

Environmental Literacy of Beginner Teacher Training Students, Israel

Yavetz, Bela

Kibbutzim College of Education, Tel-Aviv, Israel

Goldman, Daphne

Beit Berl Academic College, Kfar-Sava, Israel

Pe'er, Sara

Oranim Academic College of Education, Tivon, Israel

#### ABSTRACT

Insufficient teacher training has been identified as a major cause of curriculum failure of environmental education (EE). Hence, a major challenge facing EE today is to strengthen the environmental literacy (EL) component of pre-service teachers' programs. The aims of this study were to characterize the EL level of beginner students in teacher training colleges. The study was conducted by a survey administered to 765 beginner students from three major teacher-training colleges.

Factor analysis of responses to statements dealing with environmental behavior grouped these statements into six categories representing increasing levels of environmental commitment. A negative relationship was found between the frequency at which students performed each behavior category and the environmental commitment level of the category. Overall score of students' attitudes towards environmental issues was higher than that of their reported environmental behavior. Students' knowledge of ecological and environmental subjects was very limited. This

study is the first stage of a long-term research aimed towards effective integration of EE in preservice programs, which play a key role in achieving a sustainable society.

## INTRODUCTION

A main challenge of modern society is to find the way to a balanced inter-relationship between human and natural systems. Society perceives the educational system as carrying major responsibility in environmental education (EE) efforts (Roth, 1992). Hence teachers play a key role in developing environmental literacy (EL) in the future generation. Adequate preparation of students in teacher-training programs in the field of EE is a prerequisite for their future ability to design and implement effective EE. Insufficient teacher training has been identified as a major cause of curriculum failure (UNESCO, 1997; Knapp, 2000; Mckeown-Ice, 2000). Therefore, a major challenge facing EE today is to strengthen the professional education of teachers, one component being pre-service training. In Israel, teacher-training colleges prepare teachers for the educational system from kindergarten throughout 10<sup>th</sup> grade. Characterizing teacher-training students' EL level is a prerequisite for evaluating existing programs and developing effective future programs. To date, very little research has been conducted in this field in Israel. The aim of this study was to characterize the EL level (using accepted variables: knowledge, attitudes and reported behavior) of beginner students in teacher training colleges. This study is part of a longitudinal research focusing on EE in academic teacher-training programs.

## METHODOLOGY

### Instrumentation

A questionnaire developed by the authors (Goldman et al., in press) was administered to incoming students during the first month of the 2003 academic year.

The questionnaire consisted of four sections: 1) demographic and background variables, 2) evaluation of major sources of information concerning environmental issues 3) environmental behavior variables, 4) environmental attitudes variables, 5) environmental and ecological knowledge.

Demographic and background data. This section included questions about students' background: age, gender, parents' level of education, ethnic group and disciplinary subject chosen to major in.

Sources of information on environmental issues. The students were asked to state to what degree six different sources contributed to what they currently know about of environmental issues, using a Likert-type scale with four possible answers (1- not at all, 2- a little, 3 – quite a bit, 4- very much).

Environmental behavior. This section assessed reported behavior. Respondents were asked to state to what extent they carry out 20 environmentally-related activities, using a Likert-type scale with five possible responses (1-never, 2- very seldom, 3- sometimes, 4-often, 5-almost always). The behavior inventory had a Cronbach's alpha reliability coefficient of 0.79.

Attitude variables. This inventory included 24 statements rated on a Likert-type scale, with five possible responses to each statement (1-strongly disagree, 2-disagree, 3-no opinion, 4-agree, 5-strongly agree). The attitude inventory had a Cronbach's alpha reliability coefficient of 0.82.

Knowledge. This section included 23 multiple choice questions pertaining to environmental and ecological knowledge. Maximum score was 100.

## Participants

The study was conducted with 765 incoming students in three major teacher-training colleges in Israel (Kibbutzim College of Education, Oranim Academic College and Beit Berl Academic College). The average age of incoming students was

24.2 ± 3.5 years. 90% of the students are females. 61% of the students come from homes in which mothers obtained a high school education or less, 29% - from homes in which mothers obtained a basic academic degree or vocational certificate, and only 10% come from homes in which mothers received an advanced academic education. 90% of the students are Jewish and 10% belong to Arab ethnic groups. The majority of the students (85.5%) chose to major in non-environmentally related subjects and only 15% chose environmentally-related subjects.

#### Data Analysis

SPSS was used for data analysis. Factor analysis was conducted on results obtained for students' reported behavior. Pearson's correlation was used to test relationship between behavior, attitudes and knowledge.

### RESULTS

#### Sources of Information on Environmental Issues

Results show that television is the major source of information, while the internet is the minor.

TABLE 1. Students Scores (from 1–4) for the contribution of different sources of information to their perceived knowledge on environmental topics.

Source of information	Mean± SD
Television	3.35±0.73
Daily newspapers	2.90±0.78
Educational system	2.79±0.83
Periodicals	2.58±0.83
Radio	2.56±0.90
Internet websites	2.36±1.01

#### Environmental Behavior

Factor analysis conducted on the results obtained for students' reported environmental behavior resulted in division of the 20 behavior items into 6 categories. These categories were organized on a scale according to increasing frequency at which the respondents carried out each activity. Table 2 summarizes

the number of items, Cronbach's alpha reliability coefficient and average score for each category of environmental behavior, as well as overall mean score for environmental behavior items. According to the overall mean score, the students report that they carry out environmental activities only sometimes (3.19 from a scale of 5). The environmental behavior category carried out most frequently was 'resource-conserving actions with personal financial benefit' (4.35), while 'environmental activism' was the least frequently carried out environmental activity category (1.46).

TABLE 2. Results of factor analysis conducted on students' reported behavior.

Environmental behavior category	Mean±SD	Number of items	α Cronbach
Resource-conserving actions with personal financial benefit	4.35±0.68	3	0.51
Environmentally- responsible consumerism	3.88±0.89	3	0.59
Nature-related leisure activities	3.66±0.72	4	0.68
Recycling efforts	2.79±1.10	3	0.64
Citizenship action	2.34±0.68	5	0.64
Environmental activism	1.46±0.82	2	r=0.6, p<0.01
Overall mean of environmental behavior items	3.19±0.50	20	0.79

#### Relationship between Environmental Behavior, Attitude and Knowledge

The overall score for environmental behavior was lower than the overall score for environmental attitudes (Table 3). The level of environmental knowledge of beginner students was very low (Table 3).

TABLE 3: Mean overall scores for students' environmental behavior, attitudes and knowledge

Environmental Variable	Mean±SD
Behavior	3.19±0.50
Attitudes	3.95±0.40
Knowledge	38.38.±18.24

Pearson's test showed a significant correlation ( $p<0.01$ ) between all the variables although the significance varied: a relatively high correlation was found

between attitudes and behavior and a relatively low correlation was found between knowledge and the other two variables. The correlation between variables can be organized from highest to lowest as follows: attitudes and behavior ( $r=0.490$ ) > attitudes and knowledge ( $r=0.328$ ) > knowledge and behavior ( $r=0.233$ ).

## DISCUSSION

The ultimate goal of environmental education is acquisition of responsible environmental behavior (REB). Environmental actions that reflect REB have been divided in the literature into a number of environmental action categories, recognized also as citizenship skills (Hsu and Roth 1999; Hsu, 2004; Ramsey et al., 1981; Sia et al., 1986; Smith-Sebasto and D'Costa, 1995). Results of the factor analysis of students' reported environmental behavior obtained in this study contribute another perspective to the concept of REB. The resulting categories of environmental behavior reflect the aspect of environmental commitment and can be organized according to increasing levels of environmental commitment as follows (from lowest to highest): resource conserving actions with personal financial benefit, environmentally responsible consumerism, nature-related leisure activities, recycling efforts, citizenship action, environmental activism. Evaluating the environmental action categories from the perspective of environmental commitment highlights the relationship between environmental literacy and REB. As could be expected, the results demonstrate a negative relationship between the frequency at which students perform each behavior category and the environmental commitment level represented by the corresponding category: the higher the commitment level, the less this behavior is carried out.

The environmental literacy level of beginner students in teacher-training programs found in this study can be summarized as follows: Their knowledge of ecological concepts and environmental issues is very limited. They perceive television as the

major source of information while the educational system is not perceived as a significant source. They maintain overall positive attitudes towards the environment. In spite of their positive attitudes, they perceive themselves as being only moderately committed to the environment as reflected by reported responsible environmental behavior.

This study attempts to characterize, on a large scale, the level of EL of graduates of the educational system who chose to prepare themselves for a profession as teachers. The findings indicate that this population is characterized by a low level of EL. Based on the key function teachers contribute to the capacity of the formal education system to affectively achieve environmental education goals, it is widely accepted today that EE is a necessary component of pre-service teacher-training programs. An up-to-date profile of the EL of teacher-training students is one prerequisite to ascertain how EE might better be incorporated into their curricula.

#### REFERENCES

- Goldman, D., Yavetz, B. and Pe'er, S. (in Press). Environmental literacy in teacher training: Environmental behavior of beginner students. Journal of Environmental Education.
- Hsu, S. J. and Roth, R. E. 1999. Predicting Taiwanese secondary teachers' responsible environmental behavior through environmental literacy variables. Journal of Environmental Education, 30 (4), 11-18.
- Hsu, S. J. 2004. The effects of an environmental education program on responsible environmental behavior and associated environmental literacy variables in Taiwanese college students. Journal of Environmental Education, 35 (2), 37-48.
- Knapp, D. 2000. The Thessaloniki Declaration: A wake-up call for environmental education? Journal of Environmental Education, 31 (3), 32-39.

Mckeown-Ice, R. 2000. Environmental education in the United States: A survey of pre-service teacher education programs. Journal of Environmental Education, 32(1), 4-11.

Ramsey, J., Hungerford, H. R. and Tomera, A. N. 1981. The effects of environmental action and environmental case study instruction on the overt environmental behavior of eighth-grade students. Journal of Environmental Education, 13 (1), 24-29.

Roth, C.E. 1992. Environmental literacy - it's roots, evolution and directions in the 1990's. ERIC Clearinghouse for Science, Mathematics and Environmental Education, The Ohio State University, Columbus, OH.

Sia, A. P., Harold, R.H. and Tomera A. N. 1986. Selected predictors of responsible environmental behavior: An analysis. Journal of Environmental Education, 17(2), 31-40.

Smith-Sebasto, N.J. and D'Costa, A. 1995. Designing a Likert-type scale to predict environmentally responsible behavior in undergraduate students: A multiple process. Journal of Environmental Education, 27(1), 14-20.

UNESCO. 1997. Educating for a sustainable future: A transdisciplinary vision for concerted action. UNESCO Publication No. EPD-97/Conf.401/CLD.1. Paris: UNESCO.