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THE ROLE OF THE INTERDISCIPLINARY RESEARCH PROJECTS IN ENVIRONMENTAL EDUCATION

Abstract: Environmental (ecological) education has got an international scope, proved in records from conferences devoted to this subject. Among international motions in favour of environment education, pupils' interdisciplinary research projects (programmes) are worth to be noticed. These projects employ the methods used in scientific research regarding the environment. Very often, there are research teams consisting of pupils, teachers and research workers. Polish young people take part (or took part) in international research projects like GREEN (Global Rivers Environmental Education Network), GLOBE (Global Learning and Observations to Benefit the Environment), Air Pollution Project Europe and Coastwatch Europe.

Review of selected interdisciplinary research projects has been conducted and special attention has been paid to its significance in the implementation of environmental education.

Introduction

U Thant Report, presented in an open UNO forum in 1969, indicated the global character of threats to the environment. It has been done obvious that the actions on behalf of environment protection must have an international character. Proper environmental education of an international scope is a relevant feature of these actions. During the United Nations Stockholm Conference "Man and Environment" in 1972, the need of establishing international environmental education curriculum has already been indicated. UNEP and UNESCO Congress, which took place in Moscow in 1987, appointed International Strategy for Action in the Field on Environmental Education and Training for 1990s (published in 1988; Polish translation in [1]).

International implications of environmental education are pointed by National Environmental Education Strategy [2], whose description was commissioned by Agenda 21

(Global Action Plan), which is one of the documents of United Nations Conference "Environment and Development" held in Rio de Janeiro in 1992 [3].

Examples of interdisciplinary research projects

Among various possibilities of environmental education the interdisciplinary research projects (programmes) deserve a special attention; their advantages will be shown in conclusions of the present paper.

Starting with 1990s of the previous century, interdisciplinary research projects are popularised by young European people as a part of Science Across the World programmes like "Science Across Europe" (SAE) [4].

In Poland a high water contamination can be observed [5]. Considering our country's situation, GREEN international programme is recommendable. GREEN comes from shortcut of Global Rivers Environmental Education Network and was founded in the early 1980s. While entering the programme, pupils use Polish version of the manual by Mark K. Mitchell and William B. Stapp, "Field Manual For Water Quality Monitoring". This manual deals with problems of water and of aquatic biota. Presented information includes issues on chemistry, biology and geography [6].

During chemistry part of GREEN programme, pupils perform water analysis; for this purpose they carry out following measurements:

- a) concentration of dissolved oxygen in water,
- b) determination of the number of fecal coliform bacteria,
- c) pH,
- d) biochemical oxygen demand (5 days),
- e) water temperature,
- f) phosphorus content,
- g) content of nitrates,
- h) turbidity determination,
- i) total content of solid substances.

The above tests allow for complex evaluation of analysed water and also show the main influences of its contamination [7].

GLOBE (Global Learning and Observations to Benefit the Environment) is an internet program [8], centring pupils, teachers and research workers within the domain of acquaintance of environment global problems. The project proposal was introduced in 1994, and was accepted and enforced by United Nations Organisation in 1995. In 1997 Polish Ministry of National Education signed a treaty with the Department of Atmospheric and Oceanic Matters regarding the realisation of GLOBE in Poland.

Within GLOBE program, following observations and measurements are conducted:

- a) atmospheric (types of clouds, amount of precipitation, precipitation pH, temperature),
- b) hydrologic (transparency, water temperature, amount of dissolved oxygen, water pH, conductivity, salinity, alkalinity, content of nitrates (III) and (V)),
- c) soil (humidity, temperature, permeability),
- d) ground cover (biometry).

Norwegian preservation of nature association *Norges Naturrennforbund* worked out a programme called 'Air Pollution Project Europe' which developed as joint project

between English WATCH organisation and Swedish association called *Svenka Naturskyddsföreningen*. The project comprises the area of Central and North Europe and deals with the study of acid deposition and evaluation of sulphur dioxide concentration in the air on the basis of lichen's observation. The aim of the programme is to make annual reports relating to the threat of acid deposition.

The main value of this project is the participation of young people in research works carried out on local level; what is more, the project fulfils a significant educational function [9].

In 1987, "Coastwatch Europe" developed and the following year was the period when the idea was disseminated to 8 countries. In 1989 the first large scale survey was carried out simultaneously in 6 countries: Netherlands, Denmark, Norway, Great Britain, Ireland and Portugal. In 1992, 23 countries took part in "Coastwatch Europe", including Polish large scale participation. Initiators' main objective was to obtain data about ecological state of possibly the longest part of their countries' coast. This campaign allows for the data collection about the degree of environment threat on European coastal zone. Gathered data will enable to prepare detailed country and European reports, which will then be passed to authorities responsible for environment protection.

The survey conducted within this programme deals with:

- the way of organising the closest neighbourhood of the coast,
- the type and amount of streams going into the sea,
- the performance of chemical and microbiological tests,
- the character and type of sea fauna and flora,
- waste and pollution present on the shore [10].

Since quarter of the century, the problem of radon threat became the subject of numerous studies in scientific literature and mass media. Harmful effect of radon contamination was described in [11]. The subject of radon threat was took up in Polish research project RADONET – "Radon present at our houses – can this threat be accepted?" [4, 12]. The project was obtained by ICASE to the international programme of "Science and Technology Literacy for All". It has been assumed that the realisation of RADONET project will allow the pupils to find answers for the following questions:

- what are the ways of radon penetration into domestic buildings?
- how can radon level be diminished inside buildings?
- how can our health be protected against radon radiation?

Analysis of alpha particle traces left on TASTRAK plastic plates has been used to measure radon concentration in domestic buildings.

Only 5 environmental research projects have been presented above, nevertheless their list is quite long. By the way of example, further interdisciplinary research projects carried out by Polish young people can be enumerated: Kąg (The Ring), Zielone Karpaty (Green Karpaty), Błękitny Kciuk (Blue Thumb), Czysta Wisła i Rzeki Przymorza (Clean Vistula and Rivers of the Watershed).

Conclusions

The realisation of Polish environmental education is multidirectional and is divided into formal (school) and informal education. According to the educational reform from 1999, the realisation of formal environmental education takes place on two levels.

Environmental contents have been incorporated into block subject teaching programmes and particular subjects. The second level is established by one of educational paths – the environmental one, called environmental education.

Interdisciplinary research projects are the perfect supplement to formal environmental education. We can list following advantages of environmental education:

- possibility for pupils' knowledge integration (chemistry, physics, biology, geography),
- employment of methods used in professional scientific research regarding the environment,
- skills improvement in the usage of modern means of information technology,
- preparation of data-base in the environment scope,
- development of team work,
- pupils' stimulation around the idea of ecodevelopment.

There are not many works in literature related to the educational effectiveness of interdisciplinary environment projects. Survey results of the project "Czysta Wisła i Rzeki Przymorza" (Clean Vistula and Rivers of the Watershed) have been presented in the paper [13]. The author points out the social aspect of the analysed project. The realisation caused significant engagement of young people and social community as far as problem solving connected with environment protection was concerned.

To sum up, one can claim that the realisation of interdisciplinary research projects contributes to the increase of public ecological awareness.

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ROLA INTERDYSCYPLINARNYCH PROJEKTÓW BADAWCZYCH W EDUKACJI EKOLOGICZNEJ

Streszczenie: Edukacja środowiskowa (ekologiczna) ma wymiar międzynarodowy, co znalazło swoje odzwierciedlenie w dokumentach z konferencji poświęconych tej tematyce. Wśród międzynarodowych inicjatyw na rzecz edukacji ekologicznej na uwagę zasługują interdyscyplinarne projekty (programy) badawcze uczniów. Wykorzystują one metody stosowane w badaniach naukowych dotyczących środowiska. Często tworzone są zespoły badawcze złożone z uczniów, nauczycieli i pracowników wyższych uczelni. Młodzież w Polsce uczestniczy (bądź uczestniczyła) w międzynarodowych programach badawczych, z których najbardziej znane to: GREEN (Global Rivers Environmental Education Network), GLOBE (Global Learning and Observations to Benefit the Environment), Air Pollution Project Europe i Coastwatch Europe.

W pracy dokonano przeglądu wybranych interdyscyplinarnych projektów badawczych oraz zwrócono uwagę na ich znaczenie w realizacji edukacji ekologicznej.