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ABSTRACT

This paper focuses on three goals for improving the environmental knowledge and attitudes of elementary and junior high students: (1) analyzing the short-term influence of the "Year of the Environment" on school activities concerning the environment; (2) analyzing the contribution of the "Year of the Environment" to the knowledge and attitudes of students towards the environment; and (3) examining the relationships amongst variables such as the amount of students' time invested in environmental issues at school; integration of environmental education in the overall school "culture"; students' knowledge and attitudes towards the environment; and students' awareness, responsibility, and commitment to the environment.  
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# *Using the "Year of the Environment" as a model for improving the environmental knowledge and attitudes of Junior High School students in Israel.*

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Paper presented at the annual meeting of the National Association for Research in Science Teaching, Boston, MASS.(March, 1999)

# **Using the "Year of the Environment" as a model for improving the environmental knowledge and attitudes of Junior High School**

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# students in Israel

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## Introduction

The contribution of environmental education at school is not easy to define (Lucas 1980). Recent research on environmental education has produced a wealth of literature. However, research on the educational outcomes of such programs has been rare. Leeming et al (1993) list 34 outcome studies published between 1974 and 1991. Since then only a few studies have focused on the effects of environmental education on student understanding (most recent being the paper of Leeming, Porter et al. (1997)).

In toto, the research results are not encouraging. For example, Ostman and Parker (1987) found only weak support for the hypothesis that environmental education contributes to environmentally responsible behavior. Hausbeck & al. (1992) found that only 12% of students surveyed obtained their knowledge about environmental problems and ecological situations from school. Dempsey & al. (1998) saw only limited effects of school practices on student motivation and behavior.

In contrast, this report argues that such education contributes significantly to the attitudes, motivation and commitment of students towards the environment.

Israel is a very small country with a high population density, approximately 700 people per square mile. With a very high rate of population growth, it is constantly battling serious environmental problems such as nature preservation, pollution, crowded constructing areas and waste management.

As Israel continues to absorb immigrants, such problems will continue to grow, so it is exceedingly important that our present day students confront these issues.

In order to reinforce student awareness of environmental problems, the Ministry of Environment and the Ministry of Education declared the 1994-school year (September 1993 – June 94) as the "Year of the Environment".

This declaration was following by a flurry of activity including preparation of educational materials, teacher training and a publicity campaign in the media. Many organizations including municipal offices, community centers, youth organizations, schools and volunteer organizations were involved with implementing this project.

School head masters and teachers had much independence in deciding what would be learnt, how it would be learnt and to what level it would be learnt. Moreover, the head masters also decided about the resources that were invested on the project.

## Aims:

This research, which was initiated by the Ministries of Education and Environment, was conducted in 1996.

It had the following three aims:

1. Analyzing the short-term influence of the "Year of the Environment" on school activities concerning the environment.
2. Analyzing the contribution of the "Year of the Environment" on the knowledge and attitudes of

students towards the environment.

3. Examining the relationships amongst the following variables: Amount of students' time invested in environmental issues at school; integration of environmental education in the overall school "culture"; students' knowledge and attitudes towards the environment; students' awareness, responsibility and commitment to the environment.

## Research Population

The research population consisted of 20,700 students from 230 schools and included both elementary (grades 4 – 6) as well as junior high (grades 7 – 9) school students.

The schools that participate in the research were sampled systematically and randomly from a list provided by the ministry of education.

This report focuses on the results obtained from a sample of 7149 Junior high school students in 113 schools across Israel.

## Method

An attitude questionnaire with 64 closed questions was distributed to the subjects. The students completed the questionnaires in class during the school day.

The questions focused on four domains of environmental education:

1. Amount of students' involvement with environmental issues at school.
2. Integration of instructional activity in environmental education with the school's overall "culture".
3. Students' exposure, knowledge and awareness of environmental issues.
4. Students' understanding, behavior and commitment concern environmental issues.

## Dealing with environmental topics at school

Four questions were designed to analyze this domain

1. Do the students deal with environmental topics in the classroom?
  2. Do the students learn about the environment during special lessons?
  3. If it was not learned in a special lesson, in which topic did they learn about the environment?
  4. Are the students preparing any independent projects about the environment?

On the base of their responses, an index was created indicating the level of student involvement with issues concerning environment quality.

Involvement with environmental issues was also checked from the aspect of content. The students were asked to report if they learnt about five central environmental topics: air pollution, water pollution, nature preservation, waste management and noise.

## **Integrating environmental education into the overall school "culture"**

This domain was analyzed the following aspects

1. Involvement in the school environment fostering (including student impressions of school cleanliness, as well teacher/students policy on school environment quality).
2. Integration of parents in school environmental activities.
3. Involvement in informal environmental activities (outdoor trips, cleaning projects, videos, shows and competitions).

## **Students' exposure, knowledge and awareness**

### Exposure and knowledge

This questionnaire included a list of eleven concepts related to environment quality and the students were asked about each one, whether they had learnt about it or at least recognized it. The list included the following topics: Air pollution, poisonous waste, recycling, waste treatment, nature preservation, lead-free gasoline, water purification, environmentally friendly products, the ozone hole, population explosion and acid rain.

### Awareness

Awareness about environmental issues was examined based on student understanding concerning their common responsibility towards protecting the environment. Five activities were presented to the students and they were asked to determine who is ultimately responsible for them. The five activities were nature preservation, prevention of air pollution, dumping of waste materials in public areas, fire prevention and recycling. The categories of "responsibility" included: the student and his family, his country, neighboring countries and all of the categories.

## **Students' environmental, understanding, behavior and commitment.**

The students were asked about their involvement in environmental topics at school concerning:

1. Their understanding of the human influence on the environment.
2. Their personal interest in environmental quality.
3. Their desire to act on behalf of the environment, both in the present and in the future.

The questions were statistically analyzed. Distributions and correlations were analyzed and calculated for all variables. An index based on the responses was calculated for each of the four domains.

## **Results**

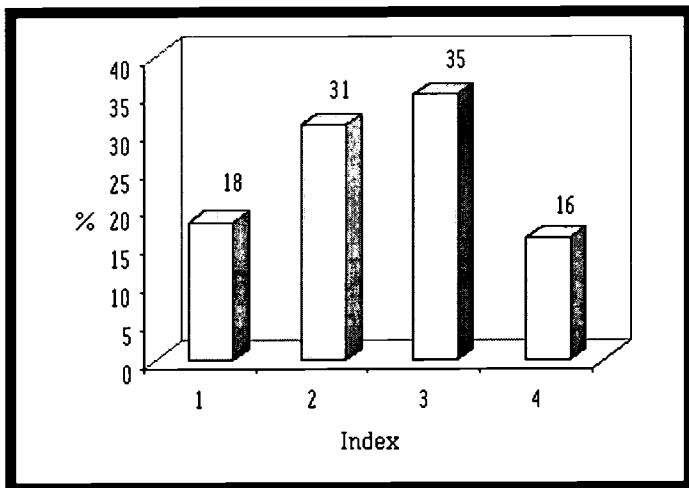
### Depth of students' involvement with environmental issues at school

Almost two years after the "Year of the Environment" the majority of schools are still focusing on

environmental issues. Approximately 85% of the students reported that they were learning about the environment. Such learning includes formal lessons in the classroom as well as informal activities including, trips, and cleaning projects both in the school and neighborhood. In class, students worked on independent projects either as in separate courses or integrated within other subjects such as geography, agriculture, or science.

An index was calculated to express the level of environmental learning done in school. An index of 1, representing 18% of the sample, indicates that the students learned about the environment as a separate topic, and also prepared an independent project. An index of 2, representing 31% of the sample, indicates that the students studied about the environment as an element of another course, and also prepared an independent project. An index of 3, representing 35% of the sample, indicates that students learnt about the topic as part of another course, but did not prepare an independent project. Finally, an index of 4 indicates minimal exposure to environmental topics in the class (see **Graph 1**)

**Graph 1: Involvement with environmental topics at school. 1=high index – 4=low index**



Students noted that amongst five possible topics, air pollution was the most common environmental subject they had learned, and noise pollution was the least common.

**Table 1: Distribution of student’s exposure to five environmental topics**

Topic	Air pollution	Nature reservation	Waste and recycling	Water pollution	Noise
Percentage	77	75	66	65	58

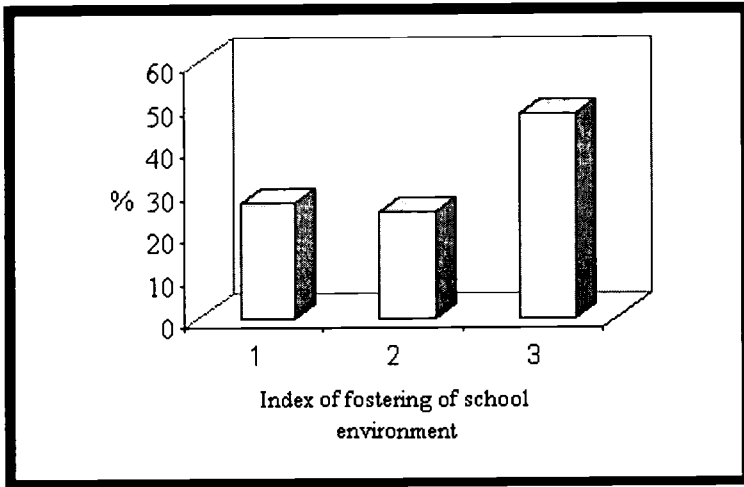
Moreover, 26% of the students reported that they had learnt all five topics.

Integration of environmental education in the overall school "culture"

Another expression of influence on environmental education in the overall school "culture", beyond formal instruction is the level of environmental fostering at school.

Students' attitudes towards the level of cleanliness of their schools were positive in general. 52% of the sample noted that their schools were clean and well groomed. 57% noted that the teachers and the students were generally strict towards the school environment and 55% noted that the students were continuously occupied in caring for the school environment.

Graph 2 integrates the three parameters, which measure the level of environmental fostering of the school area. For more than one quarter of the sample this index is high indicating: that their schools were very clean; that the teachers and their fellow classmates were generally strict towards the environment; and that the students were involved in maintaining the cleanliness of the school.



**Graph 2. Level of environmental fostering**

**at schools.**

The following informal activities were carried out during the school day: caring for the school and neighborhood environments, outdoors trips, lectures, movies, shows and competitions. 78% of the students reported that they had participated in more than one activity. The most common activity was caring for the school area. The most enjoyable activity was the outdoor excursion. The majority of the students indicated that they had participated in at least one of these activities (**Table 2**).

**Table 2. Informal activity in environmental quality at school**

The activity	Participation (%)			Preferred activity (%)
	Many times	One time	Not at all	
Caring for the school environment	59	22	20	17
outdoors trips	36	27	37	49
Lectures, movies, shows and competitions	35	23	42	21
Caring for the neighborhood environment	20	18	62	5

### Students' exposure, knowledge and attitudes

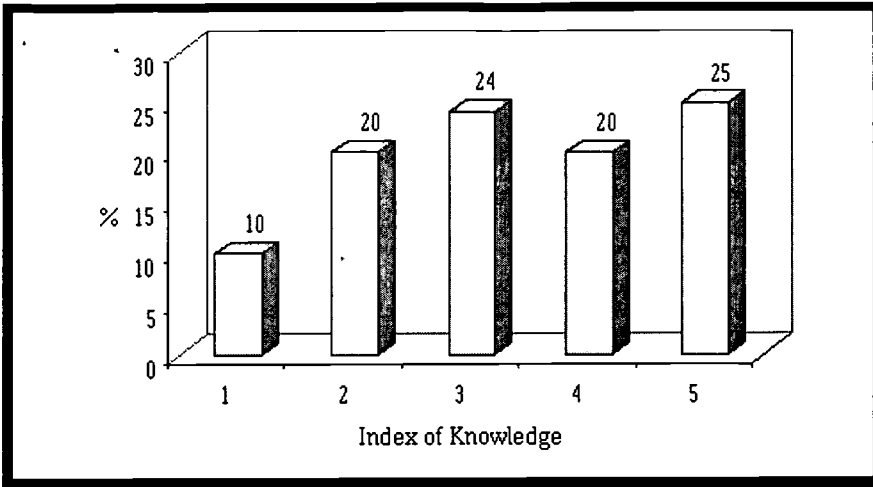
Exposing students to the concept of environmental quality, and the level of their recognition with such concepts is an important aspect of environmental learning (see **Table 3**).

Amongst the students surveyed, more than 50% learned eight of the eleven concepts. Moreover, 75% learned about air pollution, 69% about the ozone hole, 68% about nature preservation and 67% about recycling. A small percentage of the students noted that they didn't recognize these concepts. Finally, 10% of the students reported that they had learned all eleven topics (**Graph 3**).

**Table 3. The amount of student's exposure to environment quality topics**

The topic	Learned about %	Only heard about %	Don't recognize %
Air pollution	75	21	4
The ozone hole	69	21	10
Nature reservation	68	26	6
Recycling	67	24	9
Poisonous waste	57	34	9
Environment friendly products	53	27	20
Population explosion	51	28	21
Water purification	50	35	15
Waste treatment	49	36	15
Acid rain	41	29	30
Lead-free gasoline	30	42	28





Graph 3. Levels of knowledge concerning environmental quality

concerning environmental quality

One of the most important attitudes towards environmental quality is the awareness of environmental issues.

The distribution shown in Table 4 indicates how the students understand the different levels of responsibility towards protecting the environment. A relatively high percent of the subjects recognized the global responsibility for protecting the environment. In addition, the students recognized the important role of the country for recycling and the role of the individual in removing waste

Table 4. The hierarchy of responsibility for some environmental activities

Hierarchy	The Activity	Global	A group of countries	The country	Me and my family
1	Protection of the nature, the animals and the plants	66	8	14	12
2	Prevention of air pollution	65	8	23	4
3	Prevention of throwing away waste in public area	54	6	16	24
4	Prevention of fire	51	8	27	14
5	Recycling	32	16	44	8

The influence of school activities on students' sensitivity, responsibility and commitment toward the environment

About two thirds of the students estimated that involvement with environmental issues contributed to their understanding of the human-environment interface. In addition, more than half of the subjects estimated that this involvement contributed to their interest in environmental subjects. Finally, 56% indicated that such

involvement contributes to reinforcing their desire to protect the environment.

The students expressed a very high level of sensitivity to environmental damage: 82% worried about water pollution; 81% about air pollution; 71% about waste and garbage; 63% about preservation of nature and 59% about noise.

**Table 5. Level of student sensitivity to environmental damage.**

Environmental damage	Worried-Very worried (%)	Not worried-Less worried (%)
Water pollution	82	18
Air pollution	81	19
Waste and garbage	71	29
Preservation of nature	63	37
Noise pollution	59	41

Internalization of environmental education is best expressed by the students' environmental behavior. The students were asked to what extent were they involved in the following activities: preservation of nature; maintaining cleanliness in public areas; using environmentally friendly products; saving water (see **Table 6**).

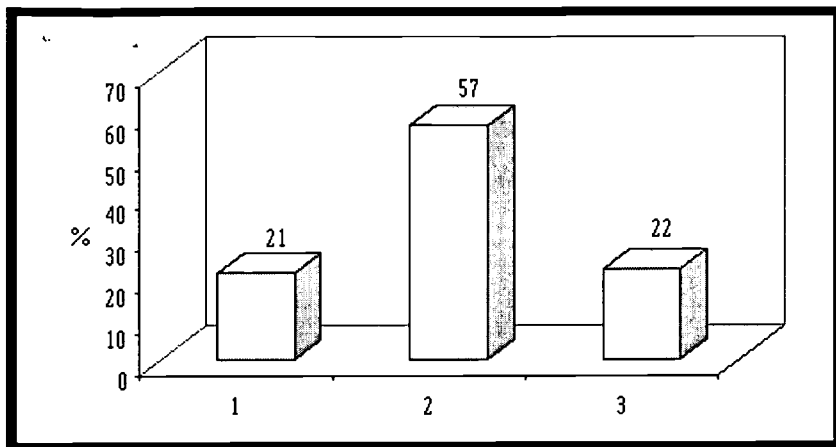
**Table 6. Extent of student involvement in environmental activities**

Activity	Level (%)
Preservation nature	60
Maintaining cleanliness in public areas	54
Using environmental friendly products	49
Saving water.	41

The activity that was pursued most frequently was preserving natural areas. In fact 40% of the students reported that they were doing it on a continuous basis.

Graph four indicates the students' level of activity towards shaping environmental quality. An index of 1 indicates that the students participated in all four remedial activities noted above. An index of 3 indicates that the students were involved in no more than 1 of the activities (see **Graph 4**).

**Graph 4. Level of activity concerning environmental quality.**



It should be note that 54% of the students expressed their desire to be involved in environmental issues in the future.

## Discussion

The results indicate that the year of environment quality was not a unique event. It influenced many schools to integrate environmental topics within the curriculum on a permanent basis. Involvement with this topic was pursued by schools in various and diverse ways.

The relationship amongst the four stages of environmental education: learning, understanding, acting and committing shows a very strong correlation.

Involvement with environmental topics generally improves students' attitudes towards their environment. For example, the greater the involvement in environmental topics at school, the greater the students appreciate the cleanliness of their school. Additionally, dealing with environmental projects contributed to their understanding, ( $r = .30$ ), their interests ( $r = .26$ ) and their desire to act on behalf of the environment both in the present and in the future.

An increase in students' general knowledge of the environment contributed towards the more awareness of environmental problems.

Exposure to environmental topics greatly contributed to student knowledge in general, but also increased their understanding of the environmental project as an important and interesting experience.

With increased exposure to environmental topics, the students expressed increased concern for environmental problems; indeed, more of them stated that they would try to better protect the environment now and in the future. A high positive correlation was found, between the students present activity and their desire for protecting the environment in the future.

**Table 7. Correlation coefficients ( $r$ ) amongst variables associated with environmental learning at school.**

	Instructional activity at school	Overall school culture	Exposure and knowledge	awareness	Sensitiveness\ bothering	Present action on behalf the environment	Commitment to future action
Instructional activity at school	-	.20 - .25	.30	.30	.31	.24	.21

Although, no pre/post comparisons were made the researchers were impressed by the contribution of "The Year of the Environment" on the attitudes and behavior of the students two years after its declaration.

The findings of this research empirically support the belief that investment in education produces results that can be measured; moreover it show a direct relationship between the amount of the investment and its influence.

This finding has implications for education in general and in environmental education in particular.

The results of this research indicate the importance of learning a relevant and timely subject towards developing positive attitudes.

"The Year of the Environment" might serve as a model for other countries to educate their future citizens towards greater responsibility for the environment.

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