# INNOVATIVE APPROACH TO EDUCATION ON CURRENT ENVIRONMENTAL PROBLEMS: SOME CASE STUDIES

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**Abstract**

*For effective education on current environmental problems in Slovenia two educational polygons were established with the help of the Ministry of Education. The mission of the first educational polygon for ecoremediation is to educate the youth about the adaptation to climate change. The focus is on green technologies and natural systems. The polygon for self-learning is intended for teaching practically all generations, not just schoolchildren, how to raise the awareness of their own self-sufficient supply. The emphasis is on protection of soil and organic matter in sustaining life in the soil.*
**Key words:** *adaptation to climate change, ecoremediation, environmental problems, learning by doing, self-sufficient supply*.

## Introduction

In today's learning process, the importance of acquiring various skills and obligatory knowledge for improving the general quality of individual lives and society as well as for developing a responsible attitude towards the living environment is increasing. The application of the sustainability principle is the assurance for a responsible attitude towards the environment; education and training were recognized as key elements in positive changes of the value and attitude towards the environment. The announcement of the period between 2005 and 2014 as the "Decade of Education for Sustainable Development" by the United Nations (Council of the European Union, 2010) has confirmed that.

Due to the increasing awareness of the importance of sustainable development and the need for education for sustainable development in accordance with international documents, such as UNECE Strategy for Education for Sustainable Development (adopted in Vilnius 2005), Slovenia has also developed a series of strategic documents as well as Education Guidelines for Sustainable Development from pre-school to pre-university education, 2007 (Res**o**lution 57 / 254 on the United Nations Decade), action plans and initiatives that have stressed the importance of environmental education and encouraged the inclusion of nature and environmental protection contents into the school area with the awareness that success in changing unsustainable trends will largely depend on the high quality education for sustainable development at all levels of education (Stipek, 2002).

By emphasizing the importance of protecting nature and the environment, contemporary trends in society, new environmental technologies, standards and legislations in the EU, which require new skills and competences, follow also the need to develop new professional profiles in the field of nature and environmental protection (Hvala

Kamenšček, 2007). During the reformation and development of professional educational programs, two completely new educational school programs were recognized as socially necessary; namely the educational program for the Nature conservation technician and the Environmental technician, which were created to acquire professional qualifications in the field of nature and environmental protection. Nature conservation as well as environmental protection requires extraordinary interdisciplinary knowledge and skills (competences), which can develop only within a high quality interdisciplinary curriculum that places great emphasis on practical education and on linking theory with practice. To this end, the initiative for the establishment of learning centres in nature or education polygons has been developed under the leadership of the International Ecoremediation Centre of the University in Maribor and with the participation of local communities, which will create the conditions for experiential learning, research and project work, developing skills and competences in the field of nature as well as environmental protection. These education polygons were established in the Dravinja Valley in the municipality of Poljčane (under the Natura 2000 region) and are also known as the "classroom in nature".

**Methodology of establishing the "classroom in nature"**

In 2009–2010, the state of Slovenia launched two projects from the ESF (European Social Fund) for innovative education and for creating appropriate conditions for experiential education for sustainable development. Within these two projects, the Dravinja Valley learning region was established, connecting two educational polygons, 15 learning trails, 7 learning observation points, 3 cycling educational trails and the Development Centre in Nature. With the establishment of the Dravinja Valley learning region an outdoor classroom in nature for the purpose of current development research in climate change, green technology, bio-economy, self-sufficient supply, traditional practices of environmental management and innovation was created.

This paper provides an evaluation of the Dravinja Valley learning region in terms of sustainable ecosystemic dimensions: the dimension of integrity, prosperity and self-sufficient supply, involving the local population. The main interest was the learning region´s contribution to the achievement of the educational goals for sustainable development. For that reason and based on the sustainability factor, the criteria were developed and an evaluation of the learning region according to the level of sustainability was made in order to classify it in an appropriate model of sustainability.

This paper presents both educational polygons with the emphasis on experimental learning about current environmental issues. Both polygons are equipped classrooms in nature, aimed to raise the motivation of students and provide better possibilities for research and practical training. The polygon for ecoremediation is intended for learning about the adaptation to climate change, while the second polygon is focusing on how to increase self-sufficient supply.

**The educational polygon for experiential education on self-sufficient supply**

This polygon was established within the framework of the project Establishing Conditions for Experiential Learning for Sustainable Development, which was financially supported by the Slovenian Ministry of Education in 2010.

**Figure 1: The educational centre in Dole with objects for sustainable energy use and garden patches (photo by the author, 2012).**

The polygon is located in the village of Dole in the municipality of Poljčane in Slovenia and covers 1.2 ha. It is intended for the purposes of education on self-sufficient supply, from the preschool education level to the lifelong learning level. Many educational contents are presented as a part of this educational polygon concept, from planning land use according to relief, exposition and inclination, soil characteristics, water availability, to the field research of landscape components. Together with land use, energy is a crucial issue in self-sufficient supply. The focus of the educational polygon is on identifying the possibilities of using natural resources for self-sufficiency regarding energy, which is closely related to gaining knowledge about the soil, humus, organic material, water condition, climate conditions and animals. It is also strengthening the cooperation within the local community.

**Figure 2: The soil cultivation is the basic task of the educational polygon (photo by the author, 2012)**

The aim of the educational polygon for self-sufficient supply is to present the possibilities of an individual's self-sufficiency in terms of available resources and to simultaneously explore new possibilities of an economical relationship towards nature and environment in innovative ways. The educational polygon offers various knowledge contents in the field of permaculture and the natural way of living. The key objective of the education on self-sufficient supply is to connect – through

experiential learning – the contents of natural sciences with those of social sciences, which is also the mission of geography (www.ucilnicavnaravi.si).

**The ecoremediation polygon for learning how to adapt to climate change**

The educational polygon for ecoremediations was established in the village of Modraže (the municipality of Poljčane). On the educational polygon many educational goals can be achieved through inquiry-based fieldwork by using various innovative techniques and approaches. The polygon offers a variety of natural or man-made ecosystems, representing nature in its basic form. The educational polygon for ecoremediation offers various ecosystems and presents them in their natural habitats. Some of the ecosystems are totally natural, while others were established under our supervision and are meant for professional education and comparison with their natural counterparts. Some of the processes which are happening in nature and are impossible to see with the naked eye are introduced by special models that explain them. Other types of ecosystems which have already been established on the educational polygon are presented as eco-systematical technologies, where the use and purpose of ecoremediations as an approach of sustainability and revitalization of degraded areas is introduced. The focus is on identifying potential water retention, water purification and multi-purpose use of water, which is very important in adapting to climate change.

**Figure 3: The model for water treatment in a natural way (photo by the author, 2012).**

**New challenges in education in the 21st century in the "classroom in nature"**

By introducing educational polygons in Slovenia, we encourage especially young people to collect direct learning experiences in nature already during their school period. We offer them an alternative to the current approach, which is mainly bound to learning in classroom or using computers and the internet. The advantage of educational polygons is the possibility to show the students even other dimensions of a healthy, happy and successful life, based on cooperation with nature and the local population. The establishment of permacultural systems that increase self-sufficiency has in recent years gained on importance as an attractive approach in the food production.

Permaculture is used as a scientific method of integrated holistic planning in all areas of life. The fundamental permacultural ethical principles are care for the earth and people and sharing of surpluses according to the permacultural planning principles. The main feature of permacultural planning is putting things in their proper place in space according to their mutual relations with other elements of the system, which enables efficient use of time, energy and resources. Ecoremediation systems are used to adapt to climate change and to reduce water and soil pollution. Its concept is used to protect and restore the environment and nature through natural and sustainable systems. Ecoremediations therefore combine several functions such as water retention, strengthening the buffer system – self-restoration potential and biodiversity, which is not possible by using classical technical methods. This multipurpose function enables the multi-sectoral use of example water by using ecoremediation, which is in line with many regulations and laws that require multipurpose use of space.

Slovenia´s rich natural and social heritage provides wide possibilities of new developments in the field of education, which are not yet fully exploited. Within the GATS projects and in cooperation with professional institutions, a number of municipalities have developed learning paths, tourist and educational infrastructure as well as possibilities for experiential learning in nature. The Faculty of Arts, especially the International Centre for Ecoremediation, is tackling the systematic linking of needs (needs for experiential education) and supply (equipped local environment) by using this learning region, equipped with innovative educational polygons. This type of integration enables not only the rise of experiential education in Slovenia but also international recognition. Current problems such as the environmental pollution, food scandals, the economic crisis and unemployment are serious milestones for reflection on education in the future. On the basis of experiential education, educational organizations have a tremendous opportunity to connect traditional knowledge with innovative approaches and thus create jobs for young generations.

**Conclusion**

Educational polygons represent the complex classroom in nature with its most important natural and anthropogenic forms of ecoremediation and self-sufficient supply that were recognized as an opportunity for cognition and understanding of ecosystemic functions so that we can find sustainable ways of solving ecological problems in the course of sustainable development. These polygons enable acquisition of interdisciplinary knowledge and competences in the field of nature preservation by using a variety of learning methods that the experts emphasise as vital: practical class (learning by doing), project work, experimental work and problem-based teaching (Boekaerts, Corno, 2005; Cortese, 1999).

The key purpose of the polygons is that the learner in the outdoor classroom tries to identify basic environmental problems through gathering different measurements, analyses, information processing and by making comparisons. Based on this, the learner can individually or / and with help of a teacher, as a catalyst in the learning process, discover causes and effects of various environmental problems and furthermore, based upon the collected data, look for a solution (Zupan, Vovk Korže, 2008). The basic purpose of the

education polygons is to develop and strengthen the individual's ability to recognize and understand the processes that are taking place in nature and the environment and based upon that educate students in monitoring and analysing so that they can critically validate the consequences that are brought upon by the scientific and technological development, and furthermore to search for alternative solutions in regard to the needs of future generations. Sustainable development considers natural processes and the carrying capacity of our planet; therefore it is crucial to know what these processes are.

**Acknowledgement**

Educational polygons were established within the project that was supported by the Slovenian Ministry of Education and Sport.

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*Received 27 February 2013; accepted 20 March 2013*

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