

TOWARD IMPROVING THE STATUS OF ENVIRONMENTAL LITERACY AMONG FORMAL AND NON FORMAL EDUCATION IN PALESTINE

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ABSTRACT

In the two decades since the first Earth Day, organizations have endorsed the development of well informed and environmentally literate citizen as the answer to our threatened environment. According to many environmental education (EE) experts, knowledge and attitudes are important components of environmental literacy (EL), especially if the goal of environmental education is to change behavior. In our study a questionnaire with two parts was distributed to 38 randomly selected schools which included 942 10th grade students in Palestine, with a 100% response rate. Results showed that participants had favorable attitudes toward the environment but lacked in their environmental knowledge. Significant differences were found in the level of EL scores by gender. Educational implications and recommendations are discussed.

1. INTRODUCTION

Since the beginning of time, Palestine has been God's unique gift to the world. Palestine is not only sacred home to three of the world's great faiths, but also a natural habitat for many of the world's magnificent and rare endangered birds, mammals, and plants. Today, as Palestinian live in one of the developing, densely populated country and strive to achieve sustainable economic and social development, they face several environmental problems and a deteriorating quality of life. One of these problems is that the level of environmental education and awareness programs is quite low. It is assumed that a primary source for the development of environmental literacy will be the schools, particularly in terms of knowledge, attitudes, values, beliefs and skills. Students from grade 8th to 11th appear to be the most appropriate targets for fostering ethical and ecological appreciation of the natural world [15]. Some of the international conventions [25], have declared that, environmental education is the vehicle for developing environmental literacy, which is crucially needed to prepare environmentally literate students who, as future citizens, would play an active role in protecting the environment through making informed decisions and taking environmental friendly actions. However, the development of environmental literacy is a multi-step process that begins with knowledge and results in active citizen participation. The knowledge component is based on the idea that before an individual can act on an environmental problem, that individual must understand the environmental problem [8]. The final step in the process is to make responsible decisions with regard to the environment through creating awareness and knowledge of the environment and environmental problems, which leading to environmentally responsible attitudes and actions [19, 21]. Using the environmental education curricula to raise environmental literacy was mentioned by [10]. Curriculum should be designed to develop three types of environmental literacy: **functional**: basically book knowledge about ecological concepts, **cultural**: teaches why society values the environment and **critical**: allows students to use functional and cultural environmental literacy to determine appropriate citizen action [23]. Stables have argued that knowledgeable citizens are not necessarily environmentally literate, but knowledge is a critical component of literacy. Numerous studies have focused on measuring youths' environmental knowledge levels and how respondents participation in environmental responsible behavior [12, 17, 20]. Limited research using adults as participates has been conducted [9, 14]. In their theory of reasoned action [7], distinguished among four basic concepts: beliefs, attitudes, intentions, and behavior. Beliefs involve knowledge or opinions concerning the attitude object; attitudes involve emotions and evaluations with respect to that object; intentions refer to behavioral aims; and behavior involves the actual action itself. It was assumed that increased knowledge about the environment promotes positive attitudes [1]. Finally, environmental educators cannot assume that several years of formal education will ensure that students gain all the knowledge and skills needed for environmental literacy. Consequently, non-formal EE should play an important role in building environmental literacy of the whole population because it can reach various population groups and can offer varied opportunities for action upon the environment [24]. My purpose in this study was to identify the level of environmental literacy status (Knowledge, Attitudes) of 10th grade students in Palestine.

2. MOTIVATION FOR THIS STUDY

From the review of the relevant literature, it is clear that the level of environmental literacy (EL) in Palestine has not been investigated in depth. The Ministry of Education identified different programs to develop all Palestinians intellectually, socially, physically, spiritually and emotionally, to become responsible citizens, able to participate in solving problems of their community, their country and the

world,[6].These programs, however, were developed without any solid research regarding Palestinian students' environmental knowledge and attitudes. Therefore, the motivation of this study has two different aspects:

- It is the first study in Palestine, as far as, the researcher knows about the status of environmental literacy among the Palestinian students.
- Data obtained from this study will provide the educators as well as the curriculum designers with necessary recommendations on real practices and experiences to reinforce positive aspects and overcome difficulties. To date, it has been difficult to guide and monitor some specific environmental education efforts in Palestine because of lack of data.

3. ASSUMPTIONS OF THE STUDY

During the last two decades the trend for environmental protection has expanded in various areas, including the realm of education. The underlying assumptions of this study are that:

- 1- If students are aware of the need and the ways of protecting the environment they will act to preserve it.
- 2- The trials to develop EE in Palestinian schools should be based on surveying the status of EE in Palestine, and the international trends in EE curriculum and instruction.

4.RESEARCH METHODOLOGY

Proportional stratified sampling was used to generate a 5 % sample of the 726 eligible schools. Of the 38 selected schools, 942 10th grade students participated, 416 boys (44.2%) and 526 girls, (55.8%). A panel of experts ensures the content validity of the questionnaire .After the questionnaire was altered according to the comments of the experts; it was pilot tested with (61) 10th grade students. A few questions were dropped, some were altered to be more comprehensible and easier to administer. The questionnaire consists of two-sections, the environmental knowledge part and the attitudes part .The knowledge part has 24 multiple-choice and 20 true-false items. Responses were coded "1" if the answer was correct and "0" if the answer was incorrect. The attitude part consisted of 35 items rated on a Likert-type scale .The five possible responses to each statement varied from 5 (strongly agree) to 1 (strongly disagree).Most of the questionnaire items were adapted from previously published instruments. Cronbach's alpha reliability coefficient taken on the two parts, environmental knowledge and attitudes, yielded values of 0.72 and 0.87, respectively. The questionnaires were distributed during the spring of 2005 in a regular class periods, and the time required to complete it was approximately 35-40 minutes .The questionnaire survey enabled the collection of quantitative data from all the partnership schools, i.e.100% returns, which is a significant feature of this study. Data analysis included t-test carried out using the SPSS, version 11. The alpha level was set at 0.05 and 0.01.

5 RESULTS AND DISCUSSIONS

5.1.Students' Environmental Knowledge

Table 1 presents the total knowledge and subtopics mean scores (M) and standard deviations (SD) for 10th grade students in Palestine. The mean total knowledge scores, which range from 45.72 to 67.36 percentage points reflect that environmental knowledge which students already possess is likely to be determined by topicality , fragmentary or incorrect, or both . After examining questions about each sub scale, it is interesting to note that Palestinian students appear to be more knowledgeable about local environmental protection issues (M=67.36) than issues that have more global relevance such as Ozone

subtopics (M=45.72) and Green –house (M=46.62). Palestinian students were also relatively uninformed about Acid rain subscale (M=53.04). This is especially the case given that the questionnaire assessed students knowledge of basic environmental concepts covering different areas in the primary school textbooks. The relatively large standard deviations represent a noteworthy aspect of the results shown in Table 1. These deviations, which ranged from 17.07 to 29.65 points, indicate that the total and topical knowledge scores were widely spread. Such spread indicates that student’s environmental knowledge was disparate. In other words, participants lacked a common knowledge base of the target environmental concepts and related issues.

TABLE 1. Means and Standard Deviations on the Total knowledge Scale and Subtopics

Knowledge- part	Sub – topics	No of items	Mean	S.D
Multiple-choice	E. protection	9	67.36	17.07
	E. problems	15	50.70	18.11
	Total of the subscale 1	24	56.95	15.31
True-False	Acid rain	3	53.04	28.70
	Green -house	6	46.62	21.29
	general	2	46.10	29.65
	Ozone	9	45.72	18.57
	Total of the sub scale2	20	47.14	14.51
Total scale		44	52.49	12.39

These results are compatible with the Research done in the US [22, 12], Australia [4, 5], Netherlands [16], and UK [18]. In the US, for example, among their sample of over 1800 high school students only approximately one third (36.3%) answered correctly five or more of the [seven] items’ and only 61% of the 10th grade, students were aware that the burning of fossil fuels is the primary source of energy in the United States today’[12]. More recently, in a study of over 9000 Dutch secondary school students, [16] report that the environmental knowledge was desired, particularly in light of the high proportion of students that selected the response ‘I really do not know’, suggesting that ‘many [¼] were uncertain whether or not the statements on environmental topics presented to them were correct’. However [3, 11] report contrasting findings in their results by having high environmental knowledge scores. Notwithstanding this point, the general message stemming from these results is that factual environmental knowledge among school age students is lower than might be expected. As well as, several of the studies also suggest that students’ environmental factual knowledge can vary considerably depending upon the topic under consideration. Work in Hong Kong showed that, students’ were more aware of certain issues (such as wildlife issues and air pollution), and less aware of others (such as world population, rainforest destruction) [3] .Another study in Greece reports that students factual knowledge is better developed in relation to larger animals, especially pets and mammals, than in relation to smaller non-domestic animals and plants [20].

5.2. Students’ Environmental Attitudes

Attitudes can serve as the focal point between knowledge and action. For the environmental attitudes Table 2 presents the total attitude and subtopics mean scores and standard deviations for 10th grade students in Palestine. The relatively moderate to high total attitude mean scores, which range from 57.54 to 74.83 out of 100 points, indicate that students’ attitudes toward the environment were favorable. Moreover, student’s scores on the emotion subscale (M 74.83) were relatively higher than

their scores on the behaviors, and belief subtopics. Additionally, relative to what was observed in the case of knowledge scores, the standard deviations of the total and subtopics attitude scores shown in Table.2 are relatively small. These deviations, which range from 9.78 to 11.51 points, indicate that students' attitudes toward the environment were relatively consistent and more uniform than their level of environmental knowledge.

TABLE 2. Total attitudes and sub topics mean scores and Stander Deviation for 10th grad student

A attitudes- part	Sub – topics	No of items	Mean	S. D
	Emotions	9	74.83	11.51
	Behaviors	13	69.77	10.02
	Beliefs	13	57.54	9.78
	Total scale	35	66.74	6.92

The results of the 10th grade students' attitude in Palestine are consistent with most of the studies in the world. The evidence generated by these studies shows that the young people appear to hold generally positive environmental attitudes. For example, within a sample of 5688 students from two major Australian cities, 82% were found to hold beliefs that aligned with an environmental (62%) or a strongly environmental orientation, [5]. A study of 1256 Singaporeans aged 14 and 16 years found that generally the students had a moderately positive attitude towards the environment [11].

5.3. Relationship between the levels of environmental literacy and gender

To investigate possible differences in environmental literacy (knowledge and attitudes), T-test were carried out. The dependent variable was the student's environmental literacy (knowledge and attitude measures) and the independent variable was the gender. Regarding the gender independent variable with the knowledge part, Results of t-test analyses revealed that the males had a significantly higher mean knowledge score than females in the total knowledge scores, ozone sub topic, and total knowledge sub topic 2 as shown in Table 3. The mean of the total knowledge were significantly different ($t = 2.24$, $df = 940$, $p < 0.05$). This also was the case in ozone sub scale were ($t = 4.97$, $df = 940$, $p < 0.05$) and finally for Total sub topic 2 were significantly different ($t = 3.94$, $df = 940$, $p < 0.05$).

TABLE 3. The Mean and Stander Deviation of The knowledge sub topics and total scale related to their Gender

	Gender	Male		Female		Paired sample T-Test		
		n=(416)		n=(526)				
Domain	Sub domain	M	S.D	M	S.D	T	D.F	Sig. (2-tail)
Multiple-Choice	E. protection	67.97	17.71	66.87	16.55	0.97	940	0.328
	E. problems	50.54	17.50	50.83	18.60	-0.245	940	0.806
	Total subscale 1	57.08	15.12	56.85	15.48	0.228	940	0.820
True-False	Green -house	48.07	21.31	45.46	21.23	1.869	940	0.062
	Ozone	49.06	18.33	43.08	18.35	4.971	940	0.000*
	Acid rain	53.20	29.64	52.91	27.96	0.154	940	0.878
	General	47.99	30.45	44.61	28.94	1.741	940	0.082
	Total sub scale 2	49.23	14.80	45.50	14.07	3.944	940	0.000*
Total - Scale		53.51	12.41	51.69	12.33	2.242	940	0.025*

* The mean difference is significant at the $p < 0.05$ level.

As far as attitude scores are concerned, significant differences were found between the mean of both Beliefs and Behaviors subtopics attitude scores Table 4. Females scored significantly higher than males on the Behaviors subscale ($t = -1.97$, $df = 765$, $p < 0.05$). This result was reversed in the case of the belief sub topics, where the mean attitudes score for males was significantly higher than that for females ($t = 2.20$, $df = 728$, $p < 0.05$).

TABLE 4. The Mean and Stander Deviation of The attitudes sub topics and total scale related to their Gender

Attitudes topics	Gender						Paired sample T-Test		
	Male			Female					
	n	M	S.D	n	M	S.D	T	D.F	Sig. (2-tail)
Beliefs	318	58.44	9.90	412	56.84	9.63	2.205	728	0.028*
Emotions	363	73.99	11.95	464	75.49	11.13	-1.861	825	0.063
Behaviors	340	68.98	11.13	427	70.41	9.00	-1.970	765	0.049*
Total scale	260	66.71	7.44	339	66.76	6.51	-0.073	597	0.942

* The mean difference is significant at the $p < 0.05$ level.

There is conflicting evidence with respect to the influence of gender on young people's environmental factual knowledge and attitudes. The present finding that grade 10 males had significantly higher knowledge than females supported by different studies. In [13] male students were significantly more likely to have higher levels of environmental knowledge when compared with female students. According to research cited by [26], blacks and women are generally less knowledgeable about ecological concepts than Whites and men. In contrast, [5] found that female students had stronger conceptual knowledge than male students. Further investigations that explored this issue reported finding no significant relationship between gender and environmental knowledge levels [4]. There is some evidence to suggest that boys and girls display understanding of different aspects of environmental issues. Girls were more aware of immediate, local problems relating to human health, while boys focused more on longer-term, more abstract issues [22]. Additionally, and Consistent with this study the findings emerging from many studies[3,4] indicated that females are more likely than males to be environmentally concerned and/or willing to undertake behaviors for the environment. In contrast to the above findings, [18] found no gender differences in the level of environmental concern as indexed by respondents' attitudes towards either controlling industrial pollution or towards banning CFS aerosol sprays'. At the end of this study we able to conclude that the Palestinian 10th grade school students held relatively uniform and favorable attitudes toward the environment, but had inadequate knowledge of basic environmental concepts and issues. Thus, participants seemed willing to take necessary actions to protect the environment, but lacked the knowledge base necessary to make informed decisions.

6. CONCLUSIONS

While our schools play a major role, cultivating environmental literacy is a task that neither begins nor ends with formal education. Many parts of our society shape attitudes toward and knowledge about the environment, family, peers, religion, community, interest groups, government, the media, etc. Apparently, acquisition of environmental literacy is a developmental process taking place over a life time, starting with what's simpler to what's more complex through a variety of education venues that would make students more concerned about the total environment and it's associated problems, and

who have the knowledge, attitudes and motivations, commitments and skills to work individually and collectively instead of being just advocates of environmental issues. With sophisticated insight and practical knowledge and sound awareness, environmental education leads to actions. That is, environmentally literate individuals make informed choices and take day to day actions that will conserve and enhance the ability to sustain functioning ecosystems and meet human needs now and for generations yet to come. Therefore, special teaching approaches and techniques, such as values-based, community-based instruction, and child centered approaches, are needed to develop teaching practices and to promote EE curriculum and instruction in Palestinian schools. Therefore, an assessment of environmental knowledge and attitudes of a target population can provide basic information for use by environmental educators in deciding what content should be included in programs.

7. RECOMMENDATIONS

The suggestions or recommendations to improve the implementation of EE in Palestinian schools could be summarized as:

1. Both formal and non-formal institutions should be effectively tapped to improve people's environmental knowledge and attitudes, environmental organizations, national parks, and schools should examine their environmental education programs.
2. Further experimental research could investigate the cause-effect relationships between environmental knowledge, attitudes, and various independent variables. We believe that the results of this study, and studies that follow, will help transform research findings into methodological proposals for EE in Palestine.

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