44. Assessing the influence of scientific story on multiple aspects of primary school students' science learning[1]

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Abstract

The aim of this research is to examine the effect of using scientific stories in science education courses on the science process skills and motivation of primary school 4th-grade students towards science education course. A quasi-experimental method was applied to 37 fourth-grade primary school students from two classes in a district of the Western Black Sea region. While science education courses were given in the control group (CG) with the activities available in the science education course curriculum, in the experimental group (EG), it was given with scientific stories. Quantitative data in the research were obtained by implementing a motivation scale for learning science and a scientific process skill scale as pre-test and post-test. The experimental study was carried out for five weeks, with three-hour courses in both groups. The independent sample t-test and the t-test for dependent groups were employed to assess the outcomes from the study. The research revealed that prior to the experimental procedures, the experimental and control groups did not show any difference in terms of their scientific process skills and enthusiasm for learning science and motivation to learn science. The post-tests showed a marked contrast between the experimental and control groups, demonstrating that teaching science education courses with scientific stories was beneficial. Assessing the disparity in motivation for learning science and scientific process skills in the EG between the pre-tests and post-tests revealed a heightened motivation in the post-test, leading to the realization that the implementation of scientific stories had a positive impact on motivation for learning science.

Keywords: Scientific stories, motivation for learning science, scientific process skills

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Fen öğretiminde bilimsel hikayenin ilkokul öğrencilerinin çeşitli değişkenlerine etkisinin değerlendirilmesi[4]

Öz

Mevcut araştırmada fen bilimleri öğretiminde bilimsel hikayelerin kullanılmasının ilkokul 4. sınıf öğrencilerinin bilimsel süreç becerilerine ve fen bilimleri dersine yönelik motivasyonlarına olan etkisinin araştırılması amaçlanmıştır. Araştırma yarı deneysel yöntem kullanılarak, Batı Karadeniz bölgesinde yer alan bir ilçedeki iki ilkokulda öğrenim gören toplam 37 ilköğretim 4. sınıf öğrencisi üzerinde gerçekleşmiştir. Kontrol grubunda fen bilimleri dersi, öğretim programında yer alan var olan aktiviteler ile gerçekleştirilirken; deney grubundaysa bilimsel hikayeler ile yapılmıştır. Bilimsel süreç becerisi ölçeği ve fen öğrenmeye yönelik motivasyon ölçeği araştırmada ön test ve son test olarak uygulanarak nicel veriler elde edilmiştir. Araştırma iki grupta da beş hafta boyunca haftada üç ders saati süresince yürütülmüştür. Bağımsız gruplar t testi ve bağımlı gruplar için t-testi uygulanarak araştırmadan elde edilen sonuçların analizi yapılmıştır. Deney ve kontrol gruplarının deneysel işlemden önce denk olduklarını belirlemek için bilimsel süreç becerisi ölçeği ve fen öğrenmeye yönelik motivasyon ölçekleri uygulanmış ve farklılık çıkmadığı belirlenmiştir. Bilimsel hikayelerle fen dersi işlemenin deney ve kontrol gruplarının son test puanlarına etkisi incelendiğinde deney grubu lehine farklılık olduğu belirlenmiştir. Deney grubunun ön test ve son test puanları arasında bilimsel süreç becerisi ve fen öğrenmeye yönelik motivasyonları içerisinde farklılığı incelendiğinde son testler lehine motivasyonda fark çıkmış, bilimsel hikaye kullanımının fen öğrenmeye yönelik motivasyonu pozitif olarak etkilediği sonucuna ulaşılmıştır.

Anahtar Kelimeler: Bilimsel hikâyeler, fen öğrenmeye yönelik motivasyon, bilimsel süreç becerisi

Introduction

The rapid scientific and technological developments in the century we live in will continue at an increasing pace in the future. A noteworthy increase is observed in the development levels of countries that can keep up with these rapid developments. As a result of the rapid changes that have emerged, education has become one of the biggest social problems in countries, regardless of the level of development. In order to keep up with this change and competition, countries have had to make changes by examining their curricula. Many studies have been carried out by dealing with the problems encountered in the field of education in detail and various scientific reports have been published.

Among them are international assessment programs like Program for International Student Assessment and Progress in International Reading Literacy Study. The developed countries stand out for their

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4. **Beyan (Tez):** Bu makale, ikinci yazarın danışmanlığında birinci yazar tarafından hazırlanan yüksek lisans tezinden üretilmiştir.
Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.
Çıkar Çatışması: Çıkar çatışması beyan edilmemiştir.
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Kaynak: Bu çalışmanın hazırlanma sürecinde bilimsel ve etik ilkelere uyulduğu ve yararlanılan tüm çalışmaların kaynakçada belirtildiği beyan olunur.
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progress with regards to education, science, industry, and technology and have attained the capability to lead other countries through the power they have gained. At this point, the importance of raising individuals who have problem-solving skills, who can produce information, who can search for and find the necessary information, who can benefit from technology, who are creative and who can keep up with innovations, is increasing. Science education course plays an important role in raising individuals. Based on all these, it is seen that it has become a necessity for each individual to be educated as a scientifically literate individual for a better future (Akgündüz, 2013).

Among the main purposes of teaching science education courses in schools are to make people comprehend the nature of science and science education, to increase motivation towards learning science, to acquire the necessary mental skills for science education, and thus to develop a positive attitude towards science and science education by increasing academic success in the learning-teaching process (Mutlu, 2012). All the events we observe around us have a relationship with science and therefore also with science education because science and science education are an inseparable whole. Since the scientific concepts in the science education course are mostly abstract and complex, students cannot comprehend these concepts in their minds and go to memorize them. For this reason, the concepts to be taught in the science education course should be concretized as much as possible and teaching methods that stimulate students' sense of curiosity, encourage research and questioning, develop their thinking skills and are active in the process should be used. One of these teaching methods is scientific stories (Demircioğlu et al., 2006; Gölcük, 2017).

Before defining the scientific story, it is useful to look at the definition of the story. Stories are written in order to arouse curiosity in children, entertain, inform, excite, prepare them for life, enable them to perceive life correctly, and guide the child (Biçici, 2006). They are literary works that deal with an event that has happened or can be experienced, informs the place and time of this event, and introduces the heroes of the event (Gündüz, 2007). Stories are teaching tools that students listen to with great pleasure and want to read in lessons. Therefore, the use of stories in learning environments is quite common (Özdemir, 2022). Scientific story, otherwise, are a method that describes the process of finding solutions to the obstacles we encounter in daily life. Students may be more interested in scientific stories rather than long texts. Because scientific stories are short and thereby encouraging students to read, while long texts can frighten them and prevent them from researching as they are still at the reading stage (Yılmaz, 2013). Scientific stories are the presentation of abstract terms and concepts, which are difficult to understand, to students with a plot within the stories (Gölcük, 2017). Scientific stories are stories about scientific facts and events in the real lives of scientists. When scientific events and facts that students have difficulty in understanding are given in the life story of a scientist, they will be remarkable for the child, and scientific events and facts will be made understandable for them. To increase students' interest in science and to enable them to develop positive attitudes, scientific stories should be told in a language that students can understand and learn in accordance with their levels (Şen Gümüş, 2009).

Milne (1998) analyzed scientific stories in four groups. The first of these are scientific heroic science stories. In these stories, the process of contributing to the development of science is told by focusing on the events of a hero who is alone. In such stories, the lifestyles of scientists are usually told. The success and failure of the scientists working in certain environments in the story will allow students to perceive the process and put themselves in their shoes. Thus, students will realize the personal characteristics of scientists (curiosity, high in research spirit, patience, etc.) and will set an example for themselves. The second type of story is the scientific discovery science story. These stories are about the formation of scientific knowledge as a result of an accident or coincidence. The third type of story, introductory declarative science stories, deals with the fact that scientific concepts or processes can be clearly

observed by everyone in nature. For example; food chain, acids or gravity. The fourth story type is politically confirmatory correct science stories which critically examine the contributions of people from different countries, cultures, races and religions to the field of science and the relationship between societies (Milne 1998). Scientific stories used in science education courses enable students to perceive the subjects they have difficulty with more easily. For this reason, teachers can prepare stories, especially for subjects that are difficult to perceive. These stories can be used at the beginning, middle or end of the topic. When used at the beginning of the lesson, it will arouse curiosity in the student and draw their attention to the lesson. When used in the middle of the lesson, it will save the lesson from monotony and will contribute to the recovery of distracted attention, increasing their interest and teaching the subject. It will be an assessment tool when used at the end of the course (Yılmaz, 2013).

The issues that motivation is an important affective factor for learning in science education courses and that it cannot be ignored, and what positive or negative factors can affect motivation have attracted the attention of researchers and have been included in the research. The reason for this is that there are individual differences in the process of learning and learning is affected by various factors. If we want students to learn science concepts well, be successful in science education courses and develop scientific process skills, we need to ensure that they are motivated (Uzun & Keleş, 2012). Students' motivation to learn science is affected by their individual characteristics, the methods and techniques used in the teaching process, the environment in which learning takes place, and the content of the curriculum (Yılmaz & Çavaş, 2007). When we look at examine the main objectives of our education system, objectives such as students' understanding of science, growing up as a scientifically literate individual and relating science to daily life have been determined. In order to reach these objectives, students need to be motivated towards learning science. When we question the reasons for the observed low achievement, we see that the student's motivation towards the course is low. Therefore, it is necessary not to ignore the factors that affect the student's motivation (Guvendik, 2010).

The use of stories in science teaching will contribute to students' science education courses. When scientific stories are used as a method for the subjects to be taught, the teaching process can be made very effective. The main problem of our science course curriculum is; not including sample activities that can attract students' attention and the types of activities are not sufficient which can motivate the students. In the learning environment created from scientific stories, learning science-related information and events will become enjoyable, the desire of the student to learn science concepts will increase, and the integration of science concepts into stories by associating them with daily life will contribute to the excitement of making comments and producing solutions for the events. For this reason, while preparing learning environments, planning should be done to increase their desire and motivation towards learning (Demircioğlu, et al., 2006). By making complex experiences meaningful, the stories both increase the motivation of the student to the lesson and make learning meaningful (Turgut & Kışla, 2015). Students use the cartoon characters they watch and love in daily life as protagonists, and when we adapt these stories to science concepts in the lesson, they will both be interested and curious about the lesson and help them to love science concepts (Coşkun, 2012).

Science process skills, which include all the skills that scientists use while researching, are among the most important competencies that should be obtained by students in science education. Scientific attitudes, which include all of the affective characteristics such as being determined, not being afraid of failures and being curious and open-minded, are the basis of scientific skills. Scientific skills consist of mental and psychomotor skills such as process skills, critical and logical thinking. In science education, scientific process skills have an important place in teaching scientific attitude and scientific knowledge (Özdemir, 2021). Acquiring scientific process skills will positively affect students' success not only in

science education courses but also in all courses because these skills also improve students' thinking processes (Özdemir, et al., 2016). By using scientific stories including scientific process skills in science teaching, students will be able to access information easily and learn effectively without creating prejudices against science. The learning provided in this way will pave the way for new learning and will enable the development of individuals who know the ways of accessing information, can use their scientific process skills, and are open to development (Gölcük, 2017).

The most basic element in the realization of learning is the interest, curiosity and motivation of the student against the lesson. Attracting the attention of the students and increasing their interest and curiosity towards the lesson is the most basic step in bringing them into the lesson and raising them as scientifically literate individuals (Gölcük, 2017). Türkiye needs scientifically literate individuals in order to be among the developed countries, and these individuals can be trained through science education courses in schools (Koç, 2007). For this reason, it should be aimed to provide more permanent learning by concretizing the concepts to be taught in science teaching as much as possible, and the methods used should include features which are keeping students' curiosity alive, attracting their attention, and improving their thinking skills. When abstract concepts are taught to students through scientific stories in science teaching, a more effective teaching process will be planned when they are presented in an entertaining, interesting and associative way with daily life (Baran, 2013; Gölcük, 2017). When examining the literature, it is observed that studies of scientific stories are restricted to certain variables (Coşkun, 2012; Gölcük, 2017; Polat, 2011). From this point of view, the present research is significant in terms of investigating how the use of scientific stories affects students' motivation towards science education course and their scientific process skills. In this context, the effect of science teaching carried out with scientific stories on the motivation of primary school 4th-grade students towards learning science and their scientific process skills was investigated.

Problem Statement

Is there a difference between the motivation of learning science and scientific process skills of the experimental group students to whom teaching with scientific stories is implemented in primary school 4th-grade science education lessons and the control group students to whom current teaching methods in the curriculum are implemented?

Research Question

1. The students in the experimental and control groups:

a) Is there a noteworthy difference between the mean values obtained from the motivation scale for learning science after the implementation?

b) Is there a noteworthy difference between the mean values obtained from the scientific process skill scale after the implementation?

2. The students in the experimental group:

a) Is there a noteworthy difference between the pre-test and post-test mean values of the motivation scale for learning science?

b) Is there a noteworthy difference between the pre-test and post-test mean values of the science process skill scale?

Method

Research Model

In the study, a pre-test/post-test matched CG design was utilized. As per Büyüköztürk (2017), the experimental design is a research design that aims to explore the cause-effect relationship between variables. The objective of the quasi-experimental design is identical to the objective of the experimental design. Utilizing the quasi-experimental approach is suitable when gauging the outcome of the technique utilized in different classroom scenarios and distinguishing the initial position from the ultimate outcome in the group. The quasi-experimental method involves selecting one of the equivalent classes to be the experimental group and the other to be the CG randomly. Despite the pre-test and post-test being implemented in both groups, the experimental group uses a different method. In general, simple experimental and quasi-experimental methods, which are types of experimental methods, are used in research in the field of education (Bilgin & Geban, 2004; Çepni, 2009). Pre-test and post-test are used since the independent variable is teaching with scientific stories and the dependent variables are examined on success, motivation towards learning science, and scientific process skills. In order to achieve this goal, two classes were designated as EG and CG in the study. In the implementation of the research, while teaching with scientific stories was implemented to the students in the EG, the narrative method was implemented to the students in the CG.

Participants

37 fourth-grade students from two primary schools in a district in the Western Black Sea region make up the research study group. The study included students who took all pre-tests and post-tests. 18 students were in the first-year experimental group (C1), while 19 students were in the control group (P1), 18 students were in the second-year experimental group (C2), and 19 students were in the control group (P2).

Table 1. Symbolic View of the Experimental Design of the Research

Groups	Pre-tests	Experimental Process	Post-tests
Experimental Group (EG)	A1-A2	Teaching Science with Scientific Stories	A1-A2
Control Group (CG)	A1-A2	Current Science and Technology Curriculum	A1-A2

A1: Motivation for Learning Science

A2: Scientific Process Skills

Table 2. T-test results for independent groups regarding the pre-test scores of the experimental and control groups' scales of motivation for learning science and science process skills

Test	Experimental Group		Control Group			
	$\overline{X}$	SS	$\overline{X}$	SS	t	p
Motivation for Learning Science	10.3	2.7	9.4	2.2	.45	.12
Scientific Process Skill	137.2	14.8	126.8	17	.24	.006

According to table 2, the arithmetic mean of the EG students in the motivation scale for learning science implemented as a pre-test was 10.3, while the arithmetic mean of the CG students was 9.4. A t-test was conducted to ascertain if there was a significant distinction between the groups' means. The outcome of

the t-test showed that no significant difference between the two groups' pre-test means in the motivation scale for learning science existed (p=.12; p>.05).

According to Table 2, while the arithmetic mean of the EG students from the scientific process skill test implemented as a pre-test was 137.2, the arithmetic mean of the CG students was calculated as 126.8. A t-test was conducted to ascertain if there was a significant distinction between the groups' means. The outcome of the t-test showed that no significant difference between the two groups' pre-test means in the scientific process skill test existed (p=.006; p>.05).

It was determined that the EG and CG were equivalent according to the pre-test score results of motivation for learning science and scientific process skills.

Data Collection Tools

In the study, as data collection tools, the “Motivation Scale for Learning Science” and the “Scientific Process Skill Test” were implemented in the groups as pre-test and post-test.

The motivation scale for learning science developed by Tuan, Chin & Shieh (2005) was used to measure students' motivation towards learning science. Yılmaz and Çavaş (2007) adapted the scale to Turkish.

The science process skill test developed by Enger and Yager (1998) was used to measure students' scientific process skills. The test was translated into Turkish by Koray, Özdemir, Presley and Köksal (2007). The test, which consisted of 36 items in its original form, decreased to 31 items with the reliability analysis. The test includes the skills of observing, space/time relationship, classification, using numbers, measuring, associating, estimating, controlling variables, interpreting data, forming hypotheses, defining and experimenting (Koray et al., 2007).

Implementation Process

In the research, the usability of the data collection tools was tested by making a pilot implementation with a total of 37 primary school fourth-grade students in two classes studying in a primary school in a district in the Western Black Sea region for a period before the actual implementation. After determining the appropriateness of using data collection tools, the actual implementation was started. Before starting the actual implementation, the motivation scale for learning science and the science process skill test were implemented in the EG and CG students as a pre-test.

The fourth-grade primary school students in the EG of the research were taught scientific stories for an overall 15 lesson hours, three hours a week for five weeks in the "Let's Travel and Know the World of Living” unit. The scientific stories used in the research were written by the researcher by paying attention to the acquisitions of the 4th-grade science curriculum and scientific story features. The scientific stories presented to the opinion of two field experts were finalized in line with the suggestions received. The scientific stories used in the research are Heidi, Cedric Travels in Time, Pepe and His Mother, Baby Fairy and Aristo, Şirin Bahar, Şirin Baba's Country, Asuka and Çöpüş. In the implementation, seven scientific stories were implemented for five weeks. Apart from the activities in the guidebook, other scientific stories were used throughout the course. Most of the heroes in the stories are cartoon characters watched by students. In the implementation, students' attention was drawn to the subject. Their prior knowledge was activated, and the stories brought vitality to the subject, contributing to the student's structuring of the subject in their minds and making connections with their lives.

The "Let's Travel and Get to Know the World of Living" unit for the fourth-grade students in the CG of the research was carried out for five weeks, three hours a week, for a total of 15 lesson hours, using the lecture method in line with the science curriculum. In the implementation, as exemplified in the

curriculum, students' prior knowledge was activated and the activities in the textbooks were carried out. In the study, at the end of the implementation, the motivation scale for learning science and the science process skill test were implemented in the EG and CG students as a post-test.

Data Analysis

The study's data was analyzed using the SPSS 21.0 (Statistical Package for the Social Science) program. An independent sample t-test was implemented to the pre-test and post-test scores of both groups and a t-test for dependent groups was implemented in order to determine whether there was a significant difference between the EG and CG students' motivation to learn academic science and their scientific process skills.

Findings

The study EG and CG formed in order to investigate the effect of using scientific stories in science teaching on students' motivation towards science education courses and their scientific process skills. Quantitative data in the research were obtained by implementing the motivation scale for learning science and the scientific process skill scale before and after the implementation. In this section, the results obtained from the implemented tests are included.

Findings of the first research question

The students in the experimental group and control group;

a) In order to test item a of the first research question, which is expressed as "Is there a noteworthy difference between the mean values obtained from the motivation scale for learning science after the implementation?" the motivation scale for learning science was implemented to the EG and CG as a post-test. The t-test (for independent groups) analysis method was used to evaluate the obtained data and determine if there was a difference between the groups.

Table 3. T-test results for independent groups regarding the post-test scores of the experimental and control groups in the motivation scale for learning science

Test	**Experimental Group**		**Control Group**				
	$\overline{X}$	SS	$\overline{X}$	SS	t	p	η^2
Motivation for Learning Science	12.3	3.1	9.4	2.4	4.35	.00*	.35

*p<0.05

As seen in table 3, the arithmetic mean of the EG students in the motivation scale for learning science implemented as a post-test was 12.3, while the arithmetic mean of the CG students was 9.4. An independent sample t-test was performed to determine whether there was a significant difference between the mean values of the groups. According to the t-value ($p<0.05$) determined by the results of the t-test analysis, it was observed that there was a significant difference between the post-test mean values of the groups in the motivation scale for learning science [$t(35) = 4.35, p<0.05$]. During the independent sample t-test, a significant difference with a large effect value (eta squared = 0.35) was found between the groups (Cohen, 1988).

b) In order to test item b of the first research question, which is expressed as "Is there a noteworthy difference between the mean values obtained from the scientific process skill scale after the implementation?" the scientific process skill test was implemented to the EG and CG as a post-test. The

t-test (for dependent groups) analysis method was used to evaluate the data obtained and determine if there was a difference between the pre-test and post-test values of the EG.

Table 4. T-test results for independent groups regarding the scientific process skill test post-test scores of the experimental and control groups

Test	Experimental Group		Control Group				
	$\overline{X}$	SS	$\overline{X}$	SS	t	p	η^2
Scientific Process Skill	138.2	14.5	129.6	15.7	2.43	.001*	.14

*p<0.05

As seen in table 4, the arithmetic mean of the EG students in the scientific process skill test implemented as a post-test was 138.2, while the arithmetic mean of the CG students was 129.6. An independent sample t-test was performed to determine whether there was a significant difference between the mean values of the groups. According to the t-value (p<0.05) determined by the results of the t-test analysis, it was observed that there was a significant difference between the post-test mean values of the groups in the scientific process skill test [t (35) = 2.43, p<0.05]. During the independent sample t-test, a significant difference with a large effect value (eta squared = 0.14) was found between the groups (Cohen, 1988).

Findings of the second research question

The students in the experimental group;

a) In order to test item a of the second research question, which is expressed as "Is there a noteworthy difference between the pre-test and post-test mean values of the motivation scale for learning science?" the motivation scale for learning science was implemented to the EG as a pre-test and post-test. The data obtained were evaluated with the t-test (for dependent groups) analysis method to determine whether there was a difference between the pre-test and post-test values of the EG. Findings related to the evaluation are given in table 5.

Table 5. T-test results for dependent groups regarding the pre-test and post-test scores of the experimental group's motivation scale for learning science

Motivation Scale for Learning Science	$\overline{X}$	SS	t	p	η^2
Pre-test	10.3	2.73	-2.41	.02*	.12
Post-test	12.2	3.21			

*p<0.05

As seen in table 5, the mean value of the motivation scale for learning science pre-test scores of the EG was 10.3 and the standard deviation was 2.73. The post-test mean value of the same group was calculated as 12.2 and the standard deviation as 3.21. According to the t value (p<.05) determined as a result of the t-test analysis for the dependent groups, it was observed that there was a significant difference between the pre-test and post-test scores of the EG in terms of motivation towards learning science. [t (35) = -2.41, p<.05]. As a result of the independent sample t-test, a significant difference with a large effect value (eta squared = 0.12) was found between the groups (Cohen, 1988).

b) In order to test item b of the second research question, which is expressed as "Is there a noteworthy difference between the pre-test and post-test mean values of the science process skill scale?" the scientific process skill scale was implemented to the EG as a pre-test and post-test. The data obtained

were evaluated with the t-test (for dependent groups) analysis method to determine whether there was a difference between the pre-test and post-test scores of the EG. Findings related to the evaluation are given in table 6.

Findings related to the evaluation are given in table 6.

Table 6. T-test results for dependent groups regarding the scientific process skill test pre-test and post-test scores of the experimental group

Scientific Process Skill	$\overline{X}$	**SS**	**t**	**p**
Pre-test	136.8	14.8	-.48	.063
Post-test	138.2	314.7		

As seen in table 6, the mean value of the scientific process skill scale pre-test scores of the EG was 136.8 and the standard deviation was 14.8. The post-test mean value and standard deviation of the same group were calculated as 138.2 and 14.7. According to the t value ($p<.05$) determined as a result of the t-test analysis for the dependent groups, it was determined that there was no significant difference between the pre-test and post-test scores of the EG in terms of scientific process skills.

Results, Discussion and Recommendations

The motivation scale for learning science was administered as a post-test to both the EG and CG after the study. Based on the t-value less than $p<.05$, as a result of the statistical analysis, it was established that there was a noteworthy discrepancy between the post-test averages of the groups in the motivation scale for science. Similar to the result obtained from the research, Demircioğlu et al. (2006) gave information about the aims of the story-based teaching program, the use of descriptive and chemical stories in the learning environment in their study in which they investigated stories and chemistry teaching, and as a result of the obtained data, they reached the conclusion that chemical stories increase students' willingness to learn and achieve meaningful learning. Unlike the results obtained from the research, in the research which Yılmaz (2013) examined the effect of scientific stories supported by concept cartoons on science academic achievement, science attitude and motivation towards learning science, while scientific stories supported by cartoons related to science course concepts were used with the students in the EG, the lessons were carried out with the activities in the curriculum with the students in the CG. As a result of the research, it was found that there was no difference between the students' attitudes towards science and their motivation towards learning science after the experimental procedure. Korkut and Ören (2018) concluded that, according to the results of their research, in which they examined the effects of scientific stories supported by concept cartoons on science attitudes and motivation towards learning science, the EG students' motivation towards science attitudes and learning science did not make a significant difference. The use of scientific stories in science teaching positively affects students' feelings, attitudes and motivations. Learning will be meaningful and permanent as it emotionally activates students (Demircioğlu et al., 2006). The use of scientific stories in science education lessons is proven to increase motivation for learning science, according to the research data.

The scientific process skill test was applied as a post-test in both EG and CG in the study. To judge if there was a divergence between the groups in the data procured, a t-test (for independent groups) was implemented. Based on the t-test results ($p<.05$), a significant difference was found between the post-test mean scores in the scientific process skill test of the groups. Türkmen and Ünver (2012) stated that it is important for students to be able to use scientific knowledge in their daily lives and to be scientifically literate with scientific thinking skills as a result of their research in which they aimed to

use the storytelling technique in the teaching of scientific concepts in order to raise scientifically literate individuals. In addition, according to the other results they obtained from their research, they stated that reading stories and fairy tales and adding scientific knowledge to the feelings of love of primary school students would contribute to their learning and that there was a need for research on the contribution of scientific knowledge to students' learning through storytelling. Based on the research data, it can be said that there is a significant difference between the post-test means of the groups in the science process skill test, it can be said that science teaching practices with scientific stories are beneficial and they have positive effects in terms of developing students' scientific process skills. Similarly, Çınar (2016) found that the scientific process skills of the EG increased based on the results of her study which investigated the effects of utilizing scientific stories on the scientific process skills and attitudes towards science held by seventh-grade students.

To assess the motivation level for learning science, a pre-test and post-test were applied to the EG in the study. An independent samples t-test was conducted to determine if there was any disparity between the pre-test and post-test results of the EG. According to the t value ($p<.05$) determined as a result of the t-test analysis for the dependent groups, it was determined that the pre-test and post-test scores of the EG demonstrated a noteworthy discrepancy in terms of motivation for learning science. According to the t value ($p<.05$) determined as a result of the t-test analysis for the dependent groups, It was concluded that the pre-test and post-test scores of the EG did not differ significantly in regards to scientific process skills. According to the results of these findings, there was a difference in motivation for learning science between the pre-tests and post-tests in the EG. It can be inferred from these data that the use of scientific stories has a positive impact on the motivation factor for science learning. Being scientific process skills in scientific stories ensures the development of students' motivation to learn science (Prayitno, et al., 2017; Yuniastuti, 2013). Since the content of scientific stories is designed to increase motivation for learning science and to develop scientific process skills, it can improve students' creative thinking skills in the learning process, their attitudes towards values and science teaching practices in daily life. Hidi et al. (2004) determined that the motivation for learning science decreased especially in the secondary school years due to the inadequacy of the current curriculum activities to investigate the subjects that students are interested in. They stated that the motivation for learning science can be increased with environmental support and scientific stories. Scientific stories were written to motivate students towards science teaching (Solomon, 2002). Hung et al. (2012) investigated the effect of a project-based digital story approach on students' learning science motivation, problem-solving proficiency and science achievement in primary school 5th-grade science education courses. According to the results of the research, they concluded that digital storytelling can effectively increase learning science motivation, problem-solving proficiency and science attainment.

In the research, the scientific process skill scale was implemented in the EG as a pre-test and post-test. The t-test (for dependent groups) analysis method was used to determine whether there was a difference between the pre-test and post-test scores of the EG. It was concluded that the implementation of scientific stories in the EG was not effective in improving students' scientific process skills. Unlike the results of the research, Ferreira (2004) determined that, as a result of the research, which aimed to determine the development of scientific process skills of primary school students with multi-sensory activities and scientific stories, scientific stories improved the classification, observation and inference skills of primary school students. Despite the benefits of teaching science process skills, they are often criticized for being taught separately from a meaningful context. These skills are often practiced by children in ways that are not connected to real-world contexts, causing questions about if young children are aware of these connections (Monhardt & Monhardt, 2006). A meaningful resource (context) for teaching/learning scientific process skills can be created by children's literature (Ostlund, 1998). Process

skills can be placed in a resource (context) that children know through the illustration of children's books, whether fiction or non-fiction (Monhardt & Monhardt, 2006). In the current study, it can be said that the reason why scientific stories are not effective in improving students' scientific process skills is that the number of hours in the weekly curriculum of the science course is low and the methods in which the students are active were not implemented in the classroom because the curriculum is intense. In addition, there may be general reasons such as students' perception of the science education course as a difficult course, difficulties in understanding the concepts and topics they encounter for the first time, or insufficient time in which the implementations are carried out. In the study, it is thought that it has no effect on the students' scientific process skills since for the first time they actively engaged in activities with scientific stories in the science education lesson. Longer studies can be conducted to obtain detailed information about the change in the results of scientific process skills by increasing the implementation time.

When science education lessons are carried out with scientific stories, it is thought that students are more successful in the lesson and their attitudes towards science education lesson increase through scientific stories compared to the activities in the curriculum. In this context, it is thought that this research will give teachers and teacher educators an idea about the use of scientific stories in lessons.

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