

WCES-2010

## Enhancing students' environmental awareness

Gulcan Cetin<sup>a\*</sup>, Seda Hilal Nisanci<sup>b</sup>

<sup>a</sup> *Necatibey College of Education, Balikesir University, Balikesir, 10100, Turkey*

<sup>b</sup> *Science Institute, Balikesir University, Balikesir, 10100, Turkey*

Received October 15, 2009; revised December 24, 2009; accepted January 8, 2010

---

### Abstract

The study aimed to examine the effects of the instruction methods in the new Biology curriculum on ninth grade students' environmental awareness. The sample included 91 ninth grade students in a high school in Balikesir. Environmental Awareness Questionnaire was administered to all students as pretest and posttest. While the experimental group received the instruction methods used in the new Biology curriculum, the control group was taught by the traditional instruction methods. Observations were made during the five-week treatment. Ten students in the experimental group were interviewed. The findings revealed that the instruction methods used in the new Biology curriculum were more effective in enhancing the ninth grade students' environmental awareness than the traditional methods did.

© 2010 Elsevier Ltd. Open access under [CC BY-NC-ND license](https://creativecommons.org/licenses/by-nc-nd/4.0/).

*Keywords:* Biology education; environment; environmental education; environmental awareness; secondary education.

---

### 1. Introduction

All living beings on the Earth live in interaction in a certain environment. Living beings are influenced by their surroundings while they maintain their vital activities and this surrounding is called habitat or environment (Alim, 2006). On the other hand, environment can also be defined as all of the factors that affect the physical, biological, sociopsychological, socioeconomic, and cultural life of an individual or society (Ozmen, Cetinkaya and Nehir, 2005). Environment is of vital importance in establishing human relations based on trust, a prerequisite for a healthy society, and ensures the protection of natural cultural and aesthetic environment. Improving environmental awareness and sensitivity will help individuals live in a healthier and safer environment, which is only possible by raising qualified individuals who receive environmental education. One of the aims of science education is to raise environmentally-aware individuals with improved attitudes and behaviors with regard to environmental protection (Altin, Bacanli and Yildiz, 2002).

Nevertheless, environmental pollution is one of the greatest problems of the 21<sup>st</sup> century. The rapid technological advancements and industrialization have resulted in an increase in negligence and insensitive behavior, leading to the destruction of environmental balance. Such destruction have brought in its tail numerous environmental problems such as pollution, annihilation of species, depletion of energy resources, reduced usable agricultural land,

---

\* Gulcan Cetin. Tel.: +0 266-241-2762 (144); fax: +0-266-249-5005

E-mail address: [gulcan\\_cetin@hotmail.com](mailto:gulcan_cetin@hotmail.com)

nuclear danger, unplanned urbanization, and rapid population growth. Environmental problems cause environmental pollution hampering our lives (Chawla, 1988). Such problems are increasingly aggravating in Turkey. Natural balance is rapidly destroyed, for which one of the most important factors is ignorance. The next generation should receive environmental education in order to eliminate ignorance and to maintain natural balance. Environmental education has two purposes: to provide the posterity with cultural richness and to inform them on environment, environmental problems, the solutions to these problems, and their responsibilities, in particular (Unal and Dimiski, 1999).

Environmental education is a lifelong process that starts in one's family and close circle and carried on at school. Numerous studies have been conducted on environmental education. For instance, Ulucinar Sagir, Aslan and Cansaran (2008) examined the environmental awareness and sensitivity of seventh and eighth grade students in terms of different variables. The authors found a significant difference between the grade levels in terms of students' environmental knowledge, while they reported no significant difference in terms of gender.

### *1.1. Purpose*

The present study aims to examine the effect of the instruction method of the new Biology curriculum on ninth grade students' environmental awareness.

## **2. Method**

### *2.1. Sample*

The study sample includes 91 ninth grade students enrolled in four classrooms in one high school in Balikesir in the spring semester of academic year 2008-2009.

### *2.2. Measuring Tools*

In this study three instruments were used: Environmental Awareness Questionnaire, Observation Form and Interview Form.

**Environmental Awareness Questionnaire:** In this study, the three-point Likert-type Environmental Awareness Questionnaire (EAQ) developed by Cabuk and Karacaoglu (2003) was used to assess students' environmental awareness. Although the original version of the questionnaire consisted of 21 questions, three of them were removed and an 18-question version was used in this study. The questionnaire's reliability was a Cronbach alpha of .81. In the present study, EAQ pretest reliability coefficient was Cronbach alpha .77 and EAQ posttest reliability coefficient was Cronbach alpha .80. The data obtained from the Environmental Awareness Questionnaire were analyzed by using the descriptive statistics and independent samples t-test in SPSS 12.0 statistical software. The scoring of the student responses in EAQ is as follows: Always-3, Sometimes-2 and Never-1.

**Observation:** To support the data obtained in the study, the primary researcher made observations and took observation notes for four weeks so as to obtain data about the way the courses were taught and the students' performance in the experimental group that would be taught by the instruction method of the new Biology curriculum and the control group that would be taught by traditional instruction method. The non-systematic observations were based on the questions contained in the Observation Form. The analysis was performed descriptively on the basis of this question. In analyzing the data in the experimental and control groups, the data were classified under themes and sub-themes (Yildirim and Simsek, 2005).

**Interview:** In order to support the data obtained from the study, 10 students in the experimental group were interviewed after the treatment. Semi-structured interviews were based on the questions in the Interview Form. Each student was interviewed for 15-20 minutes and interview notes were taken. The obtained data were descriptively analyzed. Student responses to each question in the interview form were classified under themes and sub-themes and striking interview notes were given as direct quotation (Yildirim and Simsek, 2005).

### 2.3. Treatment

This study is a quasi-experimental study and the treatment lasted for a total of five weeks (12 hours). The Biology course is taught in 2 hours a week, with each course session lasting for 40 minutes. This study was conducted with a total of 91 students in four ninth grade classrooms comprises 24-25 students and two Biology teachers in a high school in Balikesir. Of the four classrooms, two were randomly assigned as the experimental group and the other two were assigned as the control group. One of the teachers taught the unit called ‘Conscious Individual-Environment’ to the experimental group, while the other teacher taught the same unit to the control group.

The EAQ was administered to all the students as a pretest before the treatment. EAQ duration was around 20 min. In the study, the experimental group was taught with the instruction method of the new Biology curriculum, while the control group received the traditional instruction method. Biology Textbook was used in the lectures with the experimental and control groups; Biology textbook based on constructivism with multiple intelligence activities were designed for the new ninth grade Biology curriculum during the treatment. Direct lecturing method, question-answer method and note taking technique were used in the control group, while brainstorming, discussion, experimenting, preparing posters and projects, as well as direct lecturing method and question-answer method were employed in the experimental group.

After the treatment, the EAQ was administered as posttest to the students in the experimental and control groups. EAQ duration was around 20 min. Moreover, semi-structured interviews were made with 10 students in the experimental group after the treatment and interview notes were taken.

## 3. Findings

### 3.1 Descriptive Statistics and Independent Samples t-test

The pretest and posttest scores of the experimental and control groups on the Environmental Awareness Questionnaire were subjected to descriptive statistical analyses, the results of which are presented below. The study includes a total of 91 students: the control group contains 44 individuals (48.4%), while the experimental group consists of 47 individuals (51.6%). Of the 91 students, 54 were female (59.3%) and 37 were male (40.9%). The difference between the mean EAQ pretest scores of the control and experimental groups was .04 before the treatment, while the difference between the mean EAQ posttest scores of the control and experimental groups was .19 after the treatment. This difference is in favor of the experimental group.

According to the independent samples t-test analysis, there was not a statistically significant mean difference between the control and experimental groups before the treatment ( $p > .05$ ). After the treatment, there was a statistically significant mean difference between the control and experimental groups ( $p < .05$ ) (See Table 1). The findings of the study demonstrate that the instruction method of the new Biology curriculum applied in the experimental group was more effective in promoting students’ environmental awareness, when compared to the traditional instruction method used in the control group.

Table 1. Results of Independent Samples t-test

		Levene's Test for Equality of Variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig. (2- tailed)	Mean Dif.	Std. Error Dif.	95% Conf. Int. of the Dif. Lower Upper	
EAQ Pretest	Equal var. assumed	.079	.779	.550	89	.584	.036	.065	-.093	.165
	Equal var. not assumed			.547	84.354	.586	.036	.065	-.094	.166
EAQ Posttest	Equal var. assumed	2.976	.088	-3.145	89	.002	-.190	.060	-.310	-.070
	Equal var. not assumed			-3.166	87.431	.002	-.190	.060	-.310	-.071

### 3.2. Observation

The study lasted for a total of 12 course sessions. In the study, the first of the researchers separately observed the experimental and control groups and took observation notes. The experimental group was taught by the instruction method of the new Biology curriculum, while the control group received the traditional instruction method. In the control group, the subjects were taught by following the order in the Biology textbook prepared according to the new Biology curriculum, but mostly by lecturing and question-answer techniques, or by the traditional instruction method. The experimental group was taught with various activities such as lecturing, question-answer, discussions, experiments, and projects. It was observed that the students in the experimental group did more research and were more active in classes, whereas the subjects were mostly taught by the teacher by following the textbook in the control group.

### 3.3 Interview

In the study, the findings about the interviews with 10 students in the experimental group confirmed the observation findings. During the interviews, the experimental group students were asked four questions to obtain their opinions about the instruction method of the new Biology curriculum implemented while environmental subjects were taught. Some examples of the interview findings were presented below:

*Interviewer: What did you think when environmental subjects were taught?*

All of the 10 students responded by stating that the unit was taught in a different way than the other units and they enjoyed learning the unit. For instance,

“In the Biology course, we had not been as active when we were learning other subjects. But now we are more active in class and can freely express our opinions.” (Student 4)

Similarly, the students stated that all the textbook activities were performed while they learned this unit; however, others had not been fully performed. Nine of the students described the activities as very enjoyable and the opinions of two of them are quoted below:

“The activities are very nice and fun. We are relieved from writing; yet, we also understand the subjects taught.” (Student 1)

*Interviewer: Are you satisfied with the way your teacher implemented the method?*

Nine of the students responded by saying that they were satisfied with the implementation of the new method; other courses are not taught in this way. For instance,

“We are not taught this way in other courses. In Biology course we are always active; thus, I think our teacher implements the method very well. Also, the activities are performed more in this course and this makes retention of what we learn easier.” (Student 1)

## 4. Conclusion

This study demonstrated that the instruction method of the new Biology curriculum implemented in the experimental group was more effective in enhancing ninth grade students' environmental awareness than the traditional method used in the control group. The observation and interview findings of the study confirmed this result. It was observed that the students in the experimental group were more active and enjoyed the classes more as they performed the activities by themselves. Most of the students stated that the new method enhanced their environmental awareness; they enjoyed the classes; what they learned by this method is more easily remembered; they were more comfortable about expressing themselves; and they felt excited about creating new products as project work. It could be concluded that the curriculum is effective both in enhancing students' environmental awareness and making students enjoy ecology courses if it is implemented in accordance with the constructivist approach and based on activities, as recommended in the new ninth grade Biology curriculum.

## Acknowledgements

We sincerely thank all the students and teachers who assisted in conducting the study and in particular, Elvan Bahar Goktepe, a Biology teacher in a High School in Balikesir, who worked devotedly for the study.

## References

- Alim, M. (2006). Avrupa Birliđi uyelik surecinde Turkiye’de cevre ve ilkogretimde cevre egitimi. *Kastamonu Egitim Dergisi*, 14(2), 599-616.
- Altin M., Bacanlı, H., & Yildiz, K. (2002). Biyoloji ogretmeni adaylarinin cevreye yonelik tutumlari, Orta Dogu Teknik Universitesi, V. Ulusal Fen Bilimleri ve Matematik Egitimi Kongresi, Ozet Kitabi, Ankara.
- Chawla, L. (1988). Children’s concern for the natural environment. *Children’s Environments Quarterly*, 5(3), 13-20.
- Cabuk, B., & Karacaoglu, O. C. (2003). Universite ogrencilerinin cevre duyarliliklerinin incelenmesi. *Ankara Universitesi Egitim Fakultesi Dergisi*, 36(1-2), 189-198.
- Ozmen, D., Cetinkaya, A., & Nehir, S. (2005). Universite ogrencilerinin cevre sorunlarına yonelik tutumlari. *TSK Koruyucu Hekimlik Bulteni*, 4(6), 330-344.
- Ulucinar Sagir, S, Aslan, O., & Cansaran, A. (2008). İlkogretim ogrencilerinin cevre bilgisi ve cevre tutumlarının farkli degiskenler acisinden incelenmesi. *İlkogretim Online*, 7(2), 496-511.
- Unal, S., & Dimiski, E. (1999). UNESCO-UNEP himayesinde cevre egitiminin gelismisini ve Turkiye’de orta ogretim cevre egitimi. *Hacettepe Universitesi Egitim Fakultesi Dergisi*, 16-17, 142-154.
- Yildirim, A., & Simsek, H. (2005). *Sosyal bilimlerde nitel arastırma yontemleri* (Beşinci baski), Ankara: Seckin Yayıncılık, 119-183.