



THE IMPACT OF ENDEMISM CONCEPT ON ENVIRONMENTAL ATTITUDES OF SECONDARY SCHOOL STUDENTS

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SYNOPSIS

This study is based on the evaluation of the hypothesis that the more a person knows about the environment the more positive the person's attitude will be toward the environment. Is this relationship real or assumed? It is assumed that not knowing alone, but being aware of this affluence can improve environmental attitudes of Turkish people.

Endemism is one of the most important indicators to evaluate environmental value of an area. In Turkey, the rate of endemism in plant species is relatively high when compared with other European countries. Therefore, the aim of this study is to evaluate whether aware of the concept of endemism, make a positive contribution to Turkish students' attitudes towards environment.

In the study a quasi-experimental design was applied. In the experimental group (N= 30), the developed "Endemism in Turkey" instructional materials and contemporary activity pages were used, while in the control group (N= 30) traditional ecological information were given by using chalk and talk method. "Scale of Attitude Towards Environment" was used as the pre and post tests. Results indicated that although there were no meaningful difference on their attitudes towards environment between two groups at the beginning, according to the post test results, it was obviously seen that students' attitudes was increased in experimental group.

INTRODUCTION

Environmental education is importantly needed to prepare environmentally literate students who, as future citizens, would play an active role in protecting the

environment through making knowledgeable decisions and taking environmental friendly actions (UNESCO–UNEP, 1991). The process of environmental education, however, is complex and aims to achieve several goals at the affective, cognitive, metacognitive, and behavioral levels (SANERA, 1998). For sure, an ultimate goal of this process remains to influence students' decisions and behaviors. The theory of reasoned action (FISHBEIN & AJZEN, 1975) contends that behavior is determined by behavioral intentions, which are influenced by beliefs, attitudes, and social pressures. Research also indicates that ecological behavioral intentions are correlated with environmental knowledge (KAISER & al., 1999). It follows that environmental decisions and behaviors are inclined by environmental knowledge and attitudes. As such, from a theoretical standpoint, assessing student environmental knowledge and attitudes, and understanding the relationship between these characteristics and environmental decisions and behaviors are necessary first steps in realizing the goals of feasible environmental education (DILLON & GAYFORD, 1997).

This study is based on the evaluation of the hypothesis that the more a person knows about the environment the more positive the person's attitude will be toward the environment. Is this relationship real or assumed?

According to DECHANO (2006), the literature that addresses knowledge and attitudes about the environment supports two major conclusions:

First, the studies have generally reported that people have little knowledge about the environment. For example, BARROW & MORRISEY (1988–1989) focused on ninth graders in Maine (USA) and New Brunswick (Canada). According to the results, neither group exhibited adequate expected knowledge about energy or the environment. Another study conducted in the state of New York in the US reported that 11th grade students exhibited low levels of environmental knowledge (HAUSBECK & al., 1992). ARCURY & JOHNSON (1987) concluded their research with the generalization that 'public environmental knowledge remains at an alarmingly low level even though the environmental movement has been highly publicized for over two decades'.

The second conclusion is that the literature supports as well as refuses the presence of a positive relationship between environmental knowledge and environmental attitudes (DECHANO, 2006).

Common sense leads us to believe that persons with higher levels of knowledge about the environment also have more positive attitudes toward the environment. This knowledge–attitude relationship has been studied by many environmental educators in the field. For example, ARBUTHNOT & LINGG (1975), OSKAMP & al. (1991) and GAMBA & OSKAMP (1994) suggested as a result of their studies that environmental knowledge is an important determining factor of environmental attitudes. Similarly, ROTH & PEREZ (1989) found a strong correlation between knowledge of pollution abatement and attitudes toward pollution abatement, suggesting that a good foundation in environmental knowledge could lead to positive environmental attitudes. On the other hand, there are some other studies that place doubt on the relationship between knowledge and attitude. A thorough review of the literature supports GIGLIOTTI's (1990) statement 'we have produced citizenry that is emotionally

charged but woefully lacking in basic ecological knowledge' (BOHL, 1976; RICHMOND & MORGAN, 1977; BLUM, 1987; BARROW & MORRISEY, 1988–1989; HAUSBECK & al., 1992). Other reviews suggested that there was little or no significant relationship between knowledge and attitudes about the environment (DECHANO, 2006).

As seen from the above records, a direct relationship between environmental education and environmentally responsible attitudes and behaviours is far from clearly established (VLAARDINGERBROEK & TAYLOR, 2007). Studies suggest that the relationship between cognitive and affective attributes is weak and non-linear (KUHLEMEIER & al., 1999; MYERS & al., 2004).

Despite the uncertain relationship between environmental knowledge and attitudes, it has been claimed that positive environmental attitudes are associated with personal environmentally responsible behaviour (KAISER & al., 1999, but cf. SCOTT & GOUGH, 2003). Relative to environmental behavior, HUNGERFORD & VOLK (as cited in YILMAZ & al., 2004) and ARCURY (1990) established a strong link between detailed knowledge of issues and environmentally responsible behavior. According to YILMAZ & al. (2004), "formal education influences students' attitudes positively by developing students' conceptions about environmental issues"

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MATERIALS AND METHODS

In the study a quasi-experimental design was applied. In the experimental group (N= 30), "Endemism in Turkey" instructional materials and contemporary activity pages were developed originally for this study and used, while in the control group (N= 30) traditional ecological information were given by using chalk and talk method. "Scale of Attitude Towards Environment" were used as the data collection instrument by applying as pre and post tests.

"Scale of Attitude Towards Environment" consisted of 15 attitude inventory questions which were rated on a Likert-type scale (LIKERT, 1967). The five possible responses to each statement were "1= Strongly Agree, 2= Agree, 3= Neither, 4= Disagree, 5= Strongly Disagree." The attitude scale was developed by BRADLEY (1995) by using a combination of existing measurement scales (ARMSTRONG, 1989; ARMSTRONG & IMPARA, 1991; CAMPBELL, 1994) which were developed to test attitudes about the environment. This attitude scale was used to measure students' attitudes toward the protection of the environment. The questions were grouped into the following general categories: plant and animal importance, environmental laws and regulations, property rights, hunting and fishing and habitat preservation. For some questions, it was necessary to recode the answers to indicate a 1 as the most

environmentally favorable response and a 5 as the favorable response. Reliability of the instrument was measured on a 0.0 to 1.0 scale. The original attitude inventory had relatively high Cronbach's alpha reliability coefficient of 0.72.

The scale was translated to Turkish language by the researchers and then controlled by a Turkish language professional in the department of Turkish studies from Dokuz Eylul University and two field experts. After the application of the translated version of the scale, the Cronbach's alpha reliability coefficient was found as 0.70.

DATA ANALYSIS

The data collected from the questionnaires were statistically analyzed using the Statistical Package for the Social Sciences (SPSS 15.0). The students' scores were compared on differences between pre- and post-test answers. In order to answer the research questions, the differences between students' pre- and post-test attitude scores were analyzed by independent means t-tests.

RESULTS AND DISCUSSION

In the analysis of responses given by both experimental and control group students to the pre-test, t-test results indicated that both group of students were equal in their attitudes towards the environment, since there was no statistically significant difference in any 15 statements. On the other hand, after the application of instruction, post test results showed that students in experimental group develop better attitude towards the environment than those in control group (Table 1 and 2). The mean scores of both groups of students to the post test are given in Table 1.

In Table 2, as a result of t-test analysis, only statements with statistically significant differences and their mean scores and p values were summarized. Of the 15 attitude statements, six statements showed a statistically significant difference. Among the six statements, as can be seen from Table 1 that in statement number 3 "Animals that provide meat for people are the most important animals to protect", experimental group students' responses showed 2.84 higher mean score than those of control group, indicating a more environmentally friendly attitude. The difference was 0.83 between experimental and control groups attitude mean scores in post-test for the statement number 4 "Poisonous snakes and insects that pose a threat to people should be killed.". Related to the statement number 5 "Landowners should be allowed to drain wetlands/swamps for agricultural or industrial uses.", statement number 7 "Hunting and fishing are important environmental management activities", statement number 8 "Individuals should be allowed to use private land for any purpose." and statement number 13 "Management of wildlife populations should be left to nature." showed statistically significant differences between experimental and control groups (Table 2).

	Experimental group			Control group			Total		
	Mean	N	Std. Deviation	Mean	N	Std. Deviation	Mean	N	Std. Deviation
Q1	1,1333	30	,34575	1,3000	30	,46609	1,2167	60	,41545
Q2	1,2333	30	,43018	1,4000	30	,49827	1,3167	60	,46910
Q3	4,8000	30	,40684	1,9667	30	,92786	3,3833	60	1,59546
Q4	4,6333	30	,61495	3,8000	30	1,18613	4,2167	60	1,02662
Q5	4,5333	30	,77608	3,5000	30	1,27982	4,0167	60	1,17158
Q6	1,1333	30	,34575	1,3333	30	,47946	1,2333	60	,42652
Q7	4,1667	30	,83391	3,6000	30	,93218	3,8833	60	,92226
Q8	4,6000	30	,62146	2,9000	30	,95953	3,7500	60	1,17351
Q9	1,1667	30	,37905	1,5333	30	,73030	1,3500	60	,60576
Q10	1,3667	30	,55605	2,6000	30	1,24845	1,9833	60	1,14228
Q11	1,0333	30	,18257	1,3667	30	,55605	1,2000	60	,44341
Q12	1,0667	30	,25371	1,8000	30	,71438	1,4333	60	,64746
Q13	4,7000	30	,53498	3,4667	30	1,04166	4,0833	60	1,02992
Q14	1,2333	30	,50401	1,7333	30	,86834	1,4833	60	,74769
Q15	1,0667	30	,25371	1,9667	30	1,24522	1,5167	60	,99986

Table 1. Means of post-test attitude statements.
(1=Strongly Agree, 2=Agree, 3=Neither, 4=Disagree, 5=Strongly Disagree)

Table 2. Independent Samples t Test Results for selected questions.

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
Q3	Equal variances assumed	11,324	,001	15,318	58	,000	2,83333	,18497	2,46307	3,20359
	Equal variances not assumed			15,318	39,753	,000	2,83333	,18497	2,45942	3,20725
Q4	Equal variances assumed	8,657	,005	3,416	58	,001	,83333	,24393	,34505	1,32161
	Equal variances not assumed			3,416	43,539	,001	,83333	,24393	,34158	1,32509
Q5	Equal variances assumed	8,245	,006	3,781	58	,000	1,03333	,27327	,48633	1,58033
	Equal variances not assumed			3,781	47,787	,000	1,03333	,27327	,48383	1,58283
Q7	Equal variances assumed	,500	,482	2,482	58	,016	,56667	,22835	,10957	1,02377
	Equal variances not assumed			2,482	57,295	,016	,56667	,22835	,10945	1,02389

Q8	Equal variances assumed	5,169	,027	8,145	58	,000	1,70000	,20872	1,28221	2,11779
	Equal variances not assumed			8,145	49,689	,000	1,70000	,20872	1,28071	2,11929
Q13	Equal variances assumed	13,862	,000	5,769	58	,000	1,23333	,21380	,80537	1,66129
	Equal variances not assumed			5,769	43,304	,000	1,23333	,21380	,80226	1,66441

CONCLUSION AND EDUCATIONAL IMPLICATIONS

When statements number 3, 4, 7 and 13 taken into consideration, the higher mean value of the responses of experimental group students indicates that students in the experimental group developed a higher cognitive level about the concept of endemism by giving equal value of all living things and positive attitude towards the environment.

Higher mean scores in most of the post-test responses of experimental group and the six statements with statistically significant differences lead us to reach a conclusion that students who had an education via the developed “Endemism in Turkey” instructional materials and contemporary activity pages in the experimental group developed better understanding about the concept of endemism and changed their attitudes towards the environment positively.

The instructional difference between the control and experimental group students might have affected the results of this study. Therefore students in experimental group might have developed a better understanding and so the positive attitudes towards the environment.

The results obtained from this study seem to support DECHANO’s (2006) second conclusion in which better knowledgeable individuals develop more positive attitudes. However, reaching a final decision about the hypothesis that “the more a person knows about the environment the more positive the person’s attitude will be toward the environment” is not easy. There is need to hold further studies to reach this conclusion.

If the results of this study can be counted as a proof that the hypothesis is approved, then the evaluation of environmental education programs is inevitable. Since, in order to improve environmental education within the public school system, it is important to evaluate individual programs. To successfully convince the educational community and make it more relevant students and society, educators must evaluate existing programs for their efficiency and resulting effects.

The process of evaluating the effects of an environmental education program on its participants involves understanding what evaluation is, its importance, obstacles to evaluation, and the role of participants and educators evaluators. According to BENNETH (1988), the evaluation program should be organized around four steps: (1) deciding what to evaluate, (2) developing objectives, (3) collecting,

analyzing and interpreting data, and (4) reporting results and improving the educational program.

By gaining and understanding of the relationship between students' attitude toward the environment and their environmental knowledge, educators and scholars will be better equipped to understand how environmental attitudes are formed. In turn, educational programs and curricula can be enhanced to better focus on needs of the students.

Finally, results of this study alone may not support the discussed hypothesis, but they indicate that students' knowledge levels about some alternative concepts like endemism, other than basic concepts of ecology, can enhance their attitudes towards the environment. In the evaluation process of the efficient environmental education program such concepts are better taken into consideration for developing better equipped environmentally conscious generations.

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