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THE EFFECT OF THEMATIC ENVIRONMENTAL EDUCATION ON THE STUDENTS' RESPONSIBLE BEHAVIOR TOWARDS THE ENVIRONMENT

Research Article

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Abstract

The international meetings held have repeatedly demonstrated the importance of environmental education. The success of the thematic education approach has been demonstrated by previous studies and it is thought that this approach will also be successful in environmental education. Starting from here, in this study, the effect of the thematic environmental education activities on students' responsible behavior towards the environment was investigated. The study was carried out with 5th grade students studying in a public secondary school in the 2022-2023 academic year. In the research conducted in the quasi-experimental model, data were collected by applying the pretest-posttest to the non-random experimental and control groups. The data were obtained from the Behavior Towards the Environment Test form. The pretests and posttests applied to the experimental and control groups were subjected to descriptive statistical analysis. Afterwards, the assumptions of the independent samples t-test were examined to examine whether the differences observed between the groups were statistically significant. According to the findings of the study, a positive significant difference was found in the environmentally responsible behaviors of the students studying with thematic environmental education activities compared to the students studying with the current curriculum.

Keywords: Responsible Behaviors, Environmental Education, Thematic Environmental Education

1. Introduction

Environmental problems, which have been increasing in recent years, occupy the agenda around the world. In this direction, education is at the forefront of the steps taken for a sustainable environment. It is known that environmental education has been included in the curriculum in Turkey in recent years. As a matter of fact, when the curricula are examined, it is seen that environmental education in Turkey is placed in certain courses at the level of units or achievements. In addition, environmental education is included in the programs as an elective course in secondary schools.

1.1. Environmental Education

Education is generally defined as the process of bringing about desired behavioral changes in individuals through experiences. The behavior change process here also includes the process of gaining behavioral changes that will produce solutions in the face of problems (Ertürk, 1972;

Yücel & Morgil, 1999). In that case, the most important of the aims of education should be to gain the behaviors that can produce solutions together with the awareness of struggle against certain problems. Considering that environmental problems are increasing rapidly and solutions are needed, the education underlying the process of acquiring behaviors towards the solution of environmental problems can be defined as "environmental education". When considered in a broad scope, environmental education can be expressed as an effort to create a good society that is concerned and sensitive to the environment and environmental problems and that protects historical, natural, cultural and socio-aesthetic values, with attitudes, behaviors and knowledge that can carry out studies that include different and effective solutions to find solutions to existing environmental problems and prevent environmental problems (Tecer, 2007).

In 1972, the "Stockholm United Nations Conference on the Human Environment" was held in Stockholm, the capital of Sweden, with wide participation (United Nations, 1973). This meeting was the first international meeting on the environment organized by the United Nations. In the meeting, the foundations of environmental education were laid in order to combat environmental problems that have gained global importance.

Following the Stockholm conference, the environmental education framework declaration known as the "Belgrade Charter" was published in Belgrade, the Capital of Yugoslavia, in 1975 (UNESCO, 1990). According to the Belgrade Charter, some of the aims of environmental education are expressed as follows:

- Environmental education should be evaluated as a whole, together with all factors such as ecological, natural, technological, economic, political, legal, social and cultural factors.
- Environmental education should be continued throughout the formal and informal education life of individuals.
- Environmental education should be handled in an interdisciplinary approach.
- Environmental education should have a world-centered perspective, taking into account regional differences.

At this point, the framework of environmental education was clearly revealed for the first time with the Belgrade Charter. This laid the groundwork for future meetings. The Belgrade Charter was followed by the "Tbilisi Environmental Education Declaration" in 1977, the "United Nations Conference on Environment and Development" in 1992, the "International Conference on Environment and Society" in 1997 and other meetings (Çamur & Vaizoğlu, 2007).

The effects of these environmental meetings were also reflected in the field of education. Thus, the importance given to environmental education has increased over time. However, environmental education can be described as a fairly new field of education with its nearly forty-year history, as well as other known fields of education. If we look at the history of education, it can be said that in such a short time, environmental education has turned into an inclusive education field on which almost all societies agree on its function and importance.

1.2. Environmental Education in Turkey

Although the concept of environment was not directly addressed in the 1961 Constitution of the Republic of Turkey, Article 49, which includes the provision "The State has a duty to ensure that everyone can live in physical and mental health and receive medical care", has been interpreted to include environmental protection (Constitution of Turkey, 1961). Article 56 of the 1982 Constitution of the Republic of Turkey states that "It is the duty of the State and citizens to improve the environment protect environmental health and prevent environmental

pollution." (Constitution of Turkey, 1982). Although the concept of environment is emphasized in this article of the Constitution, environmental education was not included in any level of official education institutions until 1992. The first environmental education studies were included in the "Environment, Health, Traffic and Reading" course, which was put into practice at all grade levels of primary schools by the Ministry of National Education between 1992 and 1997. At the secondary school level, it was added to the program in 1992 as an elective course under the name of "Environment and Human". At the higher education level, Environmental Engineering departments opened in the 1990s are considered an important step in environmental education (Kahriman Pamuk, 2019).

One of the most important steps taken in the name of environmental education is the “Cooperation Protocol on Studies to be Made on Environmental Education” signed between the Ministry of National Education and the Ministry of Environment in 1999 (Ministry of Environment and Forestry of Turkey, 2004). The most important issue put forward in the protocol is the necessity of starting from pre-school education institutions and continuing in a systematic way at primary and secondary education levels (Kesicioğlu & Alisinanoğlu, 2009).

In 2002, a regulation was made in the pre-school education program. Behaviors that are intended to be acquired by children with the regulation are grouped under the title of "Environmental Education". In 2004, the primary education curriculum was renewed and the Science and Technology course was put into practice starting from the 4th grade level. Environmental education has started to be given under the title of STSE (science, technology, society and environment relations) in the curriculum of this course. Likewise, in the Social Studies course curriculum, which has been applied since the 4th grade level, the subjects of environment and sustainability have been introduced. As a matter of fact, it is seen that environmental education is given interspersed within certain courses at secondary and high school levels (Kahriman Pamuk, 2019). The Environmental Education course, which has been given as an elective course in secondary schools since 2015, has been decided by the Board of Education and Discipline to be abolished from the 2022-2023 academic year and to replace it with the Environmental Education and Climate Change elective course (Ministry of Education of Turkey, 2022).

1.2. Thematic Teaching Approach

It will not be possible to explain the thematic teaching approach without understanding the concepts of discipline and interdisciplinary. The concept of discipline, which is generally used in the society in the sense of rule and order, is defined in the dictionary of the Turkish Language Association as "the whole of the information that is or may be the subject of education, the branch of science" (Turkish Language Institution, 2011). The concept of discipline used in the field of education is defined by Özçelik (2015) as the specialization of information by coming together in the same group according to the closeness of information over time. If we consider in primary education, each of the fields of education such as Science, Social Studies, Mathematics, Foreign Language, Music is expressed as a discipline.

Interdisciplinary understanding, on the other hand, can be defined as advancing by combining knowledge and thinking styles of two or more disciplines when it is difficult or impossible to make cognitive progress through a single discipline (Boix & Duraisingh, 2007). In interdisciplinary approaches, perspectives and ways of thinking from different disciplines are integrated to achieve systematic results. Developed designs, methods and results are not limited to a single field, but emerge with the interaction of multiple fields (Aboelela et al., 2007; Kumar et al., 2019). In the education planned according to interdisciplinary approaches, a determined subject/theme is taken into the center, knowledge and skills from different

perspectives are integrated (Aydın & Balım, 2005). In the literature, the interdisciplinary approach and the thematic teaching approach are mostly handled in the same way.

The importance of thematic teaching approach has started to increase in Turkey as the constructivist approach adopted in education has become effective since 2005. Since the theme covers a certain area under the roof of almost all disciplines, it is described as a unified concept across disciplines. In its simplest definition, thematic teaching is the organization of the education program by associating different fields with each other and integrating around a predetermined comprehensive and general theme (Çeper, 2019; Hoerr, 2000). Thematic Teaching integrates basic disciplines such as Science, Mathematics, Language Education with the teaching of a broad subject such as society, sustainable energy, river basins, rainforests (Andrade, 2018, cited in Çeper, 2019). For example, if we accept that the theme chosen at the school is "Water", the teacher can have the students make experiments on water in the Science lesson, have them read books about water in the Turkish lesson, and draw pictures about the importance of water in the Visual Arts lesson. In addition, they can organize out-of-school excursions and take students to a stream or lake to have group discussion and examination of aquatic creatures. As a matter of fact, there are no definite distinctions, strict rules and limitations in the curricula prepared with the thematic approach. The themes are ended, so it makes it easier to turn to other points when the interest of the students decreases in the process (Çeper, 2019).

1.3. Purpose and Importance of the Research

The dynamic, interconnected and pressing issues facing our society (e.g. environmental issues) result in the interplay of fields such as sociobiology and chemical ecology. Scientists and non-scientists are alike in their ability to integrate knowledge and skills from multiple disciplines to address complex problems. Therefore, science educators underlined the need to develop students to explain or address problems involving different science disciplines (Jacobs, 1989; Klein, 2015; Mansilla, 2005; Shen, Liu, & Sung, 2014; You, Marshall, & Delgado, 2018). That is, students will have to spread interdisciplinary understanding. In addition, scientists emphasize that interdisciplinary education has functions such as improving students' understanding of natural phenomena (You, 2017), improving their knowledge integration (Mansilla, 2006), and increasing their deductive reasoning (Golding, 2009; Lattuca, Voight, & Fath, 2004).

Environmental education is multifaceted. For this reason, the disciplines it is associated with are quite a lot. The relations between disciplines should be taken into account by considering students' levels in terms of the comprehensibility, intelligibility and, more importantly, the applicability of this versatility (Gülay & Önder, 2011). When a subject related to the environment is discussed in any lesson, it is important to establish a connection with other lessons regarding this subject in terms of creating contextual cognition. It is also necessary for it to be applied in an integrative way with other courses (Özdemir, 2007). At this point, environmental education should be included in education programs by preparing it with an interdisciplinary approach at all stages in the education system, starting from pre-school education steps (Arslan, 2011).

It has been seen that the thematic approach is successful in many educational fields, and considering that it will have important effects on environmental education, the effect of thematic environmental education activities on the environmentally responsible behavior of the students has been investigated.

1.4. Research Problem

The research problem addressed in the study;

Do environmental education activities prepared in accordance with the thematic approach have an effect on students' responsible behavior towards the environment?

2. Method

2.1. Research Model

The quasi-experimental model was used in the research. The quasi-experimental method is frequently used in educational research. Errors or variables from sources such as instrument, testing, and history that may threaten internal validity can be strongly controlled, as they will have the same effect in the control and experimental groups. Central education is implemented in Turkey, so it is not possible for the classes to be randomly assigned by the researchers. In such central education systems, some of the classes that were previously created by the school administrators are randomly selected and determined as the experimental and control groups. If we look at it from this aspect, the quasi-experimental method emerges as a method that is frequently used (Çepni, 2010).

2.2. Working Group

The study was carried out with students attending the 5th grade of a state secondary school located in a medium-sized city center in the Black Sea Region in the 2022-2023 academic year. 5th grade students were chosen for the research because the Human and Environment unit was included only at the 5th grade level in the science curriculum. The study group was determined by a non-random method. At the beginning of the academic year, pre-tests were applied to five 5th grade students in the school. Considering that the scores obtained from the questionnaires from these classes are equal to each other, the two closest test results were matched. Paired groups were randomly assigned to the experimental and control groups. Thus, the experimental group consisted of 29 students and the control group consisted of 27 students.

2.3. Process Steps

For the environmental education to be given to the students, the "Human and Environment" unit of the 5th grade Science course has been determined as the main theme. Within the scope of the theme, environmental pollution, environmental protection and beautification, human-environment interaction and local and global environmental problems were studied. Based on these subjects, it was decided to prepare environmental theme activities for Social Studies, Turkish, English, Visual Arts, Music and Information Technologies courses in line with the ideas of branch teachers. As a result of joint work with the branch teachers of each course, activities that are suitable for the grade level and that can be achieved through education and training were prepared. After the preparation of the activities, the needed materials were provided and the necessary ones were developed. The activities were presented to 3 academician professors who are experts in their fields for their opinions. After the expert opinions, the activities were made ready. Finally, lesson plans covering the activities were prepared and ready for implementation.

The application was started in April 2022 after the pre-test was applied to the determined experimental and control groups. The lessons determined within the scope of the theme were started simultaneously and coordinated actions were taken against all kinds of difficulties encountered during the application. After the completion of the experimental group activities, which lasted for a total of 5 weeks from each lesson, the post-test was applied to the experimental and control groups at the end of May, and the application was completed without any problems.

2.4. Data Collection Tools

Environmental Behavior Test (EBT) developed by Sontay (2013) was used as a data collection tool in the research. The scale consists of 3 sub-dimensions and a total of 12 items in likert type with 7 options. Each item contains a behavior word and the options for the items are "none, one, two, three, four, five and more than five" respectively. In the scale, students were asked to mark how many times they have done (repeated) each behavior in these dimensions in the last year. The sub-dimensions and item numbers of the scale are as follows; Natural Balance Protective Behavior sub-dimension: 5 items, Social Behavior sub-dimension: 5 items, and High-Level Cognitive Behavior sub-dimension: 2 items. The Cronbach Alpha reliability values of the 3 sub-dimensions of this scale were given as .77, .74 and .71, respectively, and the total Cronbach Alpha reliability value of the scale was given as .77.

2.5. Analysis of Data

The pre-tests and post-tests applied to the experimental and control groups were subjected to descriptive statistical analysis (mean and standard deviation). Afterwards, the assumptions of the independent samples t-test were examined to examine whether the differences observed between the groups were statistically significant.

The results obtained from the Shapiro-Wilk test were examined in order to determine whether there is a normal distribution between the EBT scores of the students who are taught according to the current curriculum and the EBT scores of the students who are taught based on the thematic approach. In cases where the difference scores of the subjects showed normal distribution, the independent samples t-test was used. In cases where the difference scores of the subjects did not show normal distribution, the Mann Whitney U test, which is the non-parametric alternative of the independent samples t-test, was preferred.

The assumptions of the paired samples t-test were examined to compare the pre-test and post-test scores of the students. When the results obtained from the Shapiro-Wilk test were examined, it was seen that the test scores of at least one of the groups did not show normal distribution, and in this case, Wilcoxon Signed Rank test was preferred as an alternative to the paired samples t-test. Analyzes were made using the SPSS 16 program.

2.6. Ethics Committee Permission Certificate

The data of this research were obtained from the doctoral thesis named "An Environmental Education Study Based on Interdisciplinary Thematic Approach". At the Gazi University Ethics Commission's meeting dated 09.03.2023 and numbered 04, it was unanimously decided that there was no ethical objection to the thesis study.

3. Findings

Descriptive statistical information about the pre-test and post-test scores of the control group students who studied the human and environment unit of the science course, which constitutes the scope of the theme, according to the current curriculum and the experimental group students who studied according to the environmental education application prepared based on the thematic approach are given in Table 1.

Table 1. *Descriptive Information on EBT Results*

Scale	Min	Max	Control Group				Experimental Group			
			Mean		SD		Mean		SD	
			Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test	Pre-test	Post-test
EBT	.58	5.42	2.71	2.86	.99	.92	2.07	2.80	.87	1.10

The Shapiro-Wilk test was applied to the pre-test results to investigate whether the experimental and control groups were equivalent in terms of the scores they obtained from the EBT before the application, and the test results were found to be .911 for the control group and .363 for the experimental group (p>.05). Accordingly, the scale scores of the control and experimental groups have a normal distribution. Since both groups had a normal distribution, the independent samples t-test was used to compare the pretest scores of the control and experimental groups (Table 2).

Table 2. *T-Test Results of the Control and Experimental Groups EBT Pre-Test Scores*

Group	N	Mean	SD	DF	T	p
Control	27	2.71	.99	54	2.571	.013
Experimental	29	2.07	.87			

Looking at Table 2, it is seen that there is a significant difference between the students who will teach the human and environment unit according to the current curriculum and the students who will process it according to the thematic approach-based teaching responsible behaviors towards the environment at the beginning (T(54)=2.571, p<.05). Considering the test scores means, it is striking that the environmentally responsible behaviors of the students who will study the unit according to the current curriculum (2.71) are higher than the students who will process it according to the thematic approach-based teaching (2.07). This shows that the experimental group started the process at a disadvantage compared to the control group.

The Shapiro-Wilk test was applied to determine whether there was a normal distribution between the scores of the control and experimental groups before and after the teaching process. Shapiro-Wilk test (p<.05) results were insignificant (.817) in the control group and significant (.001*) in the experimental group. Since at least one of the groups did not have a normal distribution, the Wilcoxon Signed Rank test, which is a non-parametric test, was used to determine whether the difference in environmentally responsible behavior pretest-posttest scores was significant or not (Table 3).

Table 3. *Wilcoxon Signed Rank Test Results for EBT Pre-test and Post-test Scores*

Group	Posttest-Pretest	N	Mean Rank	Sum of Ranks	Z	p
Control	Negative Ranks	12	11.46	137.50	-.966*	.334
	Pozitive Ranks	14	15.25	213.50		
	Ties	1				
Experimental	Negative Ranks	6	9.08	54.50	-3.076*	.002*
	Pozitive Ranks	20	14.82	296.50		
	Ties	3				

*Based on negative ranks.

As seen in Table 3, no significant difference was found between the CST pretest-posttest scores of the control group students (Z=-.966*, p>.05). It was determined that there was a significant difference between the CST pretest-posttest scores of the experimental group students (Z=-3.076*, p<.05).

After the teaching process, analyzes were made to understand whether there was a difference between the control group, which processed the Human and Environment unit according to the current curriculum, and the experimental group, which studied according to the thematic approach-based teaching. In this scheme, EBT post-test scores are used; the total scores obtained by both groups are compared. The fact that there was no statistically significant

difference between the groups after the compared situations and after the teaching process was completed, both processes had similar meanings for the students; If a difference is seen, it shows that the group with a higher score has a more positive experience in this process. Shapiro-Wilk normality test was applied to determine whether the EBT post-test scores of the control and experimental group students showed a normal distribution, and the test results were found to be .743 in the control group and .482 in the experimental group. According to these results, independent samples t-test was applied for the post-test analysis of the EBT (Table 4).

Table 4. *Independent Samples T-Test Results Regarding the Control Group and Experimental Group's EBT post-test Scores*

Group	N	Mean	SD	DF	T	p
Control	27	2.86	.92	54	-.219	.828
Experimental	29	2.80	1.10			

When Table 4 is examined, it is seen that there is no significant difference between the responsible behaviors towards the environment in the final situation of the students who study the Human and Environment unit according to the current curriculum and the students who study according to the thematic approach-based teaching ($T(54)=-.219$, $p>.05$) . This result indicates that the environmentally responsible behaviors of the two groups, who are subject to different teaching processes, are similar at the end of the teaching process. On the other hand, when the means are examined, it is striking that the environmentally responsible behaviors of the students who study the relevant unit according to the current curriculum (2.86) are slightly higher than those who study according to the thematic approach-based teaching (2.80).

The research findings showed that the education processes experienced in the control group did not increase the environmentally responsible behaviors at a statistical level, while the education processes experienced in the experimental group increased the environmentally responsible behaviors at a statistical level. However, as a remarkable finding, the students in the experimental group, who started the process with a low average score for responsible behavior towards the environment, completed the process with an average score close to the students in the control group at the end of the process. These findings show that the teaching of the Human and Environment unit with thematic approach has a positive effect on developing students' environmentally responsible behaviors compared to the current curriculum.

4. Discussion

When the relevant literature is examined, it is seen that the results obtained show similarities with the results of some previous studies. Especially if we consider the environmental and nature education studies carried out in Turkey; Buldur et al. (2018) implemented an interdisciplinary nature education project, and as a result of the project, they found statistically significant increases in the test scores of students' affective tendencies towards the environment. It was stated that the students participating in the project became willing to take more active roles in activities aimed at protecting the environment and significant progress was achieved in their environmental awareness.

Hamalosmanoğlu and Güven (2014), in their experimental study with 4th grade primary school students, applied the environmental topics they chose from the science and technology curriculum to one group with an interdisciplinary approach, and to the other with a traditional approach. As a result of the study, it was determined that the environmental attitudes and behavior scores of the students educated according to the interdisciplinary approach increased statistically significantly compared to the scores of the students educated according to the traditional approach.

Nuhoğlu and İmamoğlu (2018) found positive significant differences in students' environmental knowledge and affective tendencies towards the environment in the interdisciplinary nature education program they developed. An increase was observed in students' environmentally responsible behaviors, but it was not statistically significant.

Çeper (2019) concluded that environmental education activities prepared according to the thematic teaching approach increased students' environmental awareness.

Candan Helvacı and Helvacı (2019) stated that STEM (science, technology, engineering and mathematics) practices, which were prepared with an interdisciplinary approach, caused positive changes in the attitudes and behaviors of the participants. The participants, who had simpler knowledge and attitudes before the application, stated that they started to react to those who throw garbage, to talk about the concepts of "Reject, Reduce, Reuse, Repair, Recycle", which mottos recycling, and to engage in concrete behaviors towards the environment.

Boyraz (2015) stated that the education he carried out, taking into account the interdisciplinary teaching approach, contributed to increasing academic achievement, perception and permanence in learning towards science.

Konukaldı (2012) found positive and significant differences in the academic achievement and attitudes of students studying according to interdisciplinary thematic teaching compared to students studying according to the activities in the teacher's guidebook. In addition, Konukaldı (2012) stated that interdisciplinary thematic teaching increases students' motivation, increases their readiness levels and helps students learn by internalizing information by facilitating teaching. Similarly, Ürey and Çepni (2014) stated that the school garden program, which is prepared with a science-based interdisciplinary approach, has a positive effect on the development of students' attitudes towards the lesson.

Focht and Abramson (2009) argued that interdisciplinary environmental education has positive effects on sustainability principles. They stated that what is needed in environmental education is an interdisciplinary synthesis between a wide range of natural sciences, social sciences, applied sciences and humanities.

Ardoin (2006) stated that the field of environmental education is an interdisciplinary field by its nature. As a matter of fact, it is seen that interdisciplinary education practices generally give successful results in the field of environmental education. In addition, it is seen that there are different methods that are effective in developing environmentally responsible behaviors (Erdoğan, 2011; Karakaya Akçadağ and Çobanoğlu, 2018; Yeşilyurt, Özdemir Balakoğlu & Erol, 2020).

5. Conclusion

When the pre-test scores of the students who study the Human and Environment unit according to the current curriculum and the students who study according to the thematic approach-based teaching from the environmentally responsible behavior test are examined, it is seen that the students who study according to the thematic approach-based teaching start the process at a disadvantage.

Considering the results of the analysis, there was an increase in the test scores of both groups. However, the results of the analysis show that there is no significant difference between the pre- and post-process scores obtained from the environmentally responsible behavior test of the students who are educated according to the current curriculum. It is observed that there is a statistically significant difference between the pre-test scores and post-test scores of the

students who are educated according to the thematic approach. At this point, it can be said that students who receive education based on thematic approach have a more successful process.

When the post-test scores obtained at the end of the process are compared, it is seen that the scores of the students educated according to the current curriculum and the scores of the students receiving education based on the thematic approach are almost equal. However, it should not be forgotten that students who are educated according to the current curriculum start the process with much higher average scores.

6. Suggestions

It is possible to find many studies in the literature showing that educational activities designed according to interdisciplinary education have a positive effect on students' learning products. From this point of view, it is thought that giving more space to interdisciplinary education in educational activities will bring positive results. At least the parts of the curricula related to environmental education can be designed according to interdisciplinary education, so that students can be more sensitive and responsible for the environment.

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