

## Measurement of the Effectiveness of Various Environmental Education Programs on Different Target Groups (A Review)

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### Abstract

Environmental education (EE) plays a very critical role in promoting sustainable environment and contributes positively towards environmental protection. Hence, understanding how to simplify the complex scientific knowledge that will properly fit the respective target group as well as the suitable method of knowledge transfer is of great importance. This study therefore reviews some recent works by various authors from different countries such as Malaysia, Vietnam, Brazil, Spain, Germany and South Africa. The general assessment of the environmental education intervention impact on the respective target group is clearly carried out and the results show that using the right delivery technique is very important in achieving effective outcome. Moreover, the right framework for environmental education is useful in any intervention program to help the practitioners achieve the best outcome.

**Keywords:** Environmental Education; Target group; Participatory Action Research; Knowledge Transfer; Success indicators

### Introduction

Globally, there are numerous cases of environmental problems such as earthquake, landslide, flooding, air pollution, forest fire, water pollution, and so many others. Most of these problems are associated with anthropogenic activities. IPCC (2014) reveals that human behaviors are great drivers of environmental degradation, hence, a call for action by everyone to help in curbing human's contribution has been made. Lack of knowledge remains a big problem in most parts of the world as people engage in various activities that pollute the environment without knowing the immediate and long term

consequences of their actions. For this reason, environmental education has been identified as a useful tool in eradicating some of the causes of environmental degradation (Otto and Pensini, 2017).

Monroe et al. (2007) describes environmental education as an approach, a philosophy, a tool as well as a profession. This approach not only helps individuals to develop an in-depth understanding of environmental issues but also equip them with the necessary skills of making informed and responsible decisions. Contribution to change in student's commitment, motivation, stewardship, behavior and attitudes are other

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benefits of environmental education (Alexandar and Poyyamoli, 2014). Lawson et al (2015) demonstrate that for effective transfer knowledge of any particular environmental issue, the target group should be identified and the suitable method for the group should also be used. Some examples of target groups include different categories of students, teachers, workers, volunteers, community, firms, government agencies and others. This will hence determine the appropriate transfer method to be used. Types of knowledge transfer in teaching include the following; video presentation, handbook, workshop, simulation, environmental games, field visit, project work, debates and panel discussions (Chunkao, 2018). The positive outcome of any intervention program is its major success indicator and is usually obtained through the use of structured program and materials (Loubser et al., 2014).

### **Methodology**

Ten different studies on environmental education carried out between 2006 and 2019 were identified through Google Scholar. Environmental education intervention programs done in various countries such as Malaysia, Vietnam, Brazil, Germany, Iran, Spain, South Africa and Lithuania used different target groups like students, farmers, teachers and women. All the studies were reviewed and the impacts of the respective programs on the target groups were carefully identified taking into consideration the delivery techniques applied.

### **Results and Discussions**

Loubser et al. (2014) assessed the effectiveness of environmental education workshops for teachers, learners and schools in Malaysia.

This evaluated the school nature club organized by the Malaysia Nature Society and Forest Research Institute of Malaysia. Both quantitative and qualitative methods were used to determine the impact of the intervention program. Kellog Logic Model (KLM) was also used as an evaluation instrument to determine its success while questionnaires were used to gather data from the participants. The principals of the schools were individually interviewed. Results showed that there were positive impacts recorded among the participants and the schools. The teachers found the workshop very useful and easy to understand. The principals on the other hand agreed that the program has positive environmental outcome on the schools.

Generally, observations made during visits to the schools showed positive evidence of impacts such as clean school gardens, establishment of recycling and gardening activities, composting, integration of EE into school curriculum as well as active reduction in resource utilization. Few schools, however, recorded lower impact but, it was concluded that more positive impact indicators were recorded.

Dopico and Garcia-Vazquez (2011) used field work as a learning methodology. The student researchers were involved with the rural farmers in the Northern part of Spain where they were exposed to the traditional culture of the region. The farmers on the other hand were impacted positively as their knowledge in farming practices was improved. Valderrama-Hernández, et al., (2017) researched on the complexity of EE among teachers in Spain. Teaching ideas, conceptions and methodological approaches of the teachers of primary, secondary and tertiary institutions were analyzed to understand their par-

adigm towards EE. 58 teachers between 22 and 60 years participated in this study. Most of the respondents believe EE should be part of entire school curriculum system but also raised concern about its fragmentation and simplification in the planning process. The study concluded that involving teachers during EE curriculum development would help to overcome hurdles faced in teaching EE and will also help to ease understanding of EE. Rodrigues (2014) researched on the impacts of involving high school teachers in the development of proposals for high school EE teaching. The study was conducted in Brazil and the evaluation of the professional development program for teachers showed that a significant transformative effect among them was recorded.

Sellmann and Bogner (2013) examined the effects of a 1-day EE program on environmental attitudes and connectedness with nature among high school students in Germany. It was an outdoor program with the objective of connecting students with nature to improve their environmental attitudes. Two Major Environmental Values scales (2-MEV) were used to assess their environmental attitudes (preservation and utilization). Inclusion of Nature in Self (INS) measurement and 2-MEV showed that a favorable change was recorded. An increase of preservation was also recorded. In addition, INS scores showed a decrease in utilization scores. The study recorded a positive effect on the students immediately after the program. However, after 4 to 6 weeks, results obtained showed that long-term change in attitude was only recorded in the utilization. In line with this, it was concluded that 1-day EE program has positive short and long-term effects on the students but when compared with a longer program, more persistent impacts on nature

connectedness is better achieved.

Almas et al. (2019) examined the impact of EE program in Iran which used women as a target group. They assessed the knowledge, attitude and practice of the Kermanshahi women towards municipal solid waste management. The study concluded that creating participatory research and encouraging programs among the families and the municipality can lead to improved waste management practices. Hoang and Kato (2016) measured the effect of EE for sustainable development at two primary schools in Da Nang city of Vietnam. 247 students were involved in this study. The students' knowledge of solid waste management was evaluated and the results showed increase knowledge after the program. 29% of the students knew about eco-bags initially which was increased to 87% at the end of the program. In addition, there was a record of 55% against 71% before and after the program in the knowledge of biodegradability of plastic bags. The study, in conclusion, showed that there was an increase in the students' knowledge about solid waste management.

Staniskis and Stasiskiene (2006) studied the impact of using integrated approach to teach EE in Lithuania using MSc degree students as target group. Various impacts of industrial processes on the environment were identified and the need to increase knowledge of the environmental consequences was promoted. The merging of EE and Cleaner production enabled the students to understand the interdependence of environment, technical, economic and social sciences and thereby developed multi-disciplinary research and development.

Otto and Pensini (2017) evaluated the impacts of nature-based education on the envi-

ronmental knowledge and ecological behavior of 4th to 6th graders in Berlin, Germany. The study promoted of environmental knowledge about flora, fauna, and the ecosystem, through nature connection. It therefore recorded increased in ecological behavior of the students. Singh (2013) used active engagement to involve research students in the problems of the communities. The approach of participatory research is to enhance their knowledge and understanding of the problems facing the South African communities on a more personal level. The study concluded that

the students developed more long-lasting and sustainable awareness and behavioral change as the program stimulated them and gave them opportunity to deeply think of solutions to real life problems.

Table 1 shows the summary of the reviewed works indicating the target groups used, countries where the works were done, topics of interest, methods of delivery used for each case study, and finally, the impacts of each program on the respective target groups.

**Table 1:** Summary of the reviewed articles

Reference	Country	Target group	Topic	Teaching method/tool	Remarks/Impacts
Loubser et al. (2014).	Malaysia	Teachers School principals	Evaluation of the school nature clubs	Workshops Questionnaires Interviews	Positive impacts on the schools recorded Collaboration between agencies, government, research institutes produces more effective results
Dopico and Garcia-Vazquez (2011)	Spain	Rural farmers (67-86 years old)	Teaching EE through immersion in rural cultural life	Participatory Action Research (PAR) Questionnaire	Change in perception of the rural farmers about future of agriculture was recorded Great improvement in the school curricula and continuous education in Spain and abroad
Valderrama-Hernández, et al., (2017).	Spain	Teachers (22-66 years old)	Analysis of teachers' conception about EE	Questionnaire Interview	Cooperation from all disciplines, teamwork and teachers' training are encouraged

Table 1 (Continue)

Reference	Country	Target group	Topic	Teaching method/tool	Remarks/Impacts
Rodrigues (2014).	Brazil	High school teachers	The continuing education of high school teachers on EE	Training workshop	Improved motivation among the teachers was recorded
Sellmann and Bogner (2013).	Germany	High school students (14 to 19 years old)	Global Climate Change	Outdoor program Questionnaires (pretest and posttest)	Short-term EE program has positive impacts on students' environmental attitudes
Almas et al. (2019).	Iran	Women	Assessing the knowledge, attitude and practice of the Kermanshahi women towards municipal solid waste management	Survey	Creating participatory research and encouraging programs among the families and the municipality can lead to improved waste management practices
Hoang and Kato (2016).	Vietnam	Elementary school students	Evaluation of knowledge of solid waste management	Workshop Survey	Increase in knowledge recorded after the workshop
Staniskis and Stasiskiene (2006).	Lithuania	M.Sc. students	M.Sc. program in Environmental Management and Cleaner Production	Teaching	Development of more technical attitude towards multidimensional environmental problems.

Table 1 (Continue)

Reference	Country	Target group	Topic	Teaching method/tool	Remarks/Impacts
Otto and Pen-sini (2017).	Germany	4th to 6th graders	Evaluation of the effect of participation in nature-based environmental education	Outdoor program Survey	Improvement in ecological behavior
Singh (2013)	South Africa	3rd year University students	Enhancing Learning and Awareness Through Assessment	Action research Outdoor program	Students became more aware of real life issues due to active participation.

## Conclusion

Generally, it was revealed that each of the environmental education study reviewed in this work achieved positive outcomes. Although the target groups differ, each study maintained well-structured approach that matched the expectation of the target audience. Much emphasis was paid on the delivery methods which helped to effectively achieve success. The success indicators were also carefully measured with suitable instruments. It can then be said that the outcome of any intervention program is very important and to achieve success, enough work has to be done in the preparation and execution of any intervention program. Since this work cov-

ered studies from almost all the continents of the world, it can be deduced that EE follows a global trend and should be further encouraged in all the countries especially the developing and under-developed ones.

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