



THE EFFECT OF MICROTEACHING APPLICATIONS IN ENVIRONMENTAL EDUCATION

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ABSTRACT

The purpose of the present study is to investigate the effects of micro-teaching applications used in environmental education on the attitudes and behaviors of individuals. The present study carried out within the framework of the environmental education course was performed with 31 pre-service teachers from the primary education department of Aksaray University in the fall term of 2009-2010 academic year. The study which is an experimental study carried out according to pretest-posttest control group design continued for 14 weeks. At the end of the study, it was found that scores for the environmental awareness, attitude and behavior of the pre-service teachers significantly increased. In light of this finding, it can be argued that more frequent use of micro-teaching applications in environmental education is useful.

Keywords: *Micro-teaching, environmental education, environmental awareness.*

INTRODUCTION

Micro-teaching is one of the methods used to provide pre-service teachers with opportunities to apply their theoretical knowledge and see their own performance in practice. Micro-teaching is a concrete method that can be used to prepare pre-service teachers for real classroom environment (Brent & Thomson, 1996). Wilkinson (1996) states that, through this method, pre-service teachers can make themselves familiar with the realities and rules of teaching profession. This method provides great opportunities for pre-service teachers to discover their own and others' learning styles and reflect on them, and moreover, learn new teaching techniques (Wahba, 1999). Micro-teaching applications bring about innumerable benefits for pre-service teachers. First, they reveal the realities of teaching; inform students about the roles of a teacher (Amobi, 2005; Hawkey, 1995; Kpanja, 2001; Wilkinson, 1996); show them the importance of planning and decision-making (Gess-Newsome & Lederman, 1990); help them to improve their teaching skills (Kupper, 2001). Kupper (2001) emphasizes that micro-teaching should be used in both in-service training and teacher training programs.

Micro-teaching can provide direct feedback about the performance through video recording and also in this method risks are low and gains are valuable (Kavas, 2009; Olrich et al., 1980). Use of video recording in micro-teaching applications makes contributions to the professional development of the pre-service teachers, defines their weaknesses and strengths and improves their skills (Tok, 2007). During learning-teaching process, video recordings can affect pre-service teachers' perceptions (Sherin, 2000). Cunningham & Benedetto (2002) argue that video recording supports learning and Spurgeon & Bowen (2002) state that by means of such devices, the problems that can emerge during the learning process can be observed and defined.

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When the related literature concerning the use of micro-teaching method in teacher training is reviewed, it is seen that there are many studies carried out on various topics such as efficiency of micro-teaching (Pauline, 1993); the use of micro-teaching method in the training of teachers from different subject areas (Akalın, 2005; Çakır & Aksan, 1992; Karçkay & Sanlı, 2009; Peker, 2009); the effects of video recording on the micro-teaching performances of pre-service teachers (Ceyhun & Karagölge, 2002; Lee & Wu, 2006); need for video recording, expert reviews and written/oral feedback for micro-teaching to be effective (Subramaniam, 2006); determination of problems encountered in micro-teaching applications and solutions to these problems (Erökten & Durkan, 2009; Gürses et al., 2005); opinions of the teachers using micro-teaching applications in their courses about teaching in the class (Görge, 2003); the use of micro-teaching at three universities of Turkey (Çakır, 2000); micro-teaching applications for improving the student teachers' presentation skills (Higgins & Nicholl, 2003) and use of micro-teaching for the innovation of sustainable technologies (Overschie et al., 2006).

Though the studies carried out so far have looked at micro-teaching from different perspectives, there is no study investigating the use of micro-teaching applications in environmental education in our country. Effective environmental education can play an important role in the development of positive attitudes, awareness and value judgments. Though technological and legislative regulations attempt to solve environmental problems, they are not adequate on their own. There should be efforts made to improve people's cognitive and affective sides. In this way, individual behaviors towards environment can be changed. Changing behaviors depends on changing attitudes, knowledge and value judgments and accordingly, raising awareness of environment. Various teaching methods and techniques should be employed in learning process to realize these changes in environmental education. Hence, the present study aims to investigate the effects of micro-teaching applications on improving pre-service teachers' competencies and performance in relation to environmental education. For this purpose, answers to the following questions were sought;

1. Does the pre-service teachers' environmental awareness change depending on the micro-teaching applications carried out in environmental education course?
2. Do the pre-service teachers' attitudes towards environment change depending on the micro-teaching applications carried out in environmental education course?
3. Do the pre-service teachers' behaviors towards environment change depending on the micro-teaching applications carried out in environmental education course?

METHOD

In this section, the study model, study group, application stages of the study, data collection tools and analysis methods will be discussed.

Study Model

This is an experimental study carried out according to pretest-posttest control group design.

Study Group

The study group consists of 31 second-year students from the department of primary teacher education of the Faculty of Education at Aksaray University in the fall term of 2009-2010 academic year. Of the study group, 67.7% (21) are female students and 32.3% (10) are male students.

Application Stages of the Study

In the present study, conducted within the context of environmental education course, micro-teaching applications were developed for 14 weeks. After giving the necessary information to the students according to a program, they were asked to design a lesson in the format of a television program based on

micro-teaching method. At the design and presentation stages of the lesson, following stages of micro-teaching suggested by Büyükkaragöz & Çivi (1999) are used;

- a. Designing of 5-10-minute lesson plan.
- b. Developing special evaluation forms to evaluate the lesson.
- c. Teaching the lesson within the previously determined time period and video-recording of the lesson.
- d. Watching the video-recorded lesson.
- e. Evaluation of the lesson by the teacher and other students having watched it by using the developed forms, and making corrections according suggestions, critics and contributions.
- f. Redesigning of the lesson according suggestions, critics and contributions and presentation of it once more.
- g. Evaluation of the lesson again by the audience and if there is any, making suggestions.

At the beginning of the term, the pre-service teachers were introduced to micro-teaching method, and sample applications designed based on micro-teaching method were shown to them. Then the students were divided into totally 6 groups five of which consist of 5 students and one of which consists of 6 students. According to the interests of the groups, topics were distributed to them. What was expected from the pre-service teachers was to design a lesson in the format of a television program. In this regard, the students were asked to decide who would assume which role in the television program they would develop to make a presentation about the topic assigned. Everything in relation to the design of the program was left to the discretion of the students. The students designed the class like a television studio for the date of presentations. Classroom design, posters, embellishing etc., all were decided by the students according to the content of their subject. According to the format of the program designed, the students presented their program, and other students participated in the program by assuming different roles such academician, a farmer, Environment and Forestry Minister, Middle East Expert, Japanese Ambassador. And other students of the class became the audience. Depending on the activities designed in the program, all the required equipment such as computer, projector, sound system etc. was provided. Totally 50 minutes were given to each group, that is, 10 minutes for each student. Activities carried out were video-recorded in line with micro-teaching method and photographs were taken. After watching the recordings, each lesson was evaluated by using "Micro-teaching Evaluation Form", which was developed by Karadeniz (2009). While evaluating the lesson, first presenters were given opportunities to evaluate themselves. Then, the other students evaluated the lesson. After revising the other students' contributions and suggestions, each television program was presented again. In the second presentation, the stages of micro-teaching were exactly followed as in the first presentation. In this way, "Television Program Simulation" environmental education application was administered based on the techniques of micro-teaching method.

Data Collection Tool

As data collection tools, "Environmental Awareness Questionnaire" developed by Milfont & Duckitt (2006) and adapted to Turkish by Ak (2008) and "Environmental Attitude Scale" developed by Uzun & Sağlam (2006) were used. Environmental thinking and environmental behavior were considered to be the two sub-dimensions of the latter scale in the present study.

Basic Constituents Analysis (BCA) was used to test the construct validity of the Environmental Awareness Questionnaire. Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett's test results were calculated to test the compliance of factor analysis of the questionnaire to normal distribution. Test results revealed that $KMO = 0.906$ and $Bartlett's = 17705.52$ $sd = 1540$, $p < 0.05$; hence, the data were found to be suitable for factor analysis. In order to test the construct validity of the Environmental Awareness Questionnaire, factor analysis was carried out by using varimax axis spinning.

As a result of the factor analysis, it was found that the questionnaire consists of six sub- dimensions, and when their power to explain the related structures is examined, it is seen that they can explain 43.49% of the total variance. There are totally 53 items in the questionnaire. The scores to be obtained from this five-point Likert type scale range from 53 to 265. Reliability coefficients of all the sub-dimensions of the scale are 0.75 or higher. Cronbach alfa reliability coefficient for the whole questionnaire is $\alpha=.90$.

Environmental Attitude Questionnaire is a five-point Likert type scale including totally 27 items. The minimum score to be taken from the questionnaire is 27 and the maximum score is 135. Factor analysis was carried out for the construct validity of the questionnaire. Whether the data are suitable for the factor analysis was tested through Kaiser-Meyer-Olkin (KMO) coefficient and Barlett Sphericity test (KMO coefficient is .632 and the significance for Barlett test is .000 ($p<.001$), and it was decided that the data are suitable for factor analysis. In order to analyze the construct validity and factor structure of the scale, explanatory factor analysis was carried out and basic constituents analysis was used as factorizing technique. In the analyses, common factor variance of the factors on each variable, factor loads of the items, explanatory variance ratios and line graph were analyzed. Varimax basic constituents analysis was conducted to analyze the factor structures. The analysis revealed that the questionnaire is a seven-factor scale, and the total variance explained by these factors was found to be 74.545%. The common variance of the factors defined in relation to the items ranges from .618 to .900. For the whole of the Environmental Attitude Questionnaire, Cronbach alfa reliability coefficient was calculated to be $\alpha=.80$; Spearman Brown Split-half test correlation was found to be .76. In the present study, Cronbach alfa reliability coefficient for the questionnaire is $\alpha=.85$.

The Environmental Behavior Questionnaire consists of 13 items and Kaiser-Meyer-Olkin (KMO) coefficient calculated for the questionnaire is .838 and Barlett Sphericity test was found to be significant ($p<.001$). Moreover, the questionnaire was found to be 3-factor scale, and the total variance explained by these 3 factors is 73.590%. The common variance of the three factors defined in relation to the items of the questionnaire ranges from .479 to .862. In the original study, the Cronbach alfa coefficient of the scale was found to be $\alpha=.88$ and in the present study, it was found to be $\alpha=.92$.

Data Analysis

The data obtained from the questionnaires were analyzed through SPSS program package. For the comparison of pretest and posttest scores taken from the environmental awareness, environmental attitude and behavior questionnaires, One-Way ANOVA for Repeated Measures was used and Bonferroni test was used for multiple comparisons.

FINDINGS and DISCUSSIONS

In this section, sub-problems are discussed in the above-given order in line with the descriptive statistics concerning the pre-service teachers' environmental awareness, environmental attitude and behavior scores and differences between pretest scores and posttest scores, and the results of One-Way ANOVA for Repeated Measures conducted.

a. Does the pre-service teachers' environmental awareness change depending on the micro-teaching applications carried out in environmental education course?

Descriptive statistics concerning the pre-service teachers' scores obtained from the environmental awareness questionnaire before they took the environmental education course designed based on micro-teaching method and after they took the course are presented below.

Table 1. Descriptive statistics related to the pre-service teachers' environmental awareness pretest scores and posttest scores

Test	N	\bar{X}	Std. Deviation
Pre-test	31	204.51	15.508
Post-test		215.22	21.680

As can be seen in Table 1, while the environmental awareness mean score obtained by the pre-service teachers from the pretest is $\bar{X}=204.51$, the environmental awareness mean score obtained from the posttest is $\bar{X}=215.22$. In order to test whether the difference between these two scores is significant One-Way ANOVA for Repeated Measures was carried out and results are presented below. Depending on the micro-teaching applications carried out within the framework of environmental education course, environmental awareness scores revealed a significant difference ($F_{(1,30)}=5.203$; $p<.05$) (Table 2).

Table 2. ANOVA results related to the pre-service teachers' environmental awareness pretest and posttest scores

Source	Sum of Squares	df	Mean Square	F	Sig.
Between subject Measure	11065.968	30	368.866		
	1777.806	1	1777.806	5.203(*)	.030
Error	10251.194	30	341.706		
Total	23094.968	61			

$p<.05$

Mean difference revealed by Bonferroni multiple comparison test carried out to find the source of the score differences found for between-groups environmental awareness is 10.71, as shown in Table 3. And this mean difference is statistically significant favoring the posttest scores.

Table 3. Bonferroni analysis-based multiple comparison results related to the pre-service teachers' environmental awareness scores

(I) Group 2	(J) Group 1	Mean Difference (I-J)	Std. Error	Sig.
Post-test	Pre-test	10.71(*)	4.695	.030

* The mean difference is significant at the .05 level

These results show that environmental awareness course executed based on microteaching method is highly effective in raising the pre-service teachers' environmental awareness.

b. Do the pre-service teachers' attitudes towards environment change depending on the micro-teaching applications carried out in environmental education course?

Descriptive statistics concerning the pre-service teachers' scores obtained from the environmental attitude questionnaire before they took the environmental education course and after they took it are presented in a table below.

Table 4. Descriptive Statistics Related to the Pre-service Teachers' Environmental Attitude Pretest and Posttest Scores

Test	N	\bar{X}	Std. Deviation
Pre-test	31	96.74	9.405
Post-test		105.67	12.215

While the pre-service teachers' mean score obtained from environmental attitude pretest is $\bar{X}=96.74$, the mean score they took from the environmental attitude posttest is $\bar{X}=105.67$ (Table 4). Whether the score differences found is statistically significant or not was tested through One-Way ANOVA for Repeated Measures and the results are presented below.

The attitude scores of the pre-service teachers participating in the environmental education course carried out based on microteaching method at the end of the term were found to be significantly higher than their scores at the beginning of the term before they took the course ($F_{(1,30)}=10.262$; $p<.01$) (Table 5).

Table 5. ANOVA results related to the pre-service teachers' environmental attitude pretest and posttest scores

<u>Source</u>	<u>Sum of Squares</u>	<u>df</u>	<u>Mean Square</u>	<u>F</u>	<u>Sig.</u>
Between subject	3512.774	30	117.092		
Measure	1237.565	1	1237.565	10.262(*)	.003
Error	3617.935	30	120.598		
Total	8368.274	61			

$p<.01$

Mean difference revealed by multiple comparison test carried out to find which group the attitude score differences found between pretest and posttest groups stem from is 8.93 and this mean difference is statistically significant favoring the posttest scores (Table 6).

Table 6. Bonferroni analysis-based multiple comparison results related to the pre-service teachers' environmental attitude scores

<u>(I) Group 2</u>	<u>(J) Group 1</u>	<u>Mean Difference (I-J)</u>	<u>Std. Error</u>	<u>Sig.</u>
Post-test	Pre-test	8.93(*)	2.789	.003

* The mean difference is significant at the .01 level

Based on the findings obtained in the section looking at environmental attitudes, it can be argued that the environmental education course carried out based on microteaching method highly improved the pre-service teachers' attitudes towards environment.

c. Do the pre-service teachers' behaviors towards environment change depending on the micro-teaching applications carried out in environmental education course?

Descriptive statistics concerning the pre-service teachers' scores obtained from the environmental behavior questionnaire before they took the environmental education course and after they took it are presented in a table below.

Table 7. Descriptive statistics related to the pre-service teachers' environmental behavior pretest and posttest scores

<u>Test</u>	<u>N</u>	<u>\bar{X}</u>	<u>Std. Deviation</u>
Pre-test	31	33.96	7.600
Post-test		44.22	8.811

While the pre-service teachers' mean score obtained from environmental behavior pretest is $\bar{X}=33.96$, the mean score they took from the environmental behavior posttest is $\bar{X}=44.22$. The results of the statistical

analysis carried out to determine whether the difference between the environmental behavior pretest score and posttest score is significant are presented below.

As can be seen in Table 8, the behavior scores of the pre-service teachers participating in the environmental education course carried out based on microteaching method at the end of the term were found to be significantly higher than their scores at the beginning of the term before they took the course ($F_{(1,30)}=24.965$; $p<.001$).

Table 8. ANOVA results related to the pre-service teachers' environmental behavior pretest and posttest scores

Source	Sum of Squares	df	Mean Square	F	Sig.
Between subject Measure	2102.419	30	70.081		
	1631.032	1	1631.032	24.965(*)	.000
Error	1959.968	30	65.332		
Total	5693.419	62			

$p<.001$

Mean difference revealed by Bonferroni multiple comparison test carried out to find the source of the environmental behavior score differences found among the groups is 10.26, and this mean difference is statistically significant favoring the posttest scores (Table 9).

Table 9. Bonferroni analysis-based multiple comparison results related to the pre-service teachers' environmental behavior scores

(I) Group 2	(J) Group 1	Mean Difference (I-J)	Std. Error	Sig.
Post-test	Pre-test	10.26(*)	2.053	.000

* The mean difference is significant at the .001 level

Based on the findings obtained in the section looking at environmental behaviors, it can be argued that the environmental education course carried out based on microteaching method highly improved the pre-service teachers' behaviors towards environment.

DISCUSSION

The purpose of the present study is to investigate the effects of microteaching applications used in the environmental education course on the pre-service teachers' environmental awareness, attitudes and behaviors. For this purpose, the pre-service teachers were administered a pretest before they took the course and then they were administered a posttest at the end of the 14 week course period. The results revealed that there are significant improvements in the pre-service teachers' environmental awareness, attitudes and behaviors. The literature review showed that there is no study looking at the effects of environmental education based on microteaching method. However, there are some studies investigating the use of microteaching method in some other subject areas and their findings are as follows:

Çakır and Aksan (1992) used microteaching method in a foreign language teacher training program. The study focused on the effects of microteaching on pre-service foreign language teachers' grammar and writing performance and some positive results were obtained. Gürses et al. (2005) carried out a study to determine the problems encountered in microteaching applications and to find solutions to these problems. They found that especially after the second presentations, the pre-service teachers can make sufficient use of laboratory and teaching technologies, explain the basic concepts and principles

concerning chemistry subjects studied, display roles and behaviors required by the profession and make lesson and unit plans. Görge (2003) investigated whether there are differences in the opinions of pre-service teachers about teaching in the class before and after microteaching applications and found some positive changes in the opinions of the pre-service teachers. Existing research indicates that throughout the process in which microteaching method is exploited, video-recording of the applications, watching of recordings to analyze the performances and giving some feedback contribute to the development of students. It is pointed out that video-aided microteaching applications are more useful in generating more constructive feedback from both peers and teacher and they help better understanding of innovative teaching (Frederiksen et al., 1999; Kpanja, 2001; Subramaniam, 2006). Moreover, Ceyhun & Karagölge (2002) reported results proving that repeated microteaching applications enhance student achievement. Karçkay & Sanlı (2009) found that microteaching applications have positive contributions to the teaching competencies of pre-service teachers. These findings are also supported by other studies (Fernandez & Robinson, 2007; Kpanja, 2001; Fernandez, 2005).

As can be seen from the findings of the present study, microteaching method is successful in environmental education. This method can play an important role in raising pre-service teachers' environmental awareness and in improving their environmental attitudes and behaviors. Therefore, environment courses given at universities should include microteaching applications in their curriculums. This will have great contributions to the training of pre-service teachers having good education on microteaching and knowledgeable about its applications. Teachers who can successfully use micro-teaching method in their courses can assume an important role in the education of students who are willing to participate in the solution of global and local environmental problems.

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