

Evaluating EE Programs through the Assessment of Students' EL

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Abstract: Many attempts have been made to evaluate the impact of environmental education programs and to measure levels of environmental literacy around the country, but only few of which were made in the primary schools of the Arab sector. This paper describes part of a research that is carried out during doctoral studies at Moldova State University. The main focus of this part was to measure the EL level of 6th grade students and to evaluate the impact of the "green school" program on their EL. The instrument that was used in this research was designed especially for it and it measures 5 different dimensions (Knowledge, Attitudes, Affect, Behavior and Skills) using a written questionnaire with 91 items and 16 demographic variables. Total number of students participated in this research was 361. The questionnaire was delivered at two points of time, at the beginning and at the end of the school year. The students were given 60 minutes to answer the questions.

Key words: environmental education (EE), environmental literacy (el), environmental education programs (EE programs).

Introduction

Environmental education (EE) programs, such as the green school program, are continually being adopted by primary schools around the country. Several schools have adopted these programs because of their effectiveness for improving students' learning, environmental literacy and school's physical environment [17]. However, the impact of these programs on students' environmental literacy is usually not measured although its aim is to develop the environmental literacy of students. In the light of this, there is a need to evaluate the effectiveness of these programs in order to make sure that these programs make a difference. Furthermore, there are limited studies on students' EE achievement in primary schools in the Arab sector. This makes it difficult to state with confidence the degree to which the EE programs are impacting students' environmental literacy. The ministry of education has called for the prioritization of EE in Israel [9] and in response for that many environmental programs were adopted by schools within the last ten years. The green school program gained tremendous recognition especially in the Arab sector and is continually being introduced to schools in order to assist students in developing environmental literacy at the same time engage in practices to become environmentally responsible citizens [17]. The improvement of the students' learning

and the school environment and the increasing number of the schools adopting an environmental program are indicators for a program success but the impact of the environmental programs on students' environmental literacy has not been documented enough.

Literature Review

There is no agreement on one definition for the EE [4]. All the definitions are influenced by philosophical approaches. Stapp et al. [13] defined EE as “aimed at producing citizenry that is knowledgeable concerning the biophysical environment and its associated problems, aware of how to help solve these problems, and motivated to work toward their solution” (p. 34), while Disinger [4] focused on the dimensions of EE. According to the Tbilisi Declaration [15], the goals of EE are: Fostering clear awareness of, and concerns about economic, social, political and ecological interdependence in urban and rural areas; to provide every person with opportunities to acquire the knowledge, values, attitudes, commitment and skills needed to protect and improve the environment; to create new patterns of behaviour of individuals, groups and society as a whole towards the environment (p. 15). The Declaration also highlights the categories of EE objectives: awareness, knowledge, attitudes, skills and participation (p.15).

There is a consensus among researchers that EL is an outcome of EE programs [8, 10, 16] and a fundamental goal of EE [2]. Roth [11] defined EL as “essentially the capacity to perceive, interpret the relative health of the environmental systems and take appropriate action to maintain, restore, or improve the health of those systems” (p. 10). Many studies that aimed to assess EL used several EE domains encompassed in EE goals such as: Environmental knowledge, affective disposition, cognitive skills, values, attitudes, motivation, participation, commitment (verbal and actual), environmental behavior, environmental involvement, and environmental sensitivity [1], [6], [7], [12], [14]. The components of EL, as highlighted above form the basic framework for EL assessment design.

The common groups of components of EL variables utilized in major assessments are: knowledge, awareness, attitudes and participation [14]; Knowledge, environmental issue awareness, knowledge of skill, and evaluation of environmental issues [1]; Knowledge, skills, affect and behavior [3]; Awareness, knowledge, attitude, skills and participation [5], [15]; Cognitive knowledge, affect, cognitive skills, and behavior [8].

McBeth and Volk [8] stated that common features in EL framework include reflection of at least four of Tbilisi categories of objectives, namely knowledge, affect, skills and behavior p. 56. It is noteworthy that an exclusion of one component does not necessarily signify that the assessment is not appropriate.

Research Purpose

The main purpose of this research is to:

1. Determine the level of 6th grade students' El in the Arab sector.
2. Assess the impact of green school program on 6th grade students' EL in the Arab sector.

Research Questions

Based on the literature review, and in order to achieve the research purpose, the following questions were raised:

1. What is the level of 6th grade students' El in the Arab sector?
2. Does the green school program have an impact on 6th grade students' El in the Arab sector?

Methodology

For this part of the research, a quantitative method was used because of the sample size and in order to generalize the findings to the population. Quantitative methodology is usually used when the samples are large and require intensive statistical analysis and when the aim is to generalize findings to the population [21].

Findings

This part presents a brief summary of the findings according to the environmental literacy dimensions:

Knowledge: The level of sixth grade students' environmental knowledge in primary schools in the Arab sector is inadequate. There was no significant change in the overall level of knowledge between the beginning and the end of the school year. A significant difference was found between the environmental knowledge of green schools and non-green schools at the beginning and at the end of the school year.

Table 3.9 - Differences in knowledge between the groups

Groups	Level of significance (p)	Difference
All schools-Pre/All schools-Post	0.1889	not significant
Green schools-Pre/Green schools-Post	0.3567	not significant
Non-green schools-Pre/Non-green schools-Post	0.1655	not significant
Green schools Pre/Non-green schools Pre	0.0048	significant
Green schools Post/Non-green schools Post	0.0435	significant

(Pre: at the beginning of the school year, Post: at the end of the school year). (significant: p less or equal 0.05, not significant: p more than 0.05).

Attitudes: The level of the environmental attitudes in most areas were generally positive among students from non-green schools and among students from green schools. It should be noted that the attitudes in green schools were a little more positive than the attitudes in non-green schools at the beginning of academic year and at the end of it in a very small percentage but with no significant difference. No significant improvement was found in the environmental attitudes during the school year of all students in the green and the non-green schools.

Table 3.10 - Differences in attitudes between the groups

Groups	Level of significance (p)	Difference
All schools-Pre/All schools-Post	0.3615	not significant
Green schools-Pre/Green schools-Post	0.3805	not significant
Non-green schools-Pre/Non-green schools-Post	0.1286	not significant
Green schools Pre/Non-green schools Pre	0.0863	not significant
Green schools Post/Non-green schools Post	0.2726	not significant

(Pre: at the beginning of the school year, Post: at the end of the school year). (significant: p less or equal 0.05, not significant: p more than 0.05).

Affect: The level of environmental Affect has increased in all types of schools at the end of the school year compared to the beginning of the school year. It is worth mentioning that there was an improvement in the affect during the school year among students in green schools and among students in non-green schools. No significant difference was found in the environmental affect of the students in green schools ($p=0.0685$, $p>0.05$) between the beginning and the end of the school year but there a significant difference was found in the environmental affect of the students in non-green schools ($p=0.0003$, $p<0.005$) between the beginning and the end of the school year. Which means that the increase in the level of the environmental affect was not only as a result of the green school program, it could be as a result of the regular teaching program or as a result of the students' maturation. The statements about loving animals, plants and nature were more prominent in green schools rather than in non-green schools.

Table 3.11 - Differences in affect between the groups

Groups	Level of significance (p)	Difference
All schools-Pre/All schools-Post	0.0001	significant
Green schools-Pre/Green schools-Post	0.0685	not significant
Non-green schools-Pre/Non-green schools-Post	0.0003	significant
Green schools Pre/Non-green schools Pre	0.1969	not significant
Green schools Post/Non-green schools Post	0.3929	not significant

(Pre: at the beginning of the school year, Post: at the end of the school year). (significant: p less or equal 0.05, not significant: p more than 0.05).

Behavior: The students' level of environmental behavior in all types of schools in most fields was low but in few fields was a little bit higher and is considered acceptable. No significant difference was found in the students' level of environmental behavior in all types of schools between the beginning and the end of the school year. At the end of the school year, a little improvement occurred in the environmental behavior of the students in green schools but not significant while in the non-green schools no difference was found at all. No significant difference was found between the green and the non-green schools neither at the beginning of the school year nor at the end it.

Table 3.12 - Differences in behavior between the groups

Groups	Level of significance (p)	Difference
All schools-Pre/All schools-Post	0.1008	not significant
Green schools-Pre/Green schools-Post	0.0531	not significant
Non-green schools-Pre/Non-green schools-Post	0.4013	not significant
Green schools Pre/Non-green schools Pre	0.4567	not significant
Green schools Post/Non-green schools Post	0.1211	not significant

(Pre: at the beginning of the school year, Post: at the end of the school year). (significant: p less or equal 0.05, not significant: p more than 0.05).

Skills: The findings indicate that the students' skills, regarding identifying environmental problems and suggesting appropriate solutions, increased in all types of schools but in very small increments, which means that the environmental program running in the school did not have a significant impact on the students' skills. The impact of the environmental program was equal to the impact of the regular curriculum.

Conclusion

The general level of environmental knowledge is insufficient. Most students in primary schools in the Arab sector are not exposed to the field of environmental knowledge in an adequate form. The knowledge level in green schools was higher than in non-green schools which means that the green-school program has a positive impact on the environmental knowledge.

The students' environmental attitudes are generally positive. The students expressed positive attitudes towards the environment and solidarity with environmental values associated with the protection of environment. Attitudes of students in green schools were a little more positive than the attitudes in the non-green schools, especially concerning green consumerism.

The impact of the green school program on the environmental affect was adequate but not much greater than the impact of the curriculum in the schools. The regular curriculum had greatly contributed to the environmental affect of students.

The level of environmental behavior, in general, is inadequate. There were no differences in the level of behavior between green schools and non-green schools but in green schools the students' behavior (according to their statements) included more fields.

The general level of skills, concerning identifying environmental problems and suggesting solutions to the problems, is inadequate.

The general level of EL has increased at the end of the school year in both types of schools but the increase was more prominent in green schools.

According to the almost identical results between the green and the non-green schools, it is most likely that within the fields of science and geography, environmental issues are integrated in the formal school curriculum, however the students in both types of schools, green and non-green, are exposed a little to environmental issues and this exposure is with a scientific focus and not with an environmental focus. This means the goals of the program and the methods of teaching and learning must be adjusted to the needs and the perspectives of the community.

The environmental programs that was examined in the research, the green school program, had a positive effect on the EL components but the overall level of EL is still not sufficient.

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