

THE EFFECT OF USING CARTOONS ON PRIMARY SCHOOL STUDENTS' ACADEMIC ACHIEVEMENT IN SOCIAL STUDIES COURSES IN TURKEY: A META ANALYSIS STUDY

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ABSTRACT

The main purpose of this study is to investigate the effect of using cartoons on primary school students' academic achievement in social studies courses in Turkey. We preferred to conduct meta-analysis instead of traditional literature review. In accordance with the purpose of the study, we analyzed experimental research such as articles, dissertations, and papers which were obtained from Web of Science, ERIC, Scopus, Proquest, Ebscohost, Google Scholar, The Turkish Council of Higher Education Thesis Center, and Dergipark databases. We used ["cartoon" OR "comic" OR "caricature" AND "social studies"] search code in order to reach convenient publications. As a result of the literature review by using search code, 25 publications that were conducted as experimental studies between 2006 and 2020, were listed. 9 publications were eliminated since they had non-parametric values in normality tests and have no standard deviation values of control and experimental group posttests. Moreover, publications that have no achievement test were eliminated as well. Finally, 16 studies were included. We used R software to analyze the data. Cohen's *d*, Hedge's *g* values, and sampling variances of all publications were calculated. Heterogeneity and publication bias of studies were also checked before proceeding to the main analysis. The random-effects model was performed to calculate the overall effect size. As a result of the analysis, a large effect size was found. In other words, using cartoons has a large effect on primary school students' academic achievement in social studies courses in Turkey.

Keywords: *Social studies, cartoons, meta-analysis, academic achievement.*

Introduction

Cartoons are very effective educational materials that include a combination of visuals, text, pictures, and speech bubbles. They could make the teaching-learning process fun, activate students' interest and curiosity about the topic of the lesson, and develop students' critical thinking skills

(Daryanto, 2013; Dougherty, 2002; Haugaard, 1973; Hutchinson, 1949; Koenke, 1981; Megawati & Anugerahwati, 2012; Parker, 2014; Sones, 1944).

Cartoons are very enjoyable materials not only for children but also for adolescents. (Indra et al., 2019). While individuals interact with cartoons by reading or looking, it is expected that they actively participate in the process and establish a relationship with them (Rota & Izquierdo, 2003). In this case, an effective communication could be established between individuals and the cartoons. So, cartoons enable the effective cognitive learning process as well.

Cartoons are very effective educational material that can also enhance academic achievement (Haugaard, 1973; Koenke, 1981; Megawati & Anugerahwati, 2012; Sones, 1944). The results of studies revealed that students' academic achievements increase when teachers use cartoons as educational materials in their courses (Brocka, 1979; Hutchinson, 1949; Sones, 1944).

Well-known scholars in educational sciences also called attention to the importance of educational materials that include different kinds of elements. For instance, Gardner (2006) emphasized the effect of the use of content that appeals to different senses and intelligence on the learning process in the theory of multiple intelligences. Besides, Vygotsky (1980) explained that appropriate educational materials should be used in order to explore and construct knowledge. Regarding these statements, cartoons could be counted as one of the effective materials for teachers.

Considering the nature of cartoons, they could easily use many courses in different grades. Social studies course is one of the convenient courses where teachers can effectively use cartoons as educational material. Because cartoons focus on real-life situations and establish connections between real life and the classroom which serve the main objectives of the social studies course. Students learn much information about social life in social studies courses and cartoons present real-life situations by exaggerating. If they can be used appropriately, students can have fun while they learn information related to real life in social studies courses (Parker, 2014). Consequently, cartoons could help social studies teachers to make lessons effective and increase students' academic achievements.

It should be noted that while cartoons have many advantages, they also have some limitations. For instance, cartoons are very responsive to current and controversial issues. In this regard, social studies teachers should consider this aspect of the cartoons. Moreover, cartoons could also be too responsive to the culture. While a cartoon could be used without any problem in one culture, the same cartoon could not be easily used in another culture because of the politics and dynamics. For this reason,

we only focused on the studies that were conducted about the effect of cartoons in social studies courses in Turkey.

In the literature review, we found many studies that examined the effect of using cartoons in social studies courses on academic achievement in Turkey (see appendix 1). Based on the literature review, we wonder about the overall effect of using cartoons on students' academic achievement in social studies courses in Turkey. From this point of view, we aimed to investigate the overall effect size of the studies conducted in Turkey about the effect of using cartoons on academic achievement in social studies courses. It is expected that this study will contribute to the literature by proving the effect of using cartoons on students' academic achievement in social studies courses in Turkey through evaluating all studies' results.

Method

Meta-analysis was employed to investigate the effect of using cartoons on primary school students' academic achievement in social studies courses in Turkey.

Data Collection

A total of eight databases were consulted including Web of Science, Scopus, ERIC, Ebscohost, Proquest, Google Scholar, National Thesis Center of Higher Education Council, and Dergipark Academy in the study. ["cartoon" OR "comic" OR "caricature" AND "social studies"] search code was performed in order to obtain convenient publications.

The following inclusion criteria were used in the study:

- 1) Studies must have been conducted by experimental designs
- 2) Studies must have one control and one experiment group
- 3) Studies must include achievement test
- 4) Studies must be conducted in the social studies course
- 5) Studies must be conducted in Turkey.

Research that was obtained from the literature review in the light of these criteria is presented Table 1.

As shown in Table 1, 17 research were obtained from at the end of the literature review. However, when the methods and findings of the studies were examined, it was decided to exclude the research carried out by Marangoz (2019) because it was seen that it had some statistical errors and inconsistencies. As a result, the findings of 16 research were analyzed in the study. 7 of these researches are research articles, 1 of them is conference paper, 6 of them are master's thesis and 2 of them are doctoral thesis.

Table 1. Publications

Type	Author(s)	Year	Name
P.hD. Dissertation	Oruç	2006	Humor in Social Studies Teaching
Article	Aksoy et al.	2010	The Effect Of Cartoon Using On Students' Academic Achievements in Social Studies Teaching
M.A. Dissertation	Yarar	2010	The Using of Learning Objects Prepared in Flash Program and Supported by the Concept Cartoons in Social Studies
Conference Paper	Oruç and Teymuroğlu	2011	The Effects of Using Cartoon in Teaching Social Sciences on Attitudes of Students Against to Social Science Course
M.A. Dissertation	Baba	2012	The Effect of the Use of Concept Cartoons in Gaining of Citizenship Consciousness of Primary School Students
Article	Karakuş et al.	2012	The Effect of the Use of Cartoons on Students' Academic Achievement in "Environmental Problems" Issues in Social Sciences Curriculum
P.hD. Dissertation	Koçoğlu	2012	6th Grade Social Studies Lessons According to Criteria Evaluation of The Use of Cartoon
Article	Tokcan and Alkan	2013	The Effect of the Concept Cartoons to the Students of the Social Studies Teaching
Article	Eker and Karadeniz	2014	The Effects of Educational Practice with Cartoons on Learning Outcomes
M.A. Dissertation	Şentürk	2014	The Effect of the Caricature in the Books of Social Sciences on Teaching Target Concepts and Student Attitude
Article	Sidekli et al.	2014	An Alternative Method in Social Studies Education: Cartoon
Article	Topcubaşı and Polat	2014	The Effect of Concept Cartoons on Student Achievement in Social Science Teaching
Article	Akbaş and Toros	2016	The Effects of Using Interactive Cartoons and Concept Maps on Academic Achievement in Social Studies Teaching
Article	Çakır and Aydoğdu	2016	The Effect of Teaching the Topic of Environment Problems by Using Caricature on Students' Academic Success and Attitude Towards Environment
M.A. Dissertation	Balcı	2018	Use of Concept Cartoons in The Unit of "Living Democracy" at Social Studies Lesson
M.A. Dissertation	Marangoz*	2019	The Use of Cartoons in Social Studies Determining the Effect of 6th Grade Students on Success
M.A. Dissertation	Ada	2020	The Effect of the Use of Concept Cartoon in the Production, Distribution and Consumption Learning Success of the 4th Grade Social Studies Course

Note: * Since it has errors and inconsistencies in the quantitative findings, this study was excluded from the research

The literature review was conducted by both authors separately. At the end of the literature reviews, authors compared publications that they obtained from the database for the inter-coder reliability. As a result, the inter-coder reliability was found .86. In other words, 86% of studies that were obtained by two authors were the same. Different studies were discussed in terms of inclusion and exclusion criteria.

Data analysis

R Mavis software was performed in the analysis of the study. At the end of the literature review, Cohen's d values of all 16 studies were calculated. Cohen's d values and sample sizes of experiment and control groups were incorporated into the R Mavis software in order to calculate Hedge's g values of the studies. In addition, the heterogeneity of the studies was examined to decide the model for the analysis obtained data in the study. Meta-analyses were interpreted according to Cohen's d values (Cohen, 1988). For this purpose, the heterogeneity test was performed and the results are presented in Table 2.

Table 2. Test for Heterogeneity

Q^*	p
112.4033	< .0001

Note: $df = 15$

As it is shown in Table 2, the result of the test for heterogeneity was found significant. In this case, it is suggested to perform a random-effects model in order to calculate the overall effect size (Berlin et al., 1989; Shadish & Haddock, 1994). Based on this information, it was decided to perform a random-effects model in the study.

Before proceeding to the main analyses, possible publication bias was also checked. We used several methods to evaluate publication bias. Firstly, the funnel plot was examined. The funnel plot is presented in Figure 1.

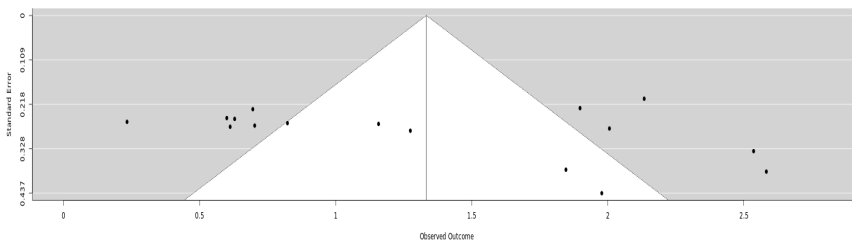


Figure 1. Funnel plot

When Figure 1 is examined, it is seen that the studies are distributed close to symmetry. Test for funnel plot asymmetry results was also examined in order to make a better decision regarding publication bias. The results of the test for Funnel Plot Asymmetry are presented in Table 3.

Table 3. Test for Funnel Plot Asymmetry

<i>t</i>	<i>df</i>	<i>p</i>
0.9585	14	0.3541*

Note: No publication bias if $p > .05$

Table 3 shows that the result of the test for Funnel plot asymmetry was not found significant ($p = 0.451$). In other words, it was revealed that research included in this study was not distributed asymmetrically. In addition, we also examined the value of Fail-Safe N calculation using Rosenthal Approach. Rosenthal (1979) suggests that fail-safe N value should be higher than $5k + 10$. In this research Fail-Safe N value was calculated as 2079 which is higher than Rosenthal's formula. Based on all these results, it was concluded that there is no publication bias in the study.

Results

16 of the results of studies were analyzed in the scope of the research. The sample sizes of the control and experimental groups, Cohen's *d*, hedge's *g* and sampling variances of the studies are presented in Table 4.

Table 4. Information About Control and Experiment Groups Populations, Effect Sizes and Sampling Variances of The Publications

Publications	<i>N1</i>	<i>N2</i>	Cohen's <i>d</i>	<i>ES</i>	<i>SV</i>
Oruç (2006)	30	30	1.2911	1.274	0.080
Aksoy et al. (2010)	35	31	1.1712	1.157	0.071
Yarar (2010)	30	29	0.2361	0.233	0.068
Oruç and Teymuroglu (2011)	29	29	0.7117	0.702	0.073
Baba (2012)	31	31	0.8331	0.823	0.070
Karakuş et al. (2012)	13	19	2.0290	1.978	0.191
Koçoğlu (2012)	75	75	2.1447	2.134	0.042
Tokcan and Alkan (2013)	40	38	2.0261	2.006	0.077
Eker and Karadeniz (2014)	28	28	0.6207	0.612	0.075
Şentürk (2014)	54	58	1.9110	1.898	0.052

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Publications	N1	N2	Cohen's d	ES	SV
Sidekli et al. (2014)	32	33	0.6361	0.628	0.065
Topçubaşı and Polat (2014)	34	31	2.5666	2.536	0.111
Akbas and Toros (2016)	24	25	0.6068	0.597	0.085
Çakır and Aydoğdu (2016)	18	22	1.8836	1.846	0.144
Balcı (2018)	27	23	2.6239	2.583	0.147
Ada (2020)	40	40	0.7020	0.695	0.053

Note: * N1 = Control Group Population, N2 = Experiment Group Population, ES = Hedge's g, SV= Sampling Variance

As seen in Table 4, the study conducted by Koçoğlu (2012) has the largest sample size and the study conducted by Karakuş et al. (2012) has the least number of sample sizes among the studies. Furthermore, the lowest and highest Hedge's g values are found respectively 0.233 and 2.583.

As noted above, a random effects model was performed in order to calculate overall effect size. The result of the random effects model is presented in Table 5.

Table 5. Random Effects Model Result

Estimate	se	z	p	%95 Confidence Interval	
				Lower limit	Upper limit
1.3346	0.1912	6.9790	<.0001	0.9598	1.7095

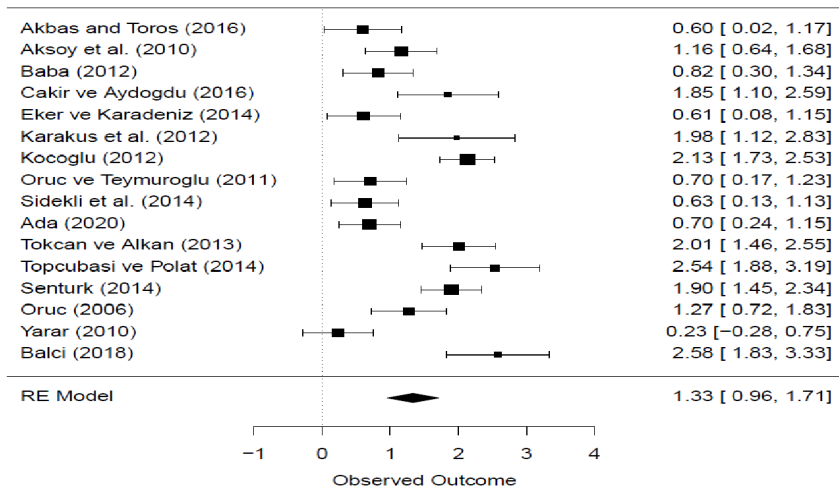


Figure 2. Forest Plot

As shown in Table 5, overall effect size value was calculated as 1.3346 and it was found significant ($se = 0.1912, p < .0001$). In other words, the results of the analysis reveal that using cartoons has a high positive impact on students' academic achievement. In addition, the forest plot of the study was also examined. Forest plot about the results of the study is shown in Figure 2.

As it is seen in Figure 2, the overall effect size which was obtained by the random effects model was calculated as 1.33. Moreover the lower limit of the overall effect size was calculated 0.959 and, the upper limit of the overall effect size was calculated 1.709 as a result of the study as shown in Table 5 and Figure 2.

Discussion

This study focuses on studies examining the effect of using cartoons in Social Studies courses on academic achievement in the literature in Turkey. By using the meta-analysis method, the overall effect size of these studies was calculated and tried to prove whether cartoons are effective on students' academic achievement in social studies courses as stated in related studies. In this respect, results of the study are quite important not only for the national literature, but also for the international literature.

The effect sizes of 16 different studies examined within the scope of the study were calculated and the overall effect size was determined by using the meta-analysis method. The studies which examined via meta-analysis reveal that the use of cartoons in Social Studies courses has a large overall effect (Cohen, 1988) on students' academic achievement. It is known that the education given in the primary school years is effective to raise awareness about social issues. It has been determined that when the Social Studies course is taught by the teacher with the traditional method, it causes demotivation about learning for the students (Indra et al., 2019).

Cartoons arouse curiosity in students, increase the interest in the lesson with their visual content, enrich their imagination, and create a feeling of comfort in students due to their humorous content (Beard & Wolf, 2001). As it was emphasized, effective learning occurs when the learning atmosphere is fun and interesting (Angkowo & Kosasih, 2007; Indra et al., 2019). As students' interest in the lesson is ensured, it is easier for students to adopt the materials used. In this context, cartoons could contribute to the formation of a positive learning climate in the classroom, as they are both an interesting and entertaining tool. Daryanto (2013) emphasized the similar contribution by stating that cartoons are effective in attracting students' attention and providing positive learning outcomes. Social studies courses should not only be theoretical; but also entertaining and supported

with visuals. In order to provide effective learning and teaching, it is necessary to use this kind of materials in the lessons (Topkaya, 2016). It is likely that teachers' use of cartoons and similar materials in the lessons will increase the success in the lessons. As a matter of fact, among the related studies, Sones (1944) and Brocka (1979) concluded in their studies that the use of cartoons has a positive effect on academic achievement.

Based on the results of the study, the following suggestions could be stated:

- All of the studies examined were carried out in an experimental design. It is suggested that researchers design different studies on this subject by using mixed and qualitative designs.
- For the effective use of cartoons in lessons, it is recommended that practitioners include this material in books and materials.
- The use of cartoons should be included more in the content of the textbooks offered to students by the Ministry of National Education in Turkey.
- Teachers should be informed about the benefits of using cartoons.
- By taking the results of this study as a reference, researchers can examine the relationship between the use of cartoons in Social Studies courses and different variables in developing teaching materials.

One of the limitations of this study is that it only deals with studies in Turkey. Since the Social Studies course is a discipline that differs from culture to culture, studies specific to this country have been examined in line with the research purpose. In this regard, it is recommended that researchers make comparisons between countries. In addition, considering only the studies on the use of cartoons in the Social Studies course is another limitation. In the future, it is recommended that researchers examine the effects of the use of cartoons on academic achievement in different disciplines. Since the use of cartoons has gained importance in recent years, it was determined that the studies examined were limited between 2006 and 2020. Maybe studies examining the effects of using cartoons in Social Studies courses in different countries can take us back to the past.

Conclusions

In this study, a meta-analysis method was used to calculate overall effect size of the findings obtained in studies examining the effect of using cartoons in social studies courses on academic achievement. Based on the findings and discussion, it was concluded that cartoons can be used as an alternative teaching material in Social Studies courses. The use of cartoons is an alternative educational tool in which different senses such as hearing,

seeing and watching are used. In recent years, among the active learning methods, cartoons have also found a wide place. Due to its structure, Social Studies is a primary education course that provides learning by reading and seeing as well as listening, and gathers different fields of science such as history, geography and citizenship under a single roof. Increasing academic success in these courses is as important as success in other courses. Since humans are the source of the Social Studies course, it is a discipline in which students gain necessary knowledge in social development, distinguishing sociological differences, recognizing nature and the environment, and using resources effectively.

As a result of the examination of 16 studies in this study, it was determined that there was a moderate effect between the use of cartoons and academic achievement. According to this result, the use of cartoons by teachers in Social Studies course is important. Academic success can be increased by giving in-service training to Social Studies teachers about the importance of using cartoons. Informative studies can be conducted on the usefulness of cartoons for students. Experimental studies can be designed to examine different alternative assessment tools that are thought to have an impact on academic achievement in the Social Studies course.

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Appendix 1. Studies Examined Through Meta-Analysis

- Ada, S. (2020). *The effect of the use of concept cartoon in the production, distribution and consumption learning success of the 4th grade social studies course [4. sınıf sosyal bilgiler dersi üretim, dağıtım ve tüketim öğrenme alanında kavram karikatürü kullanımının ders başarısına etkisi]* (Master's thesis). Düzce University.
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