

Dialectical System Approach and Education Supporting Environmental Protection

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Abstract:

Most of the environmental challenges we face could be resolved if each individual and organization slightly changed their habits and practices. The key to achieving this is education. The global economic system needs to show a more human and environment friendly face. Companies must ensure that their traditional focus on corporate profits and shareholder value is accompanied by equal concern for the needs of society and the environment. The article focuses on system approach and education as an influence on environmental care and protection. Integrated system approach and education management integrate the requirements of sustainable development and environmental care. Environmental protection and sustainable development are result of education and dialectical system approach.

Key words: environmental care, environmental education, system approach, sustainable development

1 Introduction

Over the last two decades or so, we've seen how more and more writers link our current environmental problems to modern living. Take for instance *Rachel Carsens'* 'Silent Spring' or *Ulrich Beck's* 'Risk Society', both of which continue to be widely cited and quoted at environmental gatherings. Such works argue that the environmental crises we hear about is a product of industrialization and inappropriate development. Education then, according to such an argument, must respond by addressing the destructive nature of modernity.

Today, most social problems experienced by humans somehow have their root in the distribution and use of natural resources. We know that human survival depends on the continued existence of natural resources and that the quality of life humans is intricately linked to the quality (and perhaps also, the quantity) of environmental resources such as water, air, soil and so forth. Science has shown that despite the efforts of thousands of environmental organizations, our environmental problems continue to worsen. Resources are being depleted and habitats are

still being destroyed to make way for human progress. Other life forms that depend on these resources and surroundings also become threatened. This chain effect of resource depletion or environmental degradation ultimately effects all of us.

A famous eastern saying runs as follows: 'all things are connected and are none of themselves'. Whatever affects anything in the biophysical world will ultimately affect us as humans. It is every person's duty and responsibility to find ways through which to develop an understanding of how humans are linked to the natural order and how we can use our intellect to remedy the effects of destructive actions. This realization raises important questions for the educator, who must now take up the task of addressing environmental problems as that which is rooted in the social, economic and political life-world of a learner (see also Learner Resources for more on the environment as interacting life-words).

Since biblical times, people have gotten the most done when they worked cooperatively in teams, although they didn't actually use the term team [1]. Because of this is so important co dependence,

relationships, connection, openness, dialectic system of view points and education for environmental excellence and sustainable development[2].

2 Definition and Principles of Environmental Education (EE)

Environmental education ("EE") refers to organized efforts to teach about how natural environments function and, particularly, how human beings can manage their behavior and ecosystems in order to live sustainably. The term is often used to imply education within the school system, from primary to post-secondary. However, it is sometimes used more broadly to include all efforts to educate the public and other audiences, including print materials, websites, media campaigns, etc [3].

The North American Association for Environmental Education, has established the following "Guidelines for Excellence" for environmental education:

1. Fairness and accuracy: EE materials should be fair and accurate in describing environmental problems, issues, and conditions, and in reflecting the diversity of perspectives on them. 1.1 Factual accuracy. 1.2 Balanced presentation of differing viewpoints and theories. 1.3 Openness to inquiry. 1.4 Reflection of diversity.
2. Depth: EE materials should foster an awareness of the natural and built environment, an understanding of environmental concepts, conditions, and issues, and an awareness of the feelings, values, attitudes, and perceptions at the heart of environmental issues, as appropriate for different developmental levels. 2.1 Awareness. 2.2 Focus on concepts. 2.3 Concepts in context. 2.4 Attention to different scales.
3. Emphasis on skills building: EE materials should build lifelong skills that enable learners to address environmental issues. 3.1 Critical and creative thinking. 3.2 Applying skills to issues. 3.3 Action skills.
4. Action orientation: EE materials should promote civic responsibility, encouraging learners to use their knowledge, personal skills, and assessments of environmental issues as a basis for environmental problem solving and action. 4.1 Sense of personal stake and responsibility. 4.2 Self-efficacy.
5. Instructional soundness: EE materials should rely on instructional techniques that create an effective learning environment. 5.1 Learner-centered instruction. 5.2 Different ways of learning. 5.3 Connection to learners' everyday lives. 5.4 Expanded

learning environment. 5.5 Interdisciplinary. 5.6 Goals and objectives. 5.7 Appropriateness for specific learning settings. 5.8 Assessment.

6. Usability: EE materials should be well designed and easy to use. 6.1 Clarity and logic. 6.2 Easy to use. 6.3 Long lived. 6.4 Adaptable. 6.5 Accompanied by instruction and support. 6.6 Make substantiated claims. 6.7 Fit with national, state, or local requirements [4].

According to the International Union for the Conservation of Nature (IUCN), environmental education (EE) is:

"... the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among men, his culture and his biophysical surroundings. EE also entails practice in decision-making and self-formulation of a code of behaviour about issues concerning environmental quality. International Union for the Conservation of Nature (IUCN; 1971)

The 1977 Tbilisi Conference, which followed soon after the launch of the United Nations Environmental Programme (UNEP), is known to have spearheaded clarification on the nature of environmental education. This conference resulted in a declaration which listed seven directive principles for environmental education (EE) programmes. These are summarized as follows:

- EE is a lifelong educational process that occurs at all levels of education.
- EE is about the interactions which occur in the natural, the built and social environment. It should lead to the understanding of how human interactions and political processes, together with the nature of socio-economic issues and the effect of these on environmental degradation or enhancement.
- EE is for developing attitudes and value systems which lead to socio-economic improvement through positive social interactions and the maintenance and improvement of the natural and built environment.
- EE aims to develop an individual's understanding, skills and the feelings of empowerment that are necessary for both

positive behaviour towards the biophysical and social environment in everyday living, and for active participation in group efforts to find the optimal solutions for environmental problems

- EE requires a holistic and preferably interdisciplinary approach to teaching with opportunities for diverse learning experiences, but with particular emphasis on direct experiential learning in natural, built and social environments. EE requires a holistic and preferably interdisciplinary approach to teaching with opportunities for diverse learning experiences, but with particular emphasis on direct experiential learning in natural, built and social environments.

Environmental education is therefore not only the concern of natural scientists, but draws from the tools and resources of a wide range of disciplines in order to demonstrate the root of current problems and suggest ways in which learners could either prevent or remedy these [5].

Recently, and because of agreement that our environmental crises are the result of problems with modernity, educators have begun to move away from teaching approaches that stress 'wildlife experience' or 'nature study' (i.e. teaching merely about the scientific

aspects of nature). Educators now prefer an approach that encourages learners to understand and transform problem environments. It is in this sense that we now prefer to speak of EE as education about and for the environment. Ten years ago EE would have been equated with the environmental sciences, a field which is dominated by the conventions and traditions of the scientific method. It is now seen as a holistic field that draws from the tools of both the social and natural sciences [5].

It is agreed both locally and further abroad, that educators should adopt the approach that stresses holism when addressing environmental issues. This means that planet Earth should be seen as a super-organism consisting of interrelated and interdependent biophysical entities that are undergoing continuous transformation. Humans are located within a technologically-orientated sphere (techno-sphere), which in turn is located within a broader social and biophysical environment (see figure below). This approach requires educators to encourage learners to think in terms of systems theory, which sees the whole (the super-organism) as greater than the sum of its individual parts. Thus, positive actions in specific parts (or individual life-worlds e.g. the economy) should work to the benefit of the whole. This form of 'inclusive' thinking encourages learners to develop associations between various constituents (life-worlds) of a system and demands that learners develop proficiency in a range of subject areas or disciplines. [5].

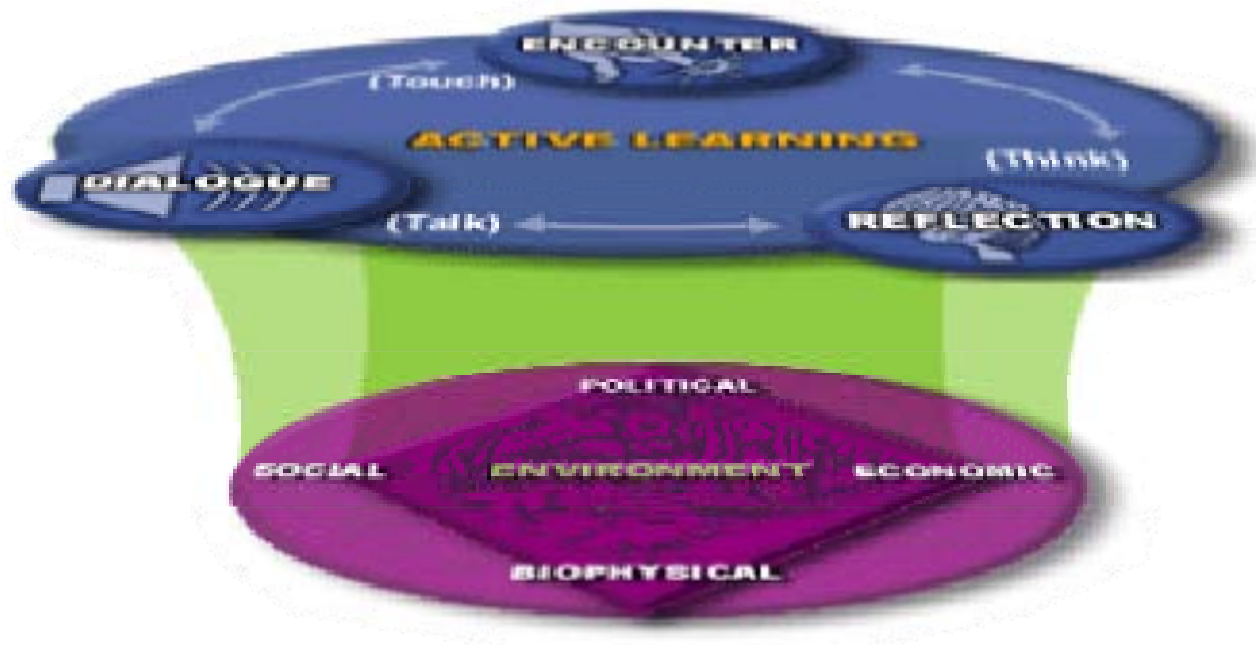


Figure 1: Active learning [5]

Most educators also agree that environmental education is not a separate discipline. It is a systematic process in which learners are empowered to critique a problem environment, through direct experience and the communication of information. Learners are also encouraged to engage in practical activities that ultimately benefit the biophysical environment. This process must result in three outcomes:

- understand their learners must relation to other interlinking chains of natural systems and socio-ecological processes.
- learners must interpret conditions into their own frameworks, since much of what we learn about 'reality' is determined and shaped by our individual worldviews and backgrounds.
- learners must be able to critique conditions and uncover hidden ideologies or assumptions underlying specific problems. That which is learned must drive the learner towards transformation. Knowledge of environmental issues must be built for the ultimate objective of action and practical change.

Programmes differ in the extent to which they are able to achieve all of these outcomes. Some succeed in creating the awareness and knowledge of environmental problems, while others culminate on renewed action that benefit the natural environment. Yet, with our environmental problems still worsening

after 25 years of debate, it's not hard to understand why many educators are insisting that learners embark on practical, action-geared projects[5].

3 Application of Systemic Thinking

Following the hypothesis, a survey was conducted to determine how companies assess application of systemic thinking (dialectal systems theory approach) and environmental innovations and how they maintain opportunities for establishing long-term sustainable development. The purpose of the article is to illustrate and find an answer to the question what dialectal system approach can bring in the long run for sustainable development and show an example, based on this methodology.

The survey was performed from September 2007 to January, 2008. Out of 120 questionnaires sent, 66 or 55 % were returned.

The polled companies were asked if they were thinking about the possibility of systemic thinking (dialectal systems theory approach) as a tool for environmental innovations supporting sustainable development. 52 % company replied that they did not think of such a possibility. 33 % of companies replied that this is unknown methodology, and 15 % of companies have thought about the possibility of systemic thinking (dialectal systems theory approach) as a tool for environmental innovations supporting sustainable development (table 1).

<i>Q: Have you thought about the possibility of systemic thinking as a tool for environmental innovations supporting sustainable development ?</i>	Frequency	Percentage
Yes.	10	15
No.	25	38
We have not though about it.	9	14
Unknown methodology.	22	33
Together	66	100

Table 1: Results [15]

The next question for the polled companies referred to their opinion about what they would do in future environmental innovations activities. 12 % of polled companies replied that they would

have adequate knowledge and skills. 78 % of polled companies replied that they would be faced with the lack of skilled workforce, who would be able to initiate and start the environmental innovations.

A case study was developed. Personal interviews were carried out with five environmental decision makers in companies, in order to get a deeper understanding of environmental innovations meaning for sustainable development.

The interviews lasted approximately one hour, were not recorded but simultaneously written down. According to interviews, companies which accepted systemic thinking were faced with the following consequences:

- improve cooperation, co dependence, relationships, connection, openness,
- improve competitive ability
- manage environmental legal obligations,
- improve environmental performance,
- save money,
- improve pollution prevention
- reduce environmental risk [15].

In spite of general availability and well-spread concepts of strategic management, research showed that only few managers think about the future, about environmental innovation for sustainable development. Based on research I designed a SWOT check list (table 2) for systemic thinking as a tool for environmental innovations supporting sustainable development. The company shall consider the following potential.

ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> • improve co dependence, connection, dialectic system of view points, • synergy, system, synthesis, • improve environmental performance, • public image retain, • valuable employees, • pollution prevention, • increased efficiency/reduced costs, • reduced environmental risks . 	<ul style="list-style-type: none"> • potential consulting assistance • more education and training

Table 2: SWOT check list [15]

4 System Approaches Change Education Management

Early in the final decade of the 20th century, the largest group of world leaders ever to assemble defined what may be education's greatest challenge and responsibility: to help citizens of the world prepare for a future of sustainable development (Sitarz, 1993). Sustainable development has been defined over the years in a variety of ways, but Jacobs (1993) has suggested that all definitions have a core meaning characterized by three elements: (a) consideration of environmental issues and objectives interdependently with economic issues and objectives; (b) a commitment to social equity and the fair distribution of environmental benefits and costs, both geographically and across human generations; and (c) an enlarged view of "development" that extends beyond simple measures of "growth" to include qualitative improvements in daily life [7].

Campaigns for social change are not a new phenomenon. They have been waged from time immemorial. In Ancient Greece and Rome, campaigns were launched to free slaves. In England during the Industrial Revolution, campaigns were mounted to abolish debtor prisons, grant voting rights to women, and abolish child labour. Notable social reform campaigns in nineteenth-century America included the abolition, temperance, prohibition and suffrage movements as well as a consumer movement to have governments regulate the quality of foods and drugs. In modern times, campaigns have been launched in areas as health promotion (anti-smoking, safety, drug abuse, drink/driving, AIDS, nutrition or physical fitness); environment (safer water, cleaner air, preservation of national parks and forests); education (literacy, school attendance, encouragement of students to take math and sciences) and in the economy (to boost job skills and training, attract foreign investors or revitalise older cities). Some of these campaigns have been successful, while others have failed. People involved in social change campaigns have gradually come to realize that an approach focused entirely on alerting the public to the dangers of certain health related behaviours or of polluting the environment is often inadequate in fostering changes in attitudes, opinions and, above all, behaviours. [8]

The educational challenges for sustainable societies are great for several reasons: (a) the global sustainability challenge is unprecedented in both magnitude and complexity, (b) there is no history of

societies willingly and deliberately taking steps to institutionalize restraints and change individual and collective behaviors to achieve greater sustainability, and (c) a constructive educational response must include a comprehensive, coordinated attempt to redefine the human role in nature and reexamine many assumptions, values, and actions we have long taken for granted [9]. We must "prepare each student to lead a sustainable lifestyle" and "place ecosystems concepts at the intellectual center of all disciplines" [9].

In outlining an array of strategic actions and initiatives promoting education for sustainability, the report focuses on six themes:

1. Lifelong learning within both formal and nonformal educational settings.
2. Interdisciplinary approaches that provide themes to integrate content and issues across disciplines and curricula.
3. Systems thinking as a context for developing skills in problem solving, conflict resolution, consensus building, information management, interpersonal expression, and critical and creative thinking.
4. Partnerships between educational institutions and the broader community.
5. Multicultural perspectives of sustainability and approaches to problem solving.
6. Empowerment of individuals and groups for responsible action as citizens and communities[6].

These themes reflect an acknowledgment that education about the environment and sustainability is interdisciplinary in nature, must allow for multiple perspectives, depends on collaboration across agencies and groups, and presumes a lifelong path of learning that extends through all levels of formal education into a variety of nonformal settings. The task, simply put, is to transform prevailing mindsets to recognize the long-term limits that nature imposes and the need to "nurture, rather than jeopardize, the ecological systems" that support our activities [10]. The Guidelines provide a conceptual framework for environmental education, and they are organized around themes that are well aligned with the ideas shaping education for sustainability. Indeed, some have suggested that education for sustainability has become the new focus and justification for environmental education[11].

The organizing themes for the NAAEE guidelines are as follows:

- Questioning and analysis skills.
- Knowledge of environmental processes and systems.

- Skills for understanding and addressing environmental issues.
- Personal and civic responsibility.

These themes clearly complement the six themes of "Education for Sustainability," and they reflect a connectedness among natural systems, human actions, and the need for individuals and groups to analyze issues, make decisions, and take actions that support sustainable ecosystems. It is also clear from these two sets of themes that teaching for sustainability cannot be relegated to a single course or subject area; the themes of education for sustainability must come to permeate all subject areas at all educational levels [12].

5 Instruments of Environmental Policy - Eco School

Instruments of environmental policies are related to methods, environmental legislation and administrative procedures developed with a view to reduce negative impacts on the environment created by human activity. The aim of developing such mechanisms is the establishment of a decision-making system that will contribute to more reasonable and balanced decisions. The instruments of environmental protection policy are divided into environmental protection, information and legal instruments. The synergy of all these instruments reflects society's reactions and dictates the steps that are to be made in order to ensure balanced development of the society as a whole. Their integration into sectoral policies is necessary in order to assure the integrated pollution prevention.

The instruments of environmental protection policy indicated further in this chapter deal with the economic aspect of environmental policy (environmental protection taxes and other environmental pressure charges), information parameters of environmental policy (reporting of environmental data), as well as the case of introducing an environmental management system which meets the requirements of ISO 14001 certification and the EMAS scheme (Eco-Management and Audit Scheme) [16].

Eco school as a way of life offers and gives us possibilities to change our relation to nature and preserve what we have today. Carrying out the project Eco school as the way of life is actually kind relation to nature and at the same time our way of life [17].

The Government in England wants every school to be a sustainable school by 2020. The Department for

Children, Schools and Families (DCSF) launched their Sustainable Schools Framework in 2006 when the Secretary of State for Education, the Rt Hon Alan Johnson MP set out challenging long-term aspirations for schools to mainstream learning about sustainable development issues and sustainable practices into everyday school life. Eco-Schools is an international award programme that guides schools on their sustainable journey, providing a framework to help embed these principles into the heart of school life[18]. Eco-Schools is one of five environmental education programmes run internationally by the Foundation for Environmental Education (FEE). In addition to Eco-Schools, FEE runs Green Key, Young Reporters for the Environment, Blue Flag and Learning about Forests. There are 46 countries around the world that run the Eco-Schools programme, linking more than 40,000 schools – from the UK to France, from Morocco to South Africa. Eco-Schools is administered in England by ENCAMS; in Scotland by Keep Scotland Beautiful; in Wales by Keep Wales Tidy; and in Northern Ireland by Tidy Northern Ireland [18]. It is now easy for Eco-Schools across the world to get in touch and explore ways of working together on environmental issues. Visit www.eco-schools.net where you will find instructions on how to register your school and carry out a search. After finding an Eco-School that matches your criteria, you

can then contact the ‘match’ school by post, telephone or email! Joining the Eco-Schools programme is free and it makes tackling sustainable issues manageable and easy for all schools, whether they are children’s centres, nurseries, primary schools, secondary schools or schools with special status. Once registered, schools follow a simple seven-step process which helps them to address a variety of environmental themes, ranging from litter and waste to healthy living and biodiversity. Children are the driving force behind Eco-Schools – they lead the eco-committee and help carry out an audit to assess the environmental performance of their school. Through consultation with the rest of the school and the wider community it is the pupils that decide which environmental themes they want to address and how they are going to do it. Measuring and monitoring is an integral part of the Eco-Schools programme, providing schools with all the evidence they need to really shout about their environmental success. Schools work towards gaining one of three awards – Bronze, Silver and the prestigious Green Flag award, which symbolises excellence in the field of environmental activity. Bronze and Silver are both self accredited through this website and Green Flag is externally assessed by ENCAMS [18]. Figure 2 presents number of Eco- schools in Slovenia.

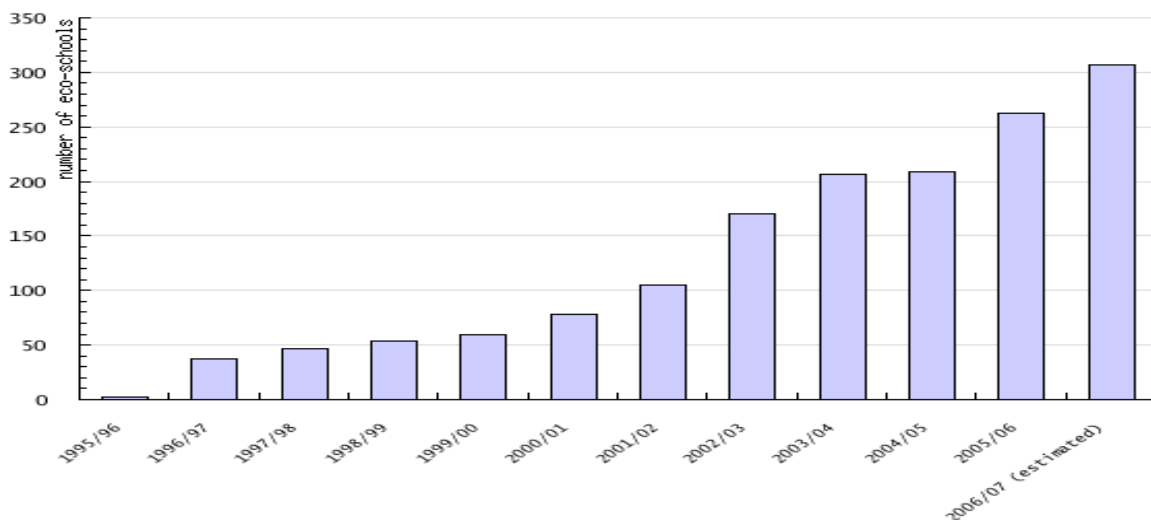
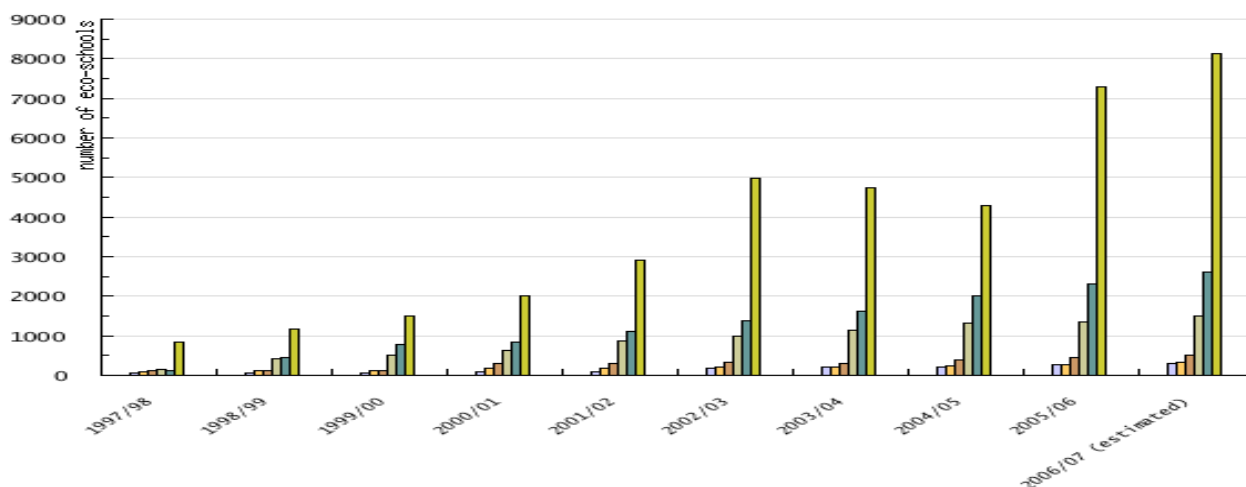


Figure 2: Number of Eco schools in Slovenia [16]

		1995/96	1996/97	1997/98	1998/99	1999/00	2000/01	2001/02	2002/03	2003/04	2004/05
Eco-schools	no.	2	37	47	54	59	78	105	170	206	209
		2005/06	2006/07 (estimated)								
Eco-schools	no.	263	307								

Table 3: Number of registrated Eco-schools in Slovenia**Figure 3:** Number of Eco schools in Slovenia and EU countries with the biggest number of Eco-schools[16]

6 The 7 Eco- Schools Steps

1. The Eco-School Committee

The committee is the core of the Eco-Schools process, both organizing and directing Eco-Schools activities. Consisting of the stakeholders of the school environment - pupils, teachers, cleaners, caretakers, parents and governors - the committee is democratic and run by the students themselves. Whatever the type of school or age group, student involvement in the committee is essential.

2. Environmental Review

Work begins with a review of the environmental impact of the school and identification of issues for action. Pupils are involved in this work from assessing the level of litter on school grounds to checking the

building for inefficiencies such as leaky taps or electric equipment left on overnight. The Eco-School can work with local organizations and industries during the review.

3. Action Plan

The information from the review is used to identify priorities and create an action plan, which sets realistic targets to improve environmental performance. The action plan could involve and promote, for example, a paper recycling policy, eco-friendly cleaning materials, car sharing, turning off lights, fitting push water taps or litter strategy.

4. Monitoring and Evaluation

This ensures that progress towards targets and any necessary changes to the action plan are made and that

achievement is recognized. It also ensures that environmental education is an on-going process in the school.

5. Curriculum work

Classroom study of themes such as energy, water and waste are undertaken by most students. The whole school should be involved in practical initiatives - for

example, saving water, recycling materials and preventing litter. Where environmental education is not part of the national or regional curriculum, recommendations are made as to how these themes can be incorporated.



Figure 4: The 7 Eco- Schools Steps [19]

6. Informing and involving

This brings Local Agenda 21 directly into schools as local authorities, businesses and the wider community are involved in the Eco-Schools process. Eco-Schools are encouraged to make ties with external organisations in order to benefit from their experience and expertise. In some schools, environmental consultants have offered to take part in the environmental review process. Others have offered advice on school grounds and energy management. Eco-Schools are also encouraged to consider the wider community when preparing action plans - for example, schools could offer to be the local recycling point. A

publicity programme keeps the school and the community informed of progress through classroom displays, school assemblies and press coverage.

7. Eco-code

Each school produces its own code setting out what the students are striving to achieve. The Eco-Code is displayed in various places within the school and is recognized by the students as a statement of beliefs and intents [19].

7 Conclusion

Most of the environmental challenges we face could be resolved if each individual and organization slightly changed their habits and practices. The key to achieving this is education – providing the knowledge and desire for change to happen. A truly sustainable society will only be created when caring for the environment becomes second nature to us all. Ultimately, most of the environmental challenges we face could be resolved if each individual and organization slightly changed their habits and practices. The key to achieving this is education – providing the knowledge and desire for change to happen. We as individuals, and indeed society as a whole, change our habits all the time. Ten years ago very few people recycled their waste yet today the majority have learnt the habit. For many it is no longer a conscious effort, recycling has simply become the way things are done. Small changes such as this accumulate to change the paradigm of our society. A sustainable society will only be reached when caring for the environment becomes second nature to us all.[20]. The theory on the basis of the practical experiences envisages sustainable development planning as a process of continuous improvement [21]. New environment issues dictate the redefining of economic interests in the wake of the recognition, that the natural environment is a limited production factor[13]. The interest of customers, users, developers and others in the environmental aspects and impacts of products is increasing [14]. Education for Environmental Excellence in Global Marketing is no more question. Education and environmental management with environmental policy is a first step to sustainable development.

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