Environmental Education, Communication and Sustainability

Umweltbildung, Umweltkommunikation und Nachhaltigkeit

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Contributions to the UN Decade of Education for Sustainable Development

EXTRACT

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Foreword

Our world is currently facing many kinds of problems: economic, social, political and environmental. These problems are different among the various world regions and may have a different impact on people's lives. The problems, and our understanding of them, are influenced by the way we see and perceive the complexities of life. Each day, many unsustaintable facts call for our attention. Sometimes we are aware of them and act. But to the same level, sometimes we are not and, as a result, fail to act.

In order to foster a global awareness about sustainable development, the United Nations General Assembly established a Decade of Education for Sustainable Development (2005-2014) which constitutes an urgent call for all people around the world to contribute to citizens' awareness and action guided by the idea of sustainability, to the benefit of the world community. But, without learning, s*ustainable development* is impossible. Thus, it is important to foster sustainable development learning and enable people to participate in well-founded decision-making process, particularly (but not only) those concerning the environment, and take the appropriate course of action.

Bearing this in mind, this book presents essential learning approaches, introduces educational and training activities, as well as a various innovative methods aimed at the development of practical skills, in order to strengthen the continuous process of environmental education, and in particular, education for sustainable development (ESD). It does so by focusing on three dimensions: social, economic and environmental, as a means of achieving an effective change of behaviour. Similar to a previous book (volume 27, in this collection), this one "tries to bridge the gap between science and environmental education by describing a set of projects, initiatives and field activities".

The present book, after a brief review of the strategic action for ESD, educational policies and curricular orientations, analyses the obstacles that could explain the poor response to previous calls by the community of educators and researchers in science education. It also presents a global analysis on how higher education institutions are including sustainability issues in different areas (e.g. teaching, research, outreach and institutional management) and describes the progress made in this field during the last 10 years.

A special emphasis is given to teacher training programmes, conception, and implementation, highlighted the problems and barriers, which prevent development as far as integration of sustainability issues in higher education is concerned. Furthermore, this book presents instruments, related to ESD indicators, to help monitor and evaluate changes. The development of tools is crucial to clarify which educational approaches are necessary, and to evaluate the quality of these approaches in terms of their relevance and effectiveness to promote sustainable development.

This book makes a reflection on several environmental strategies and policies that reinforce a citizen's need for more collaborative and participant in actions towards biodiversity conservation, and the maintenance of the ecosystems' services. In particular, the use of fieldwork in environmental science programmes delivered through online methodology can be outlined, along with the concept of sustainability in fisheries, which pays a particular attention to the human dimension of fisheries.

In the framework of practical examples, other matters such as the implementation of Local Agenda 21, applying educational and environmental management concepts and ideas in the daily life of schools, problem-solving activities, environmental projects, participatory management, etc. are tackled. A special attention is given to natural sciences, because they are a far-reaching field for the development of innovative and diverse teaching strategies envisaging improvements in learning processes. Research-based recommendations on science and technology education are also highlighted, emphasizing good practices, at different levels, especially regarding science teachers' education, but also agronomists, civil engineers, architects and workers related to these sectors, to help to re-set education towards ESD.

In conclusion, this book intends to reshape science education in order to achieve sustainable development and to provide some concrete measures to address some of the current needs in the field, towards the of the decade and beyond.

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Chapter 1

The Need for Contributions to the Decade of Education for a Sustainable Future: an Ethical Commitment[1]

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Abstract

Given the serious and urgent problems humanity is now facing, the United Nations General Assembly has adopted a resolution establishing a Decade of Education for Sustainable Development (2005-2014). This constitutes a new urgent call to educators of all levels and areas to contribute to citizens' awareness and understanding of the state of the world in order to enable them to participate in well-founded decision-making. Our aim in this paper is to analyze the obstacles that could explain the poor response to previous calls, in order to overcome these obstacles and make it possible to assume an ethical commitment on behalf of the community of educators and researchers in science education.

Introduction

We will begin by recalling the surprise some of us experienced during the first Earth Summit, held in Rio in 1992, when the United Nations asked educators from all levels and subjects to contribute to citizens' awareness and understanding of the current situation of planetary emergency in order to enable them to participate in well-founded decision-making. The use of the expression "*planetary emergency*" (Bybee 1991) gave the state of the world a dramatic overtone which we were not previously aware of.

Our surprise grew when a rapid inquiry revealed that such calls to educators had been made repeatedly for quite some time: for instance, as early as 1972 at the United Nations Conference on Human Environment in Stockholm. So why have most of these calls, along with the contributions from many environmental

1 This chapter has been conceived as a contribution to the Decade of Education for Sustainable Development, established by the UN General Assembly for the period 2005-2014.

educators and some researchers in the STS (science, technology and society) domain of science education, been ignored?

Despite receiving wide media coverage, the Rio Conference failed to involve educators in incorporating the state of the world topic into their teaching and research priorities (Vilches et al. 2003).

Consequently, the need for a long and intense campaign became clear and, ten years later, at the second Earth Summit (Johannesburg 2002), a Decade of Education for Sustainable Development (2005-2014) was proposed in order to create a social climate oriented towards involving all educators in making citizens aware of the current situation of planetary emergency and capable of participating in the decision-making processes necessary to stop degradation (Resolution 57/254, approved by the United Nations' General Assembly on 20 December 2002).

But how can this climate be created? The minimal success of previous calls compels us to anticipate serious obstacles that, if not taken into account, may hinder the new and ambitious initiative of the Decade. In other words, it is necessary to study what obstacles may exist and understand why the situation of planetary emergency has not received the attention of most educators up to now; because this lack of attention to the Earth's situation and its future affects all societies and includes most scientists, political leaders and educators.

In particular, research in science education has shown that the problem of the state of the world and sustainability education have been absent in most curricula until very recently, and even in curricula focusing on environmental education (Fien 1995). Orr's statement (1995), denouncing that we still educate the young as if there were no planetary emergency, continues to be valid, as well as the lamentation of the limited attention our educational systems pay to planning for the future (Hicks and Holden 1995; Anderson 1999). Most materials on environmental education focus exclusively on local problems without addressing the global situation (Hicks and Holden 1995; Vilches et al. 2008). Moreover, they show a reductionist approach which almost exclusively concentrates on natural resources, ignoring the strong connections between the natural environment and social, cultural, political and economic factors (Fien 1995; Tilbury 1995; Vilches et al. 2008). Summing up, the attention science education teachers *and researchers* pay to the state of the world is still minimal and constitutes a serious *missing dimension* in science education research and innovation (Vilches et al. 2003).

On the other hand, research has also shown that when a relatively in-depth, collective discussion is encouraged, most teachers correctly perceive the seriousness of the situation, brainstorm possible solutions and understand the necessity of contributing to citizens' education for a sustainable future (Gil Pérez et al. 2003). We will now describe how this discussion is organized and summarize the general results obtained.

Eliciting Science Teachers' Perceptions of the State of the World

We have organized numerous workshops for science teachers who are currently employed and studying the profession — grouped in teams of five – to discuss "the problems and challenges humankind will have to face in the near future, in order to construct a view of the current situation and measures to be taken which is as complete and correct as possible". In these workshops, the contributions made usually cover most of the aspects studied by experts:

Almost all of the teams indicated that the main problems facing humanity include:

- Environmental pollution and its consequences (acid rain, ozone layer depletion, development of the greenhouse effect, global climatic change, etc.)
- Depletion of natural resources (fossil energy resources, fertile soil, drinking water, etc.)
- Ecosystem degradation, destruction of biological diversity and desertification, etc.

We substantiate these contributions with texts from a variety of expert analyzes (World Commission on Environment and Development 1987; Worldwatch Institute 1984-2010; Mayor Zaragoza 2000; McNeill 2003; Lynas 2004; Gore 2006; Pearce 2006; Duarte 2006; IPCC 2007; Duarte Santos 2007).

A smaller number of teams made references to other *related* problems, such as:

- Increasingly disorganized and speculative urbanization (Girardet 2001; Vilches and Gil 2003, chapter 2)
- The destruction of *cultural* diversity (Folch 1998; Maaluf 1999; Vilches and Gil 2003, chapter 5; United Nations Development Programme 2004; Worldwatch Institute 2007; Burdett and Sudjic 2008)

Nevertheless, throughout the discussion there is general agreement on the importance of such problems *and the strong links among these problems*.

The same is true for the possible causes of the planetary emergency (which can be viewed as new problems). Teams make reference to:

- Economic growth guided by private, short-term interests (Meadows et al. 1972; Meadows, Meadows and Randers 1992; Brown 1998; Giddens 1999; Meadows, Randers and Meadows 2004; Sachs 2008)
- Over-consumption in "developed" societies and dominant groups as if the Earth's resources were infinite (Brown and Mitchell 1998; Folch 1998;