PoS3-18

Projects of extra-curricular lessons in environmental education

Elwira Samonek-Miciuk, Department of Biology Education
Maria Curie-Sklodowska University in Lublin, Poland

Abstract. Contemporary Polish schools prepare pupils to living in the environment. Because of no subject like „environmental protection" teaching those contents are achieved interdisciplinary, principally during lessons of biology, geography, chemistry and physics. In the Polish environmental education the extra-curricular lessons in biology play an essential role. They stimulate interests in the problems of environment threats and its protection as well as increase the ecological awareness of young people. The authors' projects concerning the local environmental problems are a more and more frequently used educational strategy in this type of education organizational forms. In the Department of Biology Education M.Curie-Sklodowska University, there were carried out the studies to determine the effectiveness of the author's educational project concerning functioning and protection of the water environment. This educational proposal was elaborated to be used during the activities of the biology club in the grammar school. The subject of the author's project, information about organization and course of the studies as well as results and conclusions of the educational experiment are presented in the paper.

Introduction. After-school activities make a very important form of the natural science education. They are conductive to a talent and interest growth regarding the natural science (Stawinski 1985). They are based mainly on individually teacher-made-up programs. A non-obligatory nature of this type of activities, a small number of students in group (12-15) give big opportunities to organize educational trips and to put the research methods into practice. This influences students' intellectual and practical skills, creates a need to get to know the world empirically, contributes to more complete understanding of the processes and biological occurrences.

Didactical projects regarding local environmental problems make an important form of the natural science education (Cichy 1997, Rutkowski 1997). They model the awareness, are conductive to the values favorable to a man and environment promotion and prepare students to make decisions and solve problems (Cichy 1992 a, 1993).The important feature of the project of this type is a possibility of the students' direct activity in their surrounding natural reality. The participants of the scientific class activities make a diagnosis of the state of the environment and collectively undertake a task of improving it. Their pro-ecological attitude is formed, which makes a primary aim of ecological education (Cichy 1992 b).

In the Department of Biology Education M.Curie Sklodowska University in Lublin, an educational projects regarding the water environmental problems entitled „The environment of the Bystrzyca River, the diagnosis and protection", has been elaborated. It's aimed at the secondary level of education. Putting it into practice enables the students of the Lublin schools to see the relation between the natural processes taking place in water reservoirs. The project has been verified empirically during pedagogical experiment in order to examine its influence in education.

Theoretical assumption of the research. *The aim of the research* : Specifying the effectiveness of the author's after-school activity project regarding the water environment issues made-up for grammar schools students.

The matter of investigation: On what scale putting the author's project into practice increases the grammar schools students' knowledge on living conditions in the water environment

The research hypothesis : Using the didactical project which is assigned to be used during the extra- curricular lessons increases students' knowledge on water environment which is statistically essential.

The following *indicators* have been adopted in the research: the results of the didactical measurement evaluating students' achievements, the observed symptoms of students' interest in the discussed issues.

In order to verify the project empirically, the appropriate methods and research instruments have been used.

The research methods: the pedagogical experiment conducted with the one-group technique, pedagogical observation, a didactical measurement.

The research instruments: the school achievement test forms, pedagogical observation protocols.

The research organization. The research was conducted on the turn of September and October 1993. The four biology after-school activity groups have been set, in which 63 students from grammar schools took part (41 second-year-students and 22 third-year-students). Forty hours of after-school activities have been carries out. Ten lesson units in a four-meeting cycle (2-3-hour activities) have been used to put the author's project into practice in one group. The students' participation was voluntary. The students having high grades in biology were not the only ones who took part in the activities. The participants had different grades in biology. The biggest group were the students with a „satisfactory" grade (a „3" grade) -36%; a „very good" grade (a „5" grade)- 30,1%; and next the ones with a „good" grade (a „4" grade)- 28,6% and those with a „sufficient" grade (a „2" grade) -4,8%.The teachers have been thoroughly informed about the way of elaborating the research material. Every teacher received a detailed summary which included the aims of the education, the information regarding the range of contents, the methodology hints, didactical devices, the students' forms of work, the teacher's supporting literature.

The results of the research. The test of the students' knowledge and skills included 40 tasks. There were 22 tasks testing their knowledge (55%) and 18 tasks testing skills (45%). The test reliability factor was 0,87 which proves its technical correctness as an instrument of didactical measurement. To characterize the students' achievements the following statistical calculations have been used: the percentage indicators of each test task, the values of the arithmetic averages, standard deviations, coefficients of variation, the essence of differences between variations (with an F-test) and an r-Person correlation efficient.

Comparing the results achieved by the students during the initial and final measurements, it has been concluded that they were, in all cases, in reference to all the tasks, higher in the final test. The percentage of the positive results in the final is higher by 53,1% compared to the initial test. This prevalence referred both to the

tasks testing the knowledge and to the ones testing the skills, where the tasks controlling the knowledge showed the higher increase in the students' achievements by 61,7% and the ones controlling the skills by 43,3%.

When analyzing the indicators of dispersion of the measurement results, it has been noted that the initial measurement results were more changeable (a coefficient of variation higher by 45,2% compared with the final test). The bigger dispersion of the results around the average was in the final test. The statistical study carried out with the U-test allowed to note that the difference between the average results achieved by the students during the initial and final measurements is statistically essential on the level of 0,01. The achieved research results prove that the verified project made a considerable, statistically essential increase in the students' knowledge and skills regarding the water environment which confirms the assumed research hypothesis.

The research sum-up. The test results achieved by the biology activity group students are impressively high. We can suppose they were influenced by the following:

- the participants were the students who were interested in biology and whose participation was voluntary

- a small number of students in one activity group (10-15) which has a bigger impact on the students' contact with the teacher who can notice the students' problems more easily and react and eliminate them instantly when they occur through the appropriate didactical strategy

- the activity program which is of interest to the students

On the grounds of the conducted research the following conclusion have been made: The author's proposal about the extra-curricular lessons makes the grammar school students' achievements greater both in terms and skills

The didactical proposal verified in the research can be used in grammar schools and can be an inspiration for the teacher to make similar, effective projects regarding after-school activities and putting them into practice at school.

References.

Cichy D. ,Authors' Projects as a New Strategy in Environmental Education, Biology in School, 1992,5.

Cichy D., Authors' Projects as New Strategy of Science Education, Proceedings of 9th Seminar Didacics of Biology, Slupsk 1993, Pedagogical University

Kafel K., School Enviromnental Education - State and Prognoses (in:) Environmental Education Program. Theory and Practice, Cichy D. (ed.), Warsaw-Skierniewice 1996, National Fund for Preservation of Nature and Water

Rutkowski K., Agenda 21- Realisation of Educational Tasks (in:) Environmental Education - Agenda 21, Cichy D.(ed.), Warsaw 1997,Institute of Educational Research

UNO Conference Documents in Rio de Janeiro, „The Environment and Development", Warsaw 1993, Institute of Educational Research