natur.

## **Soziales**

Geborgen sein in der Gruppe, die Stärke der Gruppe erleben, zu erleben wie der eigene Beitrag die Gruppenarbeit als ganzes bereichert – dies sind elementare Erfahrungen. Gruppen prägen unsere Gesellschaft und Teamarbeit und gegenseitige Hilfe sind unabdingbare Voraussetzungen für erfolgreiches Handeln. Der vorliegende Praxisteil bietet Ihnen viele Möglichkeiten, diesen wichtigen Agenda Bezug immer wieder anzulegen und zu üben.

## **Gestaltung**

Schöpferisch tätig sein ist wohl eine der elementarsten Bedürfnisse des Menschen. Aus Einzelteilen etwas Ganzes zu machen, Unscheinbares ins rechte Licht zu rücken, mit Federn und Tinte, Wachsknetmasse oder Lehm – unsere natürliche Umgebung bietet unzählige Möglichkeiten, diesen schöpferischen Akt immer wieder zu begehen.

## **Kultur und Brauchtum**

Viele kirchliche Feste, regionale Traditionen sind fester Bestandteil vieler Jahresabläufe in unseren Kindergärten.

Wir ergänzen sie durch Blick in andere Kulturen, beziehen Naturmaterialien im Rhythmus der Jahreszeiten mit ein und lenken so den Blick auf unsere eigenen Wurzeln, aber auch über unseren eigenen Tellerrand hinaus.

## **Klima und Ressourcen**

Der drohende Klimawandel, der zum Teil sicherlich auch von uns Menschen durch unseren ungehemmten CO<sub>2</sub>-Ausstoß mit verursacht ist, und der immer noch viel zu verschwenderische Umgang mit unseren Ressourcen ist ein sehr ernstes Bezugsfeld zur Agenda 21. Achtsamer Umgang mit Materialien, sinnvolle Nutzung von Sonnenenergie und Einblick in das Entstehen von Spielmaterialien zu bekommen, sind deshalb wichtige Handlungsfelder unserer Kinder-Agenda.

## **Orientierung in Raum und Zeit**

Unser Anspruch an hohe Geschwindigkeit aller Verkehrsmittel und schnelle Erreichbarkeit aller Orte in unserem Land und über die Kontinente hinweg haben unseren Alltag immer hektischer werden lassen. Dies betrifft auch den Alltag unserer Kinder: verplante Tages - und Wochenabläufe, hier noch ein Angebot, dort noch ein Event: auch der Alltag unserer Kinder wird immer ruheloser. Dabei brauchen gerade Kinder die nötige Zeit, um groß werden zu können. Es ist höchste Zeit, unseren Alltag und den unserer Kinder zu entschleunigen, unsere Städte und Dörfer wieder lebenswerter anstatt autogerechter zu machen und wieder zur Ruhe zu kommen. Begleiten Sie uns auf unserer Reise zu den drei Luxusgütern unserer Tage: Stille, Natur und Zeit füreinander.

## **Biodiversität**

Vogelgezwitscher, bunte Blumenwiesen, Mischwälder mit vielfältigen Waldsäumen: Artenvielfalt ist Lebensqualität. Biologische Vielfalt zu erhalten, ist aber nicht nur Aufgabe, um uns eine lebenswerte Umwelt zu sichern, sondern erkennt auch den Eigenwert jeder einzelnen Tier- und Pflanzenart an. Ziel unserer Vorschläge, die auf der Verbindung der Förderung kindlicher Kompetenzen und Themen der Agenda 21 beruhen, ist es, die Kinder zu befähigen, ihre Zukunft in ihrem Wirkungskreis aktiv mitgestalten zu können.

Partizipation heißt hier das Zauberwort, bei dem es darum geht, die kindlichen Wünsche und Bedürfnisse in der Vorbereitung, Planung und Durchführung des Kinderalltags mit einzubeziehen. Die Kinder sollen dabei lernen, die eigene Meinung zu vertreten, die anderer zu akzeptieren, zu spüren, dass man gemeinsam mehr erreichen kann, die eigene Stärke für die Stärke der Gruppe einzusetzen.

Zusammengefasst haben wir unsere Ergebnisse auf einem Video und in einem Sammelordner, in dem Hintergrundinformationen, ein großer Praxisteil, Meinungen von Experten und weiterführende Literatur zu finden sind.

Der Praxisteil ist untergliedert in fünf große Themengebiete, Insekten, Schatzkiste, Steine, Laub und wilde Küche. Die jeweiligen Spiele, Rezepte und Bastelaktionen sind den Jahreszeiten, den jeweiligen Agendabereichen und den Räumen, in denen sie durchgeführt werden können, zugeordnet.

Ein wichtiger Punkt ist die Elternarbeit. Wie Eltern in die Entscheidungsfindung, Planung und Durchführung von großen und kleinen Projekten im Kindergarten einbezogen werden können, stellen wir an einem Beispiel detailliert dar.

Der Ordner ist inklusive DVD/Video sowohl in Englisch als auch auf Deutsch erhältlich.

Weitere Informationen sind beim LBV erhältlich:  
Landesbund für Vogelschutz in Bayern e.V.  
Klaus Hübner  
Eisvogelweg 1  
91161 Hilpoltstein  
[www.lbv.de](http://www.lbv.de)



## **COMPLEJIDAD, RACIONALIDAD AMBIENTAL Y DIÁLOGO DE SABERES**

**Enrique Leff**

*Coordinador de la Red de Formación Ambiental  
para América Latina y el Caribe.*

*Programa de las Naciones Unidas para el Medio Ambiente.*

*C.E.: enrique.leff@pnuma.org*

Hacia el fin del siglo XIX, Friedrich Nietzsche, al reflexionar sobre la condición de su mundo y de su tiempo habría exclamado: “el erial crece, el desierto se extiende”. No se refería entonces a la devastación de la naturaleza, sino a la desolación del alma. Y agregó: “ay de aquél que esconda ese erial dentro.” Un siglo más tarde esta intuición precursora del ecologismo se hizo visible. La desolación se abate sobre nuestros mundos de vida, desprovistos de esperanza y de sentido para la existencia humana. Martin Heidegger, el filósofo del siglo XX, se habría preguntado: “¿Qué llama a pensar?” Y habría respondido: “el hecho de que no estamos pensando”. La crisis ambiental nos llama a repensar nuestro mundo y la condición humana en la era posmoderna, en la era del terror, el caos, la incertidumbre y el riesgo. Y esta reinención de nuestras identidades y sentidos no podría darse fuera del proceso educativo en el cual se forja el ser humano de nuestro tiempo.

La crisis ambiental es el signo de una nueva era histórica. Esta crisis civilizatoria es, ante todo, una crisis del conocimiento. La degradación ambiental es resultado de las formas de conocimiento a través de las cuales la humanidad ha construido el mundo y lo ha destruido por su pretensión de universalidad, generalidad y totalidad; por su objetivación y cosificación del mundo. La crisis ambiental no es una crisis ecológica generada por una historia natural. Más allá de la evolución de la materia

desde el mundo cósmico hacia la organización viviente, de la emergencia del lenguaje y del orden simbólico, la materia y el ser se han complejizado por la re-flexión del conocimiento sobre lo real. En nuestra proclamada sociedad del conocimiento, la ciencia avanza arrojando sombras sobre el entendimiento del mundo y subyugando saberes. La ciencia que pretendía aprehender la realidad ha intervenido al ser, culminando en la tecnologización y la economización del mundo. La economía mecanicista y la racionalidad tecnológica han negado a la naturaleza; las aplicaciones del conocimiento fraccionado y de la tecnología productivista han generado la degradación entrópica del planeta, haciendo brotar la complejidad ambiental del efecto acumulativo de sus sinergias negativas.

El saber ambiental que de allí emerge interroga las causas de esta crisis y las perspectivas de un futuro sustentable posible, conduciendo la

construcción de una racionalidad alternativa, fuera del campo de la metafísica y de la ciencia moderna que han producido un mundo insustentable. En el conocimiento del mundo – sobre el ser y las cosas, sobre sus esencias, sus leyes y atributos –, en toda esa tematización ontológica y epistemológica, subyacen nociones que han dado fundamento al conocimiento y significantes que han arraigado en saberes culturales y personales, configurando las subjetividades de los seres humanos modernos. Para construir sociedades sustentables en ese otro mundo posible al que aspiramos, es preciso “desconstruir” lo pensado para pensar lo por pensar, para desentrañar lo más entrañable de nuestros saberes y para dar curso a lo inédito, arriesgándonos a desbarrancar nuestras últimas certezas y a cuestionar el edificio de la ciencia. Ello implica saber que el camino en el que vamos acelerando el paso – la ideología y la política de un crecimiento sin límites – es una carrera desenfrenada hacia un abismo. Desde esta comprensión de las causas de esta crisis civilizatoria, la racionalidad ambiental se sostiene en el propósito de refundamentar el saber sobre el mundo que vivimos desde lo pensado en la historia y el deseo de vida que se proyecta hacia futuros inéditos a través del pensamiento y la acción social, del encuentro con la otredad y el diálogo de saberes.

La crisis ambiental es la primera crisis global generada por el desconocimiento del conocimiento. El conocimiento científico, al fragmentarse analíticamente, separa lo que está articulado orgánicamente; sin intención expresa – sin saberlo – genera una sinergia negativa, un círculo vicioso de degradación ambiental que la ciencia ya no comprende ni contiene. Esa forma de conocimiento, que quiere aprehender a los entes en su objetividad, indagando sus esencias, ha construido un “objeto” complejo que ya no refleja la multicausalidad de los procesos que lo produjo. El transobjeto que genera esta transgénesis demanda un saber que desborda los marcos del conocimiento sistémico, el pensamiento ecologista y los métodos interdisciplinarios. El desarrollo del conocimiento no trasciende la ignorancia en una “dialéctica de la iluminación”, sino que va generando sus propias sombras, sus áreas de desconocimiento, construyendo un objeto negro que ya no se refleja en los paradigmas de la ciencia normal.

El conocimiento ya no representa la realidad; por el contrario, construye una hiperrealidad en la que se manifiesta y se ve reflejado. El conocimiento ha intervenido al ser generando nuevos entes híbridos, amalgama de lo orgánico, lo tecnológico y lo simbólico. El conocimiento ya no salva. El conocimiento ya no provee de una cura existencial. El conocimiento ya no ofrece seguridad alguna en la era del riesgo y del terror. La libertad ha sido cooptada por el mercado. El sujeto, el yo, el ser, se mantienen alejados, enajenados, sometidos al poder de un conocimiento que despliega su propia lógica interviniendo la vida, pero fuera del mundo de la vida, de los espacios de convivencia y las redes de solidaridad.

La reintegración del mundo no remite a un proyecto de reunificación del conocimiento. La emergencia del saber ambiental rompe el círculo “perfecto” de las ciencias, la creencia en una Idea Absoluta y la voluntad de

un conocimiento unitario, abriéndose hacia la dispersión del saber y la diferencia de los sentidos existenciales. El saber ambiental desborda el campo de la racionalidad científica y de la objetividad del conocimiento. Este saber se conforma dentro de una nueva racionalidad teórica de donde emergen nuevas estrategias conceptuales para la comprensión y construcción de un mundo sustentable. Ello plantea la revalorización de un conjunto de saberes sin pretensión de científicidad. Frente a la voluntad de resolver la crisis ecológica mediante el “control racional del ambiente”, el saber ambiental cuestiona la “irracionalidad” de la razón científica.

El saber ambiental es afín con la incertidumbre y el desorden, con lo inédito, lo virtual y los futuros posibles; incorpora la pluralidad axiológica y la diversidad cultural en la formación del conocimiento y la transformación de la realidad.

La crisis ambiental lleva así a repensar la realidad, a entender sus vías de complejización, el enlazamiento de la complejidad del ser y del pensamiento, para desde allí abrir nuevas vías del saber en el sentido de la reconstrucción y la reapropiación del mundo y de la naturaleza. La racionalidad dominante encubre la complejidad, la cual irrumpe desde sus límites, desde su negación, desde la alienación del mundo economizado, arrastrado por un proceso incontrolable e insustentable de producción.

Desde el campo de externalidad de la racionalidad modernizante; desde los núcleos del conocimiento que han configurado a los paradigmas de las ciencias, sus objetos de conocimiento y sus métodos de investigación, emerge un nuevo saber. El saber ambiental no es la retotalización del conocimiento a partir de la conjunción interdisciplinaria de los paradigmas actuales. Por el contrario, es un saber que, desde la falta de conocimiento de las ciencias, problematiza a sus paradigmas, generando un haz de saberes en los que se enlazan diversas matrices de racionalidad, órdenes de valor y vías de sentido. Más que una mirada holística de la realidad que articula múltiples visiones y comprensiones del mundo, convocando a diferentes disciplinas y cosmovisiones, la complejidad ambiental emerge de la re-flexión del pensamiento sobre la naturaleza; es el campo donde convergen diversas epistemologías, racionalidades e imaginarios que transforman la naturaleza, construyen la realidad y abren la construcción de un futuro sustentable.

Si lo que caracteriza al ser humano es su relación con el saber, la complejidad no se reduce al reflejo de una realidad compleja en el pensamiento. Pensar la complejidad ambiental no se limita a la comprensión de una evolución “natural” de la materia y del hombre hacia el mundo tecnificado y un orden económico, como un devenir intrínseco del ser. La historia es producto de la intervención del pensamiento en el mundo, no obra de la naturaleza. La ecología y la teoría de sistemas, antes de ser una respuesta a una realidad compleja que los reclama, son la secuencia del pensamiento metafísico que desde su origen ha sido cómplice de la generalidad y de la totalidad. Como modo de pensar, estas teorías generaron un modo de producción del mundo que, afín con el ideal de universalidad y unidad del pensamiento, llevaron a la generalización de una ley totalizadora



y a una racionalidad cosificadora del mundo de la modernidad. Es en este sentido que la ley del mercado, más que representar en la teoría la generalización del intercambio mercantil, produce la economización del mundo, recodificando todos los órdenes de lo real y de la existencia humana en términos de valores de mercado, e induciendo su globalización como forma hegemónica y única del ser en el mundo.

La crisis ambiental lleva a un cuestionamiento del pensamiento y del entendimiento, de la ontología, la epistemología y la ética con las que la civilización occidental ha aprehendido al ser, los entes y las cosas; de la ciencia y la razón tecnológica con las que ha sido dominada la naturaleza y economizado el mundo moderno. El saber ambiental emerge como una nueva comprensión del mundo, incorporando el límite de lo real, la incompletitud del ser, la imposible totalización del conocimiento y la apertura del ser hacia la otredad. La incertidumbre, el caos y el riesgo son al mismo tiempo efecto de la aplicación del conocimiento que pretendía anularlos, y condición intrínseca del ser y del saber. El saber ambiental permite dar un salto fuera del ecologismo naturalista y situarse en el campo del poder en el saber, en una política del conocimiento, en un proyecto de reconstrucción social a través de un diálogo de saberes, que es un diálogo entre seres.

La epistemología ambiental no es un proyecto para aprehender un nuevo objeto de conocimiento – el ambiente – ni la reintegración del saber disperso en una retotalización del conocimiento. La epistemología ambiental es un trayecto para llegar a saber qué es el ambiente – ese extraño objeto del deseo de saber – que emerge del campo de exterminio al que fue expulsado por el logocentrismo de la teoría y el círculo de racionalidad de las ciencias. Trayecto y no proyecto epistemológico, pues si bien en las tendencias que se proyectan hacia el futuro lo real está ya trastocado por el conocimiento, la creatividad del lenguaje, la productividad del orden simbólico y la fecundidad del deseo no se anticipan por el pensamiento. Es una aventura epistemológica, pues el horizonte del saber se desdibuja en la lejanía de un futuro que la razón no alcanza a descifrar.

*C'est la mer qui s'est allé avec le soleil*

El ambiente no es la ecología, sino el campo de relaciones entre la naturaleza y la cultura, de lo material y lo simbólico, de la complejidad del ser y del pensamiento. El ambiente es una realidad empírica; si, pero en una perspectiva epistemológica es un saber; un saber sobre las estrategias de apropiación del mundo y la naturaleza a través de las relaciones de poder que se han inscrito en las formas dominantes de conocimiento. Allí se configura un pensamiento que ha tomado al ambiente como su objeto de reflexión, yendo a su encuentro, descubriendo en su búsqueda que éste desbordaba los marcos epistemológicos que intentan nombrarlo, codificarlo,

circunscribirlo y administrarlo dentro de los cánones de la racionalidad científica y los instrumentos económicos del desarrollo sostenible.

La epistemología ambiental conduce este camino exploratorio, en el que se van delineando los límites de la racionalidad que sostiene a la ciencia normal para aprehender al ambiente, al tiempo que va construyendo el concepto propio del ambiente y configurando el saber que le corresponde. En este trayecto se va desplegando un itinerario epistemológico en un continuo proceso de demarcaciones y desplazamientos que desemboca en un saber que desborda al conocimiento científico y cuestiona a la racionalidad de la modernidad.

El saber ambiental abre un diálogo entre modernidad y postmodernidad; entre logos científico, racionalidad económica y saberes populares; entre ética y conocimiento. El saber ambiental se mantiene fiel a su exterioridad y riguroso con su falta de conocimiento, que lo anima a indagar desde todas las vertientes y el límite de lo pensado, sin por ello fundirse con una teoría general de sistemas, disolverse en un pensamiento holístico o integrarse en un paradigma científico interdisciplinario y una lógica formal. El saber ambiental se despliega conforme con su identidad de extranjero, de judío errante, de indio sin tierra, de pueblo sin dios; en su condición de saber subyugado amenazado de exterminio y de saber emancipador, libre de toda atadura; comprometido con la creatividad, con el deseo de saber, con el enigma de la existencia, con el insondable infinito, con la solidaridad humana y con el valor de la vida.

La epistemología ambiental no es la formalización de un método diseñado para reintegrar y recomponer el conocimiento de un mundo globalizado. A tientas, el saber ambiental que nace en el campo de externalidad de las ciencias, se cuela por los intersticios de las murallas del conocimiento; desde allí lanza nuevas miradas y va barriendo certezas, abriendo los razonamientos circulares que con su fuerza centrífuga proyectan al ambiente fuera de sus órbitas celestiales. Lo que une estas miradas es su vocación antitotalitaria y crítica, su inconformismo con los saberes consabidos; lo que impide convertir la crítica en dogma y lleva a seguir indagando al saber desde todos los frentes y proyectarlo hacia todos los horizontes.

El ambiente se filtra entre todas las mallas teóricas y discursivas de la modernidad, haciendo visibles las murallas defensivas que se erigen frente a la invasión silenciosa del saber negado. El saber ambiental vulnera los muros de contención de la racionalidad positivista dominante, del proyecto universal objetivador y cosificador del conocimiento. El saber ambiental devela las estrategias de poder que enlazan al iluminismo de la razón y el racionalismo del conocimiento con las teorías de sistemas y el pensamiento ecologista. Al mismo tiempo establece las bases para pensar y construir una racionalidad alternativa.

La epistemología ambiental es una política del saber que tiene por “fin” dar sustentabilidad a la vida; es un saber que vincula las condiciones de vida únicas del planeta, con el deseo de vida del ser humano; los

potenciales ecológicos y la productividad neguentrópica con la creatividad cultural. El saber ambiental cambia la mirada del conocimiento y con ello transforma las condiciones del ser en el mundo en la relación que establece el ser con el pensar, con el saber y el conocer. La epistemología ambiental es una política para acariciar la vida, motivada por un deseo de vida, por la pulsión epistemofílica que erotiza al saber en la existencia humana.

El saber ambiental desplaza el modelo de la racionalidad dominante hacia un haz de matrices de racionalidad en la diferenciación de saberes que vinculan a las diferentes culturas con la naturaleza. El saber ambiental se va entretejiendo en una trama compleja de conocimientos, pensamientos, cosmovisiones y formaciones discursivas que desborda el campo del logos científico, abriendo un diálogo de saberes en donde se confrontan diversas racionalidades y tradiciones. El saber ambiental problematiza el campo de las ciencias; pero sobre todo alimenta la construcción de una nueva racionalidad social. El saber ambiental se construye en el encuentro de identidades y saberes marcado por la apertura del ser a la diversidad, a la diferencia y a la otredad, cuestionando la historicidad de la verdad, abriendo el campo del conocimiento hacia la utopía, al no saber que alimenta a las verdades por venir.

Si ya desde Hegel y Nietzsche la no-verdad aparece en el horizonte de la verdad, la ciencia fue descubriendo las fallas del proyecto científico de la modernidad, desde la irracionalidad del inconsciente (Freud) y el principio de indeterminación (Heisenberg), hasta el encuentro con la flecha del tiempo y las estructuras disipativas (Prigogine). El saber ambiental acoge el no saber, la incertidumbre, la indeterminación y la posibilidad en la producción de la verdad, del conocimiento, del devenir y del porvenir.

El saber ambiental navega hacia nuevos horizontes del ser y del tiempo. Fuera de la relación de identidad entre el concepto y lo real que propone la epistemología y la metodología de la ciencia en el imaginario de la representación, el saber ambiental indaga la relación entre el ser y el saber, la constitución de nuevas identidades que permiten la emergencia de nuevos actores sociales en los actuales procesos de reapropiación de la naturaleza y recreación de las culturas. Esta perspectiva abre nuevas vías para la desconstrucción del *logos* científico, de la objetivación, la cosificación y la economización del mundo, y para repensar la racionalidad ambiental desde las condiciones del ser: no del hombre en general, sino del ser constituido por su cultura en los diferentes contextos en los que significa a la naturaleza, reconfigura sus identidades y fragua sus mundos de vida.

El saber ambiental se construye en relación con sus impensables, con la generación de lo nuevo, la indeterminación de lo determinado, la posibilidad del ser y la potencia de lo real, con todo aquello que es desconocido por las ciencias al carecer de visibilidad, de empiricidad, de positividad. De esta manera lleva a la reflexión del pensamiento sobre lo ya pensado, en la apertura del ser en su devenir, en el horizonte de lo posible y de lo que aún no es. El saber ambiental orienta así la construcción de una nueva racionalidad y abre la historia hacia un futuro sustentable.

El saber ambiental emerge desde el límite del pensamiento unidimensional, de la razón objetivadora y cosificadora. La epistemología ambiental se lanza a la aventura del pensamiento de la complejidad generando una visión sobre las relaciones entre procesos que supera al conocimiento orientado a establecer el vínculo entre cosas, hechos, datos, variables y factores, al que accede separando al sujeto del objeto de conocimiento. La fenomenología de Husserl con la intencionalidad del ser y la ontología existencial de Heidegger desde el “ser en el mundo”, rompen con el imaginario de la representación y con la ilusión de una ciencia capaz de extraerle a la facticidad de la realidad su transparencia y su verdad absoluta. La relación ética de otredad confronta al proyecto epistemológico que pone por encima la relación de identidad del concepto y la realidad, donde la experiencia humana queda subsumida a la aplicación práctica, instrumental y utilitarista del conocimiento objetivo.

El saber ambiental produce un cambio de episteme: no es el desplazamiento del estructuralismo hacia una ecología generalizada y un pensamiento complejo que correspondería con la complejidad de la realidad, sino hacia la relación entre el ser y el saber. La aprehensión de lo real desde el conocimiento se abre hacia una indagatoria de las estrategias de poder en el saber que orienta la apropiación subjetiva, social y cultural de la naturaleza y plantea nuevas perspectivas de comprensión y apropiación del mundo desde el ser, la identidad y la otredad. Más allá de la vuelta al Ser, que libera la potencia de lo real, del “Ser que deja ser a los entes”, el saber ambiental abre un juego infinito de relaciones de otredad que nunca alcanzan a completarse ni a totalizarse.

El Ambiente nunca llega a internalizarse en un paradigma o en un sistema de conocimiento. Ante la ontología existencial que lleva al Ser del ente, la ética de la otredad abre la cuestión del ser al pensar lo que excede al Ser, lo que está antes, por encima y más allá del ser, de eso que se produce en la relación de otredad. La ética toma supremacía sobre la ontología y la epistemología; es la relación por excelencia que recupera al ser y abre la historia al futuro; no es la relación ontológica del Ser con el mundo, sino el encuentro del yo con el otro, un diálogo que no dirige al yo con un “eso” (donde el ambiente es reducido a una cosa), sino un yo que se dirige a un tú, un tu que es otro, irreducible al yo y a sí mismo, a un alter-ego ensimismado. La relación ética con el Otro abre un diálogo de saberes, que es un diálogo entre seres culturales, en tanto que el ser se constituye por su identidad con un saber arraigando en un territorio de vida. El futuro sustentable se construye así desde una ética de la otredad, del reconocimiento del Ambiente como el otro – el absolutamente Otro – de todo sistema, que abre el conocimiento recluso en la imagen especular de la representación y lo despliega hacia la infinita alteridad de lo real y lo simbólico en la aventura del saber.

La racionalidad ambiental se forja en esta relación de otredad en la que el encuentro cara a cara se traslada a la otredad del saber y del conocimiento, allí donde emerge la complejidad ambiental como un

entramado de relaciones de alteridad (no sistematizables), donde se reconfigura el ser y su identidad y se abre a un más allá de lo pensable, guiado por el deseo insaciable de saber y de vida; por la dignidad humana y la justicia social.

La multirreferencialidad de los saberes abre el camino para el análisis plural de la realidad desde diferentes racionalidades culturales, sobre la base de un pluralismo ontológico y gnoseológico. Ni el ser es Uno, ni el saber es Uno. La epistemología ambiental lleva hacia una política de la diversidad cultural y de la diferencia; se abre a un diálogo intersubjetivo e intercultural que trasciende el espacio de un intercambio interdisciplinario.

El saber ambiental desconstruye la relación del conocimiento con lo real, dislocando, desbordando y desplazando la reflexión epistemológica hacia el reposicionamiento del ser en el mundo en su relación con el saber. La interdisciplinariedad se abre así hacia un diálogo de saberes en el encuentro de identidades conformadas por racionalidades e imaginarios que configuran los referentes, los deseos y las voluntades que movilizan a actores sociales; que desbordan a la relación teórica con lo real hacia un diálogo entre lo material y lo simbólico en contextos ecológicos, políticos y culturales diferenciados.

La epistemología ambiental da curso a un nuevo saber; un saber que emerge desde la marca de un límite, de una ley-límite de la naturaleza, de la ineluctable ley de la entropía. Pero también viene a cuestionar la epopeya del proyecto científico de la modernidad, fundada en la creencia en la representación de lo real a través del concepto, la voluntad de unificación del ser, y la objetivación y transparencia del mundo a través del conocimiento. La epistemología ambiental reconoce los efectos de las formas de conocimiento en la construcción y destrucción de la realidad; del imaginario de la representación y la identidad entre el concepto y lo real; de la supremacía de la relación de conocimiento sobre la relación ética. Al mismo tiempo revaloriza a la teoría como estrategia de comprensión, significación y apropiación del mundo, y como proceso de desconstrucción de las tramas de poder asociadas a la racionalidad formal e instrumental de las ciencias. La teoría crítica del ambientalismo aparece así como una estrategia (conceptual) de emancipación frente a los efectos de sujeción de las ideologías inscritas tanto en el discurso científico como en el discurso técnico, práctico y político del desarrollo sostenible. De esta manera se enfrentan los efectos de naturalización de los procesos políticos de dominación al subsumir a la sociedad como subsistema de un ecosistema global y dentro de la lógica del mercado – a esos principios ordenadores del mundo –, que neutralizan la conciencia de los agentes sociales al pensarlos como individuos iguales dentro de una misma Tierra y ante un futuro común. El conocimiento aparece como un proceso que se despliega en las mallas del poder, donde visiones e intereses diversos promueven la generación de conocimientos asociados a diferentes racionalidades, abriendo posibilidades alternativas de organización productiva y de apropiación de la naturaleza en la construcción de un futuro sustentable.

El saber ambiental se construye en un diálogo de saberes propiciando un encuentro de la diversidad cultural en el conocimiento y construcción de la realidad. Pero al mismo tiempo plantea el problema de la apropiación de conocimientos y saberes dentro de diferentes racionalidades culturales e identidades étnicas. El saber ambiental no sólo genera una ciencia más compleja e interdisciplinaria; también produce nuevas significaciones sociales, nuevas formas de subjetividad y posicionamientos políticos ante el mundo. Se trata de un saber que no escapa a la cuestión del poder y a la producción de sentidos civilizatorios.

En el tránsito de la modernidad hacia la posmodernidad, la epistemología orientada por la búsqueda de la unidad y la objetividad del conocimiento, se encuentra y confronta con una política del saber comprometida con la valorización de la diversidad y la diferencia, y por el lugar que ocupan las posiciones subjetivas en el campo de la interdisciplinarietà y las esferas del saber. El saber ambiental devela la voluntad del saber totalitario al que aspira la ciencia moderna y rescata de sus falsas ilusiones al sujeto creado por la ciencia, a ese sujeto dividido por su deseo inconsciente y diferenciado por su sociedad, que aspira a cubrir su falta en ser con el imaginario de un cuerpo teórico total, ocultando su desconocimiento bajo el manto unitario de la Ciencia, integrado por los retazos de los saberes disciplinarios que ha producido el proyecto positivista. La nostalgia de una totalidad originaria, la ambición de un saber absoluto, impulsan el retorno mítico a un saber total, a un método interdisciplinario capaz de trascender la división constitutiva del deseo de conocer.

Pues al final del propósito de nombrar, codificar y controlar lo real; de aprehender, comprender y dominar a la naturaleza; de deletrear el infinito; luego de todo ese periplo por el mundo de la gramática, de las ciencias, de la hermenéutica, el sujeto se reconoce siendo pensado por otro, por el conocimiento como un Otro, externo, que piensa al ente y piensa al sujeto, pero que no comprende al ser; que lo deja desnudo ante el conocimiento y ávido de sentido. El desbordamiento del conocimiento produce el vaciamiento de sentidos existenciales y una sed de vida que se expresa tanto en las luchas de las etnias por la reafirmación de sus identidades, como en el drama de ese ser solitario, cuyo grito se escucha en el vacío que ha dejado la metafísica, el logos y la epistemología que desbordan lo real y al ser. Un verbo que nos piensa, nos impone su verdad y nos sujeta. El sujeto existe no como principio del conocimiento, sino como efecto del conocimiento que lo produce en el sujetamiento del ser. La voluntad de universalidad, unidad y totalidad del conocimiento ha constituido un proyecto opuesto a la productividad de lo heterogéneo, al potencial de la diferencia, a la integridad de lo específico y a la articulación de lo diverso, de todos esos principios que dan fundamento a la racionalidad ambiental.

El saber ambiental arraiga en identidades que dan sentido a racionalidades y prácticas culturales diferenciadas. La identidad se forja en significaciones relacionadas con prácticas sociales incorporadas a un ser cultural, cuya memoria viaja en el tiempo echando raíces en la tierra y en el cielo, en

lo material y lo simbólico. El diálogo de saberes al que convoca la racionalidad ambiental no relaja el régimen disciplinario del conocimiento para dar lugar a una alianza de lógicas antinómicas, a la individualización del conocimiento, a un juego libre e indiferenciado de lenguajes, al consumo masificado de conocimientos, capaces de cohabitar con sus significaciones, polisemias y contradicciones. El saber ambiental se forja en el encuentro, enfrentamiento, entrecruzamiento, hibridación y complementación de saberes diferenciados por matrices de racionalidad-identidad-sentido que responden a estrategias de poder por la apropiación del mundo y la naturaleza.

La consistencia y coherencia del saber se produce en una permanente prueba de objetividad con la realidad y en una praxis de construcción de la realidad social que confronta intereses contrapuestos y muchas veces antagónicos, insertos en saberes personales y colectivos. En este sentido, el conocimiento no se construye sólo en sus relaciones de validación con la realidad externa y en una justificación intersubjetiva del saber, de un discurso consensuado por una acción comunicativa y un saber común. Todo saber aparece inscrito en una red de relaciones y tensiones con la otredad, con el potencial de lo real y con la construcción de utopías a través de la acción social; ello confronta la objetividad del conocimiento con las diversas formas de significación y de asimilación de cada sujeto y de cada cultura que se concreta y arraiga en saberes individuales y colectivos.

El saber ambiental se forja en la pulsión por conocer, en la falta de saber de las ciencias y el deseo de llenar esa falta incolmable. Desde allí se impulsa un proceso de real-ización de una utopía como construcción de la realidad desde una multiplicidad de sentidos colectivos, más allá de una articulación de ciencias, de intersubjetividades y de saberes personales. El saber ambiental busca saber lo que las ciencias ignoran porque sus campos de conocimiento arrojan sombras sobre lo real y avanzan subyugando saberes. El saber ambiental, más que una hermenéutica de lo olvidado, más que un método de conocimiento de lo consabido, es una inquietud sobre lo nunca sabido, lo que queda por saber sobre lo real, el saber que propicia la emergencia de lo que aún no es. En este sentido, el saber ambiental lleva a construir nuevas identidades, nuevas racionalidades y nuevas realidades.

El saber ambiental reafirma al ser en el tiempo y al conocer en la historia; arraiga en nuevas identidades y territorios de vida; reconoce al poder en el saber y la voluntad de poder que es un querer saber. Más allá de todo determinismo, de todo esencialismo y de toda certidumbre, el saber ambiental hace renacer el pensamiento utópico y la voluntad de libertad, no en el vacío histórico de una posmodernidad sin referentes ni sentidos, sino como una nueva racionalidad donde se funden el rigor de la razón y la desmesura del deseo, la ética y el conocimiento, el pensamiento y la sensualidad de la vida. La racionalidad ambiental abre las vías para una reerotización del mundo, trasgrediendo el orden establecido que impone la prohibición de ser. Ese saber, que siempre ha estado atravesado por la incompletud del ser, pervertido por el poder del saber y movilizado por la relación con el Otro, desde el límite de la existencia y del entendimiento,

desde la condición humana en la diferencia y en la otredad, elabora categorías para aprehender lo real; y en ese proceso crea mundos de vida, construye nuevas realidades y abre las vías para un futuro sustentable.

La racionalidad ambiental genera lo inédito en el encuentro con lo Otro, en el enlazamiento de seres diferentes y la diversificación de sus identidades. En el ambiente subyace una ontología y una ética opuestas a todo principio de homogeneidad, a todo conocimiento unitario, a todo pensamiento global y totalizador. El saber ambiental lleva a una política que va más allá de las estrategias de disolución de diferencias antagónicas, en un consenso basado en la racionalidad comunicativa, en un saber de fondo y una ley universal. La política ambiental es convivencia en el disenso, la diferencia y la otredad.

Se abre así un diálogo de saberes que atraviesa el discurso y las políticas del desarrollo sustentable; es la hibridación entre las ciencias objetivas y los saberes que condensan los sentidos prácticos y existenciales que han fraguado en el ser a través del tiempo. El saber ambiental disloca el cuerpo rígido y el sentido unívoco del discurso científico, mira hacia los horizontes invisibles de la ciencia y abre los caminos de lo impensable de la racionalidad de la modernidad.

El diálogo de saberes se produce en el cruzamiento de identidades en la complejidad ambiental. Es la apertura del ser, constituido por su historia, hacia lo inédito, lo impensado; hacia una utopía arraigada en lo real, en los potenciales de la naturaleza y los sentidos de la cultura. El ser, más allá de su condición existencial general, se constituye a través del sentido de su mundo de vida, de la forja de identidades individuales y colectivas en el crisol de la diversidad cultural y de una política de la diferencia, movilizándolo a los actores sociales hacia la construcción de estrategias alternativas de reapropiación de la naturaleza, entre los sentidos antagónicos de la sustentabilidad.

El saber ambiental se hace así solidario de una política del ser y de la diversidad. Esta política se funda en el derecho a ser diferente, el derecho a la autonomía, a su defensa frente al orden económico-ecológico globalizado, su unidad dominadora y su igualdad inequitativa. Es el derecho a un ser propio que reconoce su pasado y proyecta su futuro; que restablece su territorio y reapropia su naturaleza; que recupera el saber y el habla para darse un lugar en el mundo y decir una palabra nueva, desde sus autonomías y diferencias, en el discurso y las estrategias de la sustentabilidad. Para activar las gramáticas de futuro – como diría George Steiner – ,dejar que digan sus verdades y que se entrelacen en un diálogo entre identidades colectivas diversas.

La comprensión del ser en el saber, la compenetración de las identidades en las culturas, incorpora un principio ético que se traduce en una guía pedagógica; más allá de la racionalidad dialógica, de la dialéctica del habla y el escucha, de la disposición a comprender y “ponerse en el sitio del otro”, la política de la diferencia y la ética de la otredad implican la internalización de lo Otro en lo Uno, en un juego de mismidades que



introyectan otredades sin renunciar a su ser individual y colectivo. Las identidades híbridas que así se constituyen no son la expresión de una esencia, pero tampoco se diluyen en la entropía del intercambio subjetivo y comunicativo. Estas emergen de la afirmación de sus sentidos diferenciados frente a un mundo homogeneizado y globalizado.

La crisis ambiental es una crisis del conocimiento y un vaciamiento de los sentidos existenciales que dan soporte a la vida humana. Frente a las certezas y el control que buscaba otorgar la ciencia a una vida segura, asegurada de la violencia de la naturaleza y de la perversidad humana sometida a la fatalidad, hoy nos invade otro terror: el que ha generado el forzamiento del mundo por el dominio del poder de la idea universal, del sometimiento de lo diverso a lo uno, de la palabra significativa a los designios del mercado. Desamparados ante el descreimiento en la magia y la impotencia del conocimiento que ha desencadenado un mundo a la deriva, incognoscible, que paraliza la acción no sólo por el terror, sino porque se han apagado las luces que orientaban el camino hacia alguna parte, así fuera hacia una muerte con sentido. Hoy, el mundo, enloquecido por la intervención del poder y de la ciencia, está pasmado por la incompreensión. Ya no es sólo el mundo de los contrarios que se niegan, del otro a quien se le desconoce, se le excluye y se le extermina. Más allá del maniqueísmo al que llevó la visión polar del mundo (lo blanco y lo negro, lo bueno y lo malo, la verdad y la mentira, el capitalismo imperante y el socialismo real) estamos en un juego de abalorios donde no hay ni cálculo racional ni apuesta al azar. La ruleta tiene más de 36 números y el tablero más de dos colores (rojo y negro). El mundo se encuentra enfrentado a crisis y dilemas más allá de todo conocimiento y que retan todo abordaje racional para la recomposición del mundo. Es una alienación que no sólo es provocada por la reificación del mundo, que sustituye el conocimiento de relaciones entre procesos y entre seres humanos por relaciones entre cosas, como planteaba Marx hace un siglo y medio.

Vivimos un mundo sometido al poder del mercado, a una jaula de racionalidad y una razón de fuerza mayor ante la que se retrae el pensamiento, se disuelve el sentido y se paraliza la acción. Estamos sometidos a la racionalidad de un poder concentrador de la riqueza, generador de insustentabilidad y desigualdad. La inteligencia humana ha desencadenado el poder del átomo y ha invadido la vida haciendo posible la reproducción de lo uno, la clonación del ser. La transgénesis, la invasión tecnológica de la vida, nos enfrenta a incertidumbres y retos que no alcanzan a dilucidar ni la ética ni el conocimiento. El reclamo de autonomía y autogestión de la ciudadanía se plantean ante el fracaso del “Estado Benefactor” y del automatismo del mercado, que dejan a las poblaciones sujetadas, imposibilidades para autogestionar sus condiciones de existencia. Y al mismo tiempo, ese derecho de emancipación levanta la cabeza y da la cara en un mundo donde el poder institucionalizado se ha dislocado. Los demonios andan sueltos, los procesos económicos y tecnológicos se han desbordado y desbocado en sus inercias, aplastando toda capacidad para

recomponer el mundo sobre la base de la racionalidad científica y económica. La confrontación de poderes se ha exacerbado hacia posiciones fundamentalistas y el uso de la fuerza, poniendo en riesgo las normas mínimas de convivencia y democracia que tantos holocaustos, genocidios y injusticias ha costado a la humanidad.

Para sobrevivir en este mundo tendremos que ejercer nuestro derecho a pensar y nuestro derecho a saber. Aprender lo que la ciencia puede saber sobre la crisis global y nuestras condiciones de existencia: sobre el calentamiento global y el grado y formas de riesgo para la humanidad y para las poblaciones locales; sobre las relaciones del proceso económico y la degradación ambiental, el vínculo entre la ley del mercado y la ley de la entropía. Pero también deberemos aprender a construir una nueva racionalidad social y productiva y un diálogo con lo Otro. Debemos aprender no sólo de la ciencia, sino de los saberes de los otros; aprender a escuchar al otro; aprender a sostenernos en nuestros saberes incompletos, en la incertidumbre y en el riesgo; pero también en la pulsión de saber.

Navegar es preciso, vivir no es necesario, solía decir Fernando Pessoa, siguiendo a Nietzsche quien había escrito: “Es necesario navegar, dejando atrás las tierras y los puertos de nuestros padres y abuelos; nuestros barcos tienen que buscar la tierra de nuestros hijos y nietos, aún no vista, desconocida”.

Debemos pues aprender a escuchar armonías hasta ahora inaudibles en el estruendo de las fanfarrias de trompetas que no han cesado de anunciar la llegada del rey y el triunfo del poder; abrir nuestra razón y sensibilidades para dejar ser al ser, para abrir las puertas a un devenir, a un por-venir que no sea sólo la inercia de los procesos desencadenados por un mundo economizado y tecnologizado. Abrir los espacios para un diálogo de seres y saberes en el que no todo es cognoscible y pensable de antemano; aprender una ética que permita desatrincherar y desarmar los cercos protectores de las identidades que nos damos desde nuestra formación disciplinaria y para evitar que las identidades culturales se conviertan en campos antagónicos de batalla, para que pueda surgir un mundo donde convivan en armonía la diversidad y las diferencias. Debemos aprender a dar su lugar al no saber y a la esperanza, a aquello que se construye en el encuentro con el otro, con lo Otro, más allá de la objetividad y del interés, inscritos en el proyecto del conocimiento que nos ha legado la modernidad.



## **EDUCAZIONE AMBIENTALE: LA NECESSITÀ DELLA PROSPETTIVA PEDAGOGICA**

**Elena Marescotti**

*Ricercatore confermato di Pedagogia generale e sociale*

*Docente di “Educazione ambientale”*

*Università degli Studi di Ferrara*

### **Considerazioni preliminari**

Prima di entrare nel vivo degli argomenti che affronterò, sia pure sinteticamente, nel corso del mio intervento, mi preme chiarire i principali presupposti teorici che lo informano, al fine della maggiore comprensibilità ed incisività possibili delle tematiche e delle argomentazioni concettuali che saranno via via trattate. Tale chiarimento riguarda, essenzialmente, il titolo della mia relazione o, meglio, il suo carattere pleonastico: l'educazione ambientale, infatti, in quanto educazione, non può esistere al di fuori della prospettiva pedagogica. Si tratta di un aspetto fondativo quasi banale nella sua semplicità, di un vero e proprio sillogismo: se per Pedagogia intendiamo la Scienza dell'educazione, ovvero quella disciplina che, con rigore metodologico, mette a punto il suo oggetto di indagine – l'educazione come modello ideale, individuandone caratteristiche e finalità – ne deriva, quale logica conseguenza, che qualsivoglia aggettivazione del termine educazione – e, quindi, anche l'educazione ambientale – deve trovare giustificazione e significato nell'alveo della Pedagogia. Se ciò non avviene, ovvero se una simile operazione non è logicamente sostenibile nel quadro epistemologico della Pedagogia, significa che quell'espressione non ha, scientificamente parlando, alcuna valenza.

In altri termini, la prospettiva pedagogica è quanto consente di attribuire legittimità scientifica all'educazione ambientale, di spiegarne il corretto significato, di indicarne coerentemente e con rigore prescrittivo le linee guida per il suo sviluppo, intendendo quest'ultimo sia sul piano della ricerca che sul piano dell'operatività concreta.

Per queste ragioni, una concezione dell'educazione ambientale, per quanto condivisibile possa sembrare, sul versante dell'opinione pubblica, per la positività degli obiettivi che si prefigge, se elaborata al di fuori della Pedagogia non può essere in alcun modo accreditata scientificamente e costituisce un'espressione impropria, un mero trascorso di lingua frutto di un'indebita incursione nel settore della Pedagogia, per ragioni legate vuoi all'opportunità politica, vuoi alle sensibilità maturate in seno all'immaginario collettivo, vuoi, infine, ad istanze messe in luce da altre discipline.

Quanto detto porta, inevitabilmente, a dover chiarire che cosa si intende per Pedagogia, che cosa si intende per educazione, che cosa si intende per

ambiente, ovvero a sbarazzare il campo da quei fraintendimenti e da quelle ataviche confusioni che popolano il senso comune – ma non di rado anche il dibattito culturale “dotto” e il settore della divulgazione scientifica – allorché si affrontano le complesse questioni dell’universo educativo, e soprattutto quando ciò avviene in prospettiva, come si usa dire, pluridisciplinare, interdisciplinare o transdisciplinare. Ed è proprio questo lo sforzo che anima le argomentazioni che oggi vi propongo e, più in generale, l’attività di ricerca e di docenza universitaria che svolgo in questo settore da diversi anni: precisare il significato di Pedagogia come Scienza dell’educazione; precisare il significato di educazione come suo oggetto peculiare ed esclusivo di indagine scientifica; precisare le dimensioni portanti, le strutture concettuali costitutive della Pedagogia come Scienza dell’educazione e dell’educazione medesima. E l’ambiente rappresenta, a mio avviso, come cercherò di dimostrare, uno di questi nuclei portanti.

Ma procediamo con ordine. I termini in gioco – pedagogia, educazione, ambiente – sono accomunati da una ambiguità semantica tutt’altro che trascurabile, per motivi di carattere etimologico, storico, culturale in genere. Per ovvie ragioni, non mi è possibile, in questa sede, scendere approfonditamente nel dettaglio delle cause e delle vicende che hanno talvolta logorato, talvolta arricchito, talvolta addirittura stravolto il significato di questi termini. Mi limiterò, pertanto, solo ad alcuni accenni che ritengo particolarmente funzionali a illustrare, per un verso, i sopraggiunti meccanismi di fraintendimento e quindi di ostacolo alla loro affermazione scientifica e, per altro verso, le suggestioni che indicano la via da intraprendere per una loro assunzione più matura, ovvero più critica e consapevole.

## **Dalla Pedagogia alla Scienza dell’educazione**

Il cammino della Pedagogia, da prassi formativa e da riflessione sull’educazione come fenomeno eterodiretto a Scienza dell’educazione autonoma e laica, ovvero strutturata *iuxta propria principia*, non è stato privo di difficoltà storiche, e non è agevole concettualmente in sé e per sé. La stessa dizione Pedagogia è quanto mai infelice a designare una scienza, poiché, in primo luogo, rimanda a un’azione, a un fare, e non a un pensare, e, in secondo luogo, limita tale azione a una categoria ben definita di soggetti: il pedagogo era, in origine, semplicemente colui che si occupava di accompagnare i fanciulli presso i luoghi di istruzione. Successivamente, il termine Pedagogia ha designato il settore della riflessione e dell’organizzazione dell’attività formativa e della sistematizzazione e della divulgazione di principi teorici riguardanti l’educazione, principi teorici, tuttavia, elaborati sempre “al di fuori” di essa. Principi teorici dettati dalla filosofia e dalla politica, *in primis*, per il perseguimento di una ideologia particolare, per il mantenimento e il consolidamento di un determinato *status quo*, per il perseguimento di un preciso assetto sociale ritenuto opportuno dai detentori del potere.

In questa lunga e complessa fase evolutiva della Pedagogia non sono ovviamente mancati slanci, né intuizioni, né, tantomeno, articolate proposte

tali da prefigurarne un assetto scientifico. Ed è proprio sulla base di questi contributi che è possibile contemplare l'approdo della Pedagogia a Scienza dell'educazione; un approdo che trova ragion d'essere nel suo rigore metodologico, nel suo apparato lessicale il più possibile liberato dalle ambiguità, nella compenetrazione tra la dimensione teoretica e la dimensione pratica del suo sapere e, soprattutto, nella messa a punto del suo oggetto, vale a dire del suo stesso principio di individuazione – l'educazione, appunto – come creazione concettuale autonoma ed esclusiva.

La Pedagogia, così intesa, andrebbe, allora, più propriamente chiamata Scienza dell'educazione, ovvero disciplina che costruisce, definisce e garantisce logicamente l'educazione come oggetto di scienza, come invenzione razionale, come ideale da perseguire. In quest'ottica – ripeto: l'unica logicamente difendibile e sostenibile scientificamente che, del resto, e non poteva essere diversamente, compendia i medesimi requisiti che qualsiasi altra disciplina deve soddisfare per essere considerata una scienza – l'educazione si configura come un oggetto unitario e universale.

Ai fini del discorso che qui intendo affrontare, quanto detto evidenzia il fatto che l'educazione, come oggetto di scienza, non si diversifica né nella sua essenza né nelle sue finalità a seconda dei contesti in cui si sviluppa, dei soggetti che coinvolge, dei contenuti di istruzione di cui si serve. Le aggettivazioni che derivano da queste circostanze contingenti – ad esempio: educazione familiare, in riferimento al contesto della famiglia; educazione degli adulti, in riferimento agli individui in età adulta; educazione musicale, in riferimento a questo ambito specifico del sapere – non rappresentano entità diverse, bensì declinazioni metodologiche della medesima entità.

L'educazione può e deve esperire svariate articolazioni proprio perché è un'entità concettuale unitaria che pervade, in prospettiva inclusiva e tendenzialmente totalizzante, qualsiasi ambito e qualsiasi manifestazione dell'esistenza. Parlare di educazione, in estrema sintesi, significa parlare di quella inesauribile tensione, in ottica sia individuale sia collettiva, che, mediante la valorizzazione e lo sviluppo di tutte le potenzialità – cognitive, affettive, operative – che consentono di raffinare costantemente le capacità interpretative e di intervento, punta al miglioramento della qualità della vita olisticamente intesa.

### **L'educazione ambientale: una questione complessa**

È questa, sostanzialmente, la cornice teorica in cui prende corpo la mia riflessione sull'educazione ambientale; una riflessione che, quindi, non può prescindere dalla definizione del concetto di ambiente in chiave pedagogica. Il termine ambiente, va detto subito, è un termine polisemico, così come suggerisce sia la sua origine etimologica sia il significato corrente che ha assunto nella nostra contemporaneità, al punto che si potrebbe affermare – paradossalmente quanto correttamente – che tutto ciò che ci circonda, in cui siamo immersi e con cui entriamo in contatto, il mondo delle realtà concrete così come il mondo delle realtà astratte, inclusi noi stessi, è ambiente.

Tuttavia, limitare la definizione di ambiente al ruolo di contesto in cui si svolge la nostra esistenza è, dal punto di vista della Scienza dell'educazione, indubbiamente interessante ma riduttivo: l'ambiente, infatti, non si configura solo come un insieme di condizioni o come il prodotto di un'attività operativa o conoscitiva, bensì anche e soprattutto come la relazione dinamica e trasformatrice tra sé e l'altro da sé.

L'ambiente, allora, può essere funzionalmente definito come il rapporto con l'altro da sé e allo stesso tempo come la risultante di tale rapporto, in un'ottica di complessa circolarità e di evoluzione continua, in cui la permanenza e il divenire delle entità coinvolte nel rapporto diventano l'una il presupposto dell'altro.

Vale a dire che l'ambiente rappresenta la circolarità tra le dimensioni temporali passato-presente-futuro e la dimensione spaziale ed è, congiuntamente, fissità e movimento, trasmissione e trasformazione, oggetto e soggetto, fine e mezzo, realtà e ideale, causa ed effetto, contenuto e contenente, in quanto la dinamicità e la processualità su cui si fonda agiscono in direzione di una continua decostruzione-ricostruzione degli elementi coinvolti, rilevandone la reciproca relatività.

Così impostata, la questione porta inevitabilmente a considerare l'ambiente in ottica educativa non solo sul piano fattuale – ambiente come risorsa o come ostacolo per l'educazione, da un lato, e ambiente come contenuto di educazione, dall'altro lato – ma anche sul piano teoretico: ambiente come dimensione dell'educazione. Nell'educazione, infatti, l'ambiente entra in gioco su almeno tre livelli, sempre presenti: contestualizzazione del rapporto educativo, rapporto educativo in quanto tale, trasmissione e trasformazione dell'ambiente-contesto e dell'ambiente-rapporto. Si tratta di tre momenti inscindibili, che ripropongono integralmente l'essenza del concetto di ambiente, al punto che la stessa educazione può essere definita, con una pregnante metafora, ambiente nell'accezione più completa del termine.

Ancora prima della sua implementazione, infatti, la stessa educazione è concepita come un rapporto, ovvero ravvisa nel momento dell'interconnessione identità/alterità la *conditio sine qua non* del proprio sussistere. Per l'educazione, quindi, l'ambiente è un *prius* logico, antecedente al contesto specifico in cui essa, giocoforza, si immette nel momento della sua attuazione storica. In definitiva, il concetto di ambiente racchiude in sé il come (rapporto), il cosa (trasmissione/trasformazione), il perché (miglioramento) dell'educazione.

Non ho ancora accennato al tangibile e pressante problema della crisi ecologica, e non è né un caso né una dimenticanza. Sulla base delle mie argomentazioni, la crisi ecologica non ha nulla a che vedere con l'educazione ambientale propriamente intesa, almeno non a livello fondativo e di legittimazione scientifica.

È vero che l'educazione ambientale – come prassi volta alla creazione di una *forma mentis* rispettosa delle dinamiche ambientali, così come varie discipline, l'Ecologia prima fra tutte, le hanno messe in luce, consapevolmente attenta all'impatto e alle conseguenze, a breve e a medio-lungo

termine, degli interventi umani e, non ultimo, volta alla tutela del patrimonio naturalistico – comincia a manifestarsi in maniera crescente a partire dagli anni Settanta del Novecento, come occasione risolutiva, come risposta ad un'emergenza, come necessità contingente tesa a ribaltare un *modus vivendi* lesivo della qualità della vita perché non sostenibile, a causa degli indotti di inquinamento e di riduzione della biodiversità ingenerati. È vero che, attualmente, l'educazione ambientale si configura come un percorso formativo che si qualifica per l'impartizione e l'acquisizione di specifici contenuti e comportamenti, dalle conoscenze relative al funzionamento degli ecosistemi, delle catene alimentari, dei procedimenti fisici e chimici che interessano il cosiddetto mondo naturale – non di rado considerato come un'entità disgiunta da quella cosiddetta artificiale, cioè creata dall'uomo – alle buone pratiche, da adottare sia nella quotidianità sia su larga scala, di conservazione, di salvaguardia, di tutela. Così come è vero anche, va detto, che l'apparato conoscitivo elaborato dall'Ecologia e dalle correnti di pensiero ecologiste e ambientaliste ha contribuito, e non poco, all'affermazione di una visione complessa, sistemica, interrelata non solo del nostro essere nel mondo ma, soprattutto, del nostro pensarci nel mondo.

Ciononostante, ricondurre significato e ruolo dell'educazione ambientale unicamente a questo insieme di fenomeni non è corretto né auspicabile, poiché significa depauperare la Scienza dell'educazione dal compito che le è proprio, prevaricandola e relegandola a mera cinghia di trasmissione di precetti ad essa sostanzialmente estranei e, di fatto, erodere dalle fondamenta la possibilità di un'azione autenticamente migliorativa.

Non ultimo, la prospettiva pedagogica solleva in maniera ancora più esplicita un interrogativo di fondo, la cui risposta, dai più considerata scontata, è determinante ai fini della stessa concezione di educazione *tout court* e di educazione ambientale: è ammissibile l'esistenza della Natura come entità ontologica, con leggi proprie che attendono solo di essere scoperte e a cui adeguarsi, come realtà incontaminata? Si tratta di una questione che apre uno scenario di discussione assai ricco e denso di implicazioni che, ovviamente, qui non è possibile affrontare, neppure per sommi capi. Mi limiterò, pertanto, solo ad un aspetto e all'esito che ne deriva: sulla scia di quanto ho detto sinora, non è possibile considerare la Natura come entità a sé stante: nel momento stesso in cui la si nomina, in cui la si conosce, essa diviene Cultura, cioè Ambiente, prodotto di una relazione, relazione essa stessa. Alla luce di questo impianto, l'idea assai radicata e diffusa di educazione ambientale come difesa di un'entità oggettiva decade e, per contro, si manifesta in tutta evidenza il *proprium* dell'educazione in quanto tale, vale a dire il suo puntare al raffinamento continuo delle capacità interpretative per una gestione sempre più razionale e positiva delle relazioni che tramano l'esistenza di tutte le cose.



## **Per concludere: alcuni punti fermi**

Mi avvio velocemente alle conclusioni del mio intervento, nella consapevolezza che svariati problemi, alcuni dei quali decisivi, sono rimasti sullo sfondo o sono stati soltanto abbozzati. Cercherò, allora, di riprenderli e di illustrarli nel tirare le fila del mio discorso e procedendo schematicamente per punti, in risposta a tre quesiti cruciali.

1) Il primo: che cos'è l'educazione ambientale? L'educazione ambientale è una specificazione dell'educazione intesa come oggetto di indagine proprio della Scienza dell'educazione. Tale specificazione ha valenza euristica, per l'individuazione di piste di ricerca, ermeneutica, per l'interpretazione e la messa a punto del concetto stesso di educazione, operativa, per il perseguimento storico dell'educazione. L'educazione ambientale, pertanto, non mira ad altre finalità che non siano quelle dell'educazione *tout court*. L'aggettivo "ambientale", quindi, non rappresenta un elemento aggiuntivo che piega l'educazione verso obiettivi estrinseci e particolaristici quanto transeunti, bensì l'esplicitazione di un *quid* già insito nel concetto stesso di educazione. Tale operazione è funzionale nella misura in cui, denunciando la riflessione e l'interpretazione critica su specifiche questioni e problemi, concorre sia ad una migliore conoscenza dell'educativo e dei suoi meccanismi sia ad ottimizzarne le ricadute esistenziali. Pertanto, l'educazione ambientale non si esaurisce nell'insegnamento dell'Ecologia, nella divulgazione dei saperi delle scienze naturali, nelle attività di contemplazione del paesaggio, nel volontariato ambientalista o in esperienze simili. Essa riguarda, piuttosto, la circolazione di idee, attraverso queste esperienze così come attraverso qualsivoglia altra esperienza o contenuto, intitolate alla complessità, all'interdipendenza, alla reciprocità, alla dinamicità e alla processualità delle relazioni che intercorrono tra il sé e l'altro da sé. In quanto oggetto di studio della Scienza dell'educazione, l'educazione ambientale trova esclusivamente in essa le ragioni del proprio sussistere e le indicazioni performative che la riguardano, e non certo in presunte ibridazioni o connubi disciplinari.

2) Questo mi porta direttamente al secondo quesito: come si pone l'educazione ambientale nei confronti di settori disciplinari – penso soprattutto alla famiglia delle scienze naturali – altri rispetto alla Scienza dell'educazione e nei confronti del fenomeno intitolato alla crisi ecologica? Fermo restando che un oggetto di scienza non può essere condiviso da più discipline e che l'educazione ambientale in quanto educazione è appannaggio riservato della Scienza dell'educazione, si profilano due indicazioni epistemologiche di fondo.

La prima indicazione riguarda il fatto che, laddove una qualsiasi disciplina nella conduzione della ricerca conoscitiva sul proprio oggetto di studio giunge ad interessarsi o comunque a contemplare il discorso dell'educazione ambientale, deve cedere il passo alla Scienza dell'educazione o, meglio, deve farsi Scienza dell'educazione, ovvero assumerne consapevolmente i paradigmi e tutte le responsabilità che ciò comporta.

La seconda indicazione riguarda il fatto che la stessa unitarietà del sapere scientifico, suddivisibile metodologicamente in più scienze a seconda della porzione di realtà formalizzata, cioè di quell'oggetto assunto a perno del proprio essere una specifica scienza, non solo suggerisce, ma richiede, necessariamente, una integrazione delle conoscenze e delle strategie conoscitive maturate, purché ciò avvenga nel rispetto dell'autonomia di ciascuna scienza. Per ciò che concerne, invece, il ruolo dell'educazione ambientale a fronte delle esigenze prospettate dalla crisi ecologica, occorre rimarcare con forza che non può, nella maniera più assoluta, configurarsi come un ruolo subalterno, di adeguamento immediato ai bisogni del contingente. Questa impostazione, che di primo acchito è forse la più impopolare, per così dire, di tutto il mio discorso, a ben vedere non annulla la positività dell'educazione per il miglioramento concreto della realtà. Al contrario, le dà il maggiore vigore possibile, perché la garantisce a prescindere dalle mode e dalle pressioni politiche ed economiche, sottolineandone la *vis* progettuale, l'afflato ad andare sempre oltre il contingente, la vena utopica intitolata ad un mondo migliore che sta agli individui costruire, guardando al futuro, e non certo conservare, volgendosi al passato. Solo in questi termini, l'educazione ambientale, proprio perché educazione, non può che incidere positivamente sul superamento del dato di fatto e trovare nell'analisi critica della crisi ecologica feconde suggestioni per riesaminare la propria identità e il proprio ruolo.

Il terzo quesito cruciale, infine, concerne la formazione di tutti coloro che, a vario titolo, si occupano di educazione ambientale. Quale formazione, dunque, per i ricercatori, per i docenti, per gli educatori impegnati in questo settore? Ho chiamato in causa tre professionalità che, in quanto tali, non si possono in alcun modo improvvisare o acquisire per abbrivio. Quando ciò avviene, come purtroppo non è raro riscontrare, significa che non si sta svolgendo in maniera né seria né onesta, al cospetto della comunità tutta, il proprio mandato sociale. Occuparsi professionalmente di educazione ambientale, sia come ricercatori, sia come docenti, sia come educatori, significa infatti, in primo luogo, poter contare su una salda preparazione pedagogica che non si acquisisce certo nello *espace d'un matin* né si può raffazzonare in maniera asistemica.

Non basta una superficiale infarinatura di Pedagogia, ma occorre addentrarsi negli affascinanti, e faticosi, sentieri della Scienza dell'educazione. Del resto, i dilettanti, i faciloni, i parolai tutto fumo e niente arrosto non contribuiscono al miglioramento della qualità della vita di tutti e per tutti. Quelle poche volte in cui accade, si tratta solo di un caso fortuito.

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## **LA PERCEZIONE SOCIALE DELLA SOSTENIBILITÀ: CONOSCENZE, ATTEGGIAMENTI E VALORI IN STUDENTI AD ALTO PROFITTO**

**Ángeles Murga Menoyo**

*Professoressa della cattedra UNESCO*

*di Educazione Ambientale*

*Universidad Nacional de Educación a Distancia (UNED).*

*Madrid, Spagna*

*mmurga@edu.uned.es*

### **Parole chiave**

Educazione ambientale. Alto profitto accademico. Percezioni, atteggiamenti e valori. Crisi ambientale. Sviluppo sostenibile.

### **Sintesi**

Presentiamo i risultati di una ricerca di tipo diagnostico, realizzata al fine di individuare le percezioni, gli atteggiamenti e i valori di studenti universitari ad alto profitto in relazione all'attuale crisi ambientale e al modello socioculturale proposto dal nuovo paradigma della sostenibilità.

I risultati mostrano una chiara percezione del rischio ambientale globale e un'incipiente sensibilizzazione verso la problematica della sostenibilità. Avallano la necessità di promuovere la formazione dei giovani.

Le conclusioni saranno utilizzate nella progettazione di un programma formativo post-laurea, nell'ambito dell'educazione ambientale per lo sviluppo sostenibile.

### **Introduzione**

Nel dicembre del 2002 l'Assemblea Generale delle Nazioni Unite, istituendo il Decennio per l'Educazione allo Sviluppo Sostenibile per il periodo compreso tra il 2005 e il 2014, ha rivitalizzato il proprio appoggio al ruolo centrale dell'educazione come strumento strategico per raggiungere la sostenibilità globale del Pianeta. La Cattedra UNESCO di Educazione Ambientale della UNED si è aggregata a questa iniziativa mediante diverse attività tra le quali s'inserisce la ricerca qui presentata.

Difendere il diritto allo sviluppo come un diritto umano inalienabile e, soprattutto, mantenere uno stile di vita coerente con questo principio esige, in molti casi, una profonda trasformazione dello stile di vita sociale, del nostro modo di essere e di stare nel mondo. Un semplice sguardo all'attualità ci rivela che facciamo parte di una società ancora molto lontana,

nei suoi usi e costumi dominanti, da un modello coerente con l'ideale dello sviluppo sostenibile.

Quindi, sebbene dobbiamo riconoscere assieme a Mayor Zaragoza (2002) che il passato e il presente ormai non possono più essere cambiati – possiamo solo descriverli – allo stesso modo condividiamo la sua speranza verso un futuro che ancora può essere scritto. E l'educazione è uno strumento di primaria importanza per raggiungere tale obiettivo.

Risulta necessario progettare e implementare nuovi programmi educativi, oltre a sottoporre quelli già esistenti a processi di miglioramento che permettano di ottimizzarne i risultati ed estenderne i benefici.

La pluralità della nostra società, costituita da gruppi umani eterogenei (per credo, opinioni, impegni) ci richiede un trattamento differenziato per ognuno di essi. Analizzare le caratteristiche dei gruppi è un compito obbligato, preliminare rispetto al disegno di azioni formative con pretese di grandezza.

### **Progetto dello studio**

Partendo da questa impostazione iniziale, la ricerca che presentiamo si concentra sulla popolazione universitaria ad alto profitto iscritta nei centri di istruzione superiore della Regione Autonoma di Madrid (CAM), una delle diciannove che costituiscono lo Stato spagnolo<sup>4</sup>. Lo studio riguarda tutti quei soggetti che hanno iniziato la loro formazione universitaria nell'anno accademico 2004/05 e che, inoltre, avevano ottenuto la Borsa di Studio al Merito, concessa dalla Regione Autonoma di Madrid (CAM) a un piccolo gruppo di studenti la cui media di voti alla fine della Scuola Superiore è superiore a 9,3. Il numero totale di soggetti che formano la popolazione *target* del nostro studio è pari a 756 studenti, di cui 411 donne. Tutti sono stati invitati a partecipare alla ricerca mediante comunicazione postale, inviata in due occasioni; coloro che hanno risposto favorevolmente sono passati a far parte del campione o gruppo sperimentale, un totale di novanta studenti, tra cui cinquantaquattro donne.

Il nostro obiettivo era quello di conoscere le percezioni, gli atteggiamenti e i valori di questi giovani in relazione a due questioni principali: l'attuale crisi ambientale e il modello socioculturale proposto dal nuovo paradigma della sostenibilità. Le conclusioni tratte saranno utilizzate per la progettazione di un programma formativo postlaurea, nell'ambito dell'educazione ambientale per lo sviluppo sostenibile.

Nella ricerca vengono definiti quattro costrutti o fattori principali:

- La percezione della crisi ambientale planetaria (v1).

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4. La CAM ha un'estensione territoriale di 8.028 km<sup>2</sup> e vi abitano 5.423.384 persone. È un territorio molto popoloso, con una densità pari a 675 abitanti per km<sup>2</sup>, specialmente nell'area metropolitana e nei municipi limitrofi. Il capoluogo della regione, Madrid, è anche capitale dello Stato.

- L'opinione su alcuni assiomi teorici dell'attuale modello socio-culturale dominante (v2).
- Il grado di accordo con i principi basilari dello sviluppo sostenibile (v3).
- L'impegno con i valori della sostenibilità (v4).

**Per raccogliere i dati è stato elaborato un questionario ad hoc (Murga Menoyo, 2005), con sessantuno voci articolate attorno ai seguenti quattro fattori:**

- Crisi ambientale.  
Sedici voci consentono di raccogliere i dati relativi al grado di percezione della crisi ambientale da parte dei soggetti. Si tratta di indagare, in primo luogo, se esiste una percezione globale, anche se diffusa e, in maniera più concreta, di indagare tre delle sue principali dimensioni: quella ecologica, quella sociale e quella morale o etica.
- Assiomi del modello socioculturale dominante.  
Le voci di questa categoria, un totale di dodici, enunciano assiomi teorici che la letteratura scientifica e gli esperti reputano essere caratteristici del modello socioculturale dominante. Permettono di raccogliere l'opinione degli intervistati, la loro affinità relativa all'argomento.
- Premesse basilari dello Sviluppo Sostenibile.  
Anche in questo caso, i quindici enunciati corrispondono a premesse ed a principi molto noti del paradigma della sostenibilità.
- Impegno con i valori della sostenibilità.  
La quarta categoria di variabili, sedici voci, consente di approssimarsi all'impegno dei singoli soggetti con lo sviluppo sostenibile attraverso la loro intenzione manifesta di agire.

Le possibilità di risposta si adattavano a una scala Likert con cinque gradi. Le voci consistono in semplici enunciati, derivati dalle conoscenze messeci a disposizione dagli esperti e dalla letteratura scientifica, sui principi e sui valori fondamentali della sostenibilità e sugli indicatori della crisi nei grandi assi che la supportano: quello ambientale, quello economico e quello sociale. La scala di risposte è codificata nel seguente modo: 1 niente, 2 poco, 3 d'accordo, 4 abbastanza, 5 molto e 6 non so.

Il questionario è stato sottoposto a un saggio pilota e al giudizio degli esperti.

### **Esposizione e interpretazione dei risultati**

Tra le caratteristiche del gruppo sperimentale bisogna sottolineare che la maggior parte di esso, un 63,3% del totale, è formato da donne e che le donne rappresentano la maggioranza anche nei diversi tipi di corsi di lau-



rea, eccezion fatta per ingegneria. Inoltre, la maggior parte dei soggetti proviene da facoltà universitarie in cui si studiano le scienze sociali e le scienze giuridiche (36,7%) oppure le diverse ingegnerie (29,0%). Il resto si distribuisce in maniera equilibrata tra le Facoltà di Scienze Umanistiche, Scienze della salute e Scienze Sperimentali.

D'altra parte, una percentuale superiore all'80% dei partecipanti svolge i suoi studi presso quattro università pubbliche della regione di Madrid: Complutense, Politecnica, Autonoma e Carlos III. Il restante 20% è composto da studenti di altre università sia pubbliche che private (Alcalá, San Pablo Ceu, Comillas, ecc.). Tutti questi dati confermano le caratteristiche della popolazione di riferimento (Direzione Generale delle Università della Regione di Madrid), dando validità alla rappresentatività del campione.

Per quanto riguarda gli obiettivi della ricerca, bisogna sottolineare che, se considerate nel loro insieme, possono ritenersi soddisfatte le aspettative. I risultati dimostrano che gli studenti percepiscono chiaramente la crisi ambientale. Il fatto che in un gradiente di cinque valori essi scelgano l'opzione che esprime il grado di massimo accordo con gli enunciati proposti, così come riportato nella Tabella 1, ci consente di affermare che si dimostrano almeno sensibili di fronte alla situazione del pianeta. Possiamo dedurre che tra i giovani si stia configurando una sempre maggiore coscienza riguardo al degrado e al rischio dell'ambiente, sebbene gli indicatori concreti di tale fenomeno non siano avvertiti in tutta la loro magnitudine.

<b>Oltre il 50% degli intervistati si dichiara MOLTO d'accordo</b>
S27. Crescono gli squilibri ingiusti tra gli esseri umani e i popoli in materia di utilizzo delle risorse naturali e lo sfruttamento dei beni sociali.
S29. Stiamo consumando le risorse naturali a una velocità superiore rispetto alla capacità di rinnovamento.
S30. Il crescente degrado della Natura sta producendo effetti irreversibili nel sistema globale.
S32. La perdita della biodiversità preannuncia squilibri che avranno un impatto negativo imprevedibile.

Tabella 1. - Percezione della crisi ambientale (I)

In questo modo vediamo, per esempio, una maggiore sensibilità verso la dimensione ecologica della crisi mentre rimangono velati altri aspetti di carattere sociale, culturale o etico, altrettanto fondamentali nel modello dello sviluppo sostenibile.

Eppure, anche in relazione a queste ultime dimensioni, si osserva come il grado di accordo con alcune voci che le riflettono (Tabella 2) raggiunge, se non un ottimo risultato, almeno un buon livello. Lo stile di vita occidentale viene visto come la locomotiva del consumismo e della mercificazione dei rapporti sociali e viene percepita una certa preoccupazione per

quanto riguarda le conseguenze della situazione. Ma le risposte a molte voci del questionario appaiono tiepide e mettono in evidenza numerosi punti deboli relativi alla percezione della possibile associazione tra crisi ambientale e cause che la provocano.

Sarà necessario ampliare la ricerca per approfondire questi aspetti.

<b>Oltre il 50% degli intervistati si dichiara ABBASTANZA d'accordo</b>
S7. L'Occidente è il motore dell'estensione del consumo smodato di beni materiali e della mercificazione della vita sociale.
S13. L'attuale globalizzazione avanza parallelamente alla socializzazione dei rischi, ma non alla distribuzione dei benefici provenienti dallo sviluppo.
S14. La crescita economica basata sull'utilizzo delle risorse naturali ha un limite.
S28. Stiamo assistendo alla crescita esponenziale delle tecnologie ad alto rischio.
S33. La capacità di ricarica del Pianeta tende a raggiungere, a passi giganteschi, il punto di saturazione.
S39. Non ci dirigiamo verso la scomparsa della sistematica violazione dei diritti umani universali.
S44. L'inusitata produzione di ricchezza va di pari passo a una distribuzione non equitativa mentre diminuiscono velocemente i livelli di solidarietà sociale.
S45. Nella relazione essere umano - comunità biotica predominano gli interessi utilitaristici a breve scadenza e l'individualismo narcisista.
S46. Problemi quali: la disoccupazione e la disuguaglianza, la speculazione o l'esaurimento delle risorse e l'inquinamento sono endemici all'attuale sistema dell'economia di mercato.
S47. La situazione attuale è di crisi planetaria, con grave rischio di collasso dei sistemi.

Tabella 2. - Percezione della crisi ambientale (II)

Per quanto riguarda il grado di accordo degli studenti con il principio e con i presupposti dello sviluppo sostenibile, le Tabelle 3 e 4 raccolgono l'opinione della maggioranza in relazione a questo argomento. Una percentuale superiore al 50% degli intervistati sembra avere molto chiaro che il nostro Pianeta è un sistema e che quindi è soggetto agli effetti sinergici delle interrelazioni tra i suoi diversi componenti ed elementi.

<b>Oltre il 50% degli intervistati si dichiara MOLTO d'accordo</b>
S5. Le caratteristiche del Pianeta ci richiedono la conoscenza degli effetti prodotti dalle nostre azioni e il loro impatto globale.
S8. Tutti gli abitanti del Pianeta hanno lo stesso diritto di beneficiare delle risorse della Natura: l'aria, l'acqua, la terra o l'energia sono beni comuni dell'Umanità.
S10. La diversità della Natura è un valore intrinseco che risulta imprescindibile per il mantenimento equilibrato della vita.
S15. Per ottenere uno sviluppo sostenibile bisogna tener presente la complessità

dei fattori in gioco e l'incertezza degli effetti e delle relazioni.
S22. Prima di iniziare o meno un progetto scientifico è necessario analizzarne le ripercussioni etiche (perché? a quale scopo? E per chi?).
S48. L'uso delle risorse naturali deve essere sempre subordinato alla propria capacità di rinnovamento.
S52. Le risorse naturali fondamentali sono un bene comune di tutta l'Umanità e tutti gli esseri umani dovrebbero averne assicurato il diritto di accesso, in condizioni di equità.

Tabella 3. - Opinioni sugli assiomi e sui principi relativi allo Sviluppo Sostenibile (I)

È anche maggioritaria l'opinione di massimo accordo sulla condizione di bene pubblico delle risorse naturali e il diritto dell'Umanità di sfruttarle e di mantenerle.

Questa è certo una conoscenza elementare del modello dello sviluppo sostenibile ma, essendo un assioma basilare, un così elevato accordo al riguardo da parte dei giovani produce un senso di ottimismo per il futuro.

<b>Oltre il 50% degli intervistati si dichiara ABBASTANZA d'accordo</b>
S38. Nelle tecnologie di rischio deve prevalere il principio della precauzione su quelli dell'efficacia e dell'efficienza.
S40. L'insicurezza globale è consustanziale al modello di sviluppo basato sulla crescita economica.
S50. Lo sviluppo non deve essere giudicato secondo i parametri della capacità di consumo ma, preferibilmente, mediante indicatori di qualità.
S51. Il Pianeta è un sistema globale e al momento di prendere delle decisioni cruciali la prospettiva ultima deve tener conto di tutto il Pianeta.
S56. L'utopia dello sviluppo sostenibile richiede alle società occidentali, inevitabilmente, una rivoluzione di fondo che abbia radici nel pensiero, nell'organizzazione sociale e nella cultura.
S59. La qualità della vita deve prevalere sul livello di vita.

È anche ottimista, sebbene l'opinione a favore non sia altrettanto solida, la valutazione che dà maggiore importanza alla qualità della vita rispetto al livello di vita. Quest'ultimo indicatore si riferisce ad aspetti quantitativi del benessere, a differenza di quelli qualitativi premiati dal sondaggio.

Infine, i risultati relativi all'impegno preso dagli studenti con i valori della sostenibilità, che saranno interpretati nell'ottica della considerazione dell'intenzione di azione espressa dagli intervistati, presentano una maggioranza moderatamente impegnata (Tabella 5), che si colloca in una scala ascendente di quattro su cinque opzioni. È quindi possibile esprimere un ottimismo, non ingenuo, sull'intenzione di azione, sebbene da ciò non si possa dedurre che, in pratica, l'impegno, giunto il momento, si plasmi in un'azione coerente con lo sviluppo sostenibile.

<b>Oltre il 50% degli intervistati si dichiara ABBASTANZA d'accordo</b>
S6. Preferisco disporre di tempo da dedicare a me piuttosto che possedere grandi risorse economiche, comfort materiale o tecnologia avanzata.
S18. L'occidente, anche nel rispetto dei propri interessi, dovrebbe agire nelle proprie relazioni internazionali mosso dall'impulso del proprio debito morale verso il Terzo Mondo.
S24. È necessario anteporre la qualità di vita (tempo proprio, relazioni sociali, salute, ecc.) al livello di vita (comfort materiale).
S36. Occorre che la scienza si occupi di più dei problemi ambientali e demografici e meno della redditività economica.
S37. La dignità degli esseri umani ci obbliga ad appoggiare lo sviluppo endogeno dei popoli.
S43. Anche se il nostro tenore di vita ne dovesse risentire, i governi devono cercare una soluzione al debito esterno del Terzo Mondo.
S49. L'etica deve essere il primo e principale referente della condotta umana.
S58. I governi dovrebbero adottare misure volte a stimolare l'utilizzo dei fondi dedicati alla ricerca a progetti che abbiano lo scopo di migliorare la qualità della vita di tutti gli esseri umani.
S60. È inammissibile che i paesi poveri debbano far fronte al proprio debito esterno a costo di aggravare il proprio debito sociale interno.
S61. In beneficio dello sviluppo sostenibile sarei disposto a diminuire di 1/3 il mio attuale livello di consumo.

Tabella 5. - Impegno con i valori della sostenibilità

## **Conclusioni e proposte nel campo dell'educazione**

La ricerca ci ha permesso di approssimarci alle idee che un campione di giovani studenti universitari, la cui caratteristica è una dimostrata capacità e un alto profitto negli studi, ha intorno allo sviluppo sostenibile. Un'interpretazione non esageratamente ottimistica dei dati lascia intravedere in loro una certa sensibilità per i valori della sostenibilità, forse dovuta alla loro giovane età, da moti associata ad atteggiamenti idealisti.

Pur tuttavia, pare evidente che esista la necessità di progettare e implementare dei programmi formativi di rinforzo destinati alla popolazione universitaria, affinché i giovani abbiano una conoscenza più profonda e precisa sia della crisi ambientale e delle sue radici profonde sia del modello odierno alternativo rispetto al modello socioculturale dominante, un modello di sviluppo sostenibile. Programmi formativi che sviluppino in loro, oltre a un impegno deciso con i valori della sostenibilità, soprattutto e prioritariamente, dei comportamenti civici propri dei cittadini di una società con la pretesa di muoversi nel sentiero dell'equità, della giustizia sociale e dello sviluppo sostenibile.

L'educazione ambientale è già da oltre un decennio, nel suo approccio teorico più elaborato e principalmente nei paesi latini, una educazione allo sviluppo sostenibile e compie una missione che quotidianamente sembra imprescindibile per il futuro dell'Umanità.

## **Ringraziamento**

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## **THE ATTITUDES OF YOUNG SPANIARDS STUDENTS TOWARDS THE ENVIRONMENT AND THEIR PERCEPTION OF THE FUTURE.**

**Miquel F. Oliver Trobat**  
**Margalida Castells Valdivielso**

*Education and Citizenship Research Group (GREIC).  
University of the Balearic Islands, Spain<sup>5</sup>.*

### **Keywords.**

The environment, sustainability, interculturality, a culture of peace, active citizenship, teacher training, heritage.

### **Presentation.**

This paper outlines the main results of a research study entitled Young Spaniards' Attitudes to the Environment, which analysed the opinions of 1267 Spanish secondary school students using data from a questionnaire containing qualitative and quantitative questions, as well as 492 descriptions and 138 drawings related to the future of the planet.

Among other issues, the questionnaire asked young students about their understanding of the concepts of "nature" and "environment", their perceptions of the seriousness and causes of leading environmental problems are, their opinions on solutions to these types of situations and their level of awareness of the issue.

The opinions and attitudes of young Spaniards were compared with those of other young Europeans, using the research study entitled Training European Teachers for Sustainable Development and Intercultural Sensitivity (TETSDAIS) (Miranda, Alexandre & Ferreira, 2004), which involved the same team of researchers from the University of the Balearic Islands, along with researchers from universities in the UK, Finland and Portugal (hereon in, E-3). Several questions have also been compared with the Eurobarometre 58.0 (2002), entitled *Les attitudes des Européens à l'égard de l'environnement*.

The aim of this paper is to contribute to the debate on the similarities and differences between the opinions and behaviours towards the environment of young Spanish students and students from different European countries, and to analyse their view of the future. Similarly, another objective is to act as a springboard for research into improving formal and informal education aimed at forming future citizens who feel greater solidarity towards

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5. Contact details: Miquel F. Oliver. University of Balearic Islands. Departament de Pedagogia Aplicada i Psicologia de l'Educació. Edifici Guillem Cifre de Colonya. Carretera de Valldemossa, km 7,5. 07122 Palma de Mallorca. Balearic Islands (Spain). Fax: +34.971 173190. [m.oliver@uib.es](mailto:m.oliver@uib.es).



their immediate environment or, in other words, towards their natural and cultural heritage.

### Data collection and sample characteristics

The sample was made up of 1267 analysis units (surveys) for 1267 subjects: 636 males and 631 females. Seventeen secondary schools (one secondary school in each of Spain's autonomous communities) were used as sampling points and the sample margin of error as a whole was less than 2.75%, calculated for a 95% confidence level and under the most unfavourable conditions of  $p=q=0.5$ . A multi-stage sampling procedure was used and stratified by conglomerates. Simple, random sampling was used to select the units (one school in each autonomous community), and quotas and proportions were established for selecting secondary units (students). The contents of the open questions were first analysed and then the responses were categorised to conduct a quantitative approximation of the sample. This step was not carried out with the international sample (E-3, i.e., Finland, the United Kingdom and Portugal) and therefore, an international comparison of qualitative results could not be carried out and only perceptions and trends could be presented.

The following tables show sample distribution by Autonomous Community of origin and include information on the size and percentages of the total sample, as well as subject age and gender variables distributed by frequencies and percentages.

Autonomous community	Frequency	%	Autonomous Community	Frequency	
Andalusia	62	5	Madrid	70	
Aragon	80	6	La Rioja	80	
Asturias	53	4	The Basque Country	80	
The Balearic Islands	80	6	Murcia	80	
The Canary Islands	80	6	Extremadura	80	
Cantabria	80	6	Galicia	67	
Castile la Mancha	80	6	Navarre	80	
Castila and Leon	80	6	The Community of Valencia	83	
Catalonia	52	4	Total	1267	00

Figure 1. Sampling distribution by autonomous community

	Frequency	%
<b>Gender</b>		
Male	636	50.2
Female	631	49.8
<b>Age</b>		
Age 12-13	473	37.3
Age 14-15	589	46.5
Age 16 or over	205	16.2

Figure 2. Sample distribution by sex and age

### **Young Spaniards' attitudes towards the environment**

#### **General perception.**

- Degree of importance of political objectives.

Young Spaniards consider solving unemployment and protecting the environment and quality of life to be the two most important political objectives, as do young people from E-3 countries. Students from the Communities of Andalusia, Castile-La Mancha, Catalonia, Extremadura and the Balearic Islands chose protecting the environment and quality of life as their priority objective.

	Spain	E-3
Solving unemployment	68	61
Protecting the environment and the quality of life	63	55
Improving salaries	53	42
People's participation in decision-making on public issues	50	45
Security and public order	45	53
Freedom of economic enterprise	18	22
Defending moral codes and traditions	15	6 <sup>1</sup>
	45	42

Figure 3. The degree of importance of political objectives. A comparison between Spain and E-3 countries.

- Equal opportunities and social exclusion.

A high percentage of young people from Spain and the E-3 countries (the latter group more categorically) want their countries to offer all people equal opportunities (although young women scored higher than young men did), which is the prevailing trend in ten autonomous communities, whereas

aid to the socially excluded, among other options, had the same or greater importance in other communities. Young women show slightly more solidarity and are somewhat more inclined than young men are to help the socially excluded, while young men opted in somewhat higher numbers than young women did for continuing to offer the same help as has been offered until now.

Aid to the socially excluded finds greater acceptance among young people from families with middle and lower professional standing than among young people from families with high professional standing.

	<b>Spain</b>	<b>E-3</b>
Offer equal opportunities to all	47	54
Guarantee the present quality of life and help those who are excluded	36	32
Continue to offer me the same that it has offered so far	17	13

Figure 4. Equal opportunities and social exclusion. A comparison between Spain and E-3 countries.

- Degree of concern about the environment.

The predominant opinions about nature and the environment indicate young people's familiarity with and sensitivity for issues caused by human interventions that do not respect the environment. The communities that scored the highest on options that respect the environment are the Balearic Islands, Navarre, Castile-La Mancha, Andalusia and Aragon, but no community registered low scores on any of these proposals. The students displayed greater concern for the state of the environment worldwide than for other, more specific contexts (country, region and locality). The communities with the highest scores in this territorial area are Galicia, Castile and Leon, Murcia and the Basque Country. Young women showed more concern about all the issues, especially those referring to the planet and their country. The E-3 countries and Spain show similar trends as far as the environment at the global level is concerned; nevertheless, the E-3 countries are less concerned about local levels. The communities with the highest percentages of concern about the overall environment (world, country, region and locality) are the Canary Islands, Murcia, Aragon and the Balearic Islands. Forest fires and pollution problems (environmental, seas and beaches, and rivers and lakes) are the environmental problems that young Spaniards are most concerned about. Noise is the problem that causes the least concern, followed by population loss in some areas. On the other hand, the issue that generates the most concern in E-3 countries is pollution (environmental, seas and beaches, and rivers and lakes), while forest fires rank sixth on the list of concerns. The communities that are most concerned about environmental problems are the Balearic Islands, the Canary Islands, Castile-La Mancha, Galicia, Murcia and the Basque Country. Navarre, Asturias, Ex-

tremadura and Catalonia also show concern. It is interesting to note that the two island communities, together with Castile-La Mancha, display the greatest concern about environmental problems.

	<b>Spain</b>	<b>E-3</b>
In the world	56	59
In your country	27	21
In your local area	22	6
In your region	20	11
	31	24

Figure 5. The degree of concern about the environment at different levels. A comparison between Spain and E-3 countries.

	<b>Spain</b>	<b>E-3</b>
Forest fires	55	34
River, lake and reservoir pollution	52	41
Ocean and beach pollution	51	40
Air pollution	48	46
Lack of interest in conserving nature and different species	43	34
Industrial waste	42	39
Destruction of historical sites	38	19
Untreated effluent/sewage	33	39
Quality of drinking water	33	33
Urban (city) waste	26	31
Wasting energy	25	28
Use of pesticides and chemicals in farming	25	20
Increase in unplanned/unregulated building development	25	15
Traffic	22	22
Decrease in population in some areas	18	13
Noise	15	8
	35	29

Figure 6. The degree of concern about environmental problems. A comparison between Spain and E-3 countries.

- Energies the country should invest in.

Overall, young people believe that their countries should invest primarily in solar and wind power energies, and less in tidal power, gas, nuclear, wood, coal and peat moss. Young people displayed a marked trend

towards investing in renewable energies (especially solar and wind power) to the detriment of conventional energies. No significant differences can be seen in the results between Spain and the E-3 countries; however, students from the latter group expressed the need to invest in hydro-electrical energies and tidal power more often than Spanish students did. In general, most autonomous communities reproduce the above trend, except Cantabria and Castile-La Mancha, where most students are in favour of investing in conventional energies. Young men demonstrate more support for hydro-electrical energy, oil, gas and nuclear energy than young women do. However, young women scored slightly higher on renewable energies than young men did. As for parents' professional standing, a salient feature is that young people from high and middle status backgrounds favour renewable energies, whereas young people from low status backgrounds are slightly more in favour of conventional energies.

	<b>Spain</b>	<b>E-3</b>
Solar	59	45
Wind	43	44
Hydro-electric	28	36
Oil	20	9
Tidal	10	15
Gas	10	13
Nuclear	7	8
Wood	6	6
Coal	4	6
Peat	1	2

Figure 7. Energies the country should invest in. A comparison between Spain and E-3 countries.

- Priorities for making the world a better place.

Students from Spain and the E-3 countries coincide overall, but the opinions of the former are more emphatic. The hole in the ozone layer is the first priority in achieving a better world through global action, followed by poverty, species in extinction and hunger. The Balearic Islands and Galicia give the highest priority to intervening on the hole in the ozone layer. The issues that scored the lowest in terms of priority are acid rain, population growth, desertification and the destruction of historic heritage. By gender, young women placed higher priority on interventions to help end poverty, while young men had higher scores on issues related to the environment and heritage: climate change / global warming, acid rain, desertification and the destruction of historic heritage. Poverty and AIDS are perceived as a somewhat higher priority by students from the low status group, whereas the high status group scored higher on climate change / global warming and human rights.

	<b>Spain</b>	<b>E-3</b>
Hole in the ozone layer	65	53
Poverty	46	43
Species in danger of extinction	45	33
Hunger	42	45
HIV/AIDS	39	42
Human rights	36	31
Deforestation	35	39
Water pollution	35	38
Exhaustion of natural resources	32	29
Nuclear power stations and nuclear waste	32	37
Climatic change / global warming	28	43
Acid Rain	18	17
Population growth	16	23
Desertification	12	9
Destruction of historical heritage sites	10	6

Figure 8. Priorities for making the world a better place. A comparison between Spain and E-3 countries.

- Economic growth and protecting the environment.

Young Spaniards coincide with students from the E-3 countries in demanding a balance between economic growth and protecting the environment. This option received higher scores from young women and young people from middle and high status backgrounds.

	<b>Spain</b>	<b>E-3</b>
It is necessary to guarantee economic growth but also to respect environmental protection	60	65
Protecting the environment should be more important than economic growth	27	21
Economic growth should be more important than environmental protection	5	4

Figure 9. Economic growth and protecting the environment. A comparison between Spain and E-3 countries.

- Relationship between environment, science and technology.

For a high percentage of students from both Spain as well as the E-3 countries, science and technology are the cause and solution for environmental problems, a proposition that is more widely accepted by young people from middle and high status backgrounds than by those from low status back-

grounds. Navarre scored the highest on these questions, while Catalonia scored the lowest. More young men than young women believe that technology and scientific progress will solve environmental problems in the near future.

	<b>Spain</b>	<b>E-3</b>
Science and technology are not only the cause but the solution to environmental problems	46	44
Progress in science and technology will solve environmental problems in 10/15 years time	17	17
Science and technology cause more problems than they solve	12	14
Science and technology are responsible for the present state of the environment	10	7

Figure 10. The relationship between the environment, science and technology. A comparison between Spain and E-3 countries.

### Information and knowledge.

- Knowledge about environmental problems.

Recycling, climate changes, air pollution, the hole in the ozone, layer and polluted drinking water are the environmental topics that young Spaniards consider themselves best informed about. Local planning, biodiversity, urban planning, evaluating environmental impact and nuclear waste are the issues young people are least familiar with. The autonomous communities most familiar with environmental issues were Navarre, Castile and Leon, Madrid and La Rioja. The communities least familiar with these issues were Andalusia, the Canary Islands and the Balearic Islands. At the general level, young men show higher levels of knowledge than young women do.

	<b>Spain</b>	<b>E-3</b>
Recycling	93	93
Atmospheric pollution	85	83
Climatic change	85	83
Hole in the ozone layer	81	82
Pollution of drinking water	80	81
Water management	79	65
Deforestation	71	69
Acid rain	68	73
Rubbish disposal /treatment	61	72
Soil erosion	60	61
Desertification	47	48
Genetically modified foods	45	55
Nuclear waste	44	57

Environmental Impact Assessments	43	38
Urban planning	37	52
Biodiversity	28	26
Local planning	23	37
	61	63

Figure 11. Knowledge about environmental problems. A comparison between Spain and E-3 countries

- Main causes of water pollution.

Young Spaniards consider industrial waste the main cause of water pollution, followed by the lack of sanctions and fines for those who contaminate. The community with the most students to designate industrial waste as the main cause was Madrid, while the Canary Islands scored the lowest on this option.

	<b>Spain</b>	<b>E-3</b>
Industrial discharges of waste	79	73
Lack of fines and sanctions for polluters	43	28
Use of pesticides	36	35
Poor quality sewerage system	13	33
Lack of law enforcement	13	16
Drought	13	8

Figure 12. The main causes of water pollution. A comparison between Spain and E-3 countries

- Main causes of residual waste problems.

Young people do not agree about the causes of waste problems. The cause most cited was lack of corporate responsibility, followed by individual lack of respect and the absence of national and municipal planning for processing waste. The Basque Country gave the highest scores to lack of corporate responsibility as the cause of waste problems, followed by the Community of Madrid and Galicia. The Balearic Islands scored the lowest in this response about this cause. Young women chose causes related to individual citizens more than young men did, while young men chose causes that only and exclusively affect administrations and businesses more often.



	<b>Spain</b>	<b>E-3</b>
Lack of responsibility by businesses	44	30
Inability of councils to act	27	38
Lack of respect for people	33	45
Lack of national and local council planning to deal with the treatment of waste	30	27
Lack of active cooperation by residents	27	27
Absence of incentives to recycle and reuse	19	28
Low or no taxation on rubbish produced	13	11

Figure 13. The main causes of residual waste problems. A comparison between Spain and E-3 countries.

- Main causes of damage of historic heritage.

Individual lack of interest is the main cause of deterioration in historic heritage, followed very closely by the authorities' lack of interest. The community that attributes the greatest weight of responsibility to individuals is Andalusia, and Catalonia is the community that gives this response the least weight. On the other hand, Aragon is the community that attributes the most responsibility to authorities and Catalonia is once again the community that ascribes the least responsibility to them. By gender, once again, young women attribute the causes to individual responsibility in greater numbers than young men do.

	<b>Spain</b>	<b>E-3</b>
Lack of interest/care by people	49	53
Lack of interest by the authorities	36	33
Pollution	28	31
Business interests	28	21
Increasing number of visitors	22	16
Natural processes/disasters	15	16
Economic difficulties of the country	13	16

Figure 14. The main causes of damage to historic heritage. A comparison between Spain and E-3 countries.

### **Individual behaviour and public policies.**

- Personal economic involvement.

Slightly over half of the Spanish respondents stated that they would be willing to be involved with personal economic contributions to ensure that more brands of products respect the environment and that the money would be used to protect it. These responses received greater support from

young women. However, the response proposing that this money be administered through higher priced products so that business can better conserve the environment was the least accepted option, although it was chosen by more young men than by young women. Young Spaniards chose individual participation over other options as the solution to environmental problems. Navarre was the most convinced that the solution to environmental problems depends on attitudes (change of habits) and individual participation. The community with the most pessimistic view of solving environmental issues was Catalonia. Young women believe that environmental problems can be solved by individual participation more than young men do. This option also received higher scores from students from high status backgrounds than students from the middle and lower status groups.

- Participation in civic problems within the framework of formal and informal education.

Young Spaniards affirmed high levels of participation in school activities that focussed on student rights, health (AIDS prevention, anti-smoking campaigns), human rights and anti-racism, although these levels were lower than E-3 students'. The issue schools work on least is animal rights. Young Spaniards who are enrolled in informal education are less involved in environmental activities than students in formal education, although they are more involved than young people from E-3 countries. In this case, the issues with the highest participation are those that obtained the lowest participation in school activities: animal rights, conserving cultural and historic heritage, and hunger and poverty. On the other hand, informal education works least on the issues that formal education most works on: (health-preventing AIDS, anti-smoking campaigns, etc.) student rights and human rights. Valencia is the community that scored the highest overall percentage of participation in formal education, followed by Asturias, the Canary Islands, the Balearic Islands and Murcia. In the informal sphere, young people from Castile-La Mancha and Madrid scored the highest average percentage of participation in educational activities that deal with citizen issues. Young women participate more often in formal educational activities than young men do, whereas young men participate more often than young women do in informal education settings.

	Formal Education		Informal Education	
	Spain	E-3	Spain	E-3
Student Rights	83	98	17	2
Health (e.g. HIV/AIDS prevention, anti-smoking campaigns)	83	98	17	2
Human Rights	82	95	18	5
Anti-racism	80	97	20	3
Anti-drugs campaigns	76	99	24	1
Nature conservation	75	95	25	5

Hunger, poverty	74	95	26	5
Preserving historical and cultural heritage	73	95	27	5
Animal Rights	70	90	30	10
	77	96	23	4

Figure 15. Participation in civic problems within the framework of formal and informal education. A comparison between Spain and E-3 countries.

– Personal actions to improve the environment.

Somewhat over half of the young Spaniards surveyed stated that they had already made a personal effort to improve the environment, such as separating paper, plastic and batteries for recycling, attempting to use less water and using recycled paper. The global percentage of personal action is higher in Spain than in the E-3 countries. Navarre and Aragon are the communities with the highest percentage of young people that have already made personal efforts to improve the environment. Young people from Castile and Leon stand out in comparison to the whole for the highest scores in the use of recycled paper. Young women scored somewhat higher than young men did on personal efforts that respect the environment: separating glass, paper, plastic and batteries for recycling, attempting to use less water and using recycled paper. Young people from high and middle professional status families scored somewhat higher than those from low status families.

	<b>Spain</b>	<b>E-3</b>
Separate glass, paper, plastic and batteries for recycling	55	44
Try to use less water	55	32
Use recycled paper	52	31
Save energy at home	43	29
Use energy efficient light bulbs	41	34
Prefer products with reusable packaging	29	34
Reduce how much you consume	26	19
Avoid using the car for everyday journeys	26	40
Eat organic foods or those not genetically modified	23	30
Use alternative energies	12	11
Participate in an activity to improve the environment	15	9
Use biodegradable detergents	14	18
Sponsor a child in the third world	11	8
Participate in a traditional festival of a community which has a culture or religion different from yours	8	8
Forego part of your weekly pocket money in favour of a child without money	7	5
Invite an immigrant to visit your home	7	4
Write a letter to Parliament to request that third world debt be reduced.	6	4

Adapt cars to alternative fuels	3	15
Volunteer in a refugee centre	3	2
Volunteer to teach English to an immigrant who is working in your country	3	4
Forego part of your job or salary in favour of a newly-arrived immigrant	2	2
	21	18

Figure 16. Personal actions to improve the environment. A comparison between Spain and E-3 countries.

- Trust in organizations and persons to solve environmental problems.

To solve environmental problems, young Spaniards mainly trust individuals themselves, the government, the European Union and international organisations (the UN, Greenpeace, etc.), in this order. This fact confirms the reiterated trust young people place in individuals. Likewise, the high level of trust placed in institutions both at the national as well as international levels is also worthy of note, as is the low level of trust young people place in autonomous governments and the academic world (scientists and schools). Young people from E-3 countries trust international organisations less than Spaniards do, whereas they trust autonomous governments more than Spaniards do. By gender, it is worth noting that young women place higher levels of trust in individuals than young men do, whereas young men trust scientists more than young women do. Young people from low status backgrounds trust autonomous governments and scientists slightly more than students from middle and high status backgrounds do. Students from high status backgrounds trust journalists, television and the Internet and international organisations more than the other students do.

	<b>Spain</b>	<b>E-3</b>
People	45	53
Government	45	43
The European Union	43	41
International Organisations	38	11
Local councils	26	18
You	18	20
Scientists	18	20
Newspapers, Television and the Internet	17	24
Business	16	12
Schools	13	18
The Regional Government	12	33
Famous People	6	18

Figure 17. Trust in organisations/persons to solve environmental problems. A comparison between Spain and E-3 countries.

- Most important issues that should be solved by governments.

The main problems cited were unemployment, deficient service in hospitals and medical centres, the homeless and increasing drug trafficking and consumption. The least urgent problems were deteriorating historic monuments and sites, disorganisation and chaos in cities and the rising number of foreign workers and immigrants. Young women are more concerned about problems related to the homeless, unemployment and increasing drug trafficking and use than young men are. Young men scored higher on topics related to excess waste and tips, the increasing number of foreign workers and immigrants, the lack of green zones and parks in cities and the high cost of housing.

- Actions that local councils should do.

At the local policy level, young Spaniards' priorities are to make businesses responsible for collecting and recycling their products' packaging, to stop certain species of trees from being chopped down and to make factories pay for the contamination they produce. The opinions of E-3 young people differ widely on this question, as they place priority on other types of actions, such as limiting the construction of buildings and closing highly contaminating factories, despite the loss of jobs involved. Accordingly, young Spaniards favour sanctions and regulatory measures more than E-3 students do. Young people from all the different countries hold the same opinions on drastic measures. The Canary Islands is the autonomous community that chose sanction solutions most often, followed by Castile and Leon and Murcia. The communities with the lowest scores on these measures were Catalonia and Madrid. The Balearic Islands was the community with the highest scores on applying drastic measures, followed by Murcia, the Canary Islands and Cantabria. Catalonia stands out for its low scores on these types of measures. Regulatory measures were chosen most often by the two Island communities, whereas once again Catalonia was the community with the lowest scores on this solution.

- If the waste from a factory started to contaminate a river or lake.

Regarding government intervention to address the problem of industrial waste, most young people from both Spain as well as the E-3 countries agreed that the government should fine factories and close them until the problem is solved. This opinion was also the majority opinion in the Canary Islands and Murcia.

- If too much traffic endangered the conservation of a monument.

Regarding municipal intervention to conserve public heritage, most young people believed that municipalities should only allow public transport to circulate. This option received more support in Catalonia than in any other community. The most radical proposal, which suggested a municipal ban on vehicles, received the highest scores in Murcia and the lowest scores in Valencia.

## **The perception of environmental problems.**

- About the concepts of “nature” and “environment”.

Young Spaniards describe different views of the concepts of “nature” and “the environment”. They tend to perceive nature as anything that is not human (forests, wildlife, clean air, the sea), to value the need for man’s involvement in its conservation and to highlight its values (beauty, spectacular scenery, resource for recreation). On the other hand, the environment is linked to the local setting and is perceived as the interaction between nature and society, habitually with negative consequences, and pollution problems, global warming and acid rain were cited. The respondents appealed to humanity to be responsible and respect nature.

	<b>TR</b>	<b>%</b>
Flora, forests, countryside, nature parks, trees, fields	614	48
Fauna, animals	371	29
Pollution-free, no cars, no smoke, clean air	177	14
Surroundings to be taken care of, everyone’s collaboration in taking care of them	145	11
Landscapes, mountains	139	11
Not respected, more and more polluted, destruction	132	10

Figure 18. The concept of ‘Nature’

	<b>TR</b>	<b>%</b>
Not respected, more and more polluted, destruction	243	19
The local environment, our surroundings	173	14
Flora, forests, countryside, nature parks, trees, fields	148	12
Surroundings to be taken care of, everyone’s collaboration in taking care of them	128	10
Bugs, few amenities	126	10
<b>No answer</b>	125	10

Figure 19. The concept of ‘the environment’

- The places they live in and where they would like to live.

Students place great importance on the environment in enjoying the setting they live in, defining the place they would like to live in and describing the planet’s future. The main problems about where they live and the major weaknesses of the future they will be inheriting are pollution (mentioned both generically as well as in detail: air, water, noise, caused by traffic or by factories, etc.) and the destruction of natural values (extinction of species, fires, deforestation, overbuilding). The aspects that positively define

the place they live in and characterise the places they would like to live in are the absence of pollution, traffic and noise; the presence of green zones; citizen safety and peace and quiet; cleanliness and the beauty of the setting. The respondents would like to live surrounded by nature in rural settings far from traffic, pollution and urban pressure. The mainly urban problems cited above - traffic, dirty streets and the lack of green zones - appear frequently; nevertheless, when questioned about the places they would like to live in, a large percentage of the respondents stated that cities and urban areas are ideal places. The lack of water was only occasionally mentioned as a problem that affects daily life. The communities that are most satisfied with the places they live in are Andalusia and Extremadura and the most unsatisfied are the Balearic Islands and Murcia. Students from Galicia and Navarre would prefer to continue living where they are to a greater degree than other respondents. The communities that would least chose the place they currently live in are Madrid, Valencia, Murcia and Aragon. As an alternative, the respondents opted for living in the country and the coast or beach. Cleanliness is an essential trait for the places they would like to live in for all the autonomous communities, except for respondents from Murcia and Extremadura, who prioritised the presence of nature.

	<b>TR</b>	<b>%</b>
Pollution (water, noise, contamination)	241	19
Parks, gardens, green zones	224	18
<i>No answer</i>	184	15
Peace and quiet, safe, few conflicts	165	13
Pleasant, pretty, a good place to live in	137	11
Not very polluted, healthy, well cared for	131	10
<i>Incongruent</i>	129	10

Figure 20. Perception of the places where respondents live

	<b>TR</b>	<b>%</b>
Clean, unpolluted, healthy	290	23
Nature, animals living in the wild	232	18
Where I live now	191	15
Peace and quiet, silence, well-being	127	10
Beach, coast, island	131	10
The countryside, fields, natural areas	114	9
Cities	73	6

Figure 21. Description of the places where they would like to live

- Perception of local, national and international problems.

The respondents indicated several socio-economic and political problems that affect the quality of life. They mentioned crime, poverty, integration problems and the lack of individual participation, among others. Although the respondents were very critical of the places they live in and provided a list of different problems that demonstrate negative views, a high percentage chose to continue living where they do now, when choosing the place they would like to live in. As for Spain, a series of problems related to the environment (pollution, deforestation, extinction of species, drought and global warming), socio-economic conditions (poverty, hunger, marginalisation, drug addition and delinquency) and politics were mentioned. All the communities cited pollution as their main concern except Aragon, where terrorism, a problem that has grown in importance on the national and international level as a result of the recent attacks on the United States (11-S), was most often mentioned. At the international level, young Spaniards denounce the seriousness of poverty, hunger, pollution, war and terrorism. Poverty and social inequalities are perceived as the world's main problem, surpassing pollution in all the autonomous communities except Cantabria, Catalonia, Castile-La Mancha and Murcia. Andalusia mentioned the hunger problem and La Rioja was especially concerned about war.

	<b>TR</b>	<b>%</b>
Pollution	507	40
<b>No answer</b>	233	18
Destruction of nature, fires, deforestation, desertification, disappearance of green zones, hunting, extinction of species, depletion of natural resources	191	15
<b>None</b>	89	7
No recycling, residual waste, dirtiness	66	5

Figure 22. Problems in the places where they live

	<b>TR</b>	<b>%</b>
Pollution	432	34
Destruction of nature, fires, deforestation, desertification, disappearance of green zones, hunting, extinction of species, depletion of natural resources	211	17
Migration	192	15
<b>No answer</b>	183	14
Terrorism	168	13
Unemployment	106	8

Figure 23. Problems in Spain



	<b>TR</b>	<b>%</b>
Poverty, social inequality, inequality between countries, lack of social aid	363	29
Hunger	261	21
Pollution	227	18
War	206	16
Drought, lack of water	186	15
<b><i>Incongruent</i></b>	174	14
Depletion of energy resources	131	10
Destruction of nature, fires, deforestation, desertification, disappearance of green zones, hunting, extinction of species, depletion of natural resources	113	9

Figure 24. Global problems

- If excess traffic endangered conservation in a nature park.

Taking drastic measures to solve excess traffic in a nature park was prioritised. On one hand, closing the road and diverting traffic to other roads; on the other, building another road in a different place, without lending importance to the negative environmental impact that a new road could cause in the district. Adopting various regulatory measures and sanctions were proposed as a secondary choice. Solutions that involve individuals were only mentioned occasionally. The majority of students from the Canary Island and Castile-Leon chose to build a new road, an option that stood out in comparison to the unanimity demonstrated by the rest of the autonomous communities, which advocated closing the current road and banning traffic.

	<b>TR</b>	<b>%</b>
Close the road, ban circulation	435	34
Build another road in another place, change the site	319	25
No answer	123	10
Limit the number of vehicles	102	8
Permit only public transport	100	8

Figure 25. If excess traffic endangered conservation in a nature park

- Knowledge about organisations, which work for a better world.

Spanish students are familiar with thirty organisations that work to improve the planet on the local and worldwide level and focus on social as well as environmental problems. Greenpeace, UNICEF and Manos Unidas were the most frequently mentioned organisations.

	<b>TR</b>	<b>%</b>
Greenpeace	516	41
Unicef	384	30
Manos Unidas	282	22
<b>No answer</b>	243	19
Red Cross	200	16
Doctors without Borders	192	15
<b>Incongruent</b>	146	12
Caritas	132	10

Figure 26. Organisations that work for a better world

- Evaluating the environment in each autonomous community.

Half of the respondents mentioned specific natural spaces as the best-protected environmental space in their autonomous community of residence, and each autonomous community provided up to seven different examples. The rest of the responses focussed on certain types of environment and cited protected natural spaces, mountains and the countryside as priorities. The coast and sea are mentioned by a minority as the best-protected environmental space in their autonomous communities.

	<b>TR</b>	<b>%</b>
Pollution in general	404	32
Traffic, pollution caused by cars	249	20
Air pollution	184	15
<i>Noise pollution</i>	126	10
Dirty streets	115	9

Figure 27. Local environmental problems

- Distribution of responses in relation with the community of residence.

A clear pattern of response in terms of respondent's community of residence could not be established, as that depended on the different questions posed. Nevertheless, a few significant examples can be mentioned: Madrid and the Basque Country perceive the environment as not being respected, while Valencia and Asturias link this concept with nature. All the autonomous communities except Aragon and Extremadura choose pollution as the main problem in the place they live. Students from the Balearic Islands mainly denounce the community's traffic problem, while students from Madrid made significant mention of pollution and those from Murcia cited noise pollution. Greenpeace was mentioned by the majority of students in thirteen communities, while the rest chose UNICEF and/or Manos Unidas.

- Distribution of responses among sexes.

As for distribution by sex, a clear trend in favour of young women can be seen. They abstained in lower percentages than their schoolmates and indicated fewer incongruences. In general, they offered more ideas and solutions for the questions posed and scored higher in the leading response categories. They are more critical than young men are about the places they live in, but even so, they prefer to stay where they live in higher percentages than young men do.

- Distribution by professional standing.

In relation to the professional standing of the respondents' parents, a clear pattern of response does not emerge, although some tendencies can be seen: the results from the responses by students from low professional backgrounds are more diverse. Students from low status backgrounds responded less often to the questions posed in the questionnaire. Students from high status backgrounds frequently scored the highest percentages of response, also in the main categories indicated. Students from middle status backgrounds were closest to the medium. Students from high status backgrounds opted to a greater degree than their schoolmates did for the places they are currently live in, the presence of nature, concrete cities and freestanding homes.

- Comparison with European studies.

The results from the international study in which Finland, the United Kingdom and Portugal took part are similar to those obtained from the Spanish study: in the first place, similar connotations are conferred upon the concepts of "nature" and "the environment"; in the second place, European students perceive pollution as the primary environmental problem and in the third place they coincide on their pessimistic view of the future of the planet. Greenpeace and UNICEF are the organisations they are most familiar with. The findings on the concept of "the environment" are similar to the Eurobarometre 58.0 (2002, 5): the concept is linked to pollution for a quarter of the respondents and this negative connotation is most frequently chosen in southern European countries (Portugal, Italy and Spain).

### **The view of the future.**

The most common view of the future afforded by the students' drawings and descriptions is mainly negative: an overbuilt, industrialised and polluted world, unequally developed at the local and global level, with scarce opportunities for sustainable development. On the basis of the descriptions they provided, young people from Valencia and Andalusia express an especially negative view, while in the case of the drawings, the most negative views were expressed by students from the Canary Islands and Galicia. According to their descriptions, the most optimistic students about the future they are to inherit come from Valencia and the Canary Islands and according to drawings, the most optimistic students come from Catalonia and Extremadura. Women perceive the future of the planet more negatively than young men do. The descriptions and drawings reflect the

students' feelings (sadness, joy, etc.) to a greater degree than they reflect their knowledge about the environment (sustainable development, recycling, etc.) Students perceive a world in crisis that requires help but that do not supply concrete solutions. The various negative aspects mentioned refer to environmental problems: pollution in the first place but also the destruction of natural values and global warming, humanitarian problems such as hunger and AIDS, social conflicts such as war and delinquency, and urbanisation and technification. Industrial pollution, water and air pollution are mentioned recurrently, in this case by students from the Canary Islands, Catalonia, Cantabria, Extremadura, La Rioja, Navarre and Valencia.

As for economic and development problems, beyond citing poverty and hunger generically, students did not usually identify substantial questions such as inequalities, globalisation or market liberalisation, market agreements, foreign debt. Concrete environmental aspects are mentioned much more often. On a very few occasions, the respondents represented themselves as playing an active role to create a better world, precisely one of the challenges involved in educating for sustainability.

- If we participate in solving the world's problems and we concern ourselves with them, we can solve them. But little can be achieved without collaboration. The future depends on us.
- In a few years, especially in the western world, this situation is going to deteriorate to such an extent that it will influence the rest of the cultures, countries, etc. and inevitably lead to global destruction. Part of the solution would be to stand up to the government pacifically and attend to the needs of citizens' and not only to the government's, as their needs are private.
- A blueprint of the future cannot be designed, but I believe that it is best to think that the future shall be how we forge it on a day-to-day basis.
- A world full of life, because everyone all over the world will take care of the planet.
- If people continue to abuse nature, the world will be like a desert. Nevertheless, it seems that now we are becoming aware of nature's great importance, which is why if we all manage to maintain our treasure, the world will be able to continue to be inhabitable.
- All of nature dead...do something.

Aspects such as respect for living beings, cleanliness, intercultural understanding and protecting the environment are among the few positive values that stand out. The negative view of the planet's future posed by Spanish students coincides with the findings from the TETSDAIS project, although Spanish students in the latter mentioned the key role that individual participation plays in developing a sustainable future.

### **Beyond the conclusions of the study: some key ideas to continue working with.**

In addition to providing several key ideas about the attitudes and opinions of young Europeans towards the environment, the study poses important questions that open the way for new research.

In the first place, the recurring appearance of pollution, both in general as well as in detail, demonstrates that students know more about this topic than about other issues. It is legitimate to wonder whether too much work on the issue of pollution is being carried out, compared to other issues that affect the local, national and international environment - climate change, deforestation, fires or lack of water - questions that school curricula should deal with in more depth.

In the second place, the role played by environmental education as the trigger for changes in environmental attitudes needs to be reflected on. Among other goals, environmental education should work to achieve a fairer society, encourage intercultural sensitivity and a culture of peace, "offer reference points so as to guarantee a moral education that helps us live together in a democratic and pluralist society" (Benayas & Marcén, 1996). To which degree and how should school curricula work to include attitudes, values and behaviours into cross-curricular topics, as far as methodology and contents is concerned and on the process of students' moral and personal development? Updating the teaching staff's initial and ongoing training should also be included, so they can implement the knowledge and skills related to these issues.

In the third place, the question of how to integrate student knowledge, attitudes and opinions into developing education for sustainability is posed. Precisely one of the challenges involved in educating for sustainability is achieving active individual participation. The results of the study indicate that more work needs to be done to make children understand that they are involved in the process and that they cannot restrict themselves to adopting a passive role based on pessimistic expectations of the planet's future. The respondents mentioned a wide range of organisations that work to solve environmental and humanitarian problems for a better future. Nevertheless, this knowledge does not mean that the respondents are directly involved, as was noted when analysing the personal efforts young people make to achieve a better world.

The results of the study confirm how important students consider the environment to be in enjoying a positive future. Nevertheless, in the face of the evident social and environmental problems that affect humanity, from the local to the worldwide level, most young Spaniards adopt a passive role based on their pessimistic expectations of the planet's future. Training active and responsible citizens does not consist of informing them of environmental issues that mark the conditions for the planet's future, but rather making them understand that it is possible to imagine a sustainable future, that they must work towards that and that it includes respect for cultural diversity and the struggle against environmental, economic, social and politi-

cal inequalities in different regions and countries.

In short, to achieve a sustainable future, we must first show children the role they play in negotiating the world they are to inherit, the value of active individual involvement at the local level and its projection at the global level. In the words of R. Wade, if we cannot imagine a sustainable future then it is unlikely to be achieved” (Wade, 2002).

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## **A NEW THEORY OF HIGH QUALITY LEARNING TO ENHANCE EDUCATION AND LEARNING FOR SUSTAINABLE DEVELOPMENT**

**Mauri Åhlberg**

*Professor of Sustainability Education, University of Helsinki*

United Nations (UN) has declared Decade of Education for Sustainable Development (2005 – 2014) in 2002. UN is an organisation of all nations of the world and in this sense presents humankind better than any other organisation. As an animal species humans, as humankind, is a part of biosphere and totally dependent on it for oxygen, food, fresh water, renewable raw materials etc. In October 2 – 3, 2004, UN General Assembly accepted the Agenda document for the UN Decade of Education for Sustainable Development (2005 – 2014). In the final document importance of learning is highlighted, but nature of learning is left in many ways unspecified.

**Outline of an integrating theory of high quality learning** (based on <http://bulsa.helsinki.fi/~maahlber/sivut/publications.htm> )

I present the theory of high quality learning as a list of propositions. All of them have theoretical underpinnings and justifications, and empirical support. All the elements, building blocks, of this tentative theory are selected because there are aspects of the same learning process (This integrating theory is coherent until somebody is able to show convincingly that it is not.)

- 1) Learning is both individual and social knowledge building process. Learning is a concept that is used to explain change in thinking and actions of individuals, teams, organisations, regions, nations and in humankind. Knowledge covers in this theory declarative knowledge, procedural knowledge, tacit knowledge, value knowledge etc. The point is that in the learners' minds mental models of the world and universe are created, tested and continually improved. All human knowledge is tentative, at best approximately true, always, improvable. It is of utmost importance is continually to test both constructed knowledge and its assumptions, both theoretically and empirically. The best way to learn in this way is to join a group of knowledge builders, like research groups or learning groups. It is not wise to stick to dogmatic conceptions, but to be open-minded and to compare own theories with other theories. All human knowledge is tentative, at best approximately true.

- 2) Science (in broad sense of “Wissenschaft”) and technology are main tools for humankind to create, test and reconstruct knowledge, concepts, and theories of the world, including sustainable development. Science and technology are the biggest learning projects for humankind. Science is the only known systematically self-correcting way of obtaining knowledge.
- 3) In high quality learning tentative theories of the world are constructed, values included. In high quality learning, learners take full responsibility for their own learning, thinking, feeling and acting.
- 4) Poppers (1972) three (Part) Worlds theory makes understandable how knowledge can be built collaboratively. Learning itself, as brain/nervous processes, happens in the World 2. Shared cultural products of learning, theories etc. are in the World 3. Human beings and the biosphere they are part of, is in the Part World 1.
- 5) Meaningful learning, in which learning is relevant, new knowledge is linked to earlier knowledge, structures of concepts and propositions are continually tested and reorganised.
- 6) Also learning by heart can be meaningful in meaningful contexts, e.g. learning usernames and passwords.
- 7) Deep learning in the sense that history and evidence for the knowledge are sought for. Predictions from on knowledge are tested, when needed and possible. Teachers can test their tentative personal educational theories by design experiments.
- 8) When testing of learnt knowledge happens in a form that knowledge is applied to own life, in everyday life and practice, it can be called transfer aspect of high quality learning.
- 9) Meta-learning is included, and it covers at least monitoring and promotion of own learning and knowledge.
- 10) Creative, proactive learning, expansive learning to create better possibilities for optimal satisfaction of real human needs.
- 11) Tacit learning is used and explicated by tools available, e. by improved concept mapping and improved Vee heuristics.
- 12) Learning everywhere, life as learning, is in use. Both formal and informal learning are applied in life long learning as a part of high quality learning.
- 13) In high quality learning both generalisations and their contextual irregularities are learnt.
- 14) In high quality learning mental conceptual systems (tentative theories) are created of the real systems of the world. The universe is the biggest system known, and all other systems are parts of it. Everything in the world is somehow connected, linked. If some part of the universe would not be connected to the rest of the Universe, humankind would have no chances of ever learning anything about it. It would no belong to our Universe.

- 15) In high quality learning people are seeking as truthlike/truthful knowledge as possible, as wise as possible, as efficient as possible, as good and beautiful as possible. This is axiological aspect of high quality learning.
- 16) Human beings learn best as integrating whole person: thinking, feeling and acting at the same time. Directing attention is a form of acting required in intentional learning. It demands whole person to do it.
- 17) In high quality learning there is continual integration and empowerment that are used to solve problems of both individuals and societies, and humankind. This happens when win-win strategy is used. It has been theoretically shown that in long run whole humankind benefits of right kinds of win-win thinking and decisions, in which all participants and stakeholders win in long run. Also flow experiences are often met in this aspect of high quality learning. Sternberg's theory of wisdom as learning to balance different types of interests is an essential part of high quality learning.
- 18) Learning from the best of each field is an essential aspect of high quality learning. This is sometimes called bench-learning (from benchmarking). People can learn from anybody, but highest quality of learning results from learning the best in each field of knowledge.
- 19) High quality learning involves learning to network and learning in networks.
- 20) Three essential indicators of high quality learning are: a) critical but at the same time constructive thinking, b) innovative, creative problem solving, c) constructive actions to promote sustainable development, integrating ecologically, economically and socially sustainable development.



# **RESEARCH ON PROMOTING WISDOM FOR SUSTAINABLE DEVELOPMENT: EDUCATING FOR WISDOM, CREATIVITY AND INTELLIGENCE AS A MAIN PART OF EDUCATION FOR SUSTAINABLE DEVELOPMENT**

**Mauri Åhlberg**

*Professor of Sustainability Education, University of Helsinki*

## **Introduction**

There are many definitions of sustainable development, including the landmark one which first appeared in 1987: "Development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (The World Commission on Environment and Development, 1987). Åhlberg (1998 and 2005) has defined Sustainable Development as follows: Sustainable Development is development for optimal satisfaction of real human needs of both present and future generations.

## **Creating a new framework of Education for sustainable development**

I have created a new interpretation of Education for Sustainable development integrating Robert J. Sternberg's (2003) ideas and my earlier work in this field. I have developed a new interpretation for culturally sustainable development. From viewpoint of biology everything that is learnt is part of culture, and may be part of cultural evolution, and in this sense may be also part of culturally sustainable development. New components of Sustainable Development are health-centred sustainable development and an amended version of politically sustainable development.

## **What is culture and culturally sustainable development from viewpoint of biosciences**

Human beings are part of the biosphere, and nature in general, as all other organisms. Understanding of systems and systemic consequences of our actions are parts of wisdom. All organisms change their environment during their lifetime, think e.g. coral and coral reefs, ants and ant hills, termites and their influence on environment, tropical organisms and rain forests etc. Human beings are no exception. All cultural products are transformed nature, all materials are originally from nature, all domesticated animals and cultivated plants have their origins in nature. Human beings

have transformed them from nature (physis) to the transformed nature (artephysis).

### **Using Sternberg's research results of educating for intelligence, creativity and wisdom to promote ESD**

Sternberg (2003) and his research group have shown that intelligence, creativity and wisdom can be promoted by education. They are based on openly developing abilities, competence, expertise, and skills. Sternberg (2001a and 2004) presents 16 practical principles of teaching for wisdom derived from the balance theory of wisdom. It is a tentative normative psychological and educational theory that can be tested by educational research. Sternberg (2001b) answers to five critics of his tentative theory. This is kind of theoretical testing of the balance theory of wisdom that is needed also in future.

All good theories deserve to be tested continually both theoretically and empirically. It is the only known way to continually improve them, to make them more truthful/truthlike and more efficient. According the empirical research results both theory and practice can probably be improved when the balance theory of wisdom is applied. It is a tentative sound, well justified normative theory that can be tested and improved by educational research to promote Education for Sustainable Development. Both continual theoretical and empirical testing are needed in order to develop theory and practice of promoting wisdom as a part of Education for Sustainable Development in science education. The interests involved are both individual and societal interests of humankind.

### **Some of the main ideas of promoting wisdom in education to be tested continually both theoretically and empirically**

According to Sternberg (2001a, 238) there are 16 practical principles of teaching for wisdom derived from the balance theory of wisdom, eg.:

- Help students to learn to recognize their own interests, those of other people and those of institutions.
- Help students to balance their own interests, those of other people and those of institutions.
- Encourage students to form, critiques and integrate their own values in their thinking.
- Teach students to search for and then to try to reach the common good – a good where everyone wins, not only the ones whom one identifies.
- Encourage and reward wisdom.

It means that it would be wise if we in education could somehow be able to integrate those kinds of issues into our daily life and work: to live wisely, to teach wisely about the balance theory of wisdom and its components. One of the main common goods is sustainable development.

Ordinary definition of intelligence is often very narrow. It does not focus of success, e.g. success in promoting sustainable development. I have selected aspects of Sternberg's theories. They are coherent and meaningful. They are tested ideas how to promote successful intelligence, also success in Education for Sustainable Development.

Main ideas of promoting successful intelligence in education to be tested continually both theoretically and empirically. According to Sternberg & Grigorenko. (2000) three kinds of thinking ought to be promoted in order to promote successful intelligence:

- 1) analytical thinking (analytical intelligence),
- 2) creative thinking (creativity) and
- 3) practical thinking (practical intelligence).

## **Conclusion**

It is a good time to rethink curriculum of Education for sustainable development: How to teach-study-learn, in integrating ways, to learn and to educate for sustainable development. We have nowadays deeper understanding of sustainable development than ever and better educational theories and tools than ever. Sachs (2005) has written a well argued book how to end poverty, and, as a matter of fact, at the same time to promote sustainable development, and good environment. Their achievement is open ended, and requires educating for wisdom, creativity and intelligence

## **More information and references**

My homepage (<http://www.helsinki.fi/people/mauri.ahlberg>) contains publications, links, articles, and their lists of references, continually updating knowledge of research on promoting wisdom for sustainable development, and education for sustainable development.





## **SELF-REGULATION OF ATTITUDES IN EDUCATION FOR SUSTAINABLE DEVELOPMENT**

**Aitor Albizu Intxausti**

*aitor.ajangiz@euskalnet.net*

**José Manuel Gutierrez Bastida**

*jmgb@irakasle.net*

*The Research And Environmental School of Sukarrieta  
Department Of Education Of The Autonomous Basque Government*

We are members of the Pedagogical Team of the Research And Environmental Centre of Sukarrieta and on behalf of our school and of the Department of Education of the Basque Autonomous Government we would like to present you our system of educational intervention in programs of Environmental Education.

Our centre is the result of the agreement made between the Bilbao Bizkaia Kutxa Bank, a non profit welfare financial institution and the Department of Education of the Basque Government.

We are located in the Urdaibai Biosphere Reserve and it is here where we develop our Programs of Environmental Education connected to real environmental issues.

The programs are sustained in the development of:

- Ethical, conceptual and methodological principles of Environmental Education
  - Working on real environmental issues, dealing with the complexity those issues contain and dealing with the ethical standard, a layer beneath the attitudes and human behaviour;
  - In the environment, about the environment and for the environment.
- The Psycho-pedagogical Principles of Constructivism
  - building new knowledge on previous experiences and prior knowledge of students,
  - functional and meaningful learning and with authentic material
  - interaction with the natural, cultural, social, environment),
  - dealing with diversity (race, ethnic group, cultural and socio-economical means... )
  - considering the regulation of the teaching-learning process, in order to acquire awareness and autonomy.
  - and assessment being the engine of the educational practice, understood as support of the teaching-learning process, as a self-regulating element of the students' learning process, and as an

element of control of the teaching process designed by teachers (outline set by N. Sanmartí and J. Jorba).

Our educational offer is aimed at the school community of the region of Bizkaia where 3.500 student, 100 schools and 200 teachers distributed in weekly stays during the school year have this possibility. Students take part in one of our 5 projects (Earth, Water, River, Forest, Green Planet) and in this setting, teachers receive training on our three main columns: Constructivism, Assessment and Environmental Education.

We are a centre of Investigation-action that promotes favourable attitudes towards the environment in schools that contribute to the Sustainable Development, from a design proposed to teachers and students. It is based on reflective practice, contrasting different realities and issues, and offering a teaching-learning process, taking place in and for the environment.

### **Teaching-learning modes**

Next, we will briefly describe the outlines of the educational intervention or the teaching-learning mode in programs of environmental education that we propose.

#### **Initial stage**

In this 1<sup>a</sup> stage, Initial Diagnostics, we take into account the students' prior knowledge about different Environmental Issues in order to sensitise and to cause enough permeability and complicity that makes sharing a program possible. We are speaking then, of an immersion in a program of Environmental Education.

We explore that prior knowledge of the students to detect the Zone of Proximal Development (Vigosky), this is where we will intervene. The steps of Environmental Education will act as a thermometer in such a way that it will allow us to move closer to the students' needs by making sure that this will be the outcome of an all-around treatment, without neither falling into the consecration of the concepts, nor falling into activism as a consequence of overrating the procedures, nor falling in the alignment of a frivolous indoctrinated conception of the attitudinal change.

#### **Procedural stage**

2<sup>a</sup> Stage: Procedural: in this stage we will undertake the development of the program itself emphasizing the following phases:

- Planning-action.

Making use of Gowin's V (*adapted*) as a starting point, the objectives shared between students and teacher revolve around three questions:

- What are we going to do? (Searching for prior knowledge and the objectives of the activity)

- How are we going to do it? (searching for the attitudinal and methodological component)
- What are we going to do it for? (searching for the meaning and the purpose of the activity)
- This way we will foster:
  - The attention to diversity, welcoming all contributions that come from the group
  - The representation of the objectives of the activity and the anticipation of the action making sure therefore, of a scaffolding that will allow the acquisition of commitments, a fundamental component in a program of Environmental Education
- Investigation-reflection

Through interaction with the environment we guarantee the meaningfulness of the material, understanding the environment as a complex and dynamic system where a mountain of interrelations take place among all its components, that are in constant evolution whether they are physical-chemical or social, cultural, economical...

To that effect, a field trip to the environment is our main resource so, The Urdaibai Biosphere Reserve becomes the ideal scenario to do field trips to the Swamp, Forest, Port, River, Coast, Garbage dump... (on-sight view).

We implement this with activities that include data analysis, reflections, group discussion, contrasting views, role play... that will expand the environmental perspective and its issues, as much as the in-depth knowledge as its location in this globalized world (overall view).

As we advance in the development of the program we begin the joint process of a Content Network (based on Novak's conceptual maps) where the group incorporates new meanings into their prior knowledge, in the shape of a map, with multiple connections. A graphic representation will emerge that will help with personal and collective construction of knowledge.

The teacher will guide with his/her questions the map constructing process, putting in ideas conveyed by students, opening a space for learning among equals and the attention to diversity. Beyond the graphic outcome, what is most important is that a space is offered that will allow the self-regulation and co-regulation of the students, therefore, this will clear the way for building an individual and collective awareness of knowledge (meta-learning).

## **Final stage**

Among the elements that provide meaning to the accomplishment of activities and learning, the need students have of explaining what they have learnt always turns up, specially the causes and consequences of the issue under consideration and the open practice that will help resolve it.

This entails arranging a sensitising campaign whose preparation and staging will serve simultaneously to enhance the meaningfulness of the learning process, assess the achievements and non-achievements and thus, close the cycle. All in all, to have caused the sensitive, affective and cognitive impact that is directed to induce the attitudinal conflict that stimulates the desired attitudinal change, in this way facilitates or, at least, helps fulfil our dream..., which is, to advance towards a desired future scenario, as an alternative to the current one. From our experience during these years, we do believe that its possible to change (As M<sup>a</sup> Novo, an authority concerning environmental education, states).

## **To finish, why Environmental Education Constructivism – Assessment?**

Because we understand that constructivism and assessment must bear the weight of Environmental Education and only from the contextualization of the constructivist approach of our programs and the educational intervention (in other words, dealing with prior knowledge, announcement of objectives, foreseeing the action, learning among equals...) and of the regulating mechanisms that assure the conscious knowledge, students will be provided with Responsibility, Commitment, Cooperation, Solidarity, Freedom, Justice, Critical thinking skills... basic values to achieve the final purpose of Environmental Education that we think is: to educate people that will have a capacity to give an individual and joint response to current or future environmental issues, rather than being confined to the application of a set of prescriptions.

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## **AUTORREGULACIÓN DE ACTITUDES EN EDUCACIÓN PARA EL DESARROLLO SOSTENIBLE**

**Aitor Albizu Intxausti**

**Josemanuel Gutierrez Bastida**

*Centro de experimenpedertación escolar de perdernales*

*Sukarrieta eskola saiakuntzarako zentroa.*

*Consejería de educación y universidades*

*del gobierno autónomo vasco*

Egunon, somos miembros del EP del CEEP y en nombre del Departamento de Educación del Gobierno Autónomo Vasco venimos a presentaros nuestro sistema de intervención educativa en programas de EA. Nuestro centro es fruto del convenio entre una y el Departamento de Educación del Gobierno Vasco. Euskadi Basque Country.

Estamos ubicados en la Reserva de la Biosfera de Urdaibai (MaB) y es aquí donde desarrollamos nuestros programas de EA entroncados en problemáticas medioambientales reales del entorno.

Los Proyectos están sustentados en el desarrollo de los y en los principios psicopedagógicos emanados del constructivismo siendo la evaluación-autorregulación el motor de la practica educativa.

Nuestra oferta educativa va dirigida a la comunidad escolar de Bizkaia y gozan de esta posibilidad 3500 alumnos, 100 centros y 200 profesores repartidos en estancias semanales a lo largo del curso escolar donde el alumnado desarrollan 5 proyectos (Tierra, Agua, Ría, Bosque, Planeta Verde) y alrededor de ellos el profesorado desarrolla actividades de Formación al profesorado en torno a nuestros tres pilares: Constructivismo, Evaluación, Educación Ambiental.

Basándonos en la reflexión sobre la practica, contrastando distintas realidades y problemáticas y ofertando un proceso de enseñanza-aprendizaje desarrollado en el Medio y a favor del Medio, somos un centro de Investigación-Acción que desde un diseño propuesto al profesorado/alumnado quiere promover actitudes favorables al Medio que contribuyan al desarrollo sostenible.

Vamos a citar como planteamos el desarrollo de nuestros programas.

1ª Fase: Diagnóstica Inicial.

2ª Fase: Procesual.

3ª Fase: Final.

En una 1ª fase Diagnostica Inicial recogemos las IP en torno a distintas problemáticas medioambientales. Para sensibilizar y provocar la suficiente permeabilidad y complicidad que haga posible compartir un programa. Estamos hablando en definitiva de una inmersión en un programa de EA.



Investigamos esas IP para detectar la zona de desarrollo próximo (Vigoskye) de los escolares. Los pasos de la EA actuaran de termómetro de tal forma que nos permitirá a las necesidades del alumnado sin caer en la sacralización de los conceptos ni caer en el activismo resultante de sobrevalorar los procedimientos ni de caer en el alineamiento de una concepción frívola y adoctrinante del cambio actitudinal sino que asegurándonos de que este sea el resultante de un tratamiento integral.

2ª Fase Procesual. En esta fase acometeremos el desarrollo propio del programa acentuando los siguientes momentos.

- Planificación.
- Acción
- Investigación (por parte del alumnado)
- Reflexión.

Desde la V de Gowin se comparten los objetivos entre el alumnado y el docente en torno a tres preguntas – Que, Como, Para que – dando cabida a la diversidad por lo que promovemos la anticipación de la acción asegurándonos por lo tanto de un andamiaje que permitirá la adquisición de compromisos, componente fundamental en un programa de EA.

A través de la interacción en el Medio aseguramos la significatividad del material. Entendemos el Medio como un Sistema dinámico y complejo donde se dan multitud de interrelaciones entre todos sus componentes tanto físico-químicos como sociales, culturales, económicos, que estan en constante evolución. La RBU se torna ideal para poder hacer salidas a la Marisma, Bosque, Puerto, Río, Costa, Vertedero. Implementamos a esto análisis de datos, reflexiones, debate, juego de simulación, que van ampliando la perspectiva del Medio y de las problemáticas tanto en su profundidad como en su ubicación en este mundo globalizado. En la medida en que avanzamos en el proceso acometemos la elaboración conjunta de una Red de Contenidos (Novak) pero mas allá del resultante grafico abrimos un. Este momento permitirá la autorregulación y cooregulación y por tanto la consciencia individual y colectiva del conocimiento que se esta construyendo.

3ª Fase Final.

Nuestros programas concluyen con la realización de una campaña de comunicación justificada por la necesidad que suelen presentar los alumnos/as de contar aquello que han aprendido y que simultáneamente sirve para afianzar la significatividad de los aprendizajes y de esta forma cerrar el ciclo. En definitiva haber provocado el choque sensitivo, el choque afectivo, el conflicto cognitivo va dirigido a provocar el conflicto actitudinal que derive en el cambio actitudinal perseguido que posibilite ó cuanto menos ayude a cumplir nuestro sueño, a avanzar hacia un escenario de futuro deseado y alternativo al actual. Cambiar es posible (Mª Novo).

## **En definitiva ¿por qué? Educación Constructivismo – Evaluación-Ambiental?**

Porque entendemos que el constructivismo y la evaluación han de ser el sustento de la EA y porque sólo desde la contextualización a nuestros programas e intervención educativa del enfoque constructivista, es decir atendiendo las IP, CO, AA ,A entre Iguales, y de los mecanismos de regulación que aseguren el conocimiento consciente, se dotara al alumnado de responsabilidad, compromiso, cooperación, solidaridad, libertad, justicia, pensamiento crítico; ingredientes /valores básicos para conseguir la finalidad ultima que entendemos es:

“Educar personas que tengan capacidad para dar respuesta individual y colectivamente a los problemas medioambientales actuales o futuros, y no que se limiten únicamente a aplicar recetas”.



## **ENVIRONMENTAL AND SUSTAINABILITY EDUCATION IN A UNIVERSITY SETTING: OUTCOME ASSESSMENT**

**Thomas Bevins, Sharon Irish Bevins  
& Peg Gray-Vickrey**

### **Introduction**

The founding mission statement for Florida Gulf Coast University (FGCU) noted that “study of the environment” would be a central focus and that “student volunteer service” would complement the teaching and service missions of the university. These two concepts, ecological perspective and civic engagement, have become integral parts of the university’s identity and were reaffirmed when a new mission statement was adopted in December 2002. As further evidence of FGCU’s commitment to these critical concepts, it chose to focus its university-wide reaffirmation of accreditation activities in these areas.

This plan for self-assessment is known as the Quality Enhancement Plan (QEP). This five-year plan consists of assessing the extent to which graduates of FGCU have met the identified student learning outcomes in these areas.

The ultimate goal of FGCU’s Quality Enhancement Plan (QEP) is to improve student learning in two of the university’s Undergraduate Student Learning Outcomes, specifically 3 “An Ecological Perspective” and 9 “Community Awareness and Involvement”, by employing teaching and learning strategies that emphasize experiential learning, scholarly dialogue, and interdisciplinary engagement. It provides an opportunity to systematically evaluate student learning in these areas and develop strategies to refine curriculum and enhance student learning as part of an on-going plan of continuous improvement.

The proposed QEP builds on current university planning and evaluation strategies and benchmarking to develop assessment instruments and processes to systematically evaluate student learning.

Knowledge gained as a result of this systematic evaluation will be used to inform curricular and administrative decisions and practices. Although both topics are linked both in FGCU’s mission and curricular activities, the focus of today’s presentation is the assessment of the development of an ecological perspective through environmental and sustainability education. Goal 3 (Ecological perspective) of the Undergraduate Student Learning Goals and Outcomes is stated as follows: Know the issues related to economic, social and ecological sustainability. Analyse and evaluate ecological issues locally and globally. Participate in collaborative projects requiring awareness and/or analysis of ecological and environmental issues.

The Undergraduate Student Learning Goals and Outcomes are addressed in numerous courses and experiences throughout the undergraduate curriculum. For the purposes of the QEP, it was decided to limit the focus by addressing those experiences that fall within the intersection of:

- courses focusing on the environment and ecological perspectives;
- courses that incorporate service-learning as part of the academic experience.

It was further decided to narrow the scope of the QEP by focusing on the educational experiences provided in three required courses spread throughout the undergraduate curriculum

### **Environmental Education at FGCU**

An institutional commitment to make environmental education an integral part of the identity of the University evolved from the early and complex environmental history of FGCU. The university developed one course, IDS 3920 “University Colloquium: A Sustainable Future” (the Colloquium) as the focus of its instructional commitment to its environmental mission. The Colloquium is an upper-division course that all students take as a graduation requirement. The Colloquium examines the diversity of the local and global communities including cultural, social, political, economic, and ecological differences. It also examines ethical, historical, scientific, and health issues related to sustainability. Consistent with the guiding principle of interdisciplinary learning, faculty from all colleges are involved in the development and implementation of the course.

While beginning data suggest that this course provides a promising beginning for enhancing student learning in ecological perspective, new research in environmental education and in pedagogy suggest that one course alone, offered at the end of a student’s educational experience, may not be sufficient. The QEP offers an exciting opportunity to employ a developmental approach to the curriculum to enhance student learning in ecological perspectives throughout the undergraduate experience.

### **Discussion of Student Learning**

Faculty at FGCU consider experiential learning, interdisciplinary engagement and scholarly dialogue as fundamental to enhancing student learning. Past experiences are linked to current life experiences in order to develop meaning, construct new knowledge, and provide learners with the skills necessary for informed decision making and action.

Experiential learning offers a foundation for lifelong learning. Interdisciplinary engagement occurs when individuals from different disciplines strive for mutual understanding, knowledge, and awareness in pursuit of common goals and objectives; integration of knowledge and application and synthesis of ideas are encouraged, leading to the development of deeper un-

derstanding through critical thinking. Situations are provided that foster collegiality, reflections, and learning in a controlled and safe environment.

The QEP recognizes that diverse perspectives need to be presented to facilitate critical thinking, scholarly engagement, and learning. Scholarly dialogue occurs through a respectful exchange of ideas, based on research, from a variety of perspectives. It is a transactional discussion in which individuals work toward understanding by critically reflecting upon their own positions and those put forth by others.

While there has been increasing attention to environmental education in the literature, there is a noticeable absence of evidence-based studies, particularly in higher education. Interpretation and comparison of research findings are challenging because of the differences found in research methods, sampling, and focus. In spite of the presence of some conflicting findings in these studies and the difficulties associated with generalizing the findings of studies that use small, non-randomised samples, it is still possible to make the following conclusions regarding best practices in environmental education:

- Exposure to a single environmental literacy course can have profound impact on an individual's behaviour.
- Developing an environmental awareness requires that students examine the environment from more than one perspective.
- Team-based applied problem-solving in environmental studies provides students with the skills necessary to assess sustainability issues.
- Combining environmental education with in-field experiences facilitates student involvement in environmental activities and field research.
- Active participation during environmental education improves learning retention and fosters involvement in environmental activities.

### **Assessment of the Plan. Program Evaluation**

This is an objectives-oriented program evaluation based on two pre-existing student-learning outcomes of the University. A variety of techniques will be used to measure how well the students are achieving the stated objectives. Methods used to assess QEP Goals and Objectives are outlined in Table 4.1 of the QEP document found at <http://itech.fgcu.edu/sacs/QEP-2005.pdf>. The QEP evaluation plan outlines procedures for gathering, management, and evaluation of the data related to these measurements.

### **Student Learning Assessment Plan**

The QEP will conduct student testing with a nationally recognized "external" instrument: the Environmental Literacy and Citizenship Assessment Instrument (ELCAI). The ELCAI will be used to measure student learning in the area of ecological perspective (McKeown-Ice, 1997). It is recom-

mended that the instrument be given to incoming students, and then again prior to graduation to determine whether their environmental literacy and environmentally-responsible behaviours have changed during their time at the institution.

The evaluation plan will utilize triangulation of various external and internal, quantitative and qualitative measurement of student learning. The QEP will utilize internal, curriculum-specific tests, surveys, questionnaires, portfolio assessment of student work (including term papers, journals, and other products), and focus group interviews designed by FGCU faculty. Student work that cannot be scored by scanner will only be sampled for rubric-based data analysis. Student portfolio work will also be sampled for qualitative data analysis. In order to evaluate the temporal aspects of student learning, portfolio entries will be required on a regular basis throughout the semester in order to examine changes in knowledge, attitudes or skill over time. Evidence-based literature emphasizes that portfolios must include student reflection. A post-graduation survey will be developed to measure attitudes about ecological perspective and community involvement of our alumni.

## **Conclusion**

The ultimate goal of FGCU's Quality Enhancement Plan (QEP) is to improve student learning in ecological perspective and community involvement by employing teaching and learning strategies that emphasize experiential learning, scholarly dialogue, and interdisciplinary engagement. This topic has received strong support from all campus constituencies and is congruent with the FGCU Mission.

## **ENVIRONMENTAL EDUCATION, A MATTER OF QUALITY**

**Antonio Bossi**

*Education Office of WWF Italy*

*WWF Italia - Via Po, 25/c - 00198 Roma.*

*Tel: 06844971. Fax: 0685300612.*

*e-mail: soci@wwf.it. sito: www.wwf.it.*

*Ufficio Educazione Via Orseolo 1220144 Milano.*

*Tel: 02/831331 Diretto: 02/83133251 Fax: 02/83133222.*

*e-mail: educazione@wwf.it. sito: www.wwf.it*

The awareness of the close interdependence among economic development, environmental protection, social equity and education to environmentally compatible life styles, which are the bases of the programmes and the actions of sustainable development, is increasingly evident and established. By now, the features of the “key concepts” for an educational programme on sustainable development are almost settled:

- Environmental, social and economic dimension.
- Long-term view.
- Connections with the quality of life.
- Systemic approach to environmental issues.
- Integration of environmental policies with sectional policies.

In the last 30 years, the great educational aims and the cultural change, which are typical of the environmental education, have been emphasized in the documents of national and international conferences, starting from the conference of Rio in 1992. This conference introduced the necessity to revise the relation between man and nature that prevails in the western countries and is characterized by a view of the world, where man dominates nature, to pass to an outlook of the world, where the future of man is inseparable from the future of nature and environment. The human being is placed inside the system of relations, which characterize the environment.

Before the Conference of Rio, the Conference of Belgrade in 1975 pointed out the inspiring principles of the environmental education:

- The environmental education should consider the natural environment and the environment, which was created by man (ecological, economic, technological, social, legislative, cultural and aesthetic environments) as a whole.
- The environmental education should be a continuous process, which extends to the whole life, both in the school and outside the school.



- The environmental education should adopt an interdisciplinary method.
- The environmental education should emphasize the importance of an active participation in the prevention and solution of environmental problems.
- The environmental education should examine the principal environmental issues in a global perspective, while respecting regional differences.

These principles, which have been revised and completed during a thirty-year process of quality research, are still the basis of several documents, which attempt to describe the features of a high-quality project of environmental education.

In Italy, the conditions to clarify the principles and the features of the environmental education occurred during the 1990s, first with the publication of the “Indicators of Quality for the Environmental Education” (1991), then with the Charter of Fiuggi for the environmental education (1997).

- Concreteness and local significance (the value of near and tangible reality).
  - Educational innovation (the change toward a better achievement of the aims).
  - School/territory relation (the connection with the reference framework of activity).
  - Complexity (the way of thinking based on relations, the systemic approach).
  - Fieldwork (it promotes explorative situations and mentalities).
  - Transversality (the interdisciplinary approach).
  - Research/collectivity (the new teachers/student approach).
  - Change (the modification of behavioural styles).
  - Flexibility (the willingness to dispute one’s acquisitions).
  - Enhancement of differences (the methodological pluralism, the respect for divergences, the search for concordances).
- (Ammassari, M. & Palleschi, T.,1991).

Today, a large agreement about the principles and the theories, which make the environmental education the most important of the “Educations”, is evident; nevertheless the introduction of principles and methods into everyday life is still difficult. The large experience of our Association, which is in contact with thousand of students every day, leads us to some considerations. Through the environmental education, it is possible to live a total education to the environment, which develops mind and spirit as a whole. The environmental education cannot be separated from social and personal education; the attention and the respect for the environment cannot grow without the attention for oneself and the respect for the others. Therefore, some considerations about the “ethic values” are inevitable, on which an educational action that involves the people working with environmental education must be

based. These considerations must recall the general ethic, on which all the educational activity of the WWF is founded.

The basic value for all the other values is the awareness: awareness of ourselves, our environment, our duties, our rights, our needs, our limits, of the others, of the global and the local sphere. Another fundamental value is the personal responsibility, the willingness to be protagonists of a change and the feeling to be satisfied of having a positive role for the others. In addition to the awareness and the sense of responsibility, there is the sense of respect for ourselves and for our planet, for different people and their ideas (with the consequent attitude to intercultural relations), for our environment (nature and its sacredness), for the evolution of every form of existence opposite to conservation and immobility. To soften the “heaviness” of these strong values, we notice a pronounced tendency to critical sense, a sort of lightness, non-moralism and laicism in facing reality, and a certain amount of scepticism about the salvific philosophies and the simple and schematic solutions.

We notice also a pronounced curiosity for the physical and social environment and the ideas of the others, and consequently the determination to turn curiosity and exploration into the fundamental subjects of many educational proposals.

The curiosity is founded on the awareness of the complexity of existence and its irreducibility to simple models and classifications. The perception of this complexity is followed by the sense of limit, which is not understood as a reduction of the complexity but as the perception of the limitedness of reality and as an opportunity to experiment harmony and balance in the biophysics of ecosystems. Curiosity, listening and respect outline a non-competitive approach, which is open to sharing and cooperation and is able to face conflicts.

The non-competitive attitude and the sense of responsibility should lead to some behaviours that influence the private sphere:

- Looking for coherence between ideas and life experiences, between statements in favour of a “cleaner” environment and contradictory behaviours.
- Searching for simplicity and essentiality as key elements of the personal well being and the quality of the relations with our environment.
- Paying attention to the quality of relations, the respect of time, with a strong tendency to slow rhythm.
- Being sensible to the beauty of reality, with the consequent search for harmony and balance.

## **The basic ideas**

Now we are able to describe some interpretations and essential features to plan high-quality educational programmes:

- Sensibility. Helping individuals and communities to acquire sensibility and interest in the global vision of the environment and in the relevant issues.

- Competence. Helping individuals and communities to acquire a basic competence on the complexity of the environment, the relevant issues, the responsibility and the role played by the humankind.
- Helpfulness. Helping individuals and communities to acquire social values, deep feelings, helpfulness for the environment and motivation for an active participation in its protection and improvement.
- Capacity of evaluation. Helping individuals and communities to acquire the capacity of evaluating actions on the environment and for the protection of the environment from an ecological, economic, political, social, aesthetic and educational point of view.
- Participation. Helping individuals and communities to develop a sense of responsibility and urgency to ensure an adequate action to solve the environmental problems.

### **Environmental education and local community**

The greater capacity of organizing and planning in the field of environmental education faces various local realities every day and shows the possibility to become a real service for the local community. But the local community must be considered neither the community of the users, nor of the members of the territorial government and institutions. It must rather be considered the pattern of relations among different institutional and non-institutional subjects, and between these subjects and the physical environment, which make a territory rich, communicative and particular. Therefore, the organization of the systems, which promote programmes of environmental education, must be so flexible to encourage the creation of this territorial network. It is necessary to consolidate the sense of belonging and the common roots, to modify the meaning of the word “participation”, to act as a real factor of local development. In this way, the idea of education expands beyond the formal institutions, and involves even the great events of environmental participation and voluntary work of the citizens.

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## **EDUCAZIONE AMBIENTALE, UNA QUESTIONE DI QUALITÀ**

**Antonio Bossi**

*Ufficio Educazione WWF Italia*

*WWF Italia - Via Po, 25/c - 00198 Roma.*

*Tel: 06844971. Fax: 0685300612.*

*e-mail: soci@wwf.it. sito: www.wwf.it.*

*Ufficio Educazione Via Orseolo 1220144 Milano.*

*Tel: 02/831331 Diretto: 02/83133251 Fax: 02/83133222.*

*e-mail: educazione@wwf.it. sito: www.wwf.it*

È sempre più chiara e affermata la consapevolezza della stretta interdipendenza esistente tra sviluppo economico, salvaguardia dell'ambiente, equità sociale e formazione a stili di vita di ridotto impatto ambientale: i pilastri su cui poggiano i programmi e le azioni di sviluppo sostenibile. Sono ormai definite anche le caratteristiche, quasi dei "concetti chiave", entro le quali ci si muove quando si affronta un programma educativo sullo sviluppo sostenibile:

- Dimensione ambientale, sociale ed economica
- Visione di lungo periodo
- Connessioni con la qualità della vita
- Approccio sistemico ai problemi ambientali
- Integrazione delle politiche ambientali con le politiche settoriali.

Le grandi finalità formative e il cambiamento culturale propri dell'educazione ambientale sono state ribaditi negli ultimi trent'anni dai documenti elaborati nel corso di conferenze nazionali e internazionali, a partire dalla Conferenza di Rio del 1992, che introdusse la necessità di rivedere la relazione uomo-natura che domina l'Occidente, caratterizzata da una visione del mondo in cui l'uomo è dominante sulla natura, per passare a una visione che vede il futuro dell'uomo come parte inseparabile del futuro della natura e dell'ambiente. L'essere umano quindi, all'interno del sistema di relazioni che caratterizzano ogni ambiente.

Ancor prima di Rio, la Conferenza di Belgrado del 1975 mise in evidenza i principi ispiratori dell'educazione ambientale:

- L'educazione ambientale dovrebbe considerare nella sua globalità l'ambiente naturale e creato dall'uomo, ecologico, economico, tecnologico, sociale, legislativo, culturale ed estetico.
- L'educazione ambientale dovrebbe essere un processo continuo, esteso alla vita intera, tanto scolastica quanto extrascolastica.
- L'educazione ambientale dovrebbe adottare un metodo interdisciplinare.

- L'educazione ambientale dovrebbe sottolineare l'importanza di una partecipazione attiva alla prevenzione e alla soluzione dei problemi ambientali.
- L'educazione ambientale dovrebbe esaminare le principali problematiche ambientali in una prospettiva mondiale, pur rispettando le differenze regionali.

Tali principi, ripresi e completati durante un percorso di ricerca di qualità che durò un trentennio, sono ancora oggi alla base dei numerosi documenti che tentano di individuare le caratteristiche proprie di un progetto di educazione ambientale di qualità.

In Italia negli anni Novanta, prima con la pubblicazione degli "Indicatori di qualità per l'Educazione Ambientale" (1991), poi con la "Carta di Fiuggi per l'educazione Ambientale" (1997), si crearono le condizioni per chiarire principi e caratteristiche proprie dell'educazione all'ambiente.

- Concretezza e rilevanza locale (il valore del "vicino", del direttamente attingibile).
  - Innovazione educativa (il cambiamento rivolto a una migliore realizzazione degli obiettivi).
  - Rapporto scuola/territorio (il legame con il contesto di riferimento in cui opera).
  - Complessità (il pensare per relazioni, l'approccio sistemico).
  - Lavoro sul campo (favorisce situazioni e mentalità esplorative).
  - Trasversalità (l'approccio interdisciplinare).
  - Ricerca/insieme (nuovo rapporto docenti/allievo).
  - Cambiamento (modifica degli stili comportamentali).
  - Flessibilità (disponibilità a mettere di discussione le proprie acquisizioni).
  - Valorizzazione delle differenze (pluralismo metodologico, rispetto per le divergenze, ricerca di concordanze).
- (Ammassari, M. & Palleschi, T., 1991).

Oggi ci troviamo ad un punto in cui, se risulta ormai chiaro che c'è una notevole concordanza sui principi e sulle teorie che fanno dell'educazione ambientale la più importante delle "Educazioni", ci sono ancora difficoltà a calare principi e metodologie nella pratica quotidiana. La lunga esperienza della nostra Associazione, impegnata ogni giorno a contatto con migliaia di ragazzi, ci porta ad alcune riflessioni.

Attraverso l'educazione ambientale è possibile vivere un'educazione totale all'ambiente, che sviluppi cioè globalmente ogni persona nel corpo e nello spirito. L'educazione ambientale non può, infatti, essere scissa dall'educazione sociale e personale, e l'attenzione ed il rispetto per l'ambiente non possono aver luogo senza un'attenzione nei confronti di se stessi e il rispetto per gli altri. S'impongono quindi alcune riflessioni sui "valori etici" intorno ai quali impostare un'azione formativa che coinvolga chi opera

nell'educazione ambientale. E una simile riflessione non può che richiamarsi, più in generale, all'etica su cui poggia l'intera azione educativa del WWF.

Il valore attorno a cui ruotano tutti gli altri valori è quello della consapevolezza: consapevolezza di noi stessi, dell'ambiente che ci circonda, dei nostri doveri, dei nostri diritti, dei nostri bisogni, vedremo poi anche dei nostri limiti, consapevolezza degli altri, della sfera locale e di quella globale. Altro valore fondante è quello della responsabilità personale, con la percezione di voler essere attori di cambiamento e di sentirsi appagati nello svolgere un ruolo positivo rispetto agli altri. Conseguente alla consapevolezza ed al senso di responsabilità viene il senso di rispetto per noi stessi e per il pianeta che ci ospita, per il diverso e per le sue opinioni (con la conseguente predisposizione all'interculturalità), per ciò che ci circonda (la natura e la sua sacralità), per l'evoluzione delle cose in tutte le forme, in contrasto con la conservazione e la staticità.

A stemperare il “peso” di questi valori forti si legge però una spiccata vocazione al senso critico, una sorta di leggerezza, di non moralismo e di laicismo nell'affrontare le cose, unite ad una buona dose di scetticismo verso le filosofie salvifiche e le soluzioni facili e schematiche.

Va poi aggiunta una spiccata curiosità verso l'ambiente fisico e sociale e verso le altre opinioni, con la conseguente determinazione a fare della curiosità e dell'indagare l'argomento portante di molte proposte educative. La curiosità ha come base la consapevolezza della complessità dell'esistente e della sua irriducibilità ai modelli semplici e alle catalogazioni. La percezione della complessità si accompagna al senso del limite, non inteso come riduttivo della complessità ma come percezione della finitezza delle cose e come possibilità di sperimentare armonia ed equilibrio all'interno della biofisica degli ecosistemi. Curiosità, capacità di ascolto e rispetto delineano un approccio non competitivo, disponibile alla condivisione ed alla collaborazione, capace di affrontare i conflitti.

L'atteggiamento non competitivo ed il senso di responsabilità dovrebbero portare ad una serie di atteggiamenti che si riflettono sulla sfera privata:

- Cercare la coerenza fra idee e vissuto, fra dichiarazioni tutte a favore di un ambiente “più pulito” e comportamenti spesso contraddittori.
- Ricercare la semplicità e l'essenzialità come elementi chiave del benessere personale e della qualità delle nostre relazioni con ciò che ci circonda.
- Fare grande attenzione alla qualità delle relazioni ed al rispetto dei tempi, con una forte vocazione alla lentezza.
- Essere sensibili alla bellezza delle cose, con una conseguente ricerca dell'armonia e dell'equilibrio.

## **Su cosa puntare**

Ecco quindi delinearsi alcune chiavi di lettura e alcune caratteristiche essenziali per operare nella progettazione di percorsi educativi di qualità:

- Sensibilità. Aiutare singoli e comunità ad acquisire sensibilità e interesse per la globalità dell'ambiente e per i problemi ad esso correlati.
- Competenza. Aiutare singoli e comunità ad acquisire una competenza di base sulla complessità dell'ambiente, sui problemi ad esso connessi, sulla responsabilità e sul ruolo che l'umanità gioca al suo interno.
- Disponibilità. Aiutare singoli e comunità ad acquisire valori sociali, sentimenti profondi, disponibilità verso l'ambiente e motivazione per partecipare attivamente alla sua protezione e al suo miglioramento.
- Capacità di valutazione. Aiutare singoli e comunità ad acquisire le capacità di valutare gli interventi sull'ambiente e di tutela dell'ambiente, sotto il profilo ecologico, economico, politico, sociale, estetico e educativo.
- Partecipazione. Aiutare singoli e comunità a sviluppare un senso di responsabilità e di impellenza nell'assicurare un'azione adeguata alla risoluzione dei problemi ambientali.

### **Educazione ambientale e comunità locale**

L'accresciuta capacità organizzativa e progettuale nel campo dell'educazione ambientale si confronta ormai nel quotidiano con le più varie realtà locali, lasciando intravedere la possibilità di porsi come un vero e proprio servizio per la comunità locale. A condizione che per comunità locale non si intenda la comunità degli utenti né la rappresentanza istituzionale e amministrativa del territorio. Piuttosto il tessuto di rapporti tra soggetti diversi, istituzionali e non, e tra questi e l'ambiente fisico, che rendono un territorio ricco, comunicativo e particolare. Occorre perciò prevedere che l'organizzazione stessa dei sistemi che attivano programmi di educazione ambientale siano tanto flessibili da favorire la costruzione di questa rete territoriale. Rinsaldando il senso di appartenenza e le comuni radici, modificando il significato stesso della parola "partecipazione", operando davvero come un agente di sviluppo locale. In questa direzione è la nozione stessa di formazione che si allarga, al di là delle sedi formali, investendo anche le grandi occasioni di partecipazione e di volontariato ambientale dei cittadini.

### **Referenze bibliografiche**

Ammassari, M. & Palleschi, T. (1991). *Educazione ambientale, gli indicatori di qualità*. Milano: Franco Angeli.

## **PRESCHOOL CHILDREN KNOWLEDGE AND ATTITUDES ABOUT THEIR COMMUNITY ECOSYSTEMS: A STUDY CASE IN THE MEXICAN WEST**

**Cano Margarita<sup>6</sup>**

One of the main causes of the environmental crisis has its origins in attitudes and perceptions. Thus, the study of children knowledge and attitudes in the early years of schooling is crucial to develop environmental education programs at this level.

The aim of this study was to know how children from 5 years old perceive their community ecosystems: tropical dry forest (TDF) and marine ecosystem through the hydrological cycle. 21 children and two teachers were interviewed. An interpretative methodology was used and 7 tools were designed to evaluate children knowledge and attitudes.

Results show that 100% of children had empathy attitudes towards marine ecosystem and wide knowledge of its components. Contrary 92% of them showed a negative attitude and fear towards the TDF and they lack knowledge about it.

The results of this research could be used to design educative programs in the curricula to promote the development of positive attitudes towards TDF and to improve the knowledge about marine ecosystem in order to develop environmental awareness to allow the children to understand the relevance of ecosystems and their wellbeing for the community.

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6. Centro de Investigaciones en Ecosistemas, Universidad Nacional Autónoma de México. Morelia, México.





## **EDUCAZIONE LINGUISTICA PER LA SOSTENIBILITÀ AMBIENTALE**

**Natalia Andrea Gallo**

*Fondatrice della start up di impresa E-dioms  
(Ethics and Environment Languages)*

### **Introduzione**

Il presente lavoro rispecchia il percorso professionale e accademico della dott.a Natalia Gallo, che ha partecipato alla III edizione del WEEC, riportando la propria pluriennale esperienza di educatrice svolta in Argentina e ora ampliata e consolidata con un percorso di formazione professionale e universitario in Italia.

Il progetto “Educazione linguistica per la sostenibilità ambientale” rappresenta un esempio di come le *best practices* nell’ambito dell’educazione ambientale europea possono essere trasferite e validamente utilizzate al di fuori dei confini europei e, più precisamente, nei Paesi dell’America Latina.

### **Le premesse del progetto**

Le premesse del progetto “Educazione linguistica per la sostenibilità ambientale” sono legate alla diretta esperienza della dott.a Gallo nel campo di specifiche iniziative didattiche svolte nei distretti scolastici della Provincia di Buenos Aires. Tali iniziative, rivolte prevalentemente a bambini in età prescolare, (dai tre ai cinque anni) nell’arco temporale che va dal 1996 al 2001, erano basate sul tentativo di coinvolgere direttamente i giovanissimi partecipanti in attività ludiche e ricreative che evidenziassero l’importanza del contatto e della relazione con l’ambiente naturale (preparazione dell’orto organico, contatti con animali, realizzazione di giochi con carta riciclata, ecc.).

I risultati, pur soddisfacenti sia a livello di coinvolgimento dei bambini che delle relative famiglie, non mancarono di porre in evidenza alcune potenziali aree di miglioramento su cui si sarebbero potute investire risorse ed energie. In particolare, al termine di ogni iniziativa di educazione ambientale venivano rilevate varie criticità, tra cui è possibile ricordare:

- Esigenza di maggiore sensibilizzazione ambientale nei cittadini, nei bimbi e nei ragazzi attraverso la funzione di agenti moltiplicatori da parte dei soggetti più sensibili.
- Consapevolezza del lavoro interdisciplinare come strumento per stimolare uno sviluppo critico dei giovani sui temi ambientali.
- Richiesta di aiuto e contributi alle istituzioni locali e regionali per avviare delle iniziative su più larga scala.

- Necessità di aggiornamento da parte degli insegnanti sulle tematiche ambientali e sulla loro trattazione in altre regioni del mondo (importanza del fattore linguistico per avere accesso ad altre realtà).

E proprio sull'importanza del fattore linguistico come strumento di facilitazione delle comunicazioni internazionali si è concentrato lo sforzo della dott.a Gallo, una volta giunta in Europa e ottenuto il traguardo della laurea in Scienze della Mediazione Linguistica presso l'Università di Torino.

### **Dalla tesi di laurea allo sviluppo di una start up di impresa**

La conoscenza linguistica è un punto di partenza per promuovere attivamente e positivamente il *melting pot* di idee, attività e iniziative che caratterizza e caratterizzerà in grado crescente l'Europa e il resto del mondo.

Sulla base di quest'assunto, largamente condiviso a livello di politiche educative ed economiche in Europa, si è pensato di dare inizio allo sviluppo di un'iniziativa che mette le competenze linguistiche a disposizione dei temi della sostenibilità ambientale: è nato quindi un progetto di impresa denominato *E-dioms*, che costituisce la prosecuzione pratica dei concetti teorici illustrati nella tesi di laurea triennale della dott.a Gallo.

*E-dioms* fonda la propria filosofia sulla Mediazione Linguistica, intesa come processo culturale teso ad avvicinare interessi, iniziative, progetti e attività di individui, gruppi, comunità ed imprese che, pur geograficamente e culturalmente lontani, si sentono vicini nel perseguire quello che diviene sempre di più un imperativo del XXI secolo, ossia il percorso individuale e collettivo verso un nuovo modello di sviluppo, più equo e più sostenibile rispetto al passato.

Tale obiettivo ha rappresentato l'asse portante della tesi di laurea triennale della fondatrice di *E-dioms*, discussa presso la Facoltà di Scienze della Mediazione Linguistica nel novembre 2005. In tale occasione sono stati illustrati gli aspetti principali di un progetto linguistico volto a valorizzare gli strumenti della mediazione linguistica per sviluppare una nuova consapevolezza e una nuova sensibilità giovanile sui temi del risparmio energetico, quale leva individuale e collettiva per contribuire ai cambiamenti culturali, tecnologici ed economici imposti dalla recente entrata in vigore dal Protocollo di Kyoto.

Il lavoro, in particolare, ha evidenziato l'importanza della specificità del linguaggio ambientale quale strumento in continua evoluzione, su cui deve essere costruita una comune consapevolezza, un condiviso modo di conoscere ed apprendere con cui i più giovani, in Italia come in altre parti del mondo, possano cominciare ad individuare nuovi modelli di sostenibilità ambientale.

Varie e molteplici sono le tematiche oggetto di studio ambientale: effetto serra, inquinamento di aria, acqua e suolo, riduzione della biodiversità, gestione dei rifiuti, ecc.; quindi il carattere interdisciplinare in campo ambientale induce alla necessità di individuare un'ampia quantità di termini e

di concetti che debbono essere definiti e nominati allo scopo di poter scambiare informazioni e conoscenze. Si rivela quindi importante poter disporre di un'adeguata terminologia al fine di ottimizzare la comunicazione ambientale e, in particolare, le attività di traduzione, insegnamento e redazione di testi, dal momento che generalmente il *corpus* terminologico ambientale presenta una forte predominanza di prestito linguistico: deriva, infatti, da altre scienze (biologia, chimica, zoologia, ecc.), mentre un'altra significativa parte del suo lessico proviene dalla lingua comune.

A partire da queste premesse, il lavoro si è snodato attraverso le seguenti tappe principali:

- Una sintetica parte descrittiva che illustra il contesto, i contenuti e le finalità del Protocollo di Kyoto.
- Una descrizione dei più rilevanti effetti ambientali causati dai cambiamenti climatici, in corso in varie zone del mondo.
- La parte centrale ed essenziale della tesi, costituita dalla traduzione vera e propria dei contenuti di un'iniziativa di educazione ambientale avviata in Italia e potenzialmente trasferibile nei Paesi dell'America Latina: in particolare, la traduzione vera e propria si concentra sulla sintesi dell'iniziativa denominata "The Bet - La Scommessa" lanciata dall'Associazione "Gli Amici della Terra" della Toscana per sensibilizzare i ragazzi sulla necessità di ridurre i consumi energetici nell'ottica del Protocollo di Kyoto.
- La realizzazione di un "Glossario ambientale multilingue" (Italiano, Spagnolo, Portoghese), da intendersi come ulteriore parte di traduzione vera e propria: tale traduzione parte da 100 termini accessibili in ordine alfabetico in lingua italiana (testo fonte) e conduce ai rispettivi termini equivalenti in lingua spagnola e lingua portoghese (testi d'arrivo).
- Cenni e riferimenti ad altri strumenti linguistici nel campo dell'educazione ambientale, elaborati in contesti di ricerca italiani ed europei.

Tra le principali osservazioni emerse al termine del lavoro, la più importante riguarda sicuramente l'eterogeneità terminologica, ossia la natura non omogenea dei concetti ambientali prescelti ed inseriti nel glossario. Tale eterogeneità è riscontrabile in numerosi termini: si va da termini descritti in maniera molto scientifica (es. il benzene, il biossido di zolfo) a quelli descritti in maniera molto più divulgativa (es. ambiente, catena alimentare, ecosistema). Questa impostazione è stata voluta al fine di rendere evidente come le tematiche ambientali possano essere affrontate, analizzate e descritte a vari livelli, cioè dal più complesso al più elementare e viceversa, dal momento che ci si trova di fronte a una disciplina nuova che presenta una terminologia nuova, caratterizzata da neologismi, forestierismi, calchi semantici, oltre a essere vasta, intersemiotica e spesso diversificata nelle scelte traduttive degli stessi traduttori.

Una seconda osservazione riguarda gli aspetti di innovazione/sperimentazione di questo tipo di lavoro. L'idea di fondo è stata quella di adottare le competenze linguistiche maturate nel percorso universitario presso l'Università di Torino per riannodare i fili con una trascorsa esperienza di docente in un Paese dell'America Latina, l'Argentina.

In particolare, la scelta è stata quella di puntare sul potenziale trasferimento di buone pratiche di educazione ambientale dall'Italia e dall'Europa verso i Paesi dell'America Latina.

Tale approccio può aiutare a capire che l'educazione ambientale e le conoscenze linguistiche, se abbinate, sono in grado di determinare nei giovani un determinato processo di apprendimento, di conoscenza e di assimilazione di concetti sempre più universali, per poi manifestarsi in comportamenti e processi mentali capaci di giungere ad una migliore conoscenza dei rapporti esistenti tra uomo e natura, in Italia come in Argentina e in altri Paesi o regioni del mondo.

## **Conclusioni**

In quest'ottica è necessario che il lavoro di traduzione non sia e non sembri un episodio isolato, ma costituisca un primo passo di un progetto più ampio, chiaro e visibile, che dovrebbe interessare il coinvolgimento di un istituto scolastico del Brasile e/o dell'Argentina, il quale accetti di collaborare con un corrispettivo istituto scolastico italiano sui temi del Protocollo di Kyoto, che risulta essere un tema di costante attenzione politica anche in America Latina.

A tale proposito, è da menzionare il concreto intento di dare a questa tesi una continuità pratica mediante l'avvio di una *start up* di impresa che in questo momento sta muovendo i primi passi per realizzare gli accennati obiettivi di formazione ambientale attraverso gli strumenti di mediazione linguistica presso l'incubatore di impresa di Tecnopolis (Valenzano, BA).

E tale *start up* di impresa, affinché questa idea di trasferibilità di consolidati progetti di educazione ambientale dall'Europa verso l'America Latina assuma una valenza formativa significativa, intenderà puntare su strategie e metodologie che colgano due aspetti molto precisi:

- Le condizioni ambientali sono fortemente influenzate dai modelli economici e dagli stili di vita delle popolazioni.
- I provvedimenti legislativi non sono, da soli, sufficienti ad affrontare i problemi ambientali.

Per un approccio corretto occorre, quindi, una forte presa di coscienza da parte delle popolazioni, che si ottiene, anche e soprattutto, mediante una rivisitazione del "fare scuola", passando da una logica di impostazione degli argomenti che, anziché fondarsi principalmente sull'emergenza, sui recuperi e sui ripristini, prenda come nuova modalità di riferimento la prevenzione, nonché un ripensamento dell'attuale modello di sviluppo del nostro pianeta e delle nostre società.

È questo il presupposto di fondo su cui dovrebbero dialogare i ragazzi europei e quelli dell'America Latina, facendo della conoscenza linguistica un requisito indispensabile, che arricchisce e qualifica il sempre più importante percorso culturale dei giovani verso la sostenibilità ambientale.



## **WE CHILDREN AIM HIGH! - LARGE TOPICS OF THE FUTURE FOR CHILDREN IN THE ALPINE REGION**

**Gerhard Hornsteiner**

*Project Manager*

*gerhard@hornsteiner.com / hornsteiner@lgu.li*

*Environment Protection Society of the Principality of Liechtenstein LGU, Schaan*

### **Aims**

The pilot project “We children aim high! - Large topics of the future for children in the Alpine region” is designed to introduce themes affecting the future of the Alpine region to the younger population living there between the ages of 8 and 14. Themes which are highly specialised and complex but at the same time immensely important to the Alpine Regions future. These topics are essentially orientated around the policy tools of the Alpine Convention.

LGU aims toward a better understanding of the major challenges of the Alpine Convention by exploring the feasibility of developing an environmental education tool for children and accompanying persons in the open.

### **Rationale**

Due to the unique combination of biodiversity features, cultural landscapes, human activities and serious pressures, the governments of the Alpine countries and the European Union have developed an Alpine Convention and several thematic protocols. These policy tools are aimed at protecting the natural and socio-economic value of the Alps and ensuring sustainable development. They were signed by all parties and entered into force for those countries which have ratified it so far.

The huge increase in our knowledge of the Alpine system is blatantly contrasted by the increasing trend amongst younger people towards alienation from nature.

A more recent study in Austria reinforces this image and underlines the need for action: “Childhood today” means to grow up with abundance, but without social values that cherish a sustainable lifestyle and without the development of an awareness of global problems.



## **Objectives**

The objectives of the pilot project are: (i.) To find new ways in which the topics important for children can be prepared and experienced outdoors; (ii.) To prepare 10 thematically different routes in the Liechtenstein Alps using varying methods and then hike them with groups of children; (iii.) To prepare the routes in such a way as to make them applicable to other regions in the Alps; (iv.) To enable young people to view nature as integral to their personal development; (v.) To develop an understanding for human use of nature; (vi.) To encourage a responsible relationship with Nature and to sensitize young people to the Alpine countryside.

## **Innovative Factors, Steps, Timeline**

The pilot project is set to start at the beginning of March 2005. In the space of two years new methods and ways will be selected and tested in the Liechtenstein Alps that interpret the following Themes appropriately for children: (1) Conservation of nature and the countryside; (2) Development of Alpine landscape; (3) Soil conservation, water management and protection of the air quality; (4) Tourism and traffic; (5) Mountain farming and mountain forests; (6) Energy; (7) Climate change; (8) Competitive and co-operative behaviour in natural systems; (9) Biodiversity, selection and adjustment; (10) Mountains as a problem area.

Every theme will have its own exploring area or walking route. It is essential that this area is part of the children's everyday life rather than a highly uncommon spot. The youngsters have to solve exciting riddles and exercises – altogether or in small groups. The introduction of systemic exercises accompanied by analogous learn fields plays a key role in the transformation of these complex themes into comprehensible contexts. The unexpected results draw the attention to the real point of the topic. The aim is to get a creative process started where the children try to come up with their own ideas as what would be a good solution.

The final objective of the pilot project is to use the experiences gained to draw up a proposal for Alp-wide sustainable environmental education that can communicate the large amounts of knowledge that we have of the Alps in an accessible and suitable format.

## **Methods**

Methods for independent discovery and research or for group activities would be developed and tested in the Pilot project phase by introducing the methodology of analogous learning fields and systemic exercises. The methods are largely based on “Levels of nature education and nature meditation” (M. Kalff), “Methods of Flow Learning” (J. Cornell), and “Eco-social educational concepts and principles”.

The following questions will need to be answered: (i.) How can the children be involved? (ii.) How will they work it out? (iii.) What roles will the children take on? (iv.) What tasks do they have to perform?

## **Expected Results**

Discussions along the Theme paths: (i.) Further development of childrens' social abilities (in terms of team work); (ii.) Increase in subject knowledge and alternative viewpoints on theme; (iii.) Gain in competence in taking action and of organisational/creative skills as a result of the various methodologies used; (iv.) A renewed participation in the themes will trigger introspection and a joy in innovation.

Due to comparative environmental conditions and similar problem areas across the whole of the Alpine region it can be assumed that the results achieved on the routes in the Liechtenstein Alps will also be applicable to other regions.

## **Acknowledgments**

Many young people and teachers of various school types in Liechtenstein contributed with their participation, suggestions and feedbacks to the development of the pilot project.

I would like to express my sincere gratitude for financial support from the MAVA Foundation (Fondation MAVA pour la protection de la nature - Montricher/Switzerland). This pilot project probably would not have happened without the resources provided by the foundation and I appreciate the general as well as financial support that we received from them.



## **IS IT POSSIBLE TO EVALUATE ENVIRONMENTAL COMPETENCIES? ICAM – A NATIONAL STUDY FOR THE EVALUATION OF ENVIRONMENTAL COMPETENCIES**

**Michela Mayer & Francesco Paglino**

*INVALSI – National Institute for the Evaluation of the Education System*

*Villa Falconieri, via Borromini 48 - 00044 Frascati (Roma)*

*email: icam@invalsi.it ; mmayer@invalsi.it*

*sito web: www.invalsi.it*

### **The context**

The ICAM project (2000-2002)<sup>7</sup> springs from the need for competencies linked to themes of **sustainable development** (at the environmental, economic, social and cultural level), meant as the “qualitative and lasting improvement not only of the relations between man and his environment, but also of relations between men”.

Calling these competencies “environmental competencies” is based on a broader view of the environment and of environmental education, in line with what has been stressed in many international and national conferences, and with what continues to be found in international documents such as the one presented by UNESCO to inaugurate the Decade of Education for Sustainable Development (2004).

Within studies in the evaluation field, INValSI has found that, for environmental issues, there is currently an abundance of questionnaires aiming to assess student attitudes, behaviours and interests, but very few studies aim at first defining and then surveying competencies that environmental education should more specifically contribute to build.

If we think that the real change proposed by environmental education is that of moving towards a culture of complexity and towards a view of knowledge that integrates values, rationality and critical evaluation, then we should define these new competencies, which cut across traditional disciplines, and study their learning.

The study carried out in Italy by INValSI, as the National Institute for the Evaluation of the Education System, is a first attempt at national and

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7. The ICAM study was coordinated at the INValSI by Michela Mayer and involved the following researchers: Giorgio Asquini, Alessandra Battaglini, Gianfranca Carotti and Francesco Paglino. The following also took part in the work group as experts: Antonio Aiello, Maria Arcà, Donatella Cesareni and Giorgio Salza.

international level to provide this definition and adds a new element to the debate in the world of environmental education.

## Competencies and concept clusters

The competencies that the study proposed to examine are called **strategic** (because they can be applied, and observed, in many contexts) and **extensive** (in that their applications belong to various spheres, not necessarily disciplinary ones but corresponding to the reality of facts and environmental problems), and thus call for knowledge and competencies relating to various disciplines and to various sectors of everyday life.

Proposing evaluation tools for this type of competencies has the value of “acknowledging” what the Italian school system already does, by removing environmental education from the ghetto of optional and voluntary work or of a “non-evaluative” project in terms of school results, and proposing a tool for reflection and orientation on what is proposed and experimented.

The Scientific Committee<sup>8</sup> set up by INVAlSI thus tried to establish the key concepts (or, rather, clusters of correlated concepts) of a culture of complexity and sustainable development, which were used as a basis for the research:

- *The structure connecting all living things to each other and to the planet:* knowing how to grasp relations and to recognise both the consequences, at local level, of global transformations, and also the distant and global effects of local actions.
- *A developmental view of natural and social processes:* understanding the difference between laws – both deterministic and predictive ones – and bonds within which a variety of processes is always possible; understanding also the importance of diversity and overabundance of paths and solutions for a selection – partly always random – of possibilities for the future.
- *An awareness of the limits* – of resources, of the time necessary to carry out biological cycles, and of the possibilities of the human mind – together with an awareness of the *unpredictability* of complex natural and social systems, and of the *risk* associated with each of our actions or non-actions.

The tests constructed for the evaluation of environmental competencies thus concern the use of one or more of the established concepts, within themes considered to be significant for environmental education, and are subject to two further **classifications**: one in disciplinary terms, extending their use, above all, within upper secondary schools, and one in terms of the cross-curriculum competencies and cognitive processes used in answering.

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8. The scientific committee of the ICAM study is composed of Marcello Cini, Saul Megh-nagi, Alfredo Milanaccio, Michele Pellerey, Vittorio Silvestrini and Boris Zobel.

In this way, the tests are also meaningful for those schools that do not propose explicit environmental education programmes and which can contribute to encouraging reflection for reviewing each discipline in the light of the sustainable development theme.

Thus, the study tried to assess the competencies necessary to deal with the themes of sustainable development:

1. Within contexts linked to phenomena or information present in daily life, distinguishing between phenomena and information concerning the “*common good*”, i.e. the earth’s resources, and phenomena and information concerning individual life decisions, the “*quality of life*” and “*well-being*”.
2. By grouping them around clusters of concepts – *interdependence, developmental processes, limits and unpredictability*, illustrated above.
3. Distinguishing between cognitive processes concerning the *understanding* of terms and contexts in which problems are posed, processes concerning the *analysis* and *evaluation* of information – both in terms of clarity and reliability of the information itself and also in terms of the identification of value choices underlying communication – to arrive at processes concerning *decision-making* or personal positions, also in conditions of uncertainty or of an incomplete definition of the problem.

## **Research phases**

A workgroup composed of experts and teachers constructed the tests and items for four different school levels (4<sup>th</sup> year primary school, 1<sup>st</sup> year lower secondary school, 3<sup>rd</sup> year lower secondary school, and 2<sup>nd</sup> and 5<sup>th</sup> year upper secondary school).

The main problem was that of having to evaluate competencies without being able to rely on a common curriculum, and thus on a corpus of knowledge shared by all students of the same school level. That is why (following the model used in the PISA – *Project of International Students Assessment* – international studies), all the item questions were preceded by a text, often taken from newspapers or textbooks, that placed the problem in perspective and provided the necessary information. The hypothesis is that most knowledge is not necessarily provided by school but by the family, friends or the media, and that schools – and the activities which many schools propose for environmental education – may have provided the competencies for using this information in an autonomous and critical way.

After a pilot administration (November 2000) on about 650 students for each school level, in order to assess the validity of a first batch of items,

the more effective tests and items were then selected and the internal consistency of the study was improved<sup>9</sup>.

In the end, the students of each school level in the study were provided with 4 booklets, each one containing 5-6 tests (from 25 to 40 items, envisaging both closed and open answer questions). May 2001 saw test administration on a national sample of about 20,000 students, including a particular sub-sample concerning the Tuscany region, on specific request of that region's authorities.

Since actions in the environmental field do not correspond to a merely cognitive structuring of reality, but also to an emotional and affective one, the following questionnaires were also given in order to study the connection between attitudes and competencies, and to compare and contrast all this with the real curriculum implemented by schools:

- A **student questionnaire** as well as an **attitude questionnaire** divided into 4 scales and of increasing complexity with student age.
- A **teacher's questionnaire**, in order to collect information on the relationship between educational offering and students' environmental competencies and to describe the state of environmental education in Italian schools.

## Conclusions

The ICAM study, on the one hand, aimed to provide all those interested in environmental education with a description of the national situation, both as regards school actions and as regards the skills gained by students; on the other, ICAM also wished to provide elements for reflection on the effectiveness of schools in integrating their curriculum with everyday life information and knowledge, and generally on the possibility of innovating curricula and educational practices in the direction of a culture of complexity and of sustainable development.

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9. The organization of the national survey and data analysis were coordinated by prof. Anna Maria Caputo, Invalsi responsible for the Servizio Rilevazioni di Sistema.

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## QUALITY CRITERIA FOR ENVIRONMENTAL EDUCATION CENTRES IN EUROPE

**Michela Mayer, Francesco Paglino,  
Paolo Tamburini , Stefania Bertolini**

*Service for Communication, Environmental Education  
and Local Agenda 21, Regione Emilia Romagna,  
Department of Agriculture, Environment and Sustainable Development  
Directorate General for the Environment  
and for Ground and Coastal Defence.  
[www.regione.emilia-romagna.it/infea](http://www.regione.emilia-romagna.it/infea) - [eecquality@tiscali.it](mailto:eecquality@tiscali.it)*

### The research project on Quality in Europe

The **EECQuality** research project, funded by the Emilia Romagna regional authorities through the INFEA 2002/04 programme and coordinated by the CEA-A21 Service, is part of a process for the construction and qualification of the “Regional Environmental Education System”, which is geared to strengthening and organising all the regional experiences gained on the matter.

A key role in the system is given to the EECs and a first indication of the necessary requirements for joining the network was given in the document *Criteria and Requirements for Suitability for the Environmental Education Centres*, and this research project aimed to provide further elements for reflection, starting from a comparison at European and overall international level and from a theoretical foundation.

### Research aims

The aim of the research project was thus that of:

- Establishing, at European level, a *methodological and conceptual frame of reference* for EEC quality indicators consistent with the EE idea proposed by Emilia Romagna INFEA Regional System.
- Selecting and documenting examples of *good practices of Environmental Education in Europe*, as the terrain for in-depth study and co-training for the EECs of the Emilia Romagna Region.

The research project thus focused on the following, often interlinked, actions:

1. Documentary and bibliographical research into the systems of “quality indicators” used in the educational field in various European and non-European countries.
2. Research into the proposals and experimentations on quality indicators or criteria, used explicitly for the evaluation (and self-evaluation) of EECs.
3. Survey of the good practices of particularly significant EECs in various European countries and recognised for their “good quality”.
4. Survey, through a questionnaire and, where possible, through interviews and on-site observations, of the “implicit or explicit” indicators inside the EECs assessed.
5. Systematic arrangement of the information, analyses and comparison of the EE experiences, for a proposal consistent with the EE idea and with the experiences of the Emilia Romagna Region.

### **Quality Indicators in Education and in Environmental Education**

Considering that the field of enquiry is very broad and relatively new, above all in Europe, the challenge was that of finding criteria or indicators for an evaluation, and self-evaluation, system in line with EE principles, used not only for “**quality control**” but also for “**a development of quality**”.

In this light, evaluation is not meant as judgement but as an “attribution of value” in order to “recognise problems as they arise”, that does not overlook the **values** guiding organisations, actions and educational practices, but indeed takes on the task of comparing them, of accepting that different priorities and interests do exist, and of having as an aim not that of eliminating diversities but of making them coexist in order to grow together.

Evaluation in the EE field cannot thus be divorced from a reflection on the paradigms and theories either explicitly or implicitly guiding its practice, in the search for consistency between what is preached in the educational field and the methodologies, tools and actions used in the evaluation field.

A system of indicators for this kind of evaluation cannot thus be used as a tool for excluding and selecting, but as a **map** in order to help recognise where each EEC or each project lies within a shared qualitative horizon. In this sense, it is an instrument in the hands of each EEC to define its own profile, to clearly state its own representations, and to argue its own chosen.

### **Scenarios and quality indicators for EECs at European level.**

Despite the ever spreading initiatives and the presence of specialised journals in many countries, the evaluation issue is still either anchored to the past or confined to the field of best practices.

There is thus an emerging interest for the quality of EECs, above all, in Spain, followed by (Walloon) Belgium, Germany, Hungary, France and Britain.

**Spain** was the first country to try and promote actions and studies at national level as regards the quality of its own centres, starting from the *White Book for Environmental Education*, which recommends the autonomous communities to “*promote the accreditation and control of quality*” of environmental education centres.

In **Belgium**, the **Walloon Region** set up a network of **CRIE** – *Centres Régionaux d'Initiation à l'Environnement*. More than the characteristics of the centres, what are defined are the “skills” that the centres should help to develop in users.

In **Germany**, the **ANU** – *Arbeitsgemeinschaft Natur und Umweltbildung* – is an “umbrella” association gathering together local associations and centres that answer to all the various Landers and is also linked to institutions and centres in other countries – particularly Austria.

**Britain** has a consolidated tradition of networks of EECs generally linked to foundations, enterprises and associations. The discussion on quality is essentially carried on within these networks, such as the *National Grid Trasco*, *Field Study Council* or *National Association of Field Study Officers (NAFSO)*.

In **France**, EE can count on a large group of centres and associations linked, above all, at regional level, and on a widespread educational and epistemological debate. We can cite national associations such as *Ecole et nature* or the **CFEE** – *Collectif français pour l'éducation à l'environnement*, which connect various centres and associations, or the **GRAINE** – *Groupe Régional d'Animation et d'Initiation à la Nature et l'Environnement*, which is widespread throughout the country in regional coordination centres.

In **eastern European countries**, EECs are still not very widespread although some support for their creation and development comes from the **REC** (Regional Environmental Centre for Central and Eastern Europe), an international organisation set up in 1990 with the contribution of the USA, the European Commission and Hungary, which hosts the head office.

In Hungary has also been set up a national agency of the Ministry of Education – the **EECPO (Environmental Education and Communication Programme Office)**, with funding from the Education and Environment ministries.

In the **Nordic countries**, the spreading of EE in schools and in the population does not seem to be accompanied by a reflection on the quality of EECs, which do exist but are generally strongly linked to the presence of protected nature areas, “*nature schools*”, and activities of “*naturalistic interpretation*”, often run by forestry personnel specialised in effective communication in the ecological field and in nature protection.

In **Greece**, a network of centres has been developed since 1993 on the initiative of the Ministry of Education with European Union support. The 24 centres envisaged, located in the various regions, are municipal property and have staff seconded from schools. The activities with schools have largely Community funding.

The research project ended by gathering together the indicators or criteria found in the field, and which are in line with a socio-critical evalua-

tion paradigm, in order to construct a list of possible indicators as a starting basis for the regional system of Emilia Romagna – a list that must then be interpreted and completed with the actors concerned.

The indicators have been divided into three broad spheres suggested by the overall analysis:

1. The **structures**, their management and their consistency (as regards building construction, landscaping, ecological and educational factors) with the principles of education for sustainable development.
2. The **organisation running them**, its scientific, educational and management skills, its capacity to learn from experience and to work in partnership with others.
3. The centre's **educational mission**, its project, the implementation modalities and methodologies, the functions (of participation, research, networking ...) characterising it and that are considered fundamental for the success of initiatives.

The summary report, available on the CD ROM entitled “Quality Criteria for Environmental Education Centres in Europe”, **does not purport to be representative** of all the indicators and clues possible, **and does not constitute a complete proposal** of indicators to be considered necessary and relevant, but only tries to offer a list of all the suggestions that we have actually collected in this survey and which, in our view, may be used within a socio-critical paradigm.

The CD also contains profiles on 44 European centres, (EECs, agencies and networks) which cooperated in the research project and which appeared particularly significant for illustrating the analysis carried out.

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## CRITERI DI QUALITÀ PER I CENTRI DI EDUCAZIONE AMBIENTALE (CEA) IN EUROPA

**Michela Mayer, Francesco Paglino,  
Paolo Tamburini, Stefania Bertolini**

*Servizio Comunicazione, Educazione Ambientale  
e Agenda 21 Locale, Regione Emilia Romagna,  
Assessorato Agricoltura, Ambiente e Sviluppo Sostenibile  
Direzione Generale Ambiente e Difesa del Suolo e della Costa.  
[www.regione.emilia-romagna.it/infea](http://www.regione.emilia-romagna.it/infea) - [eecquality@tiscali.it](mailto:eecquality@tiscali.it)*

### Il progetto di ricerca sulla Qualità in Europa

La ricerca **EEC Quality** finanziata dalla Regione Emilia Romagna (RER) attraverso il programma INFEA 2002/04 e coordinato dal Servizio CEA-A21, fa parte del percorso di costruzione e qualificazione del “*Sistema Regionale di EA*”, volto a rafforzare e organizzare l’insieme delle esperienze regionali.

Un ruolo molto importante nel sistema è appunto assegnato ai CEA e una prima indicazione dei requisiti di idoneità necessari per poter entrare a far parte della Rete è stata data nel documento “*Criteri e requisiti di idoneità per i Centri di Educazione Ambientale*” e questa ricerca ha inteso offrire ulteriori elementi con i quali confrontarsi, partendo da un confronto a livello europeo e internazionale e da una fondazione teorica.

### Obiettivo della ricerca

L’obiettivo del progetto di ricerca è stato quindi quello di:

- Individuare in ambito europeo ***un quadro di riferimento, metodologico e concettuale***, per indicatori di qualità per i CEA coerenti con l’idea di EA proposta dal sistema INFEA Emilia Romagna;
- Selezionare e documentare esempi di ***good practice di Educazione Ambientale in Europa*** quale terreno di approfondimento e co-formazione per i Centri di Educazione Ambientale dell’Emilia Romagna.

La ricerca si è articolata di conseguenza nelle seguenti azioni, intrecciate spesso tra loro:

1. Ricerca documentaria e bibliografica sui sistemi di “indicatori di qualità” utilizzati in diversi paesi, Europei e non.
2. Ricerca sulle proposte e le sperimentazioni di indicatori o di criteri di qualità, utilizzati esplicitamente per la valutazione (e l’autovalutazione) di CEA.

3. Ricognizione di “*good practices*” relative a CEA particolarmente significativi in diverse nazioni Europee e conosciuti per la loro “*buona qualità*”.
4. Indagine attraverso un questionario, interviste e osservazioni in loco, degli indicatori “*impliciti o espliciti*” utilizzati all’interno dei CEA individuati.
5. Sistematizzazione delle informazioni, analisi e comparazione delle esperienze, per una proposta coerente con l’idea di EA e con le esperienze proprie della Regione Emilia Romagna.

## **Indicatori di Qualità nell’Educazione e nell’Educazione Ambientale**

Premesso che il campo di indagine è molto ampio e relativamente nuovo, soprattutto in Europa, la sfida è stata quella di trovare criteri o indicatori per un sistema di valutazione, e autovalutazione, coerente con i principi dell’educazione ambientale, utilizzabile non solo per un “**controllo di qualità**” ma anche per “**uno sviluppo della qualità**”.

In questa ottica, la valutazione non è intesa come giudizio ma come un “**dare valore**”, per “**riconoscere i problemi al loro nascere**”, che non prescinde dai **valori** che guidano le organizzazioni, le azioni, le pratiche educative, ma anzi si assume il compito di metterli a confronto, di accettare che esistano priorità e interessi diversi, di avere come obiettivo quello non di eliminare le diversità ma di farle convivere per crescere assieme.

La valutazione nel campo dell’educazione ambientale non può prescindere quindi da una riflessione sui paradigmi e le teorie che esplicitamente o implicitamente ne guidano la pratica, alla ricerca di una coerenza tra quanto si va predicando in campo educativo e le metodologie, gli strumenti, le azioni che si utilizzano in campo valutativo.

Un Sistema di indicatori coerente con questo tipo di valutazione quindi non può allora essere utilizzato come uno strumento per escludere, per selezionare, ma come una **mappa** che aiuta a riconoscere dove ogni Centro o ogni progetto si colloca rispetto ad un orizzonte qualitativo condiviso. In questo senso è uno strumento in mano a ciascun CEA per definire il proprio profilo, per esplicitare le proprie rappresentazioni, per argomentare le proprie scelte.

## **Scenari e indicatori di Qualità per i CEA a livello europeo.**

Nonostante la sempre maggiore diffusione delle iniziative e la presenza in molte nazioni di riviste specializzate, il tema della valutazione rimane però ancora o ancorato al passato o confinato nel campo delle “*buone pratiche*”.

In Europa emerge un interesse per la qualità dei CEA soprattutto in Spagna, seguita dal Belgio francese, dalla Germania, dall’Ungheria, dalla Francia e dall’Inghilterra.



La **Spagna** è la nazione che per prima ha cercato di promuovere a livello nazionale azioni e ricerche relative alla qualità dei propri Centri, a partire dal *Libro bianco per l'educazione ambientale* in cui si raccomanda alle Comunità autonome di “*promuovere l'accreditamento e il controllo di qualità*” dei Centri di educazione ambientale.

In **Belgio**, la **Regione Vallone** ha dato vita ad una rete di **CRIE** – *Centres Regionaux d'Initiation à l'Environnement*. Più che le caratteristiche dei Centri, vengono definite le “*capacità*” che i Centri dovrebbero aiutare a sviluppare negli utenti.

In **Germania** l'**ANU** – *Arbeitsgemeinschaft Natur und Umweltbildung* – è un'associazione “ombrello” che raccoglie associazioni locali e Centri che fanno capo a tutti i diversi Lander ed è collegata anche ad istituzioni e Centri in altri paesi, in particolare in Austria.

L'**Inghilterra** dispone di una tradizione consolidata di reti di Centri di educazione ambientale, in genere legati a fondazioni, imprese ed associazioni. Il dibattito sulla qualità avviene essenzialmente all'interno di questi network, come ad esempio il *National Grid Trasco* o *National Association of Field Study Officers* (**NAFSO**).

In **Francia** l'educazione ambientale può contare su un folto gruppo di Centri e Associazioni, collegati soprattutto a livello regionale, e su un dibattito educativo ed epistemologico diffuso. Citiamo ad esempio associazioni nazionali come “**Ecole et nature**” o il **CFEE** – *Collectif français pour l'éducation à l'environnement* - che connettono vari centri ed associazioni, o il **GRAINE** - *Groupe Régional d'Animation et d'Initiation à la Nature et l'Environnement* – diffuso in tutto il Paese in coordinamenti regionali.

Nei **paesi dell'Est** i Centri di Educazione Ambientale sono ancora poco diffusi, anche se un supporto alla loro costituzione e sviluppo viene dal **REC**, il Regional Environmental Centre for Central and Eastern Europe, organizzazione internazionale costituita nel 1990 con l'apporto degli Stati Uniti, la Commissione Europea e l'Ungheria, in cui ha la sede principale.

In Ungheria è stata anche costituita una Agenzia nazionale del Ministero dell'Educazione – l'**EECPO**, **Environmental Education and Communication Programme Office** – con finanziamenti dai Ministeri dell'Educazione e dell'Ambiente, con compiti di valutazione della qualità.

Nei **paesi nordici** ad un'ampia diffusione dell'educazione ambientale nelle scuole e nella popolazione non sembra corrispondere una riflessione sulla qualità dei Centri, che pure esistono ma sono in genere fortemente legati alla presenza di aree naturali protette, a “*scuole di natura*” e ad attività di “*interpretazione naturalistica*”, spesso gestite da personale forestale specializzato in comunicazione efficace in campo ecologico e di protezione della natura.

In **Grecia** infine un network di Centri è stato realizzato a partire dal 1993 per iniziativa del Ministero dell'Educazione, con il sostegno dell'Unione Europea. I Centri previsti sono 24, diffusi nelle varie regioni, le strutture sono di proprietà della municipalità, vi lavora personale comandato dalla

scuola, e le attività con le scuole sono in gran parte finanziate con fondi comunitari.

La ricerca ha dunque permesso una raccolta di quegli indicatori o criteri rilevati sul campo, e che risultano coerenti con un paradigma valutativo socio-critico (Flogaitis e Liriakou, 2000), per costruire un elenco di possibili indicatori quale base di partenza per il sistema regionale dell'Emilia Romagna, elenco che andrà poi interpretato e completato con gli attori coinvolti.

Gli indicatori sono stati suddivisi nelle tre grandi aree suggerite dall'analisi complessiva:

1. Le **strutture**, la loro gestione e la loro coerenza (edilizia, paesaggistica, ecologica, educativa) con i principi dell'educazione alla sostenibilità.
2. L'**organizzazione che le gestisce**, le sue competenze scientifiche, educative, gestionali, la sua capacità di apprendere dall'esperienza, la capacità di lavorare in partenariato.
3. La **missione educativa** del Centro, il suo progetto, le modalità e le metodologie di realizzazione, le funzioni (di partecipazione, ricerca, lavoro in rete...) che lo caratterizzano e che vengono considerate fondamentali per il successo delle iniziative.

Il rapporto sintetico della ricerca, disponibile sul CD Rom "Criteri di Qualità per i Centri di Educazione Ambientale in Europa", **non vuole essere rappresentativo** di tutti gli indicatori e gli indizi possibili, **e non costituisce una proposta completa** di indicatori da considerare necessari e rilevanti, ma cerca solo di offrire un elenco di tutti i suggerimenti che abbiamo effettivamente raccolto in questa indagine, e che a nostro avviso può essere utilizzato all'interno di un paradigma socio-critico.

Il CD contiene inoltre 44 schede descrittive di altrettanti Centri europei (CEA, Agenzie, Network) che hanno collaborato alla ricerca e che sono apparsi particolarmente significativi per illustrare l'analisi effettuata.

### **Riferimenti bibliografici**

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# **CONTRIBUTION OF THE PHILOSOPHY OF SCIENCE TO ENVIRONMENTAL MANAGEMENT: A CASE STUDY IN VILA DOIS RIOS, ILHA GRANDE, RJ/BRAZIL.**

**Elza Maria Neffa Vieira de Castro  
Fátima Teresa Braga Branquinho  
Marilene de Sá Cadei**

*Universidade do Estado do Rio de Janeiro*

**Key words:** Philosophy of Science, Hydrologic Resources, Socio-environmental Practices, Environmental Health.

## **Introduction.**

This essay intends to demonstrate the importance of the concepts of complexity (Morin, 2001), socio-technical networks (Latour, 1992) and emancipatory knowledge (Santos, 2001) to the training of organic intellectuals (Gramsci, 1979) and the promotion of integrated actions in hydrographic basins with socio-environmental problems. Therefore, the contribution of the above concepts to the education of local actors capable of facing the challenges of environmental management will be strongly emphasized. The sustainability of complex systems such as hydrographic micro-basis requires of social actors a new mindset in which interdisciplinary, inter-institutional and interactive actions between public authorities and civil society play a central role. Environmental sustainability calls for an integrated management capable of solving conflicts and promoting participation and cooperation among social actors. The prevailing social practices of visitors, professors, students, UERJ employees and residents of Vila Dois Rios result from a fragmented approach to nature and society with limited, rigid ways of thinking which tend to view scientific facts out of context. The result of this study is a proposal for environmental education based on the philosophy of science in which techno scientific knowledge and construction of local diagnoses combine to produce a collective praxis committed to environmental sustainability.

## **Vila Dois Rios: social practices and hydrologic resources.**

Vila Dois Rios is named after the Barra Pequena and Barra Grande streams that flow from the Mãe D' Água cascade wherefrom water to the village is supplied. The physical space where social life takes place underwent different occupational patterns through time: Indian village, slave reception farm, Royal Crown estate, Federal Government property, penal col-

ony and university campus. As water supply to the village is tapped from Mãe D' Água cascade, village people do not show any specific concern over conservation of this natural resource, using it heedless of a possible water shortage in the village. When asked about the reasons for such a careless behaviour a village teenager replied: "Even if we don't use it, it'll flow to the sea anyway...there's so much water! What difference does it make?" No matter how often the Center for Environmental Education and Sustainable Development - CEADS tries to instruct people on adequate domestic waste disposal ways, part of it ends up near Barra Pequena's right bank or behind the old prison's ruins wherefrom it's eventually carried down to the riverbed of nearby streams by wind or rain. Although a comprehensive environmental impact study of these practices has never been made, studies undertaken in similar contexts and local direct observation records point summarily to the following negative impacts: reduction of water flow from the sources of the streams; reduction of the riparian vegetation at some points of the banks of the Barra Grande and Barra Pequena; pollution of superficial and underground water bodies; alteration of aquatic flora and fauna; proliferation of mosquitoes and other disease vectors; increased risk of acquiring water born diseases.

### **Participative management of hydrologic resources: an educational solution for sustainability.**

The environmental management of hydrographic basins is one of the most effective tools available for bringing about transformation in a given socio-environmental scenario, mainly with techno scientific and politico-institutional aspects embodied in a participative management process with decentralized decision-making. Hydrographic basins, as environmental systems, are the best work entities because its limits and problems are easily visualized by local residents. The hydrographic basin, considered as a system made up of different environmental units in diverse conservation or degradation stages, assumed as space for study and social intervention, allows an integrated vision of the biotic, abiotic, socio-economic and institutional aspects, given the function of water as a link between elements of the natural environment and anthropic activities, its quality and quantity being a measure of the way environmental resources are managed (Castro, 2002). Furthermore, in accordance with the concept of socio technical network (Latour, 1994), the complexity of this system and its multidisciplinary nature require the involvement of many state and city level authorities as well as the civil society. The identification of degradation factors as well as the "interplay of forces" and the set of rules and relationships that support it allow the integration of political and cultural identities of the population to administrative actions in an institutional arrangement wherein participant's values are constantly reappraised and measures of environmental management incorporated. The commitment of social actors with an ethic of solidarity with the sustainability of ecosystems is a precondition to the recovery process in

hydrographic micro-basins through alternative, non-predatory actions, to be disseminated by Environmental Education. The intervention of inhabitants as well as influential outside people in this geographic space requires the knowledge of relevant politico-economic and socio-cultural aspects and the planning of integrated actions. According to Prigogine (1998), in dissipative systems, the larger the number of interacting elements, the larger the possibilities of instability. Very complex systems are always threatened by events, fluctuations and instabilities that thwart its potential for integration. This concept can be very useful in the case of the Ilha Grande hydrographic basin, for example, where transformations following the Atlantic Rainforest devastation and disorganized human occupation pose questions such as: which mechanisms can upset those systems? Which systems manage to resist and overcome perturbations? The notion of “socio technical network” can be usefully applied when it comes to combining technical knowledge to exercise of power. In this sense, implementation of the concept of a “shared socio-environmental agenda” can contribute to a more democratic vision as regards the environment, public health and the power exerted by techno scientific knowledge in a class society, paving the way for an environmental epistemology wherein different cultures can dialogue and re-signify their senses of living and acting politically. Building up a socio-environmental agenda involves the empowerment of social actors in more horizontal power relationships. In the action research methodology students, residents, municipal authorities and community leaderships are involved in participatory planning and environmental education actions that foster solidarity and new forms of individual and collective citizenship. The accumulated experience in the socio-environmental agendas has shown the relevance of the participation of different social actors committed to conflict solving and production and analysis of information for addressing sustainable strategies.

### **Final Considerations.**

The implementation of socio-environmental practices as well as the Local Agenda 21 in Vila Dois Rios based on the action research methodology has contributed to: increasing the capacity of different actors to establishing partnerships, alliances and co-management practices leading to common good; constructing a political ethic that according to Morin (1998, p. 67-77) must contain some guiding ideas such as relinking, that embodies everything that associates, solidarizes and fosters brotherliness, as opposed to all that fragments and divides; developing an educational process committed to human sensibility, able to transcend Cartesian logic and induce complex thinking and the principles of uncertainty, indetermination and creative construction of new values.

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## **PROGETTARE L'EDUCAZIONE AMBIENTALE PER UNA SOCIETÀ IN TRANSIZIONE**

**Antonio Moroni**

*Membro Accademia Nazionale delle Scienze detta dei XL*

*Professore emerito di Ecologia Università di Parma*

### **1. L'Educazione Ambientale in una società dell'incertezza**

La società attuale sta affrontando un processo di profonda trasformazione, in cui il vecchio non c'è più e si stanno cercando gli elementi di un nuovo rapporto delle persone e delle città con l'ambiente naturale e umano, esso stesso in rapido cambiamento, che li circonda.

In questa situazione ogni cittadino che opera per la città e nella città è sollecitato a ripensare ogni giorno alla propria attività, non in un'ottica di un'esclusiva visione personale (operando, cioè, in un *sistema chiuso*), ma riflettendo sui reali bisogni della società, decodificandoli in domande e su queste organizzare l'offerta (operando, cioè, in un *sistema aperto*).

Nel caso specifico dell'Educazione ambientale, operare in sistema aperto significa individuarne l'obiettivo attraverso una ricerca nel contesto socioculturale, politico, economico, in cui si opera.

### **2. L'Educazione Ambientale, disciplina sintetica**

Dagli anni '80 ad oggi, l'obiettivo assegnato all'Educazione ambientale è stato quello di dare conoscenze di biologia e di ecologia, integrate con motivazioni fornite dall'etica ambientale. Di qui nasce l'obiettivo dell'Educazione Ambientale: *stimolare i cittadini ad assumere un comportamento responsabile verso se stessi e verso l'ambiente che li circonda*.

*Una definizione di ambiente.* Dobbiamo distinguere l'ambiente interno ed esterno rispetto ad ogni vivente. *L'ambiente interno*, proprietà comune a tutti i livelli dell'organizzazione della vita sul pianeta, è una realtà viva, fragile e complessa, costituita dai *fattori* che formano la *struttura* di un dato livello dell'organizzazione dei viventi e dal *sistema dei rapporti* che si realizzano nello spazio e nel tempo e nella condizione normale o alterata tra questi fattori stessi. *L'ambiente esterno* è quel sistema di condizioni fisiche, biologiche (e, se presenti, culturali) in cui si trova a vivere e operare un determinato vivente.

Per capire cos'è l'Educazione ambientale, occorre chiarire il significato dei termini di *sistema ambientale naturale ed umano e di educazione*, e il rapporto che intercorre tra essi.



### 3. La modalità dell'analisi e della gestione di realtà ambientali complesse

Negli anni '90 è stata formulata una metodologia per lo studio e la gestione di tematiche complesse ed è stata chiamata *paradigma della complessità di Kuhn* (un paradigma è un modello attorno a cui si costruisce una cultura).

Un'analisi ad esempio di un ecosistema eseguito con questo metodo si realizza tre fasi (Fig. A):

1. si scompone il sistema nei fattori che lo compongono e ogni fattore viene studiato da una disciplina specialistica (non si considerano i rapporti). Si opera secondo il *metodo multidisciplinare*. Questa prima fase è detta "*analitico-riduttiva*";
2. nella seconda fase, "*sintetico-ecosistemica*", si recuperano i rapporti e si ricostruisce la realtà sistemica dei processi o dei sistemi ambientali in esame. Si usa il *metodo interdisciplinare*;
3. la terza fase è rappresentata dal prodotto della ricerca che è *trans-disciplinare*.

Se qualcosa nell'analisi non funziona, si dovrà ritornare ai fattori, perchè lì sta il punto critico, da cui riavviare l'analisi del processo o del sistema. Questo indirizzo dovrebbe ormai entrare a far parte della cultura dei docenti di ogni ordine e grado di scuola, dei ricercatori, dei gestori e dei semplici cittadini.

### 4. L'area di progetto: un metodo per l'Educazione Ambientale

Ritornando all'Educazione ambientale, si è detto che il suo obiettivo consiste nel fornire conoscenze e motivazioni (etica ambientale) e attraverso l'impiego di discipline metodologiche dell'educazione (psicologia, pedagogia, didattica), suscitare comportamenti di persone consapevoli e responsabili verso il proprio ambiente.

Un buon metodo per realizzare oggi progetti di educazione ambientale, sia a livello scolastico, sia a livello extrascolastico, sui temi ambientali di natura complessa, è *l'area di progetto organizzata su sei fasi*.

1. *Il tema della ricerca* viene scelto dagli studenti, preferibilmente nel quadro del territorio di residenza.
2. Successivamente occorre fare il punto *sullo stato dell'arte* attraverso la ricerca su articoli, libri, interviste, etc.
3. Nella *fase analitico-riduttiva* si effettua una scomposizione della realtà complessa nei fattori naturali e antropici che ne costituiscono la struttura.

L'analisi dei fattori critici viene svolta con il supporto dei docenti e degli specialisti che costituiscono il gruppo di consulenti. Viene anche attuata una campagna per il rilevamento dei dati (sul terreno e tramite interviste) ed esperimenti in laboratorio.

Nella *fase sintetico-ecosistemica* si opera un confronto tra le conoscenze ottenute nella fase precedente sui fattori che sembrano più importanti al fine della ricerca (si parla di *fattori critici*), per ricostruire “la rete dei rapporti” al fine di risolvere il problema posto dal tema ambientale che si vuole affrontare.

1. *Discussione dei risultati* e confronto con le ricerche precedenti. Integrazione con i principi dell'etica ambientale.
2. *Trasferimento dei risultati ai fruitori*, mettendo in contatto gli studenti con la concreta realtà che hanno studiato: una Pubblica Amministrazione, un'azienda industriale, una società di servizi, un quartiere, un paese, etc. Nessun progetto deve rimanere nella scuola, deve essere comunicato all'esterno, in modo che i ragazzi siano soddisfatti per aver fatto qualcosa di utile.
3. *Prodotti della ricerca*. Si ha un duplice prodotto: materiale ed immateriale. *Prodotti materiali* possono essere mostre, ipertesti, videocassette, etc. Il *prodotto immateriale* è la crescita e la modificazione nella percezione dell'ambiente e l'acquisizione di nuovi atteggiamenti di consapevolezza e di responsabilità verso il proprio quadro ambientale.

## Una conclusione

Non è certo anacronistico, né di maniera, far riferimento alla responsabilità degli intellettuali, siano ricercatori, siano decisori, siano professori, ricercatori o studenti. Il ricordo va agli studenti e ai Professori del '68, di Tienamen, di Belgrado, di Timor Est perché essi, gli intellettuali, nonostante latitanze colpevoli e le innumerevoli crisi di identità, e di ruolo (di cui la storia del pensiero rende testimonianza) sono sempre stati punto di riferimento nei grandi crocevia della storia.

Nel quadro di una società arida e in cerca di senso, a tutti coloro che hanno a cuore l'ambiente è rivolto l'invito espresso da Carlos Castaneda nel testo *The teachings of Don Juan*:

Qualsiasi via è solo una via, e non c'è nessun affronto, a se stessi o agli altri, nell'abbandonarla, se questo è ciò che il tuo cuore ti dice di fare ... Esamina ogni via con accuratezza e ponderazione. Provala tutte le volte che lo ritieni necessario. Quindi poni te stesso, e a te stesso soltanto, una domanda ... Questa via ha un cuore? Se lo ha, la via è buona. Se non lo ha, non serve a niente.

Figura A

# **ARTICOLAZIONE SINTETICA DEL DISEGNO SPERIMENTALE PER L'ORGANIZZAZIONE DI UNA RICERCA SUI PROCESSI, SISTEMI, PROBLEMI COMPLESSI SECONDO IL PARADIGMA DELLA COMPLESSITÀ**

## **FASE 1 — SCELTA DEL TEMA DELLA RICERCA**

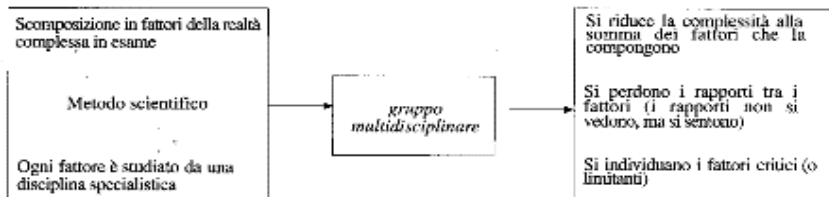
## **FASE 2 — RICERCHE PRECEDENTI**

Inquadrare, attraverso la ricerca su articoli, libri e interviste sulle fonti di dati, lo stato dell'arte (ciò che è stato e ciò che rimane da fare)

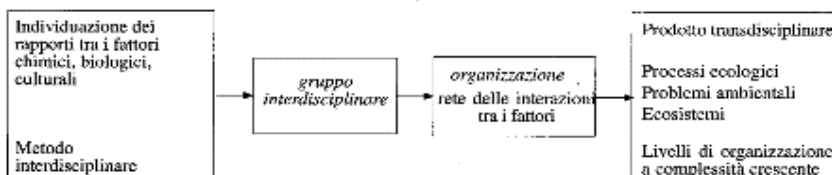
## **FASE 3**

Evidenziare le due fasi necessarie per fare ricerca su un sistema complesso

Fase analitico riduttiva:  
individuazione dei fattori che costituiscono la struttura della realtà complessa in esame



Fase di integrazione di nuclei di conoscenze disciplinari: sintetico-sistemica



## **FASE 4 — DISCUSSIONE DEI RISULTATI E CONFRONTO CON LE RICERCHE PRECEDENTI. INTEGRAZIONE CON I PRINCIPI DELL'ETICA AMBIENTALE**

## **FASE 5 — TRASFERIMENTO DEI RISULTATI AI FRUITORI**

Il tema del trasferimento, che assume oggi una particolare rilevanza, è rivolto a coloro che hanno promosso la ricerca, ma anche, se è possibile, alle varie forze della società civile (educazione ambientale nella scuola, nei parchi, nelle università per anziani, ecc.)

## **FASE 6 — PRODOTTO DELLA RICERCA**

**Prodotto immateriale:**  
l'acquisizione culturale di alto profilo e innovativa della capacità di saper organizzare e condurre una ricerca sulla complessità ambientale

**Prodotti materiali**

## **VERSO MODELLI ECOLOGICI DI TRASMISSIONE DELLA CONOSCENZA**

**Dott. Pietro Pizzuto**  
*Associazione Yellow Hop Onlus*

### **Arte e scienza, natura ed educazione**

L'obiettivo di questo studio è di delineare dei principi guida generali che applicati ai contesti formativi possano garantire che le modalità di trasmissione della conoscenza siano autenticamente ecologiche. L'ipotesi teorica di base è tratta dal movimento della *deep ecology* (Arne Naess, 1973), che a differenza della *shallow ecology*, ritiene che la crisi uomo-ambiente vada affrontata a partire da un ripensamento profondo di alcuni modelli epistemologici ed etici che stanno alla base dell'odierna modalità abitativa dell'uomo "occidentale", che non sia quindi sufficiente utilizzare al meglio le risorse e le conoscenze tecnologiche nel tentativo di arginare gli effetti della crisi, ma che sia in primo luogo necessario risalire alle sue cause remote per rimuoverle, grazie ad un profondo rinnovamento culturale.

I principi cardine di questo nuovo orizzonte culturale sono *l'uguaglianza biocentrica* e *l'auto-eco-realizzazione*, e scaturiscono dalla *interrelazione di tutte le cose*, centro concettuale della nuova scienza della complessità e dalla teoria dei sistemi.

In questo quadro il modello che verrà presentato come strumento possibile per la realizzazione di percorsi formativi basati su modalità ecologiche di costruzione e trasmissione della conoscenza sarà quello elaborato da Gregory Bateson, come integrazione tra *un paradigma estetico ed uno antiestetico*, modelli rispettivamente rappresentativi della cultura ecologica con approccio sistemico e complesso, il primo, e della cultura "dominante" con approccio galileiano-cartesiano, il secondo.

### **Principi del conoscere antiecologico ed ecologico Il "paradigma antiestetico ed estetico" di G. Bateson**

Gli uomini sono mortali  
Socrate è un uomo  
Socrate è mortale  
(Platone)

Gli uomini sono mortali  
L'erba è mortale  
Gli uomini sono erba  
(G.Bateson)

## **Paradigma antiestetico**

Cultura dominante con approccio galileiano-cartesiano:

1. Pensare atomistico
2. Prevalere di processi di pensiero che procedono per separazione
3. Elezione del criterio della quantità a principio distintivo del fare scienza
4. Dimenticanza di qualsiasi senso estetico che conduca all'apprezzamento della forma
5. Distanza emotivo-affettiva fra soggetto ed oggetto della conoscenza come condizione di un procedere oggettivamente fondato

## **Paradigma estetico**

Cultura ecologica con approccio sistemico e complesso:

1. Principio di contestualizzazione
2. Ricerca della struttura che connette
3. Assunzione del criterio della qualità come presupposto del fare scienza
4. Il processo di costruzione del sapere non disgiunto dalla ricerca della bellezza
5. Modalità di ricerca che preveda un accostarsi alle cose con empatia e sentendosi affini ad esse.

A partire da questo modello è possibile delineare una serie di principi guida applicabili sul campo. Va qui sottolineato che “l'educazione e la formazione ecologica sono intese come aspetti dell'educazione e della formazione relative all'ambiente, che hanno per oggetto specificatamente la relazione tra mondo umano e mondo naturale e che si propongono come obiettivo di contribuire alla generale educazione e formazione del soggetto in modo tale che sia in grado di pervenire ad una significazione-progettazione-gestione del suo abitare la terra nella direzione del rispetto per la natura in vista di una migliore qualità della vita” come scrive bene la Mortari. Pertanto si esplicano su diversi piani applicativi interconnessi:

1. Cognitivo: favorire l'acquisizione di una competenza ambientale scientificamente fondata;
2. Emotivo-affettivo: attraverso la valorizzazione di un rapporto polivalente con l'ambiente (anche sul piano senso-percettivo), promuovere lo sviluppo di un sentimento positivo nei confronti della natura;
3. Estetico: orientare a forme di apprezzamento estetico degli elementi che configurano il contesto ambientale;
4. Etico-sociale-politico: sollecitare all'impegno concreto e responsabile a favore della tutela e della conservazione del patrimonio naturale.

Ecco gli strumenti formativi ritenuti adeguati ad ogni livello applicativo:

1. Le concezioni iniziali, posizionamento, disanima riflessiva, attenzione al qui ed ora, contemplazione ex-centrica, ricerca della struttura che connette, il contesto che fissa il significato, pensare per storie, la metafora come strumento cognitivo, la disposizione dell'ascolto e dell'abbandono;
2. Esperienze senso-percettive, l'osservazione diretta e la permanenza in natura, relazione ingenua con le cose, partecipazione empatica (pensare che è anche sentire);
3. Osservazione ricolma di stupore, il piacere estetico dell'esperienza della contingenza, i linguaggi dell'arte;
4. Discutere insieme, elaborare idee guida, l'immaginazione-dimensione del possibile, pensare come ideazione di utopie.



**INFORMAL ENVIRONMENTAL EDUCATION  
FOCUSING ON WATER.  
ANALYSIS AND EVALUATION OF EDUCATIONAL  
CONCEPTS APPLIED IN GERMANY**

**Carolyn Rettig**

*Institute of Landscape Management,  
Albert Ludwigs University, Freiburg*

**The role of water in environmental education**

Water resources fulfil a multitude of ecological, social and economic functions. Most of all, water plays a key role in sustaining life and it may well be the most precious natural resource humans utilise. Only about 2.5 % of the world's water resources are freshwater (United Nations, 2003). Water is becoming scarcer around the world as a result of population growth, with an increase in its use for all sorts of purposes, including direct consumption, agriculture, industry, recreation, and due to the loss of water resources to pollution. Water protection and sustainable water resource management are therefore of utmost importance. Due to great disparities between the world's different regions the priorities given to different water issues vary with the local conditions and needs. No matter what the foremost issue is, education plays a key role. "Knowledge is accepted as one of the keys to development, improved livelihoods, environmental participation and stronger democracies" (ONU, 2003). The importance of water education at an international level is reflected in the efforts undertaken by the United Nations: in 1993 the annual World Water Day was introduced, the year 2003 was proclaimed the "International Year of Freshwater" and in 2005 the international decade for action "Water for Life" commenced.

In Germany water already plays an important role in environmental education. Closer observation reveals, however, that educational approaches to water issues are often limited to experiments concerning the chemical and physical properties of water, or to consumption issues and water saving tips. These are important issues of course, but they do not make full use of the potential of water in the context of environmental education.

Throughout the world water is incorporated into mythology, religion and culture, it has numerous symbolic meanings and inspired many myths. This demonstrates the special nature of the human-water relationship and, therefore, water seems to be especially suited to conveying the messages of environmental education. Water education that goes beyond the teaching of scientific facts presents an excellent medium to raise awareness and promote the idea of sustainable development, because people relate to water issues as it occupies such a fundamental position in our lives.



## **The research project**

The research project began in 2003 and will be concluded in 2006. This paper focuses on the design of the study and refers to some preliminary findings. The main research objectives are:

- To provide an overview of existing methodological approaches to informal water education in Germany and to analyse the underlying educational concepts.
- To assess the effectiveness of certain water education activities or programmes.
- To evaluate the assessment criteria applied, some of which were newly developed for the purposes of this research project.

Contemporary cognitive psychology serves as a theoretical framework of the study and encompasses the analysis of the role of cognition, emotions, the actual environment, as well as the social and cultural environment of an individual. The extent to which the educational concepts implemented in water education programmes comply with the theories and findings of modern cognitive psychology are being examined. One of the central research questions is: "Which elements must be included in water education programmes to have a positive effect on the individual's environmental awareness and ideally the behaviour, too?"

To find answers to this and other research questions, the assessment of water education programmes is based on a combination of theoretical and empirical analyses. Expert interviews were held to gain an overview of the existing programmes and concepts. Qualitative content analyses are employed to evaluate the underlying educational concepts of selected water education programmes. Simultaneously, empirical data are collected by means of questionnaires that are distributed among the participants of different water education programmes. The main target group is school children between the ages of nine and eleven, the most common participants in the programmes assessed. The survey is based on a pre and post-test design. The children and accompanying teachers are asked to fill in the questionnaires before taking part in the programme and again four weeks later. This time frame was chosen because other studies have already shown that this time lag is sufficient for detecting either manifestations or deteriorations of attitudes and behaviour (cf. Bogner, 1998). The children's answers provide information about their knowledge before and after participating in the programme, as well as about their interests, hobbies and their social environment. In each case a second school class of the same grade from the same school serves as a control. The statistical analyses of the empirical data will primarily be based on comparisons of each individual's answers given during the pre and post-test.

The assessment criteria being employed to analyse the effectiveness of water education programmes are derived mainly from two studies evaluating environmental education in schools in Germany (Eulefeld, 1993).

These criteria are deemed suitable because they have been tested on a large scale. They have been modified for the purposes of this study and further criteria were added in accordance with the research aims and the theoretical framework. The criteria include aspects such as “reference to local conditions”, “reference to dependencies and wider contexts”, “action oriented teaching”, “availability of equipment for experiments”, “addressing emotions” and so on.

Due to the general lack of impact assessments of informal environmental education, the assessment methods themselves must be analysed critically. Consequently, it must be determined to what extent the applied assessment approach is practicable and transferable.

## **Water education in Germany**

Originally, it was assumed that there are only few providers of environmental education in Germany focusing on water issues. During the initial research phase it quickly became clear that this was a misperception, however. The main reason for this was the lack of publicity extending beyond the local level in many cases. Once research had commenced more and more water education activities and programmes were unearthed and so there could be no doubt that water issues do play an important role in environmental education in Germany. What also became clear was the great variety of educational methods being applied in informal water education, often addressing different target groups. Based on the data collected, four major forms of water education were distinguished:

- Museums and exhibitions with the foremost aim of providing information, but increasingly addressing all senses and including elements of a more action-oriented approach.
- Volunteer groups comprised of all age groups that “adopt” and care for a local water body on a regular basis, supervised by the local water authority.
- Guided tours or water education vehicles which can be booked for certain educational activities, usually outdoors, providing all the necessary expertise and equipment.
- Environmental education centres with a variety of teaching facilities and suitable outdoor areas used for educational purposes.

Even though the varying forms of water education follow different approaches, they pursue similar if not the same objectives, that is familiarising their target groups with water issues, raising their awareness and ideally affecting their environmental behaviour in a positive way, nurturing sustainable use and management. What they also have in common is that they are all action-oriented, but clearly to different extents. Even the museums and exhibitions make an effort to actively involve their visitors by offering various “hands on” exhibits. Some even include outdoor facilities. All of this

indicates that the providers of water education apply modern concepts and methods in order to reach their target groups.

As yet, however, little is known about just how effective informal environmental or water education programmes truly are. And at this moment in time there is a severe shortage of empirical research addressing and attempting to fill this knowledge gap. Therefore, the intention behind this study is to observe and assess different water education programmes, as was mentioned previously.

## **Outlook**

As the project is not yet finished, the central research questions remain unanswered for now, even though first trends can already be detected. Once the final results are at hand, it will be particularly important to analyse how practicable the assessment method employed is.

Furthermore, the transferability of the results to all sorts of environmental education programmes in general and also to other regions, both nationally and internationally, must be examined. These and further issues will be put up for discussion at a public workshop in Schneverdingen, north Germany, at the end of April 2006. The workshop primarily addresses practitioners and researchers, but is open to anyone who is interested in the topic.

Ultimately, the intention is that the final results will serve as a basis for practical recommendations and fundamental environmental education and assessment guidelines.

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