

Projects on Environmental Issues for Enhancing Process Skills among Secondary School Students

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Abstract: *We, human beings, are blessed with physical elements include plants, animals, microorganisms etc. Besides physical and biological elements, cultural elements also contribute in the making of our environment. Lack of stabilized environment is a serious problem affecting the current generation. Our education has the responsibility to make them conscious about environmental issues happening around them. Project based learning (PBL) is a dynamic classroom approach in which students actively explore real - world problems and challenges and acquire a deeper knowledge. Learning through projects based on environmental issues will lead the students to reach the appropriate solutions about what the environmental issues are they concerned with. For this they need to go through processes like problem solving, inferring, hypothesizing, generalizing, communicating etc. and result in developing process skills in them. It can provide opportunities for students to interact with environment. The present study was conducted to determine the effectiveness of Projects on environmental issues to enhance the level of process skills in science at secondary school level.*

Keywords: Project Based learning (PBL), Projects on environmental issues, Environmental issues, Process skills

1. Introduction

“Man’s attitude towards nature today is critically important simply because we have now acquired a fateful power to alter and destroy nature, but man is a part of nature and his war against is inevitably a war against himself” (Carson, 1964)

Environment refers to the surroundings or conditions in which a person, animal or plant lives or operates. It incorporates biotic factors like human beings, plants, animal, microbes etc and abiotic factors like air, water, soil, light etc. According to Douglas and Holland (1947) “The term environment is used to describe in the aggregate, all the external forces, influences and conditions, which affect the life, nature, behaviour and the growth, development and maturity of living organism”. As inventions began to dominate nature man started to exploit the nature in his attempt to conquer. Scientific and industrial revolution during the last century brought comforts to man. The explosion of scientific knowledge during the past century developments of new technologies, modernization and urbanization have caused serious environmental crisis. The deterioration and depletion of natural resources for the human use have created environmental problems viz pollution, global warming, ozone depletion, deforestation, desertification etc. The serious problem aroused is that the stability of environment is lost and each and every one is responsible for gaining the lost stability. Now we are in need to stick on effective remedies.

2. Experience Based Learning

“Experience based learning is the process whereby knowledge is created through the transformation of experience. Knowledge results from the combination of grasping and transforming experience” (Kolb, 1984). According to Boud, Cohen & Walker (1993), ‘In experience - based learning experience is the stimulus for learning, learners actively construct their own experience and learning

is socially and culturally constructed’. Experience based learning otherwise experiential learning which places the experience of the learner in the central place of teaching and learning process. A key element of Experience Based Learning (EBL) is that students analyse their experience by the processes such as reflection, evaluation and reconstruction of the experiences. These processes happen sometimes individually, sometimes collectively and sometimes both. This review of their experience may lead to further action. Experience based environmental learning is an opportunity for the students to learn through one’s own life style and actions. This type of learning says ‘Get your students involved in their own learning’. Each student is their own laboratory. It offers a way for students to apply classroom topics to realize their own solutions.

Project Based Learning Strategy (PBL) is experience centred teaching strategy and it advocates that education should be related to life situations. Markham (2011) describes Project Based Learning (PBL) as: "Project Based Learning (PBL) integrates knowing and doing. Students learn knowledge and elements of the core curriculum, but also apply what they know to solve authentic problems and results that matter. PBL refocuses education in the student, not the curriculum - - a shift mandated by the global world, which rewards intangible assets such as drive, passion, creativity, empathy and resiliency. These can't be taught out of a textbook, but must be activated through experience. "

3. Need and significance of the study

According to the declaration of the United Nations Conference on Human development (Stockholm, 1972), “To defend and improve the environment for the present and future generation has become an imperative goal of mankind. " We are blessed with physical elements include plants, animals, microorganism and man. Besides physical and biological elements, cultural elements (economic, social and political) also constitute in the making of our environment. Lack of stabilized environment is a serious

problem affecting the current generation. Regaining the lost stability is a tedious mental task. Our education has the responsibility to make them conscious about environmental issues happening around them.

Successful learning in EE is closely related to the teaching - learning strategies used by the teacher and the students. The most popular strategies for EE are under investigation are small group works, debates, peer - tutoring, collaborative learning, project works, problem solving and presentations. The students are at the centre of the educational process and teachers should take the roles like organize, direct, guide, help and support the inquiry, creativity and cognitive activities of the students. The teacher should facilitate and direct learning by stimulating students to ask questions, giving responses to their answers helping them accept challenges, think critically and offer creative solutions. It is very important that students should undertake the responsibility for their educational and personal development. EE is concerned with complex systemic objects and need an in - depth study to perceive its structure and functions. For this reason, the interaction of a number of objects is used in EE. Intra - disciplinary (integration in one school subject e. g. Biology) and inter - disciplinary (integration between several school subjects e. g. Biology, Physics, Chemistry, Geography) synthesis is possible only when real life problems are taken into account.

The present classrooms neglected the emotional aspects of the environment. It is better to concern with affective domain and attitudinal development among pupils. Experience based learning can fulfill the need of developing positive attitude and values in children towards environment. For this develop opportunities for students to interact with the environment. A teacher can stress on his/her students on detecting and monitoring any environmental issue than understanding the concept behind the issue. Not just providing information about environmental issues around them, but giving them opportunities to collect data from problem areas and to prepare projects and their own solutions. As a result, pupils develop several process skills, social and individual skills and social values so that they should attain environmental experiences.

In PBL students read some reference materials, talk to some professional people and public, visit the issue affected places, observe what is going around his/her environment and so on. This is how they gather data, and then they analyse their data and prepare their project reports. In order to present the report, the pupil can choose his/her own modes. Students learn a lot when these reports are discussed in the class. Such an experience - based strategy can make our classrooms environment friendly. But the fact is that this is the least used method in our secondary classrooms due to its practical difficulties. The prominent importance given to this technique in the classroom can develop in children process skills, learning in scientific method, increase the critical thinking ability and many social and individual skills. In this strategy students are led to reach the appropriate solutions about what the environmental issues are they concerned with. For this they need to go through processes like problem solving, inferring, hypothesizing,

generalizing, communicating etc. and result in developing process skills in them.

After thoroughly searching through the related literature, the investigator found the need for conducting the research to verify the effect of projects to work against environmental issues happening in the world and is an attempt to enhance the level of process skills of secondary school students through projects.

Hypotheses formulated for the study

- Projects on environmental issues can promote process skills among secondary school students.

Objectives of the study

- To find out the effectiveness of Projects on environmental issues on process skills in science among secondary school students.
- To compare the post - test scores of process skills of students learned through Projects on environmental issues based on gender.

Methodology in Brief

The study was conducted on a sample of 80 Std IX students of GHSS Kulakkada in Kollam District. The investigator analysed secondary school level Science curriculum of Kerala and the areas of environmental importance are identified. The project learning materials with organised steps are prepared on the basis of the environmental issues selected. The major environmental issues selected are air pollution, water pollution, unscientific solid waste disposal and river pollution. The experimental group was taught through Projects prepared.

Tools used

The various tools employed for the study are Process skills test (for both pre - test and post - test) and Projects based learning materials on selected environmental issues.

Statistical techniques used

Descriptive statistics such as mean, standard deviation and the inferential statistics 't' test are used to analyse the data.

4. Result and Discussion

Results of the study are presented below in three different parts.

Result of test of significance of difference between mean pre - test and post - test scores of experimental group.

Table 1: Result of test of significance of difference between mean pre - test and post - test scores of experimental group.

Test scores	Mean	Standard deviation	Critical ratio	Level of significance
Pre - test	33.41	4.8	12.60	0.01
Post - test	43.8	5.6		

Table 1 showed the mean pre and post test scores of the experimental group. The t - value is 12.60 which is significant at both levels.

Result of test of significance of difference between mean scores of process skills of boys and girls in experimental group.

- [6] "http://www.biologycorner.com/projectecoproject/undertml.teacher".
 [7] www.eric.in
 [8] www.ncert.nic.in

Table 2: Result of test of significance of difference between mean scores of process skills of boys and girls in experimental group

Group	No. of students	Mean	SD	CR	Level of significance
Boys	51	44.6	4.56	1.79	NS
Girls	29	43.0	3.73		

Table 2 revealed that there is no significant difference between boys and girls in their post scores of process skills test.

5. Findings

- The test of significance of difference between mean pre - test and post - test scores of process skill test of the students learned through Projects on environmental issues is statistically significant. This revealed that the effectiveness of Projects on environmental issues for enhancing process skills among secondary school students.
- The mean post test scores of boys and girls of Projects group revealed that there is no significant difference between the boys and girls in their post - test achievement. Thus Projects are effective for both boys and girls for enhancing process skills.

6. Conclusion

The present study was an attempt to explore the effectiveness of Projects on environmental issues for enhancing process skills in science at secondary school level. The study revealed that learning through Projects on environmental issues can process skills in science. Implementing Projects in classrooms can not only just provide information about environmental issues but also giving opportunities to apply the knowledge to solve problems. Doing projects provide stronger learning opportunities and encourage pupils' active inquiry and process skills development. It promotes better team working and development of an integrated knowledge base. Hence it can be effectively used in our classrooms.

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