



## The Effect of Activities Based on REACT Strategy in Social Studies Courses on Students' Academic Achievement, Attitudes Towards Social Studies Courses and on the Retention of Learning \*

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### Abstract

The aim of this study is to examine the effect of teaching activities and materials organized in accordance with REACT strategy within the scope of the 5th grade unit "People, Places and Environments" on students' academic achievement, attitudes towards social studies courses and on the retention of learning. The research was carried out with a total of 60 students in two classes attending 5th grade in a secondary school in Aydın in the fall semester of the 2018-2019 academic year. A quasi-experimental research design, a nonequivalent control group pretest-posttest was used in the research. The classes were determined as control group and experimental group via random sampling method. There were 30 students in the experimental group and 30 students in the control group. While the teaching activities organized according to REACT strategy were applied in the experimental group, the courses were instructed according to the teaching activities in the textbook prepared by the Ministry of National Education in the control group. Achievement test, retention test and attitude scale for social studies course were used as data collection tools. All the application process lasted 6 weeks. In the analysis of the data, independent groups t-test, ANOVA for repeated measures, ANCOVA Mann Whitney-U test and Wilcoxon test were used. Upon examining the data obtained from data collection tools, it has been observed that there is a significant difference in favor of the experimental group between the students' academic achievement and their attitudes towards the social studies courses. In the retention test results, it was determined that although the average of the students in the experimental group was higher, there was no statistically significant difference. This study is important for the experimental use of REACT strategy in social studies course for the first time. In addition, as a result of the study, information was offered about the cases encountered during the experimental application, and some suggestions were made regarding the points that need attention.

### Keywords

Context Based Learning  
REACT Strategy  
Social Studies  
Academic Achievement  
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Attitude

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## Introduction

Education, which is described as the way to connect with life, is one of the most important variables of the modern world. Training qualified individuals in today's society where the greatest competitive factor is qualified labor force can only be achieved by increasing the quality of education. As a matter of fact, studies have revealed that education has a significant contribution to economic growth. According to a report prepared by the Organization for Economic Co-operation and Development (OECD), it was determined that education has a significant contribution to economic growth with a rate of 7% in the UK, 14% in Belgium, 15% in the USA, 16% in Argentina and 25% in Canada (Çakmak, 2008). And therefore, it has been observed that educational services have taken the biggest share in many state budgets, especially since the end of the cold war. For example, the ratio of education expenditures to Gross Domestic Product (GDP) in OECD member countries as of 2015 is 5% on average (Organization for Economic Co-operation and Development [OECD], 2018). It is observed that this rate is 4,10% in Turkey in the same period (80. 493.500.000 TL. Ministry of National Education [MoNE], 2016). In addition, as stated in Bowen and Fincher (2018), besides the personal growth of individuals, education also plays an important role in the scientific, social, cultural and economic development of a society in general.

The "Information Age and Globalization", which emerged as a result of the end of the cold war and the developments in technology, deeply affected the perceptions of individuals and society (Aktın, 2010). This process of change made the need for education compulsory and gave it very important responsibilities. In particular, the learning process in which knowledge is directly transferred has turned into a structure that encourages students to research, question, and prioritizes the active participation of the student in the learning environment. As is the case with all other countries, Turkey is also affected by the developments in the field of technology and education and witnesses changes (Koşar & Güçlü, 2015). Accordingly, education programs of Ministry of National Education were also updated in 2017. Technological change, developments in the field of education, and the differentiation of the needs of society and individuals were among the reasons for the updated curricula (MoNE, 2017). Considering these reasons, the REACT strategy, which is an application of Context-Based Learning approach, can be effective in achieving the goals of the curriculum.

Context-Based Learning approach, which is based on constructivism and makes use of real life contexts in the learning environment, attracts a lot of attention today (Bennett, Lubben, & Hogarth, 2007; Gilbert, Bulte, & Pilot, 2011; Özay Köse & Çam Tosun, 2015; Jeffery, Frawley Cass, & Sweeder, 2019). The most important reason for this situation may be that it allows students to associate the information they have learned at school with the events in their daily lives, to use them and to transfer them to different situations (N. Ültay, 2012). Context-Based Learning can be defined as a learning / teaching approach that adopts the principle of applying and transferring that knowledge to different situations by associating an event or situation that students may encounter almost every day in their daily life with a knowledge that needs to be taught in order to ensure that students learn meaningfully and permanently.

Context-Based Learning approach (CBL) was developed by a group of teachers and education scientists at York University in 1983. (Bennett & Lubben, 2006; Otter, 2011). CBL was first used in chemistry, then physics and mathematics teaching. CBL has been adapted and used over time under different names in the curricula of America, Belgium, China, Scotland, Spain, Switzerland, Russia, and Slovenia (Ayvaci, Ültay, & Mert, 2013; Bennett & Lubben, 2006; MoNE, 2007).

The more the information to be learned reflects life and is used in real life, the more it is worth learning (Coştu, 2009). By establishing a link between scientific concepts and the daily life of the student, CBL prepares a motivating learning environment for the student (Elmas & Geban, 2016). Sometimes this happens by establishing contexts with the help of a newspaper article, a toy or a natural event. In this way, the subject becomes familiar and meaningful to the student. In addition, the student can

transfer the learned information to his/her real life. Therefore, it would be beneficial to organize curricula in a way that takes the context into account.

The REACT strategy, which is an application of Context-Based Learning approach, covers the steps of Relating, Experiencing, Applying, Cooperating and Transferring. And the name REACT is derived by taking the initial letters (acronym) of the English steps of this strategy (Crawford, 2001). REACT Strategy was developed by the Center for Occupational Research and Development (CORD) to increase efficiency in teaching. REACT strategy relates the subjects to be taught with the prior knowledge and experiences of the students. It enables them to have practical experience in or outside the learning environment related to that subject. It is also a cyclical teaching strategy that encourages students to participate effectively in the structuring of their own knowledge in a collaborative social learning environment and ultimately transfer new knowledge to different situations and use it when necessary.

The first step of the REACT strategy is relating. At this stage new knowledge is associated with the knowledge and experiences that students already know and are familiar with (Crawford & Witte, 1999). The experiencing step is the stage where the subject is transferred to the learning environment with the help of suitable models, experiments or computer simulations by paying attention to the prior knowledge of the students, and the contact of the student with the subject is provided (Kumaş, 2015). And at the applying phase, the learned things are recruited with the help of projects and case studies (Yıldırım, 2015). During the cooperating phase, issues are discussed in groups together, and the issues are shared (Kirman Bilgin, Demircioğlu Yürükel, & Yiğit, 2017). Transferring, on the other hand, involves transferring the information learned in the course to different situations that were not mentioned before, inside or outside the classroom (Karlı & Yiğit, 2016).

When the literature is examined, studies of Akpınar and Kasım (2017), Aktaş (2013), Ayvaci and Bebek (2018), Aswar and Fitriani (2018), Baltacı (2014), Baltacı and Baki (2017), Cahyaningrum and Febriana (2019), Coştu (2009), Çatlıoğlu (2010), Demircioğlu, Aslan, Açıkgöz, Karababa, and Güven (2019), Demircioğlu, Aşık, and Yılmaz (2019), Demircioğlu, Vural, and Demircioğlu (2012), Erdoğan Karaş and Gül (2019, 2020), Genç, Ulugöl, and Ünsal (2017), Gül (2016), Gül, Gürbüzöğlü Yalmançı, and Yalmançı (2017), Günter (2018), Harahap (2018), Ingram (2003), Jelatu, Sariyasa, and Ardana (2018), Junedi and Ayu (2018), Karlı and Yiğit (2016), Keskin (2017), Keskin and Çam (2019), Kılıç (2015), Kirman Bilgin (2015), Kirman Bilgin et al. (2017), Kumaş (2015), Nawas (2018), Novri, Zulfah, and Astuti (2018), Özbay and Kayaoğlu (2015), Putri, Mardiyana, and Saputro (2019), Qadri, Ikhsan, and Yusrizal (2019), Rahayu and Kurniasih (2014), Raub, Shukor, Arshad, and Rosli (2015), Saka (2011), Sari and Darhim (2020), Sari, Darhim, and Rosjanuardi (2018), Satriani and Emilia (2012), Suminten (2015), Suryaningtyas and Halimah (2017), Tatlı and Bilir (2019), Tural (2013), Tütüncü (2016), Utami, Sumarmi, Ruja, and Utaya (2016), E. Ültay (2012), N. Ültay (2012), Ültay (2014), Ültay and Çalık (2011), Ültay, Ültay, and Usta (2018), Widada et al. (2019), Yıldırım (2015), Yıldırım and Gültekin (2017), Yiğit (2015) on the REACT strategy have been found. In these studies, it was seen that the REACT strategy was more effective than traditional methods on academic achievement, conceptual change, interest in the course, attitude towards the course and student motivation. In order to reach that conclusion, it is especially important to associate the subjects with the daily life by establishing a link. However, it was also stated in the studies that the REACT strategy has been insufficient in teaching some subjects, teachers have had difficulty in finding context and students have had difficulty in transferring what they have learned.

It has also been observed that national and international studies on the REACT strategy are limited to learning fields such as mathematics, physics, chemistry and biology. As for the social studies course, only a study by Akpınar and Kasım (2017) has been found. But then it was found out that this study was not an experimental study. Akpınar and Kasım (2017) explained REACT strategy in general and they also presented a sample curriculum on how to apply the REACT strategy in social studies courses in their study. However, it would be beneficial to test the applicability of REACT strategy by

giving reflections from in-class applications within the scope of an experimental study considering the specific conditions of the social studies course.

In this study, academic achievement, retention and attitude were determined as dependent variables. In the studies of Akbaş (2008), Akdağ (2010), Bodur (2011), Bitlisli (2014), Yener (2015), Gönenç and Açıkalın (2017), the most common problem encountered in the teaching of social studies is that some subjects including abstract concepts are not adequately taught to students. Therefore, it was stated by the students that the courses were boring. The REACT strategy establishes a link between the course subjects and the student's life. In this way, the student associates the subjects with what they already know. This association is reinforced through group works and practices based on peer solidarity. As the student who applies and transfers what he has learned in real life sees that what he has learned is useful, his interest in the courses may increase, his attitude may change positively, so what he learned can be more permanent.

Upon examining the 2018 social studies curriculum prepared by the Ministry of National Education, it has been observed that there are direct or indirect references to enriching the teaching process with the contexts chosen from daily life, to associating, experiencing, to practice, to cooperation and transfer regarding the special objectives of the social studies course curriculum, the issues to be considered in the implementation of the social studies course curriculum, and the competencies of the social studies course curriculum (primary and secondary school 4th, 5th, 6th and 7th grades) (MoNE, 2018). For this reason, it was figured that the social studies curriculum and the REACT strategy could achieve a harmonious relationship and create a healthier teaching environment for social studies education. Moreover, it is also important for social studies education researchers and teachers to focus on concepts such as association, experience, application, cooperation and transfer, which have an important place in the curriculum of the Ministry of National Education (MEB in Turkish).

And this study has been conducted in order to examine the effect of a learning environment using activities prepared in accordance with the REACT strategy within the scope of the 5th grade "People, Places and Environments" unit, on students' academic achievement, attitudes towards social studies courses and on the retention of learning.

The sub research questions of the study are as follows;

1. Is there a significant difference between the pre-test, post-test and retention test mean scores of the students in the experimental group in the social studies course achievement test?
2. Is there a significant difference between the pre-test, post-test and retention test mean scores of the students in the control group in the social studies course achievement test?
3. Is there a significant difference between the corrected posttest mean scores of the experimental group and control group students in the social studies course achievement test?
4. Is there a significant difference between the corrected retention test score averages that the experimental group and control group students got from the social studies course achievement test?
5. Is there a significant difference between the pre-test and post-test mean scores of the experimental group students in the attitude scale for social studies course?
6. Is there a significant difference between the pre-test and post-test mean scores of the control group students in the attitude scale for social studies course?
7. Is there a significant difference between the posttest mean scores of the experimental group and control group students from the attitude scale for social studies course?

## Method

In this study, the pretest-posttest, which is one of the quantitative research methods, was used in a quasi-experimental design with unequalled control group. Quasi-experimental designs are frequently used in areas where it is not possible to control all variables, such as the field of education, to investigate the effect of the independent variable on the dependent variable. In the design with pre-test and post-test unequalled control group, pretest and posttest are applied to both groups. The experimental and control groups are determined objectively (Karasar, 2016).

The classes in this study were determined as an experimental group and the other as a control group using the unbiased assignment method. Measuring was carried out before and after the experiment in both groups. And the experimental application took 6 weeks. While the courses in the experimental group were taught with activities in accordance with the REACT strategy, they were instructed based on the activities in the social studies textbook in the control group. The independent variable of the research is education with the REACT strategy, and the dependent variables are academic achievement, retention and attitude.

### *Study Group*

The universe of the research study consisted of 5th grade students studying in the district of Efeler, Aydın in the academic year of 2018-2019. The study group of the study consisted of 5th grade students who continue their education in 2 different departments in a state school chosen by the simple random sampling method from the study universe. This method is the method in which each item selected in the sample has the same chance statistically and is completely randomly selected (Büyüköztürk, Çakmak, Akgün, Karadeniz, & Demirel, 2014).

In the study, there were 60 students in total, 30 in the experimental group and 30 in the control group. While there are 16 female and 14 male students in the experimental group, there are 14 female and 16 male students in the control group. Students are in the 10-11 age group. Students in both groups receive full-time education. The students were included in the research on a voluntary basis, and their parents signed the "Informed Voluntary Consent Form" and in this way their approval was received. As a result of the independent sample t test conducted according to the academic achievement pretest data performed before the application, it was observed that there was no statistically significant difference between the experimental ( $\bar{X}_{\text{experiment}} = 10.27$ ) and control ( $\bar{X}_{\text{control}} = 10.30$ ) groups ( $t(60) = -.03$ ;  $P = .977$ ).

In addition, as a result of the Mann Whitney-U test conducted according to the attitude scale for social studies course and pre-test data, it was found out that the average rank (28.63) of the experimental group students' pretest scores from the attitude scale for social studies course is lower than that of the control group students (32.37). However, the difference between them is not statistically significant ( $U = 394.00$ ;  $Z = -.829$ ;  $P > 0.05$ ). Again for the subscales of the scale, the average rank of the experimental group (28.88) in the liking dimension is lower than that of the control group students (32.12); but the difference between them is not statistically significant ( $U = 401.50$ ;  $Z = -.718$ ;  $P > 0.05$ ). The average rank of the experimental group (31.18) in the benefit dimension is higher than that of the control group students (29.82); but the difference between them is not statistically significant ( $U = 429.50$ ;  $Z = -.356$ ;  $P > 0.05$ ). The average rank of the experimental group (29.42) in the interest dimension is lower than that of the control group students (31.58); but the difference between them is not statistically significant ( $U = 417.50$ ;  $Z = -.491$ ;  $P > 0.05$ ). In the wishing dimension, the average rank of the experimental group (30.03) is lower than that of the control group students (30.97); however, the difference between them is not statistically significant ( $U = 436.00$ ;  $Z = -.209$ ;  $P > 0.05$ ). In the trust dimension, the average rank of the experimental group (29.27) is lower than that of the control group students (31.73); but the difference between them is not statistically significant ( $U = 413.00$ ;  $Z = -.557$ ;  $P > 0.05$ ). These results reveal that the academic achievements and attitudes of the students in the

experimental and control groups towards social studies course are close to each other at the start of experimental application.

#### *Data Collection Tools*

In the research, the achievement test designed by the researcher himself and attitude scale for social studies course developed by Gömleksiz and Kan (2013) were used as data collection tools. Information on the application process has been shown in Figure 1.

Group	Pretest	Method	Posttest	Retention
Experimental	Academic achievement test	REACT Strategy	Academic achievement test	Academic achievement test
	Attitude Scale for Social Sciences Course		Attitude Scale for Social Sciences Course	
Control	Academic achievement test	Activities in the Social Sciences Textbook	Academic achievement test	Academic achievement test
	Attitude Scale for Social Sciences Course		Attitude Scale for Social Sciences Course	

**Figure 1.** Application Process

#### *Academic Achievement Test*

The academic achievement test regarding the social studies course used in the research was prepared by taking into consideration the 5th grade social studies course curriculum of the 2018-2019 academic year. It is aimed that the achievement test questions cover the learning outcomes that should be attained by the students during the six-week practice. Exams such as the High School Entrance Examination, the Placement Exam, the transition exam from primary to secondary school, the State Scholarship Exam conducted by the Measuring, Selection and Placement Center or the Ministry of National Education in the past years were analyzed by the researcher. A total of 57 questions were prepared, including 54 questions determined as a result of this analysis and 3 questions developed by the researcher. Necessary permission has been obtained from the Ministry of National Education to use the questions, the class level, learning outcomes and explanations regarding learning subject the People, Places and Environments in the social studies curriculum were taken into consideration in the selection and preparation of the questions. The prepared questions have 4 options. The appropriateness of the questions was evaluated by a social studies teacher and two experts in educational sciences.

In order to test the validity and reliability of the questions in the social studies course achievement test to be applied to the experimental and control groups, a pilot study was conducted with a total of 55 students in the 6th grade of the same school. Then, item analysis of the achievement test was made. In scoring the data, correct answers were scored as 1 point, wrong, blank answers or those who marked more than one answer for the same item were evaluated as 0 points. And assessment has been carried out by taking into account the difficulties of the items in the achievement test ( $P$ ), subgroup upper group discrimination ( $r$ ), point-biserial correlation coefficients ( $r_{pbis}$ ), the number of students in the upper group who answered the questions correctly ( $Dü$ ), and the number of students in the lower group who answered the questions correctly ( $Da$ ) and the results obtained are offered in Table 1.

**Table 1.** Item Analysis of the Test According to the Answers of the Students in the Upper and Lower Groups

Question No	Dü	Da	P	r	Result
1	9	5	0,40	,27	Must be fixed
2	8	3	0,33	,33	Good
3	13	4	0,49	,60	Excellent
4	6	4	0,38	,13	Worst
5	5	1	0,25	,27	Must be fixed
6	6	6	0,47	,00	Worst
7	9	7	0,64	,13	Worst
8	11	8	0,64	,20	Must be fixed
9	10	7	0,62	,20	Must be fixed
10	10	6	0,47	,27	Must be fixed
11	13	13	0,85	,00	Worst
12	11	4	0,45	,47	Excellent
13	8	4	0,38	,27	Must be fixed
14	11	3	0,45	,53	Excellent
15	5	4	0,33	,07	Worst
16	14	7	0,75	,47	Excellent
17	14	2	0,44	,80	Excellent
18	15	2	0,51	,87	Excellent
19	12	4	0,44	,53	Excellent
20	11	6	0,53	,33	Good
21	7	9	0,44	-,13	Worst
22	12	5	0,51	,47	Excellent
23	13	3	0,47	,67	Excellent
24	10	5	0,62	,33	Good
25	15	6	0,71	,60	Excellent
26	12	3	0,49	,60	Excellent
27	14	3	0,60	,73	Excellent
28	10	5	0,38	,33	Good
29	13	3	0,62	,67	Excellent
30	11	3	0,36	,53	Excellent
31	12	5	0,44	,47	Excellent
32	4	2	0,25	,13	Worst
33	12	2	0,49	,67	Excellent
34	15	6	0,78	,60	Excellent
35	15	2	0,62	,87	Excellent
36	8	0	0,31	,53	Excellent
37	14	3	0,49	,73	Excellent
38	10	2	0,36	,53	Excellent
39	13	4	0,60	,60	Excellent
40	14	2	0,62	,80	Excellent
41	9	6	0,42	,20	Must be fixed
42	14	2	0,38	,80	Excellent
43	9	6	0,40	,20	Must be fixed
44	15	1	0,64	,93	Excellent
45	15	0	0,56	1,00	Excellent
46	14	2	0,51	,80	Excellent
47	12	0	0,49	,80	Excellent
48	5	6	0,36	-,07	Worst
49	12	5	0,56	,47	Excellent
50	11	0	0,38	,73	Excellent
51	12	3	0,55	,60	Excellent
52	15	4	0,55	,73	Excellent
53	1	7	0,27	-,40	Reverse discriminated
54	9	5	0,45	,27	Must be fixed
55	5	5	0,33	,00	Worst
56	8	1	0,27	,47	Excellent
57	13	4	0,47	,60	Excellent

Upon examining Table 1, it is observed that the difficulty indices of the test vary between 0.25 and 0.85 and the discrimination indices vary between 0.00 and 1. The high item discrimination increases the validity of the test. If the discrimination of the items is 0.19 or less, it is worst. If it cannot be improved with corrections, they should be removed from the test. If it is between 0.20-0.29, the item can be used in compulsory situations; however, it must be fixed. If it is between 0.30-0.39, the item is interpreted as good, if it is 0.40 and higher, the item is interpreted as excellent (Tekin, 2000). As a result of the analysis, items no. 1, 2, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 15, 20, 21, 22, 24, 28, 31, 32, 41, 43, 48, 49, 53, 54, 55 were excluded from the test. The achievement test took its final form with a total of 30 items.

The achievement test covers 5 questions from the subject of landforms in the unit "People, Places and Environments" (which explain what the landforms of the place and its environment are on the map), 6 questions from the subject of the effect of climate on human activities (which explain the effect of the climate in our environment on human activities by giving examples from our daily life), 6 questions from the subject of population and settlement (which give examples of the natural characteristics of the place and its surroundings and the effects of human characteristics on the population and settlement), 6 questions from the subject of disasters and environmental problems (which question the causes of the occurrence of disasters and environmental problems in the surrounding area) and 7 questions from the subject of the effect of natural disasters on our lives ( which explain the effects of natural disasters on community life with examples.). For the achievement test, which consists of 30 items, the KR20 value was calculated as .924, the average as 15.40, the variance as 67.65, and the standard deviation was calculated as 8.22. Büyüköztürk (2007) stated that the lower limit of reliability value should be 0.70 for measurement tools to be used in research. Considering this value, it can be stated that the achievement test prepared is a valid and reliable test for measuring student achievement for social studies course.

#### *Attitude Scale for Social Studies Course*

Attitude scale for Social studies course was applied to both groups before and after the study. Attitude scale for Social studies course developed by Gömleksiz and Kan in 5-point Likert type consists of 29 items, 15 of which are positive and 14 of which are negative. The scale has 5 sub-dimensions called as liking, benefit, interest, wishing and trust. Cronbach Alpha coefficients for the subscales of the scale were determined as .87 for liking dimension, .88 for benefit dimension, .77 for interest dimension, .76 for wishing dimension and .74 for trust dimension. The Kaiser-Meyer-Olkin (KMO) value of the scale was calculated as .96 and Bartlett's test (8.99) and the chi-square value ( $p = 0.00$ ) was found to be significant. Five subscales in the scale explain 55.95% of the total variance. Item loads in the scale vary between .48 and .78 (Gömleksiz & Kan, 2013). For this study, the internal reliability values of the whole scale and its subscales were calculated again and the results are offered in Table 2.

**Table 2.** Internal Reliability Coefficients of the Scale

<b>Subscale</b>	<b>Pretest Cronbach Alpha</b>	<b>Posttest Cronbach Alpha</b>
Liking	.822	.797
Benefit	.890	.760
Interest	.818	.795
Wishing	.344	.683
Trust	.712	.757
Total	.906	.904

#### *Retention Test*

In the study, four weeks after the end of the application, the achievement test prepared by the researcher himself was applied again and retention results were obtained.

#### *Analysis of Data*

The data collected from the experimental and control groups before and after the application were analyzed using the 23.0 version of the SPSS (IBM) statistics program, and it was tested whether a significant difference occurred between the groups. The significance level was taken as 0.05 in the interpretation of the data.



In addition to statistical significance, the effect size was also examined in the study in order to determine whether the REACT strategy and the activities in the social studies textbook were effective in the changes in average scores as a result of the pretest, posttest and retention test measurements. Because, according to Büyüköztürk, Çokluk, and Köklü (2010), the significance of the differences between the averages of the groups does not always indicate a strong relationship between the independent and dependent variables. Therefore, it is necessary to know the effect size in order to distinguish statistical significance and practical significance. Since it is not affected by the means, relationships and sample size, effect size allows quantitative comparison of research data and more accurate decision making. It also gives an idea to other researchers about the real value / effect of the application.

Cohen's *d*, eta squared and *r* values were calculated to determine the effect size. In the interpretation of Cohen's *d* value for the *t*-test performed in the study,  $1.45 < d$  was taken as excellent level,  $1.10 < d < 1.45$  very high level,  $0.75 < d < 1.10$  high level,  $0.40 < d < 0.75$  medium level,  $0.15 < d < 0.40$  low level, and  $-0.15 < d < 0.15$  was taken as insignificant level (Thalheimer & Cook, 2002). In ANOVA tests, eta squared ( $\eta^2$ ) values were calculated to determine the effect of independent variables on each dependent variable. When interpreting the eta squared values, the value of  $\eta^2 = 0.1$  was reported as small, for  $\eta^2 = 0.6$  as medium and  $\eta^2 = 0.14$  as high effect size. For the Mann Whitney-U and Wilcoxon tests, the effect sizes were determined by considering the correlation coefficients (*r*). In its interpretation, it was expressed as a negligible relationship between .01 and .09, a low relationship between .10 and .29, a medium relationship between .30 and .49, a strong relationship between .50 and .69, and a very strong relationship between .70 and above (Davis, 1971). In addition, D'Agostino-Pearson Test (DP) test was used for the normality of the data.

#### *Experimental Design Process*

1. The researcher determined the subject of study together with his advisor. He also prepared a 6-week course plan, materials and an achievement test by conducting a literature review on the designated topic and by taking into account the steps of the REACT strategy. The documents prepared were examined by a social studies education specialist, a Turkish education specialist, two educational sciences experts, one assessment and evaluation field expert and one social studies teacher. Necessary improvements were made by evaluating the opinions of the experts.
2. Firstly, ethical committee approval was obtained for the study from Aydın Adnan Menderes University Educational Research Ethics Committee, dated 04.12.2018 and numbered 2018/11.
3. Since the experimental process will be carried out in a classroom environment in a school, official approval was obtained from the Aydın Provincial Directorate of National Education.
4. The researcher talked with the school administration. And it has been found out that there are 4 5th grade classes in the school and that the social studies course in these 5th grades are instructed by a social studies teacher with 30 years of work experience.
5. The social studies teacher of the school was interviewed, information was given about the REACT strategy by mentioning the work to be carried out, and that teacher's opinions were taken about the course plans prepared by the researcher in accordance with the REACT strategy.
6. Two weeks before the application process started, the students were given detailed information about the experimental study. The signatures of the "Informed Volunteer Consent Form" were requested by the parents of the students who could be included in the study on a voluntary basis and who would like to participate in the study. Before starting the study, consent of 60 parents was obtained under this form. In addition, the researcher attended the courses taught by the teacher twice at different times before the application and thus the researcher and the students were able to get to know each other.
7. In order to perform the validity and reliability study of the developed achievement test, an achievement test was applied to the 6th grade students in two different classes in the same

school. Reliability and validity study has been carried out among the items in the achievement test by looking at the difficulties ( $P$ ), subgroup upper group discrimination ( $r$ ), point biserial correlation coefficient ( $r_{pbis}$ ), the number of students in the upper group who gave correct answers to the questions ( $D_u$ ), and the number of students in the lower group who answered the questions correctly ( $D_a$ ). In the achievement test, there were 30 items that were described as "excellent" according to the reference values. Within the scope of the study, there was no pilot application regarding experimental process.

8. Achievement test and attitude scale for social studies course were applied as pretest to the experimental and control group students.
9. After the pretests were taken, the researcher made a speech to the students in both groups and the students were motivated and the students' questions about the application process were answered.
10. During the experimental application, in order to avoid researcher bias and to ensure the presence of objectivity in the classroom, the school's social studies teacher also took part in the courses, made observations in the classroom with the students and these observations were taken by the researcher verbally after each course. The teacher of the course did not lecture during the application. The planning, responsibility and management of the course were undertaken by the researcher himself.
11. In the control group, the courses were instructed based on the activities in the textbook, while in the experimental group, the courses were taught in accordance with the REACT strategy by taking into account the steps of the REACT strategy. Methods and techniques such as presentation, question and answer, case study, poster preparation etc. were used in the control group, they watched a video from EBA (a social qualified educational content network in Turkey), newspaper clippings were read, and some activities such as worksheet, it's your turn and let's discuss were carried out. And in the experimental group, activities such as inventions, learning by research and investigation, video watching, video game play, puzzle, taboo, bingo, expert person presentation, worksheet, project assignment, concept and picture matching, poster preparation, drama, etc. activities have been conducted.
12. At the end of the application, the achievement test and attitude scale for social studies course were applied to the experimental and control groups as a posttest.
13. 4 weeks after the end of the application, a retention test was applied to the experimental and control group students.
14. The data obtained from the experimental and control groups were analyzed.

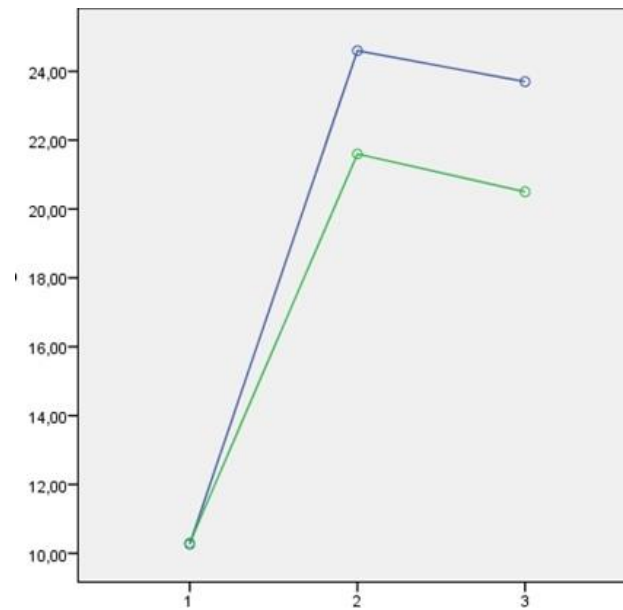
## Results

Descriptive statistics regarding the pretest, posttest and retention test results obtained from the achievement test of the experimental group using the activities in accordance with the REACT strategy and the control group students using the activities in the social studies textbook are shown in Table 3.

**Table 3.** Descriptive Statistics

Group	Pretest			Posttest			Retention		
	N	$\bar{X}$	Ss	N	$\bar{X}$	Ss	N	$\bar{X}$	Ss
Experimental	30	10,27	4,46	30	24,6	4,53	30	23,7	4,04
Control	30	10,30	4,62	30	21,6	4,94	30	20,5	4,30

Upon examining Table 3, it is observed that the pretest success point averages of the experimental and control group students are close to each other. In addition, it was found that both student groups got the highest score average in the posttest and then in the retention test and it is observed that they obtained the lowest mean score in the pretest. The change graph regarding the scores obtained from the tests is illustrated in figure 2.



**Figure 2.** The Change in Experiment and Control Group Achievement Test Scores

Upon examining Figure 2, it is observed that the students in the experimental group are more successful than the control group students in terms of success in the social studies course at the end of the application process.

#### *Findings Regarding the First Sub-Problem*

The first sub-problem of the study is the question that “Is there a significant difference between the pretest, posttest and retention test mean scores of the students in the experimental group in which the REACT strategy was used? In the study, it was determined that data regarding the experimental group's pretest (DP: 0.12;  $P > 0.05$ ), posttest (DP: 2.48;  $P > 0.05$ ) and retention test (DP: 1.19;  $P > 0.05$ ) showed normal distribution. For this reason, in order to determine whether there is a significant difference between the pretest, posttest and retention test scores of the students in the experimental group, the ANOVA test was performed in repeated measurements and the results are shown in Table 4.

**Table 4.** ANOVA Test Results in Repeated Measurements of the First Sub-Problem

Source of Variance	KT	Sd	KO	F	p	Significant Difference	$\eta^2$
Pre-Post-Retention	3867.09	1.60	2414.39			1-2	
Error	514.91	46.45	11.09	217.80	.000	1-3	.882
Total	4382.00	48.05					

The sphericity test of Mauchly was not met in the ANOVA test in the repeated measurements ( $W(2) = 751$ ;  $p = 0.018$ ). That's why the Greenhouse-Geisser correction has been checked. Accordingly, it was observed that there is a significant difference between pre, post and retention tests and the effect size of the difference is high ( $F(1.60, 46.45) = 217.80$ ;  $p = 0.000$ ;  $\eta^2 = 0.882$ ). Bonferroni multiple comparison test was conducted to determine which measurements were the difference. Accordingly, there is a difference in favor of posttest between pretest-posttest ( $\bar{X}_{\text{pretest}} = 10.27$ ,  $\bar{X}_{\text{posttest}} = 24.60$ ). There is a difference in favor of the retention test between the pretest-retention test ( $\bar{X}_{\text{pretest}} = 10.27$ ,  $\bar{X}_{\text{posttest}} = 24.60$ ). However, it was observed that there was no difference between the posttest and the retention test ( $\bar{X}_{\text{posttest}} = 24.60$ ,  $\bar{X}_{\text{retention}} = 23.70$ ). In addition, it can be stated that the effect of the activities carried out in accordance with the REACT strategy according to the eta square value on the students' success in social studies course and the retention of their learning are positively and at a high level ( $\eta^2 = .882$ ).

### *Findings Regarding the Second Sub-Problem*

The second sub-problem of the study is the question that "Is there a significant difference between the average scores of the pretest, posttest and retention test of the students in the control group in which the activities in the social studies textbook were used?". In the study, it was determined that data regarding the control group's pretest (DP: 5.70;  $P > 0.05$ ), posttest (DP: 3.09;  $P > 0.05$ ) and retention test (DP: 4.25;  $P > 0.05$ ) showed normal distribution. For this reason, in order to determine whether there is a significant difference between the pretest, posttest and retention test mean scores of the students in the control group, ANOVA test was performed in repeated measurements and the results are shown in Table 5.

**Table 5.** ANOVA Test Results in Repeated Measurements of the Second Sub-Problem

Source of Variance	KT	Sd	KO	F	p	Significant Difference	$\eta^2$
Pre-post-retention	2329.40	2	1164.70	224.73	.000	1-2	.886
Error	300.60	58	5.18			1-3	
Total	2630.00	60					

In the repeated measurements, Mauchly's sphericity test required in the ANOVA test was met ( $W(2) = .970$ ;  $p = .651$ ). As a result of the analysis, it was determined that there is a significant difference between pre, post and retention tests and the effect size of the difference is high ( $F(2, 58) = 224.73$ ;  $p = 0.000$ ;  $\eta^2 = 0.886$ ). Bonferroni multiple comparison test was conducted to determine between which measurements were the difference. Accordingly, there is a difference in favor of posttest between pretest-posttest ( $\bar{X}_{\text{pretest}} = 10.30$ ,  $\bar{X}_{\text{posttest}} = 21.60$ ). There is a difference in favor of the retention test between the pretest-retention test ( $\bar{X}_{\text{pretest}} = 10.30$ ,  $\bar{X}_{\text{retention}} = 20.50$ ). However, it was observed that there was no difference between posttest and retention test ( $\bar{X}_{\text{posttest}} = 21.60$ ,  $\bar{X}_{\text{retention}} = 20.50$ ). In addition, it can be stated that the effect of the activities carried out in accordance with the social studies textbook according to the eta squared value on the students' success in social studies course and the retention of learning are positively and at a high level ( $\eta^2 = .886$ ).

### *Findings Regarding the Third Sub-Problem*

The third sub-problem of the study is the question that "is there a significant difference between the corrected posttest score averages obtained from the achievement test of the experimental group using the activities in accordance with the REACT strategy and the control group students using the activities in the social studies textbook? ANCOVA test was planned to determine whether there is a significant difference between the effects of the applications carried out in the study on the academic achievement of the students when the pretest scores are taken under control. For this reason, it was checked whether the data met the assumptions of the ANCOVA test.

Firstly, it was examined whether the scores of the dependent variable for each of the groups showed normal distribution. In the study, it was determined that the experimental group's pretest (DP: 0.12;  $P > 0.05$ ) and posttest (DP: 2.48;  $P > 0.05$ ) and the control group's pretest (DP: 5.70;  $P > 0.05$ ) and posttest (DP: 3.09;  $P > 0.05$ ) show normal distribution.

The second assumption is that the variances of the scores of the dependent variable for each of the groups are equal. To test this hypothesis, Levene's test was conducted.

**Table 6.** Levene's Test Results

F	Sd1	Sd2	p
.429	1	58	.515

According to Field (2005), if the significance value of the Levene's Test is greater than 0.05, it can be said that the variances are equal. As seen in Table 6, it can be stated that the variances are equal since  $P > 0.05$ . The third assumption is that there is a linear relationship between the pretest and posttest scores of the groups. The graph on the linearity of the relationship is offered below.

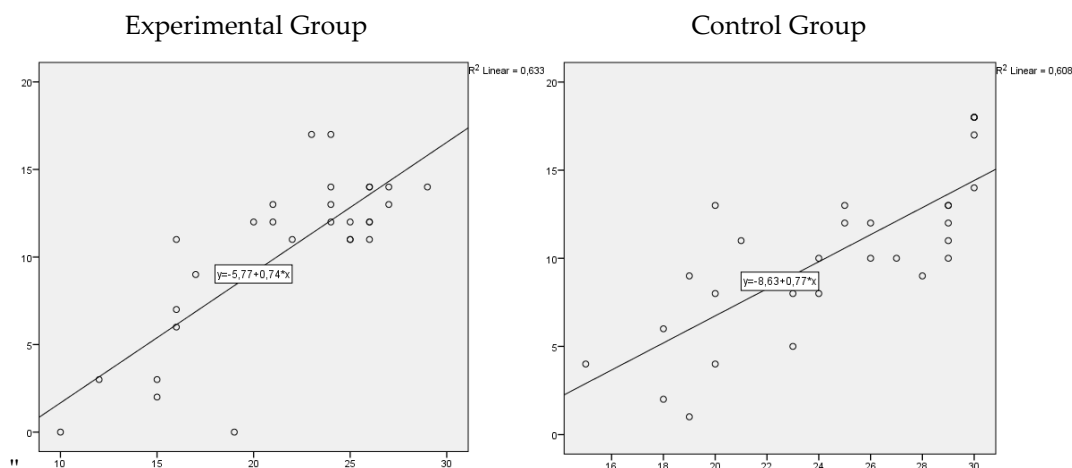


Figure 3. Scatter Diagram for Pretest and Posttest

According to the scatter diagrams in Figure 3, it can be stated that the relationship is linear. In addition, Pearson Correlation Test was performed for the data on the linearity of the relationship and the results are illustrated in Table 7.

Table. 7 Pearson Correlation Test Results

Group	Variable	N	r	p
Experimental	Pretest	30	.780	.000
	Posttest			
Control	Pretest	30	.795	.000
	Posttest			

It was observed that  $r = .780$  is between the pretest and posttest results of the experimental group and  $r = .795$  is between the pretest and posttest results in the control group. Considering both these values and scatter diagrams, it can be said that there is a linear relationship between the pretest and posttest scores for the groups.

The fourth assumption is that the regression slopes to be used to predict the posttest scores according to the pretest scores within the groups should be equal. For this, it was checked whether the pretest & group joint effect was significant on the posttest. The results are offered in Table 8.

Table 8. Regression Coefficients for Achievement Test of Experimental and Control Groups

Group	KT	Sd	KO	F	p
Group	31.50	1	31.50	3.57	.064
Pretest	806.35	1	806.35	91.42	.000
Pretest & Group	1.05	1	1.05	.120	.731
Error	493.92	56	8.82		
Total	1332.82	59			

According to Field (2005), the significance value must be greater than 0.05 in order to ensure the equality of regression slopes. Upon examining Table 8, it is observed that the pretest & group joint effect is not significant on the posttest ( $F(1, 56) = 0.120; p > 0.05$ ). In line with this result, it can be said that the regression slopes to be used in predicting the posttest scores according to the pretest scores are equal.

As a result of the analysis, it was observed that all of the ANCOVA assumptions were met. For this reason, the ANCOVA test was used to analyze whether there is a significant difference between the

corrected posttest mean scores of the experimental and control group students in the achievement test. Analysis results are presented in Table 9.

**Table 9.** ANCOVA Test Results for Third Sub-Problem

Group	KT	Sd	KO	F	p	$\eta^2$
Pretest	809.43	1	809.43	93.21	.000	
Group	137.47	1	137.47	15.83	.000	.217
Error	494.97	57	8.68			
Total	1441.81	59				

Upon examining Table 9, it is observed that there is a significant difference in favor of the experimental group and the effect size is high  $F(1, 57)=15.83; p<0.05; \eta^2=.217$  between the posttest mean scores corrected according to the pretest scores of the experimental and control groups. In the ANCOVA test, it was determined that the corrected average score of the experimental group ( $\bar{X}_{\text{experimental}}=24.61$ ) differed statistically significantly from the corrected average score ( $\bar{X}_{\text{control}}=21.59$ ) of the control group. These results show that the experimental group students for whom the activities were used in accordance with the REACT strategy are more successful in terms of academic achievement than other students in the control group where the activities in the social studies textbook were used. In addition, considering the effect size, it can be said that using the REACT strategy is more effective than teaching based on social studies textbook.

#### *Findings Regarding the Fourth Sub-Problem*

The fourth sub-problem of the study is the question that "Is there a significant difference between the corrected retention mean scores in the achievement test of the experimental group using the activities in accordance with the REACT strategy and the control group students using the activities in the social studies textbook?". ANCOVA test was planned to determine whether there is a significant difference between the effects of the applications carried out in the study on the retention of the students' academic achievement, when the posttest scores are taken under control. For this reason, it was checked whether the data met the assumptions of the ANCOVA test.

Firstly, it was examined whether the scores of the dependent variable for each of the groups showed normal distribution. In the study, the posttest (DP: 2.48;  $P>0.05$ ) and the retention test (DP: 1.19;  $P>0.05$ ) of the experimental group and the posttest (DP: 3.09;  $P>0.05$ ) and the retention test (DP: 4.25;  $P>0.05$ ) of the control group were found to have a normal distribution.

The second assumption is that the variances of the dependent variable scores for each of the groups are equal. To test this hypothesis, Levene's test was conducted.

**Table 10.** Levene's Test Results

F	Sd1	Sd2	p
3,04	1	58	.087

According to Field (2005), if the significance value of the Levene's test is greater than 0.05, it can be said that the variances are equal. As seen in Table 10, it can be stated that the variances are equal since  $P>0.05$ .

The third assumption is that there is a linear relationship between the posttest scores and retention test scores of the groups. The graphic on the linearity of the relationship is presented in figure 4.

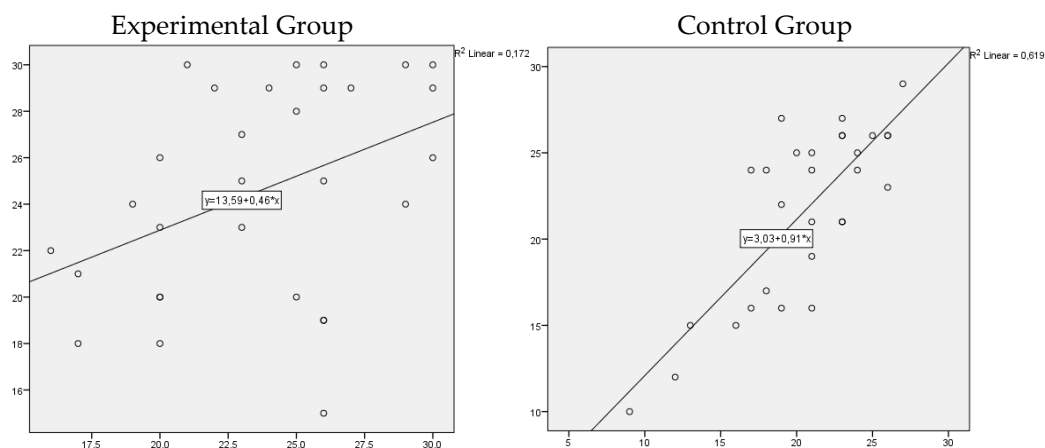


Figure 4. Scatter Diagram for Posttest and Retention Test

According to the scatter diagrams in Figure 4, it can be stated that the relationship is linear. In addition, Pearson Correlation Test was performed for the data on the linearity of the relationship and the results are shown in table 11.

Table 11. Pearson Correlation Test Results

Group	Variable	N	r	p
Experimental	Posttest	30	.415	.023
	Retention			
Control	Posttest	30	.797	.000
	Retention			

It was observed that  $r = .415$  between the posttest and retention test results of the experimental group while  $r = .797$  in the control group between the posttest and retention test results. Considering both these values and scatter diagrams, it can be said that there is a linear relationship between the posttest and retention test scores for the groups.

The fourth assumption is that the regression slopes to be used in predicting retention test scores according to the posttest scores within the groups should be equal. For this, it was checked whether the posttest & group joint effect was significant on the retention test. The results are presented in Table 12.

Table 12. Regression Coefficients of Experimental and Control Groups in the Achievement Test

Group	KT	Sd	KO	F	p
Group	45.10	1	45.10	4.23	.044
Posttest	359.62	1	359.62	33.76	.000
Posttest & Group	31.82	1	31.82	2.99	.089
Error	596.51	56	10.65		
Total	1033.05	59			

According to Field (2005), the significance value must be greater than 0.05 in order to ensure the equality of regression slopes. Upon examining Table 12, it is observed that the posttest & group joint effect is not significant on the retention test ( $F(1, 56) = 2.99; p > 0.05$ ). In line with this result, it can be said that the regression slopes to be used in predicting the retention test scores according to the posttest scores are equal.

As a result of the analysis, it was observed that all of the ANCOVA assumptions were met. Accordingly, the ANCOVA test was used to analyze whether there is a significant difference between

the corrected retention test score averages in the achievement test of the experimental group and the control group students. Analysis results are offered in Table 13.

**Table 13.** ANCOVA Test Results for the Fourth Sub-Problem

Group	KT	Sd	KO	F	p
Posttest	381.47	1	381.47	34.61	.000
Group	33.83	1	33.83	3.07	.085
Error	628.33	57	11.02		
Total	1224.84	59			

Upon examining Table 13, it is observed that there is no statistically significant difference between the experimental ( $\bar{X}_{\text{experimental}}=22.89$ ) and the control group ( $\bar{X}_{\text{control}}=21.31$ ) in terms of retention test mean scores corrected according to posttest scores  $F(1,57) = 3.07; p > 0.05$ . However, it was also observed that the corrected retention mean scores of the students in the experimental group were higher than the control group students and the difference was close to the significance value. These results show that the experimental group students using the activities in accordance with the REACT strategy were more successful in terms of the retention of what they learned compared to the control group students using the activities in the social studies textbook. It can be claimed that the students in the experimental group kept what they learned in their memory for a longer time with the help of the activities carried out in a certain order in the learning environment and the materials prepared in the learning environment, thanks to the relation of the course subjects with the information they gained in daily life.

#### *Findings regarding Fifth Sub-Problem*

The fifth sub-problem of the study is the question that "Is there a significant difference between the pretest and posttest mean scores of the students in the experimental group in which the activities were used in accordance with the REACT strategy in the attitude scale for social studies course?". It was determined that the difference between the attitude score averages of the experimental group was not normally distributed before and after the application (difference in the Liking dimension DP: 1.92  $P > 0.05$ ; difference in the benefit dimension DP: 22.14  $P < 0.05$ ; difference in the interest dimension DP: 2.78  $P > 0.05$ ; difference in the wishing dimension: DP: 0.31  $P > 0.05$ ; difference in the trust dimension DP: 5.01  $P > 0.05$ ; difference in terms of overall scale DP: 3.10  $P > 0.05$ ). For this reason, Wilcoxon test was performed and the results are shown in table 14.

**Table 14.** Descriptive Statistics and Wilcoxon Test Results of the Fifth Sub-Problem

Test	Dimension	Groups	N	$\bar{X}_{\text{rank}}$	$\Sigma_{\text{rank}}$	Z	p	r
Pretest-Posttest	Liking	Negative Rank	7	12.14	85.00	-2.69	.007	.491
		Positive Rank	21	15.29	321.00			
		Equal	2					
		Sum	30					
Pretest-Posttest	Benefit	Negative Rank	5	6.10	30.50	-1.69	.090	-
		Positive Rank	10	8.95	89.50			
		Equal	15					
		Sum	30					
Pretest-Posttest	Interest	Negative Rank	5	7.40	37.00	-2.76	.006	.503
		Positive Rank	16	12.13	194.00			
		Equal	9					
		Sum	30					
Pretest-Posttest	Wishing	Negative Rank	7	9.07	63.50	-2.05	.040	.375
		Positive Rank	15	12.63	189.50			
		Equal	8					
		Sum	30					



**Table 14.** Continued

Test	Dimension	Groups	N	$\bar{X}$ rank	$\Sigma$ rank	Z	p	r
Pretest-Posttest	Trust	Negative Rank	7	12.50	87.50	-.98	.328	-
		Positive Rank	14	10.25	143.50			
		Equal	9					
		Sum	30					
Pretest-Posttest	Total	Negative Rank	10	9.90	99.00	-2.75	.006	.501
		Positive Rank	20	18.30	366.00			
		Equal	0					
		Sum	30					

According to the result of the Wilcoxon test, it was found out that the REACT strategy activities during the application made a significant difference in the overall scale according to the attitude scale for social studies course of the students and the effect size of this difference was strong ( $W=-2.75$ ;  $P=.006$ ;  $r=.501$ ). In the sub-dimensions, there is a significant difference in the liking dimension and the effect size of this difference is medium ( $W = -2.69$ ;  $P = .007$ ;  $r = .491$ ) and it causes a significant difference in the interest dimension and the effect size of this difference is strong ( $W = -2.76$ ;  $P = .006$ ;  $r = .503$ ) and it also causes a significant difference in wishing dimension and the effect size of this difference is moderate ( $W = -2.05$ ;  $P = .040$ ;  $r = .375$ ). However, it was determined that there was no significant difference in benefit ( $W = -1.69$ ;  $P = 0.90$ ) and trust ( $W = -.98$ ;  $P = .328$ ) sub-dimensions.

#### *Findings Regarding the Sixth Sub-Problem*

The sixth sub-problem of the study is the question that "Is there a significant difference between the pretest and posttest mean scores obtained in the attitude scale for social studies course of the students in the control group using the activities in the social studies course book?". It was determined that the difference between the mean scores of the control group was not normally distributed before and after the application. (Difference in the Liking dimension DP: 17.72  $P < 0.05$ ; difference in the benefit dimension DP: 4.65,  $P > 0.05$ ; difference in the interest dimension DP: 46.12  $P < 0.05$ ; difference in the wishing dimension DP: 4.15  $P > 0.05$ ; difference in the trust dimension DP: 20.36  $P < 0.05$ ; difference in terms of the overall scale DP: 0.56  $P > 0.05$ ). For this reason, Wilcoxon test was performed and the results are shown in Table 15.

**Table 15.** Descriptive Statistics and Wilcoxon Test Results for the Sixth Sub-Problem

Test	Dimension	Groups	N	$\bar{X}$ rank	$\Sigma$ rank	Z	p	r
Pretest-posttest	Liking	Negative Rank	12	12.67	152.00	-.06	.954	-
		Positive Rank	12	12.33	148.00			
		Equal	6					
		Sum	30					
Pretest-Posttest	Benefit	Negative Rank	13	9.88	128.50	-2.47	.013	-.450
		Positive Rank	4	6.13	24.50			
		Equal	13					
		Sum	30					
Pretest-Posttest	Interest	Negative Rank	11	8.59	94.50	-.39	.693	-
		Positive Rank	7	10.93	76.50			
		Equal	12					
		Sum	30					
Pretest-Posttest	Wishing	Negative Rank	13	10.58	137.50	-.77	.441	-
		Positive Rank	8	11.69	93.50			
		Equal	9					
		Sum	30					

**Table 15.** Continued

Test	Dimension	Groups	N	$\bar{X}$ rank	$\Sigma$ rank	Z	p	r
Pretest-Posttest	Trust	Negative Rank	16	11.06	177.00	-1.65	.099	-
		Positive Rank	6	12.67	76.00			
		Equal	8					
		Sum	30					
Pretest-Posttest	Total	Negative Rank	17	14.06	239.00	-1.20	.229	-
		Positive Rank	10	13.90	139.00			
		Equal	3					
		Sum	30					

According to the results of the Wilcoxon test, the activities in the social studies textbook during the application did not cause a significant difference in the overall of the scale ( $W=-1.20$ ;  $P=.229$ ) and in the subscales of liking ( $W = -.06$ ;  $P = .954$ ), Interest ( $W = -.39$ ;  $P = .693$ ), Wishing ( $W = -.77$ ;  $P = .441$ ), Trust ( $W = -1.65$ ;  $P = .099$ ) according to the attitude scale for social studies course of the students. It was determined that there was a negative difference in the benefit sub-dimension and the effect size of this difference was at a medium level ( $W = -2.47$ ;  $P = .013$ ,  $r = -.450$ ).

#### *Findings Regarding the Seventh Sub-Problem*

The seventh sub-problem of the study is the question that "Is there a significant difference between the posttest mean scores of the students obtained in the aptitude scale for social studies course in the experimental group using the REACT strategy and the control group students using the activities in the social studies course book? After the application, the mean posttest attitude score of the experimental group (Liking dimension DP: 1.57  $P > 0.05$ ; benefit dimension DP: 52.52  $P < 0.05$ ; interest dimension DP: 39.83  $P < 0.05$ ; wishing dimension DP: 2.83  $P > 0.05$ ; thrust dimension DP: 10.94  $P < 0.05$ ; in terms of overall scale DP: 2.35  $P > 0.05$ ) and the mean posttest attitude score of the control group (Liking dimension DP: 3.80  $P > 0.05$ ; benefit dimension DP: 3.28  $P > 0.05$ ; interest dimension DP: 4.94  $P > 0.05$ ; wishing dimension DP: 2.17  $P > 0.05$ ; trust dimension DP: 3.13  $P > 0.05$ ; in terms of the overall scale DP: 2.53  $P > 0.05$ ) did not show normal distribution. For this reason, Mann Whitney-U test was performed and the results are shown in Table 16.

**Table 16.** Descriptive Statistics and Mann Whitney-U Test Results of the Seventh Sub-Problem

Test	Dimension	Groups	N	$\bar{X}$ sıra	$\Sigma$ sıra	U	Z	p	r
Posttest	Liking	Experimental	30	33.58	1007.50	357.50	-1.37	.170	-
		Control	30	27.42	822.50				
		Total	60						
Posttest	Benefit	Experimental	30	36.55	1096.50	268.50	-2.99	.003	.387
		Control	30	24.45	733.50				
		Total	60						
Posttest	Interest	Experimental	30	33.43	1003.00	362.00	-1.44	.150	-
		Control	30	27.57	827.00				
		Total	60						
Posttest	Wishing	Experimental	30	34.37	1031.00	334.00	-1.75	.080	-
		Control	30	26.63	799.00				
		Total	60						
Posttest	Trust	Experimental	30	33.62	1008.50	356.50	-1.41	.158	-
		Control	30	27.38	821.50				
		Total	60						
Posttest	Total	Experimental	30	35.45	1063.50	301.50	-2.20	.028	.283
		Control	30	25.55	766.50				
		Total	60						

According to the results of this test, the average rank (35.45) of the experimental group students' posttest scores from the attitude scale for social studies course is higher than that of the control group students (25.55). And the difference between them is statistically significant and the effect size is low ( $U = 301.50$ ;  $Z = -2.20$ ;  $P < 0.05$ ;  $r = .283$ ). As for the subscales of the scale, the average rank of the experimental group (33.58) in the liking dimension is higher than that of the control group students (27.42); but the difference between them is not statistically significant ( $U = 357.50$ ;  $Z = -1.37$ ;  $P > 0.05$ ). In the benefit dimension, the average rank of the experimental group (36.55) is higher than that of the control group students (24.45), and the difference between them is statistically significant and the effect size is at medium level ( $U = 268.50$ ;  $Z = -2.99$ ;  $P < 0.05$ ;  $r = .387$ ). In the interest dimension, the average rank of the experimental group (33.43) is higher than that of the control group students (27.57); but the difference between them is not statistically significant ( $U = 362.00$ ;  $Z = -1.44$ ;  $P > 0.05$ ). The average rank of the experimental group (34.37) in the wishing dimension is higher than that of the control group students (26.63); but the difference between them is not statistically significant ( $U = 334.00$ ;  $Z = -1.75$ ;  $P > 0.05$ ). In the trust dimension, the average rank of the experimental group (33.62) is higher than that of the control group students (27.38); but the difference between them is not statistically significant ( $U = 356.50$ ;  $Z = -1.41$ ;  $P > 0.05$ ).

### Discussion and Conclusion

This study aimed to examine the effect of a learning environment using activities prepared in accordance with the REACT strategy within the scope of the 5th grade "People, Places and Environments" unit, on students' academic achievement, their attitudes towards social studies course and on the retention of learning. As a result of the experimental study carried out, it was found out that there is a statistically significant positive increase in both the experimental and control groups according to the success posttest and retention test results. This kind of a result showed that the teaching activities carried out in both groups are effective on the academic achievement of the students.

As a result of the study, upon examining the corrected posttest scores of the groups in the academic achievement test, it was found out that the average scores of the experimental group students are statistically significantly higher than the control group students. This result showed that the activities prepared in accordance with the REACT strategy are more effective on the academic achievement of the students than the activities in the social studies textbook. Considering the effect size values, it was seen that the effect size of the difference is high. This result has similar conclusions with many other studies in the literature. Keleş (2019) and Yıldırım (2015) stated that REACT strategy increased student success; Aktaş (2013), Ayvaci and Bebek (2018), Demircioğlu, Aslan et al. (2019), Erdoğan Kardeş (2019), Erdoğan Kardeş and Gül (2020), Gül et al. (2017), Günter (2018), Ingram (2003), Karşı and Yiğit, (2017), Keskin and Çam (2019), Kılıç (2015), Kirman Bilgin (2015), Kirman Bilgin et al. (2017), Kumaş (2015), Nawas (2018), Putri et al. (2019), Yıldırım and Gültekin (2017) stated in their studies that the REACT strategy is more effective in increasing student success than traditional methods. However, Cahyaningrum and Febriana (2019) stated that there is no significant difference.

The reasons why the REACT strategy is more effective can be stated as follows: the learning process may start with an event or problem that may be interesting for the student and thus making the information to be learned a necessity. In this way, students may have adopted the idea throughout the process that "this information is familiar to me, I can learn it". In addition, throughout the learning process, the courses were instructed in a practice-oriented way without ignoring the context within the scope of the strategy and time was used flexibly. In addition, students were encouraged to approach the subject systematically and use problem solving skills while thinking about the context. Putri and Santosa (2015), Suminten (2015), Sari et al. (2018), Widada et al. (2019) stated that REACT strategy improves problem solving skills. The fact that the strategy encourages more cooperation than the traditional method may have enabled students to learn from each other and to feel confident. The student, who transformed his knowledge into a different and new knowledge thanks to alternative assessment tools, did not lose his interaction with the course even after the course bell rang. As a result, a more effective learning environment was created as a result of systematic follow-up of certain steps thanks to the REACT strategy.

Within the scope of the study, a retention test was conducted to determine whether academic achievement was permanent or not. Upon examining the retention test results, it was found out that although the average scores of the students in the experimental group were higher than the control group students, there was no statistically significant difference between them. However, as a result of the analysis, it was observed that the p value is very close to the significance level ( $P = .085$ ). Therefore, it can be stated that the activities prepared in accordance with the REACT strategy are more effective in ensuring the permanence of students' academic achievement than the activities in the social studies textbook. When the literature is examined, Aktaş (2013), Erdoğan Karaş (2019), Erdoğan Karaş and Gül (2020), Gül (2016), Karslı and Yiğit (2017), Keleş (2019), Yıldırım and Gültekin (2017), Yiğit (2015) stated in their studies that the REACT strategy is effective in ensuring the retention of academic achievement.

The fact that the strategy is cyclical and that the students experience the subjects to be taught in a practice-oriented way and that they know how to use the knowledge they learn in real life may have led to higher retention scores of the experimental group students. In addition, the lower mean scores of the control group students may have been caused by the insufficient examples given in the textbook, and also by the fact that those examples were far away from students' lives and do not allow flexible use of time, and that the questions at the end of the subject did not encourage students to think, and the homework was not allowed to be done in groups.

At the end of the experimental study, it was also found out that that the average scores of the experimental group students obtained from the dimensions of liking, interest and wishing in the overall scale and sub-dimensions of the attitude test for social studies course showed a statistically significant increase. This result can be explained by the fact that the REACT strategy actively involves the student in the course, allows collaboration, establishes a connection between daily life and the subjects learned in the classroom, allows the transfer of the acquired knowledge and motivates the student. Upon examining the literature, Aktaş (2013) and Ingram (2003) stated that the REACT strategy positively differentiated student attitudes. In addition, Aktaş (2013), Coştu (2009), Demircioğlu ve diğerleri (2012), Genç et al. (2017), Gül et al. (2017), Karslı and Yiğit (2016), Keskin (2017), Kumaş (2015), Saka (2011), Satriani and Emilia (2012), Tütüncü (2016), Utami et al. (2016), Yıldırım (2015), Yıldırım and Gültekin (2017), stated on the other hand that the REACT strategy makes the courses more fun, increases student motivation, and students are more eager in courses.

As a result of the study in which preservice teachers consulted, Karamustafaoğlu and Tutar (2020) stated that the use of REACT strategy in some units is time consuming and difficult. However, he also stated that it is necessary to apply REACT strategy in order to establish a link between daily life and course subjects, to make the student active and to contribute to his motivation. However, Cahyaningrum and Febriana (2019), Demircioğlu, Aşık et al. (2019), Erdoğan Karaş and Gül (2019), Gül (2016) stated that the REACT strategy did not provide a significant change in terms of attitude towards the course. In the control group, it was observed that the social studies textbook activities did not cause a significant difference in the overall scale and the subscales of liking, interest, wishing and trust. However, in the benefit sub-dimension of the scale, it was determined that the students got statistically significantly less scores in the posttest compared to the pretest. When the benefit subscale is examined, it is observed that there are some expressions regarding the application of the learned information in daily life. Since the students do not know how to transfer what they have learned to daily life, they may have found the topics of the social studies course useless. When the textbook is examined, it is observed that there is little or no association between the subject of the course and the student's lives, and there are no clues about how to use the learned things in student lives.

The fact that the strategy encourages cooperation and group work, and especially the use of alternative assessment activities, enabled more interaction between student-teacher, student-student during the courses than the control group. The games played in the course and experts especially helped the course not to be uniform. In addition, students were informed about the reason of learning the subject and what kind of function it will have in their daily lives. All of these may have provided a positive change in the student's attitudes towards the course. However, the presentation of the subject

in the textbook activities and then the inclusion of evaluation questions may have reduced the student's sense of curiosity, and this may have affected their attitudes towards the course.

Upon evaluating the findings obtained within the scope of the study in general, it can be stated that the REACT strategy has a more positive effect on student achievement and attitude towards the course compared to the social studies textbook. Using the REACT strategy for the first time in an experimental study in social studies course and giving effect size scores are important for the literature and constitute the strengths of this study. This research also has some limitations. First of all, the research is limited to the subjects and learning outcomes in the 5th grade "People, Places and Environments" unit. In addition, although the REACT strategy steps can also be applied cyclically, it was applied by considering the order in the name of the strategy within the scope of this research.

### **Suggestions**

The following suggestions are presented in line with the situations experienced in the study and the results obtained;

The contexts used within the scope of the REACT strategy should be paid attention to make the subject more understandable and familiar to the student, and examples or materials that will make the subject more complex or distract the student from the content of the subject should not be used as a context.

In the learning environment, it is necessary to make a statement about a subject that students have encountered for the first time. Particular attention should be paid to the fact that explanations made at the experience stage of the strategy do not directly convey information and do not cause the students to lose the curiosity.

It would be beneficial to set a time limitation in the cooperation phase of the strategy. In addition, it was observed that while applying the strategy, the suitability of the strategy for cooperation at every step enabled to conduct activities with the group, peer solidarity and students to learn from each other, it also positively changed the atmosphere of the classroom.

It is not possible to cover the subjects that are included in the units as a whole in one or a few courses. For this reason, it will be useful to operate / use the association phase in order to remember the subject and context at the beginning of the course on subjects that need to be continued on another day. The cyclical nature of the REACT strategy allows this.

The transfer stage can be carried out inside and outside the classroom. However, this stage is the key step of the strategy. The student should be monitored to adapt and transfer the knowledge he / she has learned to a new situation on his / her own, and from time to time, the student should be supported without breaking the sense of success through hints. At this stage, it will be especially useful for the teacher to express that he / she is open to all ideas and to create a free classroom environment.

For the next studies;

Effect size scores are not included in most of the studies in the literature. In order to better understand the effect of the REACT strategy, it may be useful to offer effect size scores in future studies.

The effect of the REACT strategy outside the classroom can also be examined. In addition, it is thought that it will be beneficial to work with other data collection tools at different sample groups and grade levels, and to prepare different course plans and make them available to teachers.

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