Use of Educational Films in Environmental Education as a Digital Learning Object

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Use of Educational Films in Environmental Education as a Digital Learning Object

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Article Info	Abstract
	The purpose of this study is to investigate the effects of educational movies that are used in teaching the chapter of Mystery of Earth Crust / Earth and Universe on the environment-related knowledge levels and attitudes of students. Another purpose of the study is to find out about the views of students in the experiment. As a result of the study, the knowledge test mean scores of the students after the implementation significantly differed between the groups in favor of the experiment group. Another finding in this study, no significant difference was found between the groups in terms of their mean post-test attitude scores before the implementation. For the first question, the students stated that the Mystery of Earth Crust / Earth and Universe chapter was distinct from other chapters because of some differences. For the second question, the students stated that they learned the definition, reasons, effects and types of environmental pollution, gained awareness and responsibility about the environment, learned about behaviors towards preventing environmental pollution and developed an attitude towards environmental pollution. Additionally, with the third question the students' emphasized educational movies had significant benefits for both individual outcomes and the instruction process.

Introduction

The rapid developments in science and technology today affect and change our lives to a significant extent. Increased amounts of individual science knowledge are needed for understanding the rapid developments in the field of science, and obtaining this knowledge is possible only by being scientifically literate individuals (Sürmeli, 2012). As also indicated in the curriculum, the science course aims to train all students as scientifically literate individuals. The science curriculum that was published in 2013 defined the characteristics of scientifically literate individuals in detail. Such individuals have basic skills regarding the sciences (biology, physics, chemistry, earth sciences, astronomy and environmental sciences, health and natural disasters) and skills towards discovering the natural environment, they inquire-question, are able to solve problems and learn throughout their lives by a consciousness of sustainable development. Additionally, these scientifically literate individuals have an understanding of the relationship between sciences and technology-society-environment, as well as psychomotor skills (MEB, 2013).

Accordingly, one of the important objectives of science instruction is to provide students with knowledge and awareness towards environmental problems that are increasing based on scientific and technological developments and train them to show attitudes and behaviors towards preventing these problems. This is possible only by planned environmental education with determined objectives (Güven, 2011). Environmental education is a continuous learning process that enables people to get to know concepts related to their environment, enables them to develop a positive attitude toward the environment and a high level of sensitivity and awareness to environmental problems, and also to acquire knowledge, skills, attitudes and values for solving environmental problems to leave a livable, clean and healthy environment for future society (Vaughan, Gack, Solorazano, & Ray, 2003).

The general aim of environment education is to raise awareness in and inform all individuals constituting the society. With this education, it is aimed to make individuals active in matters of the environment and provide them with positive and permanent behaviors (Kahyaoğlu, 2009). The science, environment education and biology curricula by the Ministry of National Education also aim to develop qualified nature and environment awareness, discuss topics of nature/environment and include teaching and training practices in relation to these (MEB, 2013; 2015; 2018). While providing learners with environment education, it is important to use different

methods and techniques and visual and auditory elements instead of methods and techniques that make students depend on the textbook and limit them with what is taught by the teacher.

Developed science and technology have allowed access to several pieces of information and presentation of these in different formats (Peraya, 1998). Rapid mobility of change experienced in educational technologies has also diversified learning objects and instruction materials and made these more qualified and innovative (Koşar & Yüksel, 2005). Learning objects refer to all digital resources that may be reused to support learning (Polsani, 2003; Wiley, 2002). According to South and Monson (2000), learning objects are digital environments that are designed or used to achieve learning goals and they cover a broad area that extends from conceptual maps and graphics to videos and interactive movies. A digital learning object that shows a process or an operation is a short animation or video film, a piece of text, an image or a diagram and an interactive computer simulation (Cebeci, 2003). So, as digital learning objects, educational movies are some of the important learning materials that may be used for the success of education-training and need to be included in curricula (Wenger, 1943).

According to Bruner (2008), educational movies are tools that provide students with experience in indirect was and contribute to the process of learning-teaching. As learning objects, these movies are prepared with the purpose of informing learners on a certain topic, and they are highly effective tools of education, and therefore socialization (Birkök, 2008; Michel, Roebers, & Schneider, 2007). Educational research focuses on the benefits of educational movies. Usage of educational movies in learning environments eliminates mundaneness and provides motivation for the topics that are being taught (Weinstein, 2001). According to Demircioğlu (2007), educational movies increase the curiosity and attention of the student towards the subject, take students to places that are difficult to visit, bring dangerous practices into the learning environment, provide opportunities to assess examples from different perspectives, increase academic success and positive attitudes and leads to activation of more senses.

Gregg, Hosley, Weng and Montemayor (1995) stated that movies help better understanding of abstract and complex concepts in a both visual and auditory sense. Likewise, other researchers also stated that educational movies may be used as an effective tool in teaching certain subjects and acculturation, which is a social construct (İnce-Yakar, 2013; Osborne, 2002). For example, Takmaz, Yılmaz and Kalpaklı (2018) considered the movie Avatar as an effective instruction material due to its comprehensive emphases on the behaviors that are aimed to be taught by nature/environment education. According to Robles (1997), educational movies visually enrich a situation, eliminate problems that may occur in observation of fast-acting scientific events and provide opportunities for students to see what they are told verbally. This was also emphasized by the study conducted by Barnett, Wagner, Gatling, Anderson, Houle and Kafka (2006).

The researchers found that popular science-fiction movies contribute to the understanding of students on scientific concepts and development of their mental structures. The researchers also stated that educational movies may be used as effective tools in determining the views of students regarding the teacher, the curriculum and topics of science in daily life (Güven-Yıldırım, 2015; Güven-Yıldırım, Köklükaya, & Selvi, 2015; Köklükaya, 2014). According to Pekdağ (2005), when the visual scenes in the movie feel familiar and the auditory elements that accompany the visual presentation become known, activities that are carried out based on constructivism after watching the movie make the topic more understandable and easy to learn. That is, in a learning environment where movies are utilized, it is easier and more fun to reach targeted outcomes (Saraç, 2012). Hence, the purpose of this study is to investigate the effects of educational movies that are used in teaching the Mystery of Earth Crust / Earth and Universe chapter in the 5th-grade Sciences subject on the environment-related knowledge levels and attitudes of students. Another purpose of the study is to find out about the views of students in the experiment where educational movies are used on the movies they watched, the subjects they have learned in the process and the process of instruction. With these purposes, answers were sought for the following research questions:

1. Is there a significant difference between the mean preliminary knowledge test scores of the students in the experiment and control groups?
2. Is there a significant difference between the mean final knowledge test scores of the students in the experiment and control groups?
3. Is there a significant difference between the mean preliminary attitude test scores of the students in the experiment and control groups?
4. Is there a significant difference between the mean final attitude test scores of the students in the experiment and control groups?
5. What are the views of the students in the experiment group on the educational movies, the subjects they have learned in the process and the process of instruction?

Method

Study Model

To collect the data for the purposes of the study, this study employed a mixed design where qualitative and quantitative research methods were used. Mixed design studies are studies that allow the researcher to utilize both quantitative and qualitative data instead of a single type of data (Creswell, 2005). A quasi-experimental design was used to collect the quantitative data of the study, and in order to support and explain the results obtained about the quantitative data, the method of semi-structured interviews was utilized. Thus, with this, the study was carried out in compliance with the explanatory mixed design method. The logic of this approach is consideration of the quantitative data and the analysis results of these data as the focus and usage of the qualitative data and analysis results for refining the quantitative results in detail and explaining the quantitative results (Creswell, 2005; McMillan & Schumacher, 2010).

Study Group

The study group of the study consisted of a total of 44 students selected from two classrooms that were studying at the 5th-grade of a middle school in the Osmangazi district of the province of Bursa in Turkey in the spring semester of the academic year of 2016-2017. The experiment group of the study consisted of the students who received instruction with educational movies, while the control group consisted of those who received instruction without these movies.

As the study aimed to collect both qualitative and quantitative data, two types of participants were determined. All the students who participated in the study were included in the process of quantitative data collection (N= 44). During the process of obtaining qualitative data, the data collected from the students in the experiment group were analyzed, and the mean scores of the students were ranked as low, medium and high. After this, a total of volunteer 14 students were selected from these low, medium and high groups to carry out the semi-structured interviews.

Data Collection Tools

The study used the Environment Knowledge Test developed by Cömert (2011), the Environment Attitude Scale developed by Atasoy (2005), and a semi-structured interview form developed by the researchers.

Environment Knowledge Test: The test was developed Cömert (2011) with the purpose of determining the knowledge levels of students regarding Environmental Problems and Their Effects, which is within the scope of the Science and Technology course. The final form of the test was determined to have 23 after analyses, and the KR-20 reliability coefficient of the test was found as .75. For this research, the reliability value of the test was recalculated and the KR-20 reliability coefficient of the test was found to be .71.

Environment Attitude Scale: The scale was developed by Atasoy (2005) with the purpose of measuring 6th, 7th and 8th grade students' environmental thoughts, feelings and behaviors. The Cronbach's Alpha coefficient of the 25-item scale was calculated as .85. For this study, the reliability value of the scale was re-calculated and Cronbach Alpha reliability coefficient of the scale was found to be .74.

Semi-structured Interview Form: With the semi-structured interview questions prepared by the researchers, it was aimed to collect the views of the students towards the educational movies used in instruction, the subjects they learned during the process and the process of instruction. For this purpose, 6 semi-structured questions were prepared, and these questions were examined by 2 different experts that were not associated with the researchers for suitability in assessing the issues in question. As a result of receiving expert opinions, some questions that did not serve the objectives were removed, some questions were combined, and those that were not understood were reorganized. The data that were obtained from the interviews were audio-recorded by a recorder to be converted into text in the computer environment by getting permission from the participants. The explanations about how the qualitative data were analyzed are included in detail under the title of qualitative data analysis.

Data Collection Process

Before implementation, the Environment Knowledge test and the Environment Attitude Scale were applied in both groups as pre-tests. The experimental process covered the weeks (5 weeks) where the Mystery of Earth Crust / Earth and Universe chapter was taught in the spring semester of middle school 5th -grade. While the topics in the Mystery of Earth Crust / Earth and Universe chapter were taught with educational movies in the experiment group, these educational movies were not used in the control group. Attention was paid to obtain the selected movies from reliable sources and select those movies that are suitable for the age group and have suitable lengths. 13 educational movies that were considered to satisfy these criteria and provided content validity for the chapter were selected, watched by the researchers before implementation and utilized in the process of implementation. The films and the content of the films are given in Table 1.

Table 1. Educational films used in the experimental group

Topic	Educational Film Link	Content of the film	Screen time
Environmental pollution	https://www.youtube.com/watch?v=PGGHFTPuQMY	Environmental pollution	3.35 min
	https://www.youtube.com/watch?v=1mO19g9FHP8	Environmental problems	3.10 min
	https://www.youtube.com/watch?v=_J6k9MZab-w	Environmental problems	3.00 min
	https://www.youtube.com/watch?v=Dn_KJ1sb0LM	Recycle	3.45 min
	https://www.youtube.com/watch?v=l6E9TUY11HA	Water pollution	2.31 min
	https://www.youtube.com/watch?v=KdJxuQ0pof4	Air pollution	10.38 min
	https://www.youtube.com/watch?v=Wd0FzQTDM90	Air pollution	2.37 min
	https://www.youtube.com/watch?v=Muf8SMurYHI	Soil Pollution	5.29 min
	https://www.youtube.com/watch?v=NS-1lHWAr7E	Radioactive Pollution	2.32 min
	https://www.youtube.com/watch?v=MbCZoPb1PYg	Light pollution	6.26 min
	https://www.youtube.com/watch?v=i1La4xnwFHA	Noise pollution	3.16 min
	https://www.youtube.com/watch?v=5WMQIdFY9WI	Noise pollution	4.34 min

In the application process, the students in the control group were not watched educational films, and the gains of Mystery of Earth Crust / Earth and Universe chapter were given for 5 weeks by using question-answer technique, discussion and group work methods from the activities offered by the curriculum. After the implementation, the same test and scale were applied in both the groups as post-tests. In addition, at the end of the application process, semi-structured interviews were conducted with the students selected from the experimental group.

There are some factors that threaten the internal validity of the study. Factors such as participant characteristics, attitudes of participants and teaching activities, data loss, application of measurement tools, test implementation and unexpected events are factors that threaten internal validity (Fraenkel, Wallen & Hyun, 2012). In this study, there are some factors that threaten the internal validity such as the fact that the groups of students participating in the research cannot be formed by neutral assignment, pretest effect of test and scale used in research and the effect of students' expectations. However, the research design used in the research, the selection of measurement tools appropriates to the gains, the applications, observation of the course, prepared lesson plans. SPSS 21 analysis is the main measures taken to minimize the elements that threaten the internal validity of the study.

Data Analysis

The SPSS 21 statistical analysis software was used to analyze the data obtained in the study. Descriptive statistics (mode, median, mean, standard deviation) were utilized to determine the general distribution of the responses of the students to the test and the scale and test whether the quantitative data were normally distributed or not. The central tendency (mean, mode and median) and central distribution (standard deviation, variance, skewness and kurtosis) values for the test and the scale were reported. Independent-samples t-test was used to determine whether or not there was a significant difference between the mean pre-test and post-test scores of the students in the two groups. All analyses in the study accepted the level of significance as .05.

The qualitative data analysis method of content analysis was used to analyze the qualitative data that were collected in the study. This analysis followed the steps that were reported by Miles and Huberman (1994) and Yıldırım and Şimşek (2008). The documents that are obtained by writing down the interview responses were analyzed by the qualitative analysis software HyperRESEARCHTM 2.6.1. Then, themes which were able to explain the data generally through codes and gather those codes under certain categories were formed. In order

to ensure the reliability of the study, the interviews made with the students were coded by an expert instructor. According to the measurements of consensus and dissidence in the codes which both two researchers made, the consensus correlation coefficient between the expert and the researcher was found as (.81).

Results and Discussion

For the purposes of the study that are stated above, both qualitative and quantitative data were collected from the student with a mixed research design. The findings obtained as a result of the analysis of the qualitative and quantitative data collected from the students and comments on these findings are given below.

Findings Regarding the Quantitative Data and Comments

The qualitative data of the study were obtained from the tests and scales applied with a total of 44 students including 22 in the experiment group and 22 in the control group before and after implementation. The quantitative findings regarding the research question and sub-questions of the study and comments are provided below.

Findings on the Sub-Questions 1 and 2 and Comments

Before going into the findings related to the sub-questions 1 and 2 of the study, the statistical method to be applied on the quantitative data was determined. For parametric analysis methods to be used in quantitative studies, the quantitative data collected by tests and scales must be normally distributed (Çepni, 2007; Sim & Wright, 2002). Because of this, some analyses were carried out on the data, and whether or not the data were normally distributed was controlled (See Table 2).

Table 2. Descriptive data on pre and post knowledge test scores

Tests	Group	N	M	sd	Var.	Med	Mod	Kurt.	Skew.
Pre-test	Experimental	22	6.73	2.25	5.06	7	6	-.39	-.60
	Control	22	6.36	2.30	5.29	6	5	-.58	.33
Post-test	Experimental	22	12.14	3.13	9.83	13	14	-.36	-1.04
	Control	22	8.36	3.03	9.19	9	8	-1.54	-.02

Table 2 shows the descriptive information on the mean knowledge pre-test and post-test scores of the groups. According to the information on the table, the mean knowledge pre-test score of the students in the experiment group (M= 6.73) was close to that of the control group (M=6.36), while the mean pre-test scores of both the groups were relatively low. The mean knowledge post-test score of the students in the experiment group (M= 12.14) was higher than that of the control group (M= 8.36). It is seen that the success levels of the students in both groups increased, while the increase was higher in the experiment group.

As seen in Table 2, the mean, mode and median values of both groups for the pre-test results were close to each other. Again, these values for both groups for the post-test results were almost equal to each other. Such close values of mean, mode and median scores obtained for the data collected from all the tests are interpreted as that the data are normally distributed (Köklü, Büyüköztürk, & Bökeoğlu, 2006). The skewness and kurtosis values in Table 1 were also suitable for normal distribution. Skewness and kurtosis values in the range of -2 to 2 show that the data are normally distributed (George & Mallery, 2003). As the sample sizes for both groups were n > 20, based on the central limit theorem, the data are assumed to be normally distributed (Büyüköztürk, 2010). Parametric tests were used to analyze the data that were found to be normally distributed based on descriptive statistics. Based on this, it was firstly aimed to determine whether or not there was a significant difference between the mean knowledge pre-test scores of the students in the experiment and control groups, and independent-samples t-test was applied on the knowledge pre-test scores (See Table 3).

Table 3. Independent sample t-test results of pre-test knowledge scores

Group	N	M	sd	*t*	*p*
Experimental	22	6.73	2.25	-.53	.60
Control	22	6.36	2.30		

Based on the results, there was no significant difference between the mean knowledge pre-test scores of the students (experiment group: M = 6.73, control group: M = 6.36) before the implementation (p > .05, t = -.53). The finding that there was no significant difference between the scores of the students before the implementation was suitable for the purpose of determining the effectiveness of educational movies.

The results of the independent-samples t-test regarding the difference between the mean knowledge post-test scores of the groups are provided in the table below (See Table 4).

Table 4. Independent sample t-test results of post-test knowledge scores

Group	N	M	sd	*t*	*p*
Experimental	22	12.14	3.14	-4.05	.00
Control	22	8.36	3.02		

According to Table 4, the mean post-test score of the experiment groups was M = 12.14, the mean post-test score of the control group was M = 8.36, and the difference between the groups was significant (p < .05, t = -4.05).

Findings on the Sub-Questions 3 and 4 and Comments

Before going into the findings related to the sub-questions 3 and 4 of the study, the statistical method to be applied on the quantitative data was determined by carrying out analyses on the data to see whether or not the data were normally distributed (See Table 5).

Table 5. Descriptive data on pre and post attitude scale scores

Tests	Group	N	M	sd	Var.	Med.	Mod	Kurt.	Skew.
Pre-test	Experimental	22	83.13	8.49	72.12	83	82	1.45	-.17
	Control	22	84.68	11.24	126.23	86.5	84	-1.52	-.73
Post-test	Experimental	22	90.59	6.13	37.68	92	92	-.58	-.53
	Control	22	89.59	9.90	98.06	92	92	1.34	-.13

According to Table 5, the mean attitude pre-test score of the experiment group (M= 83.13) was close to that of the control group (M=84.68). In the post-test results, the mean score of the experiment group (M= 90.59) was again close to that of the control group (M= 89.59). It is seen that there were increases in attitude scores in both groups, but there was no noticeable difference in the post-test scores.

According to Table 5, the mean, mode and median values of both groups for the pre-test scale results were close to each other. Again, these values for both groups for the post-test scale results were almost equal to each other. Close mean, median and mode values and the skewness and kurtosis values regarding the data show that they are normally distributed (George & Mallery, 2003, Köklü, et al. 2006). Likewise, according to the central limit theorem, it is assumed that the data are normally distributed (Büyüköztürk, 2010). It was decided to use parametric tests in the analysis of the data that were determined to be normally distributed based on descriptive statistics, and independent-samples t-test was used to test whether the difference between the pre-test attitude scores of the groups was significant (See Table 6).

Table 6. Independent sample t-test results of pre-test attitude scale scores

Group	N	M	sd	*t*	*p*
Experimental	22	83.13	8.49	.515	.609
Control	22	84.68	11.24		

According to the information in Table 6, the mean attitude scale pre-test scores were M= 83.13 and M= 84.68 for the experiment and control groups respectively. The difference between the groups was not significant (p > .05, t = .515). After this, the post-test scores of the groups were compared by independent-samples t-test (See Table 7).

Table 7. Independent sample t-test results of post-test attitude scale scores

Group	N	M	sd	*t*	*p*
Experimental	22	89.59	6.13	-.403	.689
Control	22	90.59	9.90		

According to the table, the mean attitude scale post-test scores were M= 89.59 and M= 90.59 for the experiment and control groups respectively. The difference between the groups was not significant (p > .05, t = -.53).

Findings Regarding the Qualitative Data and Comments

The qualitative data of the study were collected with 14 students selected from the experiment groups through semi-structured interviews to explain and support the findings obtained from the quantitative data. The students were asked to answer 3 open-ended questions to collect the qualitative data. The responses of the students to the questions were examined in detail and codes and themes for each question were derived. The qualitative data were analyzed by qualitative research methods by using these codes and themes, and the findings on each question were included by direct quotes from the responses of the students. As the students' own sentences would be presented without changing them, the students were given code names such as S_1, S_2, S_3… to protect their identity. Regarding the qualitative data, the following sections include findings on the direct quotes from the responses of the students, percentage and frequency tables about the questions and codes and themes, as well as comments on these findings.

Findings Regarding Differences in Teaching of Chapters and Comments

The students were first asked the question "what was the most important difference that distinguishes the classes where the Mystery of Earth Crust / Earth and Universe chapter was taught from other science classes?" and the study investigated why they found the class different without emphasizing the subject matter or the educational movies or the instruction process. The codes and themes were established after examining the students' responses to question 1 in detail. These codes and themes, and the percentage and frequency distributions are presented below (See Table 8).

Table 8. Percent-frequency distributions of theme and codes for question 1

Main Theme	Theme	Code	f	%
Differences of teaching Mystery of Earth Crust / Earth and Universe chapter from teaching of other chapters	Differences of unit	Frequent encounter in everyday life	9	33.3
		Addressing environmental issues	5	18.5
		Providing useful information	4	14.8
	Differences of educational films	Using visual and video	3	11.1
		Providing retention	3	11.1
		Better understanding	2	7.4
		Providing fun lesson processing	1	3.7

Table 8 shows that the students answered this question with responses that could be collected under 2 themes. 33.3% of the students responded as that the Mystery of Earth Crust / Earth and Universe chapter is intertwined with our lives and the knowledge acquired in this chapter will frequently appear in our daily lives. For example, student 2 (S_2) commented on this code as follows:

> S2:...I think, the difference that separates the Mystery of Earth Crust / Earth and Universe chapter is that what I learn from this chapter may turn up every day, while the other science chapter(s) may appear when they are needed (40.526, 25.05.2017).

18.5% of the students stated that this class talks about environmental issues, and 14.8% said the information they gathered in this class is very useful. Student 5 (S_5) explained this code as follows:

> S5: This chapter has become mentally more permanent. This chapter will be useful for me and for those I love throughout my life (84.712, 25.05.2017).

In addition, 11.1% of the students who explained the difference that distinguished the class from other classes emphasized the visuals and videos used during classes. Again, 11.1% of the students stated that the class was more permanent because of the educational movies, 7.4% said they understood the class better with the help of the educational movies and 3.7% said the class was very entertaining. For example, student 7 (S_7) and student 12 (S_{12}) commented on these codes as follows:

S7:…helps me understand better. It does not stay in my mind much when the professor teaches it. I understand better by visuals and videos. There is a great chance that I will forget the subject when the professor teaches it (111.985, 25.05.2017).

S12: The most important difference that separates the Mystery of Earth Crust / Earth and Universe chapter from other science classes is that science classes teach scientific subjects, while the Mystery of Earth Crust / Earth and Universe chapter talks about social lives, and nature-human relationships (198.320, 25.05.2017).

Findings Regarding Topics That Students Get Knowledge and Comments

The students, who revealed the reasons in their opinion on why the class was different from other classes with their responses to the first question of the interview, were asked the second question "Which subjects have you gathered knowledge on in our class?" This way, the subject titles that they learned were investigated. The codes and themes were established after examining the students' responses to question 2 in detail. These codes and themes, and the percentage and frequency distributions are presented below (See Table 9).

Table 9. Percent-frequency distributions of theme and codes for question 2

Main Theme	Theme	Code	f	%
Topics that students get knowledge	Environmental pollution	Causes of environmental pollution	11	20
		Types of environmental pollution	10	18.2
		Effects of environmental pollution	6	10.9
		Definition of environmental pollution	4	7.3
	Removal of Environmental Pollution	Environmental awareness	11	20
		Behavior to removal of environmental pollution	7	12.7
		Attitudes towards environmental pollution	3	5.5
		Waste and recycling	3	5.5

While answering the question, as seen in Table 9, the students provided responses that could be gathered under the themes of environmental pollution and eliminating environmental pollution. A large part of the students responded to the question about forming explanatory sentences about the reasons for and types of environmental pollution. For example, student 1 (S_1) commented on this code as follows:

S1: In the class, I learned not to litter, how long it takes it do degrade in nature, forest fires, exhaust gasses produced by cars and the need to install filters for those, and that the wastes and gasses that are released by volcanic eruptions harm the environment. As an example to environmental pollution, the biggest reason for it are people, as I learned, there is excessive population increase, unplanned industrialization and irresponsible hunting, soil pollution, need to avoid soil pollution, careless littering, water pollution, drainage waters, agricultural chemicals, acid rains, household waste, etc. (252.635, 25.05.2017).

Similarly, the student 9 (S_9) and student 14 (S_{14}) explained issues as follows:

S9: I learned that people are like the enemy of nature. Because we buy a phone, a higher model is released in a couple of days, and if we throw the old one in the environment, there is nature pollution.

S14: In the class, I learned about air pollution, water pollution, soil pollution, light pollution, visual pollution and noise pollution. I obtained the most amount of knowledge on air pollution. Everything like factory chimneys and exhaust smoke coming from cars may pollute the air. (615.056, 25.05.2017).

Another part provided views on the effects and definition of environmental pollution. Student 5 (S_5) explained this code as follows:

S5: Then, in air pollution, the smoke that comes out of heating stoves and factories makes us sick, but if we install filters, we protect our health. (476.426, 25.05.2017).

Under the theme of eliminating environmental pollution, the students stated that they gained responsibility and awareness for the environment in this class. Again, a very large proportion of the students emphasized that they learned about behaviors towards preventing environmental pollution and developed attitudes towards it. 3

students talked about the information they gained about wastes and environmental pollution. Some of the responses by the students were as the following:

> S13: A learned a lot that I did not know. I believe these will contribute to my life and in solving problems. For example, it is harmful to pour waste oils into the sink. We can prevent this by throwing them into the bins made by our government. Global warming also harms us much. It puts the lives of all living being in danger. For example, stores turn all the lights up at night to draw attention, everywhere is lit up like it is daytime. (577.802, 25.05.2017).

> S6: For example, I was a person who litters before observing these classes. …who excessively sprays perfume, pollutes the environment. However, after seeing these, I quit all these. I said I will not do these and warned those who did. (393.426, 25.05.2017).

> S11: We should avoid wasting water, plant trees in nature, install filters on factory chimneys, avoid pouring oil in sinks, throw batteries into battery collection boxes instead of regular thrash, construct buildings with the same heights, and avoid turning the volume up too much while listening to music. (491.802, 25.05.2017).

Findings Regarding the Use of Educational Films in Lessons and Comments

Lastly, the students were asked the question "what are your views on the educational movies that were used in the class?" With this question, it was aimed to learn about what they thought about the educational movies that were used I the class, whether or not they liked educational movies, and if any, the negative aspects of educational movies. Another purpose of asking this question was to achieve explanation of the findings obtained from the quantitative data and reveal the reasons for the investigated effects of educational movies on different variables. The codes and themes were established after examining the students' responses to question 3 in detail. These codes and themes, and the percentage and frequency distributions are presented below (See Table 10).

Table 10. Percent-frequency distributions of theme and codes for question 3

Main Theme	Theme	Code	f	%
Thoughts about the use of educational films in lessons	Contribution to the student	Providing permanent learning	13	31.7
		Providing meaningful learning	9	22
		Usefulness	4	9.8
	Contribution to the teaching process	Providing more effective learning	7	17.1
		Providing detailed information about the topic	5	12.2
		Providing fun learning aptitude	3	7.3

According to Table 10, the students provided responses under themes that emphasized the effects of educational movies on both individual outcomes and the instruction process. For example, the vast majority of the students, 31.7% emphasized that educational movies provide more permanent learning. Student 4 (S_4) and student 10 (S_{10}) explained this code as follows:

> S4: ..I am a person who understands better with visuals. If the teacher did not show these movies and just taught the subject, I would not remember it. (741.308, 25.05.2017).

> S10: ...was very helpful for me to hold the classes with movies. For example, if we write it down, it will stay in our mind for at least a day. But it can stay in our mind for a couple of years when we watch a movie or a video.(877.132, 25.05.2017).

Again, a significant portion as 22% stated that educational movies lead to meaningful learning. According to 9.8% of the students, educational movies were very helpful in their learning of the subject. While explaining the contributions of educational movies in the instruction process, 17.1% of the students stated that educational movies provide a more effective learning. 12.2% stated that movies help explain the subject in more detail, while 7.3% said classes are held in a very fun way with the help of educational movies. Some of the responses by the students were as the following: For example, student 8 (S_8) commented on this code as follows:

> S8: I think the classes were really fun with these movies. In addition to being fun, they were informative. This is because the movies told us what we can and cannot do against these pollutions. (826.541, 25.05.2017).

Discussion and Conclusion

As a result of the study, there was no significant difference between the mean pre-test knowledge scores of the students in the experiment group who were given environment education with educational movies and those in the control group who were given environment education without educational movies (p> .05, t= -.53). Additionally, the knowledge test mean scores of the students after the implementation significantly differed between the groups in favor of the experiment group (p< .05, t = -4.05). The literature review showed that there is a limited number of studies where educational movies are used in environment education. For example, Takmaz, Yılmaz and Kalpaklı (2018) aimed to investigate what the movie Avatar as an instruction material makes people think in terms of nature and environment education. As a result, it was concluded that the movie Avatar may provide significant contributions as an effective instruction material due to its comprehensive emphases on behaviors that are aimed to be created by nature/environment education. Demirkuş, Bozkurt and Gülen (2017) provided virtual materials to establish popular environmental concepts and sets of concepts in the mind properly and achieve accurate learning of these. In the material prepared by the researchers, a movie DVD with 712 concepts was created by using popular environmental concepts from 90 scientific movies viewed on documentary channels. The results of another study by Selanik-Ay (2010) were directly in parallel with those in this study. In the study, it was revealed that educational movies contribute to students' acquisition of knowledge on topics related to the environment, awareness on environmental issues, information on environmental issues and development of environmental awareness. Likewise, Barbas, Paraskevopoulos and Stamou (2007) investigated the effects of movies related to the natural environment on the effects of students' views regarding the environment. Their study used slides and educational movies with subjects of the natural environment, environmental pollution and the damages people inflict on nature. As a result, it was concluded that movies related to the natural environment had positive effects on sensitivity for the environment. Alım (2006) also emphasized the role of auditory and visual media in environment education. Moreover, the results of several studies in the literature have revealed positive effects of educational movies on the knowledge and success in classes. As reported by Birkök (2008), by usage of educational movies in the instruction process, complex information is understood more easily, the entirety of the organized information is transferred dynamically, visually and auditory, and in addition to instruction, behavioral models can also be provided to the student. The results of other studies reported that movies have positive effects on knowledge and success about the classes (Birkök, 2008; Pekdağ & Le Marechal, 2007; Watts, 2007; Woelders, 2007), experiences of watching movies change the scientific understanding of students towards science and science subjects (Frank, 2003), and movies contribute to the cognitive development of students (Anderson, Huston, Schmitt, Linebarger, & Wright, 2001; Rice, Huston, Truglio, & Wright, 1990).

Another finding in this study was about the effects of educational movies on the attitudes of middle school students towards the environment. As a result of the analysis, no significant difference was found between the groups in terms of their mean pre-test attitude scores before the implementation (p> .05, t = .515). There was also no significant difference between the post-test mean scores (p> .05, t = -.53). The researchers could explain this outcome by some important points in changing attitudes. Attitudes are formed as a result of the experiences, reinforcements, imitations and social learnings throughout people's lives, and the root of many attitudes is in the person's childhood. These attitudes that are acquired in childhood years do not change easily unless there are significant experiences and memories on the subject (Kağıtçıbaşı, 2010). Considering especially the characteristics of the age group in the study and the short time of implementation, it is believed that the attitudes resisted change as it was reported in the literature. Moreover, as attitudes are implicit, they are difficult to measure. Thurstone (1931) and Likert (1932) stated that most methods in attitude scales are based on the assumption that people's attitudes can be measured through their views and beliefs on the object of attitude (Arkonaç, 2001). That is, attitudes are highly difficult to measure as they are implicit, and it is also difficult to determine the functional relationship between the "measured attitude" and the attitude on which a conclusion is drawn (Eren, 2001). On the other hand, the literature contains studies that, in contrast to the results of this study, reported positive effects of educational movies on attitudes (Birkök, 2008; Cavanaugh & Cavanaugh, 1996, 2004; Çemrek, Anılan, Anılan, Balbağ, & Görgülü, 2005; Kaşkaya, Ünlü, Akar, & Özturan-Sağırlı, 2011; Laprice & Winrich, 2010; McCormick, 2007; Sürmeli, 2012).

The study reached its qualitative results by the semi-structured interviews carried out with the students. The responses provided by the students not only explained the reasons for the quantitative results but also provided ideas about the educational movies that were used in the process. The responses provided by the students were examined and it was found that their views gathered around a few points. For the first question, the students stated that the Mystery of Earth Crust / Earth and Universe chapter was distinct from other chapters because of this difference. A large part of the students stated that the chapter is intertwined with our lives, we would encounter the information we have learned in this chapter frequently, and environmental issues were discussed

in the class. Again, for the second question, the students stated that they learned the definition, reasons, effects and types of environmental pollution, gained awareness and responsibility about the environment, learned about behaviors towards preventing environmental pollution and developed an attitude towards environmental pollution. This shows that the environment education reached its purpose and it was provided in compliance with the targeted outcomes of the chapter. This is because with environment education provided to students, it is expected that they recognize the values, attitudes and concepts related to their environment, and this education allows individuals to develop responsibility, sensitivity and awareness about their environment. Environment education is a life-long process of learning where individuals obtain knowledge, values and experience towards solving environmental problems to leave a healthy and clean environment for future generations (Doğan, 1997; Vaughan, Gack, Solorazano, & Ray, 2003). In the sciences course curriculum prepared by the Board of Education and Discipline of the Ministry of National Education, environmental topics are included in abundance with the aims of better understanding of the environment by students, their display of behaviors that are useful for the environment, awareness of environmental issues, their responsibility about these issues and increasing sensitivity about the environment (MEB, 2013).

Additionally, the students emphasized the educational movies that were used in teaching the chapter while providing their responses and made some explanations. According to the students, educational movies had significant benefits for both individual outcomes and the instruction process. Firstly, the students stated that educational movies made it possible to hold classes by visuals and videos. Bruner (2008) also emphasized this situation and defined educational movies as tools that provide students with indirect experiences through videos and enrich the learning and instruction process. According to Birkök (2008), by using educational movement in the instruction process, the entirety of the organized information is provided dynamically, auditory and visually, and in addition to instruction, behavioral models can also be given to students. The students reported that educational movies were beneficial for their learning of the topic, contribute to better understanding of the course and the class that was held this way was more permanent. When the literature is reviewed, it may be seen that this result that was revealed by the views of the student was in agreement with those of several studies. Barnett, Wagner, Gatling, Anderson, Houle and Kafka (2006) reached the conclusion that popular movies were effective for students to make sense of scientific concepts and develop their mental structures. Likewise, several researchers reported that educational movies affected learning positively (Beuscher, Roebers, & Schneider, 2005; Birkök, 2008, Linebarger, Kosanic, Greenwood, & Sai Doku, 2004; Pekdağ & Le Marechal, 2007; Stoddard, 2009) and provided permanence for classes (Akbaş, Canoğlu, & Ceylan, 2015; Butler, Zaromb, Lyle, & Roediger, 2009; Sullivan-Kerber, Clemens, & Medina, 2004; Walker, 2006; Watts, 2007; Woelders, 2007). Finally, the students stated that the classes that were held with educational movies were very entertaining. Akridge and Balkanski (1990) found that students had much fun as a result of using educational movies in the learning environment, and their attitudes and motivations towards the course increased. Similarly, researchers defined educational movies and videos as a very good educational tool that may be used to make learning more fun in formal and informal education and achieve permanent and effective learning (Hébert & Peretz, 1997).

Recommendations

Educational movies have been found in education environments for about half a century (Depover, Giardina, & Marton, 1998), and they are defined as some of the important learning objects in achieving success in education-training (Wenger, 1943). In this sense, it is believed that research results that determine the effects of educational movies in learning environments on different variables will be effective in filling the gap in the literature. Based on the results of the study, it is recommended to include different samples in future studies and investigate the effects of educational movies on different variables.

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