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## Effects of Animation Film Use on Earthquake Knowledge Level of 4th Grade Students

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Today, use of different teaching models, materials, and tools in education and teaching process have increased. The main reason for such increase is the search to make education more quality, easier, more entertaining, and more permanent. In this sense, animation films are technological products that contribute learners in visual and audial terms. In this study, what effect does animation film use has on earthquake knowledge level of 4th grade students was analysed. The pattern of this study was selected as pre-test/post-test control group trial model among experimental research models. Participants of this study were selected among 4th grade students in Fatih Elementary School in Bünyan District, Kayseri in 2017-2018 academic year. Total of 62 students was included in the study where 31 students were included in experiment group and 31 students were included in control group. The duration of this study was four weeks. Pre-test was applied on first week, post-test was applied on last week, and application was conducted on remaining two weeks. Traditional methods were applied on the control group and animation films selected by researchers based on content and subject of class were applied on experiment group. In this study, "Academic Success Test" developed by researchers was adopted to test the effects of animation film use on earthquake knowledge level of 4th grade students. As a result, it was determined that experiment group was more successful than control group in terms of academic success, and animation film use in earthquake knowledge level of 4th grade students had positive effects.

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### Introduction

In this era, as expectations from individual change, parallel innovations are necessary within education system. According to Ministry of National Education (2016), modern education emphasises importance of raising individuals that make research, question what is out there, and create new ideas and products. In order to realise these objectives, technology or in other words tools and materials should be used in education-teaching activities.

Heinch, Molenda and Russell (1993) defined education technology as "learning scientific knowledge about how people learn and application for learning problem solving" where Reiser (1987) defined learning technology as using human and material resources to enable effective learning (Transferred by: Yalın, 2014). Based on these definitions, education technology can be expressed as using tools in learning and teaching process. Benefiting from different materials in education activities enables multiple learning environment, meet

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individual needs, and attract attention of students to class to make learning easier and permanent. These tools which affect the efficiency and quality of education today are slide projectors, movies, documentaries, cartoons, computer and computer aided software and applications, depending on time, subject and possibilities. One of the materials frequently used by teachers in teaching activities in teaching materials is animations.

Animation is a technology product that enables teaching subjects with visual and audial elements (Mayer & Moreno, 2002). Daşdemir (2006) defined animation as animation; Akaydın and Kaya (2018) defined animation as showing pictures and graphics with motion. According to Aktürk, Yazıcı and Bulut (2013), animations are the process of animating graphics in a certain scenario. Using animation in education activities enables explaining abstract subjects in more material way, developing imagination of individuals, making learning a fun and permanent activity, and offering a rich teaching resource for educators (Çakır, 2001). Appropriate, suitable, and on-time use of animation supports learning processed (Mayer & Moreno, 2002).

Today, based on the fact that individuals are experiencing problems in education of earthquake subject and raising earthquake awareness, using animation for this purpose will contribute to increase such awareness and form consciousness regarding this subject. Within the education system, there are many courses to gain earthquake consciousness, especially such gains are included as achievements in Social Sciences (MEB, 2018). Because, it is important to gain knowledge to minimise the damages of earthquake.

Earthquake education is an education process starting from how earthquake happens, damages of earthquake, and preventive measures (Öcal, 2005). For this process to achieve goals, quality and permanance of provided education should be high and the subject should be turned into interesting subject to attract attention of students. Animations is one of the materials that can help earthquake subject to be understood by students, materialised by students, and know what students should to when they face earthquake. It can be said that animation use in teaching activities effect attitudes of students towards classes and academic success (Çepni, Taş & Köse, 2006).

When contribution of animation to education was considered, literature reviews on this subject showed that animation film use was mainly applied in science teaching (Ayvacı, Abdüsselam & Abdüsselam 2012; Daşdemir & Doymuş, 2012; Daşdemir, Uzoğlu & Cengiz, 2012; İnaç, 2010; Karaçöp, Doymuş, Doğan & Koç, 2009). There were limited studies in the literature regarding animation in Social Science area (Akaydın & Kaya, 2018; Aktürk, Yazıcı & Bulut, 2013). This study is important as there are no studies in literature regarding animation use in earthquake education, there were limited studies on animation use in Social Science, and this study sheds light to future studies, and gives new ideas to future studies. This study was conducted to determine whether the use of animation for earthquake and earthquake education affected the academic achievement of the 4th grade students.

### ***Problem***

Does animation film use have any significant effects on earthquake knowledge levels of 4th grade students?

### **Sub-Problems**

- (1) Is there significant difference between control and experiment group for pre-test?
- (2) Is there significant difference between control and experiment group for post-test?
- (3) Is there significant difference between pre-test and post-test of control group?
- (4) Is there significant difference between pre-test and post-test of experiment group?

### **Method**

#### **Research Model**

This research was designed with quantitative, quasi-experimental pattern. Quasi-experimental pattern can be defined as measuring materials as different groups or single group prior to any processing and recording obtained data or making trials by processing same material (Arıkan, 2013). In this study, to determine whether animation film use have any effect on earthquake knowledge level of students, quasi-experimental pattern was used to determine pre-test/post-test control group.

#### **Study Group**

Universe of this study consisted of elementary 4th grade students in Kayseri and sample of this study was selected as Fatih Elementary School 4th grade students in Bünyan district due to easy access. Students with odd numbers on the list were selected as control group and students with even numbers on the list were selected as experiment group. Experiment and control groups were selected randomly. Gender distribution of students in experiment and control group were given in Table 1.

**Table 1** Experiment and Control Group

<b>Name of Group</b>		<b>n</b>	<b>%</b>
<b>Experiment Group</b>	Female	15	48.4
	Male	16	51.6
	<b>Total</b>	<b>31</b>	<b>100.0</b>
<b>Control Group</b>	Female	17	54.8
	Male	14	45.2
	<b>Total</b>	<b>31</b>	<b>100.0</b>

Experiment group consisted of 15 female students and 16 male students and control group consisted of 17 female students and 14 male students. Both group has 31 elementary 4th grade students. In experiment group, 48.4% were female students and 51.6% were male students. In control group, 54.8% were female students and 45.2% were male students.

#### **Data Collection Tool**

In order to measure earthquake knowledge level of students, researches prepared academic success test with multiple choice questions with four selection options corresponding to 4th grade syllabus and reliability-validity studies of the test were conducted. This academic success test was used as both pre-test and post-test. In order to determine the effect of this study on academic success, academic success test was prepared and applied. While the test was created, disaster and earthquake subject in elementary 4th class Social Science syllabus was analysed, and the test was created under this framework. Accordingly, preliminary forms for multiple choice success test with 30 items and four choices regarding



earthquake and earthquake subjects was prepared. This multiple-choice test was first analysed by two experts, validity of the scope was analysed, and the test was reviewed by language expert. Necessary changes and corrections were made based on expert views. Additionally, test was analysed by two experts in measurement-evaluation and education technologies fields and changes were made based on recommendations. Preliminary application was conducted on 35 students. After preliminary application, 6 questions with distinctiveness level under 0.2 (extremely weak) were excluded. Expert view was consultant to analyse whether excluded questions disturbed scope validity and it was determined that the scope validity was intact. Additionally, KR-20 values for result reliability were obtained as 722 for pre-test, and 774 for post-test. Academic success test was shaped based on these reliability coefficients and it can be said that the test is reliable (Kalaycı, 2010; Özdamar, 2004).

### ***Data Analysis***

Data collected with success test developed in line with research purposes were analysed with package program. In data analysis, to determine whether there were significant difference between success test scores of experiment and control group students non-relational sample t-test, and to determine whether there were significant difference between success test scores of experiment and control group students relational sample t-test technique was applied.

### ***Experimental Process***

This study was planned for 4 weeks. On 1st week, pre-test was applied, during 2nd and 3rd weeks, traditional class teaching was applied to control group and animation film was used in experiment group, and on 4th week, post-test was applied. To control the effect of remembering the questions, 2-week interval was selected between two test applications.

In the first week of experiment process, pre-test application of information test was applied to determine whether knowledge level of experiment and control group are similar.

In the experimental group, Social Science 4th grade curriculum program was examined and the outline of the earthquake topic in the *People, Environment and Places* unit was determined and a statement table was formed in accordance with the achievements of the subject. In order to determine effects of animation use in education of knowledge level of students, animation films previously prepared related with subject were analysed, and three films were selected in line with study objective. These animations include earthquake information, pre-earthquake, earthquake, and post-earthquake information, and preventive measures to be taken after the earthquake. These complementary animated films were used as teaching material for two weeks.

In face-to-face learning process under the scope of the class, the curriculum was appropriately spiral-shaped by one of the researchers during the two-week application period, and the earthquake and earthquake education was performed by direct instruction method. In the fourth week of the application period, the knowledge of experiment and control groups where the teaching methods were used, and the final test of the knowledge test were applied to determine whether there was a significant difference between each group.

## Findings

### 1. Findings of pre-test between control and experiment group

Before applying experimental methods, t-test with dependent samples was applied to determine whether there was any difference between academic success of control and experiment group and results were presented in Table 2.

**Table 2.** Pre-Test Average t-test Scores of Control and Experiment Groups

Groups	Success test	n	$\bar{x}$	S	Sd	t	p
Control	Pre-Test	31	14.39	3.44	60	.227	.821
Experiment	Pre-Test	31	15.61	4.33			

Based on Table 2, pre-test success score average of control group was ( $\bar{x}=14.39$ ) and pre-test success score average of experiments group was ( $\bar{x}=15.61$ ). Accordingly, there was no significant difference between control and experiment group in terms of academic success ( $t_{(2-60)}=.277$ ;  $p>.05$ ). Accordingly, earthquake knowledge of students before experiment process was similar.

### 2. Findings between the control and the experimental group

After classes were completed in both groups, to determine whether there was any difference between academic success of control and experiment group students, non-relational t-test was conducted, and results were presented in Table 3.

**Table 3.** Post-Test Average t-test Scores of Control and Experiment Groups

Groups	Success test	n	$\bar{x}$	S	Sd	t	p
Control	Post-Test	31	15.61	4.14	60	3.903	.000
Experiment	Post-Test	31	19.13	2.83			

Based on Table 3, post-test success score average of control group was ( $\bar{x}=15.61$ ) and post-test success score average of experiments group was ( $\bar{x}=19.13$ ). Accordingly, there was significant difference between control and experiment group in terms of academic success ( $t_{60}=3.903$ ;  $p>.05$ ). It was determined that this difference is in favour of experiment group students. Accordingly, earthquake knowledge of students in experiment group are higher than earthquake knowledge of students in control group.

### 3. Findings of significant difference between pre-test and post-test of control group

To determine whether there was any difference between pre-test and post-test results of control group to determine if traditional teaching method had an effect on earthquake education, relational t-test was applied, and results were presented in Table 4.

**Table 4** Dependent t-test Results of Control Group

Measurement	n	$\bar{x}$	S	Sd	t	p
Pre-Test	31	14.39	3.44	301.388	1.388	.175
Post-Test	31	15.61	4.14			

When Table 4 was analysed, pre-test average scores of control group students was ( $\bar{x}=14.39$ ) and post-test average scores of control group was ( $\bar{x}=15.61$ ). Accordingly, although there was average score increase for pre-test and post-test scores on control group, this increase had no significant effect ( $t_{30}=1.388$ ;  $p>.05$ ). Accordingly, it can be said that using traditional

education method in earthquake teaching effected academic success of 4th grade students at insufficient level.

#### 4. Findings of significant difference between pre-test and post-test of experimental group

To determine whether there was any difference between pre-test and post-test results of experiment group to determine if animation film use method had an effect on earthquake education, relational t-test was applied, and results were presented in Table 5.

**Table 5** Dependent t-test Results of Experiment Group

Measurement	n	$\bar{x}$	S	Sd	t	p
Pre-Test	31	14.61	4.33	304.708	4.708	.000
Post-Test	31	19.13	2.83			

When Table 5 was analysed, pre-test average scores of experiment group students was ( $\bar{x}=14.61$ ) and post-test average scores of experiment group was ( $\bar{x}=19.13$ ). Accordingly, there was significant difference between average score of pre-test and post-test scores of experiment group ( $t_{30}=4,708$ ;  $p>,05$ ). Accordingly, it can be said that animation film use in earthquake teaching had positive effect on academic success of 4th grade students.

#### Conclusion and Discussion

Based on findings of this study, there was no significant difference between academic success levels of control and experiment group before experiment operation.

In this study, it was found that there was no significant difference in earthquake knowledge level of students in control group where traditional methods were applied. In literature, there are studies indicating that traditional methods had no significant difference on academic success (Akaydın & Kaya, 2018; Çoban, 2017; Dikmenli & Eser Ünalı 2013; Tezer & Deniz, 2009; Taşçı & Soran, 2008). These results obtained from classes where traditional education methods were applied may be results of education based on memorising that is non-motivational for students, and where individual properties are often disregarded in teaching. However, some studies in literature found that traditional education methods significantly increased students success and these results are non-compliant with findings of this study (Doğan & Koç, 2017; Uçar & Karakuş, 2017; Oruç & Teymuroğlu, 2016; Yeşiltaş & Turan, 2015; Bektaş Öztaşkın, 2013; Şimşek & Has, 2013; Yemen, 2009; Kuş, 2006). This may be caused by different class subject, different student properties, or quality of performance of teachers.

Based on findings of this study, there was no significant difference between academic success levels of control and experiment group before experiment operation. This results is obtained as both control group and experiment group are equal.

Another finding of this study was that animation film use in earthquake education significantly increased student knowledge level. This results is supported by studies conducted on different subject and similar methods (İnel & Çetin, 2017; Uçar & Karakuş, 2017; Yeşiltaş & Turan, 2015; Öğütveren, 2014; Bektaş Öztaşkın, 2013). Using technology in education enables students to understand the subjects, materialising subjects, and turning teaching into fun and permanent activity. Additionally, this result is in line with findings of studies conducted on different classes with similar methods (Evrekli & Balım, 2015; Chio,

Tien & Lee, 2015; Aksoy, 2013; Daşdemir & Doymuş, 2012; Güven & Sülün, 2012; Lin & Atkinson, 2011; İnaç, 2010; Barak, Ashkar & Dori, 2011; Karaçöp, Doymuş, Doğan & Koç, 2009). Carolyn Yang and Chang (2013) found education with digital games and animation had positive effect on academic success and critical thinking, however, there was no significant difference for concentration levels. Yet, when literature was reviewed, there are studies showing that in multiple environments where animation was used, there was significant difference on success of students (Akaydın & Kaya, 2018; Çoban, 2017; Cinkaya, 2011; Engin, Cin & Gençtürk, 2007; Altınışik & Orhan, 2002; Smeets & Mooji, 1999). This may be caused by different properties of subjects, readiness level of students, and individual differences.

## **Recommendations**

Based on results of this study, following suggestion could be made:

- Due to positive effect of animation of student success, visual and audial materials can be used in education activities.
- Considering effect of animation of academic success, teachers should receive in-service education for technology and computer aided teaching.
- When positive effect of animation use on increasing earthquake academic success was considered, related people and institutions can prepare animations, films, documentaries related with class subjects.
- In this study, effect of animation film use on academic success of 4th grade students in earthquake education was analysed. In future studies, effect of animation use on academic success by using different samples, class levels, or subject can be explored in future studies to increase generalisability of results.

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