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THE EFFECTS OF USING EDUCATIONAL COMICS ON STUDENTS' COGNITIVE AND AFFECTIVE LEARNING IN SOCIAL STUDIES COURSE IN DISTANCE EDUCATION [1]

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Abstract

The aim of this study is to reveal the effects of using educational comics on students' academic achievements, democratic attitudes, knowledge retention and students' experiences about the teaching materials in the 6th grade social studies course "Participating in Administration" learning area. The research was carried out with mixed methods research and embedded design was used in the study. Mixed methods is a research approach whereby researchers collect both quantitative and qualitative data within the same study to understand research problems and integrate two data sets. Using the advantages of combining these two data sets, researchers draw conclusion on the strengths of these methods. Mixed methods research is used in the behavioural, health, and social sciences. The basic assumption of this approach is that it is more advantageous for the researcher to combine statistical trends (quantitative data) with personal experiences (qualitative data) than to use either of these methods alone to better understand the research problem. In an embedded design, both qualitative and quantitative data are collected at the same time, but one type of data, either qualitative or quantitative, is secondary to the other. Considering the findings obtained as a result of the analyses, it was found that there was a significant difference between the mean scores of experimental group students taught with educational comics and control group students in terms of academic achievement, democratic attitudes, and knowledge retention. According to the findings obtained from the interviews, it was revealed that students were pleased with the use of educational comics in online environments via distant learning and they evaluated these teaching materials as informative, entertaining, and attention grabbing. It was concluded that educational comics used in social studies course in distant education had positive effects on students' academic achievements, democratic attitudes, and knowledge retention and the students found these teaching materials used in distant learning effective and positive.

Keywords: Distant (online) education, comics, social studies, covid-19 pandemic

[1] This paper was written from the doctoral thesis.

Introduction

Coronavirus-2019 (COVID-19), which first broke out in China in December 2019, had a big impact in the whole world in a short time and it was declared as a pandemic by the World Health Organization (WHO, 2020). Globally, as in Turkey, the COVID-19 pandemic has affected the education system in many countries and caused some mandatory changes in the way education is implemented, and in this context, countries have replaced traditional face-to-face education with distance education in response to pandemic (Al Lily, Ismail, Abunasser, & Alqahtani, 2020).

Distance education has many benefits such as increasing the opportunities for education and training and contributing to equality of opportunity in education, providing equal access to education and training activities to more people in different geographical locations in time, increasing flexibility in education and training environments and methods, reducing teaching costs considerably, and accelerating the distribution of instructional materials. However, because students are not physically present in a traditional educational setting such as a classroom in online distant learning, they find it hard to get motivated to study even if they are eager to learn. In addition, as not every topic and lesson content are suitable to teach in an online learning environment, the success rate that students can attain from these courses can reduce (Krasnova and Polushkina, 2021).

Thus, modern and up-to-date teaching materials are used as much as possible to better understand what is taught in teaching and learning activities, to ensure a high level of interest, enthusiasm and attention in order to trigger the desire to learn, and to make use of the information learned in daily life (Jung, 2011). One of these modern instructional materials is undoubtedly educational comics. It is considered that comic strips which present text and image together will provide a high level of success when used as a teaching material in the education and teaching processes. Comics, which include necessary qualities for students to participate effectively in the education and teaching process, also contain both literary and artistic features. Hence, while reading comics, students establish a connection between literature and art and are engaged in the education and teaching processes fully and actively (Rota and Izquierdo, 2003). Exploring the studies in this field, it is seen that educational comics are mostly implemented in the classrooms where traditional face-to-face education is carried out. However, the implementation of educational comics is carried out via distance education in this study. No study has been found in our country which examined the effects of using educational comics in

social studies course through distance education. Therefore, it is considered that this study is important in terms of making contribution to the relevant literature and opening a new door to the studies on the use of educational comics or similar materials for the future distance education research.

The purpose of the study is to examine the effects of using educational comics in social studies course in distance education on students' cognitive and affective learning. In line with the main purpose of the research, four different sub-objectives were formed. During the teaching of learning field "Participating in Administratio" included in the 6th grade social studies course, the following sub-objectives were specified below:

1. To explore the effects of using educational comics on students' academic achievements
2. To explore the effects of using educational comics on students' retention of knowledge
3. To explore the effects of using educational comics on students' democratic perceptions
4. To explore students' views towards educational comics

Literature Review

Distance Education

A variety of studies have been carried out about distance education in the world. Specifically, during the Covid-19 pandemic, the number of these studies increased due to transitioning to mandatory online learning. In one of the studies carried out by Nasser and Abouchedid (2010) in which distance education method was used during the education process, it was revealed that school directors had negative attitudes towards meeting teachers' distance education needs. It was emphasized in the study conducted by Kebritchi, Lipschuetz and Santiague (2017) that higher education institutions should provide professional development for instructors, training for students and technical support for content development to overcome the challenges of web-based education. In the study conducted by Radu, Schnakovszky, Herghelegiu, Ciubotariu, and Cristea (2020), most of the participants stated that they were satisfied with the measures taken by the university during the pandemic period, while some participants reported some negative aspects. In the study carried out by by Hermida, (2020), it was statistically observed that most of the participants preferred face-to-face education, the rate of using learning technologies and

their ability to use these technologies increased with distance education, they experienced ease of access to technological tools and thus this increased time efficiency. In the study conducted by Hussein, Daoud, Alrabaiah, and Badawi (2020), the participants stated that distance education saved time and cost, they felt safe in terms of their health, and had the opportunity to improve their technology usage skills. However, the participants stated that they had trouble concentrating in synchronous online learning, they experienced loss of motivation, there was an increase in homework load, they had problems with internet access, and they could not get enough support from their peers and instructors. In the study conducted by Marek, Chew, and Wu (2021), it was determined that most of the teachers participating in the study reported that they had been overwhelmed with more stress and workload during online education when compared to face-to-face education. Belcheir and Cucek (2022) conducted a study exploring students' perceptions of distance education. Their findings indicate that distance education has a positive place in student perceptions due to its time and space flexibility, but distance education takes more time and learning errors occur more frequently compared to formal education. Considering the results of the studies carried out in general, it was determined that both students and teachers had usually negative attitudes towards distance education. In this study, in order to eliminate the negative impacts of distance education on students during the Covid-19 pandemic process, entertaining teaching materials such as educational comics are presented to students through distance education especially in the social studies course in the unit of 'Participation in the Administration', which consists of abstract subjects, and thus more fun and engaging classes freed students from boredom; therefore, this once again reveals the importance of the study.

Educational Comics

When both international and national studies carried out about educational comics were examined, it was revealed that comics was generally used as a teaching material and the effects of these materials on the relevant course were explored. It was observed that most of these studies were conducted in the classroom settings in which traditional face-to-face education was carried out. The study carried out by Lehenbauer, Kothgassner, Kryspin-Exner and Stetina (2013) revealed that the experimental group's social relationships improved, and their social phobias reduced. In the study carried out by Spiegel, McQuillan, Halpin, Matuk, and Diamond (2013), it was found that the use of comics increased students' interest and motivation in science courses. The study conducted by Ishikura (2013) indicated that using comics in language

learning increased students' interest and motivation in the course. In the study conducted by Richter, Rendings, and Maminirina (2015), it was discovered that comic strips are effective in increasing environmental knowledge and the experimental group students were more successful than the students in the control group. Lin, Lin, Lee and Yore (2015) conducted a study which revealed that comics increased students' sense of curiosity. Lin and Lin (2016) in their study found that comic books did not make a significant difference in achievement levels when compared to science booklets. In the study conducted by Miranda, Salazar, and Larens (2018), it was determined that using educational comics as an instructional material had positive effects on academic achievement. It was seen that most of these studies were carried out in traditional classroom settings where face-to-face teaching was conducted. Comics were used in online environments in only two studies in the world.

Methodology

Research Method

Mixed methods research design was used in the study. This study adopted embedded design, one of the mixed methods research designs. Mixed methods is a research approach in which the researcher blends and integrates qualitative and quantitative data after obtaining them. The fundamental philosophy of this approach is to provide a better understanding of the research results by collecting multidimensional data for the solution of the problem that the researcher wants to solve. Mixed methods research, grounded in pragmatism, will eliminate the disadvantages of data obtained only by quantitative or qualitative methods because the data will not be obtained from a single data set standing alone but from multiple data sets. The embedded design where either qualitative or quantitative data set plays a supportive role in a study mainly based on one of the data types is used in this research (Creswell, Plano, & Clark, 2007). In this study, mixed methods research was preferred because a single data set was not enough, and the data obtained quantitatively needed to be explained (Creswell & Creswel 2017).

The Study Group/Participants

In this section of the study, firstly the school where the experimental study is going to be carried out was determined. While selecting the school, typical case sampling, one of the purposive

sampling methods, was used. According to Frankel and Wallen (2006), process and in-depth analysis stand out in purposive sampling methods. In-depth analysis carried out in a restricted period of time which was determined considering the purpose and sub-objectives plays an important role in both exploration and explanation of phenomena and events durum during the research process. A typical case sampling is composed by identifying and including a phenomenon or trend among what is considered as typical or average for its exploration and explanation restricted period of time (McMillan, 2004).

Miller (2002) suggests that the opinions of representative individuals and institutions should be received during the process of selecting typical situations. In line with this recommendation, first, the authorised persons working in the District Directorate of National Education located in the town where the study was carried out were interviewed and information about the levels of schools in the district according to the LGS (High-school Entrance Exam) was obtained. Then, a few schools with an average performance in the relevant exam were selected among these schools.

After that, the administrators working in the District Directorate of National Education and directors and teachers at the schools included in the study were interviewed. As a result of the interviews carried out by the school directors and teachers, a school that has the following characteristics was determined: being close to the city average in terms of student ratios and having families with medium socio-economic status and education levels.

Convenience sampling was used to choose two classes in which the gender ratio within the class and between the classes is normal and the number of people is the same. Since the convenience sampling is an economic method that minimises the loss of labour force, time and money, the experimental and control groups were formed randomly after the classes were selected. According to McMillan, (2000), if each sampling unit of population, either individuals or objects, has an equal chance of being included in the sample in terms of similarities and differences, random sampling method is used.

Data Collection Tools

Academic Achievement Test (ACT), Demographic Perception Scale (DPS) and Retention Test were used for the collection of quantitative data in the study. Considering the qualitative data,

focus group interviews and semi-structured interview form were administered as data collection tools.

Academic Achievement Test (ACT)

With the achievement test developed in line with the purpose and sub-objectives of the research, the two features, subject of measurement, were tested on the study groups. The first feature tested is to determine the experimental and control group students' levels of knowledge about the unit before the implementation stage and the second is to measure the effectiveness of the experimental studies applied by evaluating the students' achievements in the experimental and control groups after the implementation stage.

During the process of developing the Academic Achievement Test, firstly, the learning outcomes of the unit were listed and the national exam questions from the previous years, elementary school 6th grade Social Studies textbooks, High School Entrance Exam (LGS) preparation books and leaf tests were examined to choose the appropriate questions. In the last stage, in order to ensure the content validity, the specification table of the learning area of the course was prepared. The resources related to the field were analysed and 34-item multiple-choice test with four options were developed. To determine the content validity of the achievement test, the opinions of three social studies teachers and 3 field experts with at least five years of experience in the field were consulted. Considering the expert opinions, necessary corrections were made on the questions and the test was administered to 80 7^{th} grade students who have taken the course before to measure the reliability of the test. The correct answers were coded as 1, the wrong and blank answers were coded as 0 in the Academic Achievement Test (ACT) and the item analysis of these 34 items in the test were carried out with SPSS 20.0 statistical program. Considering the table of learning outcomes and removing 14 questions with discrimination index (r) less than 0.2, the test consisting of 20 multiple choice questions was finalized. The reliability coefficient of the test was found to be (KR-20) 0,76. Miles and Huberman (1994) state that if the aim of the research is to compare two groups in terms of the qualitative measurement, the reliability coefficient r= 0.70 or even 0.60 can be considered normal. Thus, the reliability level of the achievement test used in the study is high. Item difficulty indices ranged between 0.28 and 0.74. The mean difficulty index was found to be 0,47. The test was scored by giving 5 points for each correct answer and 0 points for wrong or blank answers.

The test used to measure academic achievement was also administered to measure the retention of knowledge four weeks after the post-test.

Democratic Perception Scale (DPS)

The democratic perception scale, which was administered to the experimental and control groups as pre-test-post-test, was developed by Topkaya (2014). In order to determine the reliability of the democratic perception scale, Cronbach Alpha Coefficient, test-retest, and split-half methods were used. The internal consistency coefficient of the scale was 0.96 and the split-half reliability coefficient was 0.95. The test-retest reliability coefficient determined by using Pearson's product-moment correlation coefficient technique was found to be 0.92. The scale used in the study included 27 items. The maximum and minimum scores the students can get from the scale is 135 and 27, respectively. The items included in the scale are scored as strongly disagree 1, disagree 2, undecided 3, agree 4, and strongly agree 5. There are no reverse scored items in the scale.

Semi-Structured Interview Form

The interview is a data-gathering technique that conducts interviews with the individuals to get their personal viewpoints in the research and enables the use of the data obtained as a result at the end of the research. In accordance with the qualitative tradition which allows participants to explain their own words and to reveal the analysis, the interview provides enough flexibility for the researcher to collect data about the unexpected aspect of the topic (Bogdan & Biklen, 2007).

Some issues should be taken into consideration in the interview form to ensure that the interviews achieve the desired goal. First, the questions included in the interview should be very clear and understandable. The interview questions should be appropriate to the level of readiness and interests of the group or individuals to be interviewed. The questions included in the interview should be arranged in a logical order and one-dimensional or open-ended questions should be preferred. No attempt should be made to lead the interviewee to give the desired answers. However, the researcher should probe and ask alternative questions to the interviewees when they digress from the topic (Patton, 2014).

Semi-structured interview form developed by the researcher was used in the study to determine student views to specify the effect of using educational comics on students in social studies course. This interview form was administered to the students in the experimental group in which comics is used as a course material in the study. In addition, the form consisted of five questions and it was developed benefiting from the literature and related research.

Two experts in the field reviewed the interview questions and as a result of their evaluations, it was concluded that one question must be removed, so there were four questions in the interview. The interview form was revised considering the experts' opinions and then the questions were piloted with three students. The interview was finalized after taking students' opinions about the questions in the pilot study. Before getting in contact with the respondents of the research and presenting the interview questions, executing pilot interviews allow to obtain more effective and correct data because a piloting work carried out before the major study provides an opportunity to allow necessary modifications by testing both the interviewer and the prepared questions in advance (Wolf, 1988; Gay, Mills and Airasian, 2009). In order to ensure the reliability of the data obtained from the interviews, the students' interviews were recorded with a camera to avoid bias and the students' statements are quoted in the findings section.

Development of Teaching Materials

This study explored the effect of using educational comics in social studies course on students' academic achievements, democratic attitudes, and retention of knowledge. For this purpose, firstly, comics related to the unit that was previously taught were developed and administered for a pilot study. Students' opinions were taken about the comics designed after the implementation and negative situations related to the colour, font size, and characters pertaining to comics were identified; these negativities in the comics were eliminated for the major implementation. Then considering the target outcomes and objectives of the relevant learning area, 6 different educational comics were developed for each learning outcome (Appendices-1-2-3-4-5-6). After completing the scenario created for the educational comics, the website http://www.pixton.com was used to combine the visuals and text and then turn them into comics. The scenarios prepared by the researcher were presented to the two lecturers who are experts in the relevant field to review them in terms of language and meaning, and the educational comics were finalized by considering the suggestions and necessary corrections.

While developing the comics, the stages recommended by Topkaya (2016b) were followed. These stages were given below:

1. Developing scenarios suitable for the readiness level of students.
2. Presenting the scenarios to the relevant experts in terms of meaning and grammar and taking their opinions.
3. Visualising and illustrating the scenario after receiving expert opinions.
4. Determining speech bubbles for the heroes to appear in the comics.
5. Piloting the finalised comics.
6. Executing the major implementation.

Implementation

After obtaining the necessary permissions from the institution where the implementation would be carried out, the experimental and control groups were determined. The implementation was carried out online and it lasted a total of 9 weeks and in 27 lesson hours. In the first week, the implementation was introduced. An online academic achievement test and demographic attitude scale were administered as pre-test. The implementation lasted 6 weeks and 18 lesson hours. In the last week, the online academic achievement test and demographic attitude scale were used as post-test and an online semi-structured interview was conducted to determine students' opinions about the implementation. Task plans (Appendix-8) for each learning outcome included in the learning area were designed and then the experimental group was taught 3 hours a week for a total of 6 weeks and 18 hours within the framework of the learning area "Participating in Administration" through educational comics in the online environment, and all lessons were carried out by the social studies teacher and the researcher by following the task plans prepared by the researcher. In the control group, the same learning area was taught online by the social studies teacher considering the constructivist approach and the implementation process was completed.

Data Analysis

This study aimed at examining the effects of using educational comics in social studies course on students' affective learning including democratic perception levels, cognitive learning including levels of knowledge retention, and opinions on educational comics. Considering the quantitative aspect of the study, the one-group pretest-posttest quasi-experimental design was used, and the quantitative data obtained from both control and experimental groups were

analysed statistically with SPSS 22.0 package program. While analysing the data obtained as a result of the research, the significance level between the variables was statistically determined as 0.05. The data analyses conducted in the research were also stated below.

- The dependent samples t-test analysis was performed to determine the effects of the applications on students' academic achievements.
- The independent samples t-test analysis was carried out to determine the students' prior knowledge levels about the subject.
- The independent samples t-test analysis was carried out to compare the effects of implementations on students' academic achievements.
- The dependent samples t-test analysis was performed to determine the effects of educational comics application on knowledge retention.
- The dependent samples t-test analysis was carried out to determine the effects of applications on students' democratic perceptions.
- The independent samples t-test analysis was carried out to determine students' levels of democratic perceptions before the implementation.
- The independent samples t-test analysis was carried out to compare the effects of applications on students' democratic perceptions.
- The Shapiro-Wilk test for normality was carried out to determine whether the data meet the assumption of normality for using parametric tests.
- Content analysis was used to analyse the data obtained from the semi-structured student interviews.

Validity and Reliability

Validity and reliability can be achieved by checking the variables that may negatively affect the internal and external validity of scientific studies. Some of these controlled variables will positively affect the validity of the research (Mcmillan & Schumacher, 2006).

As the participant groups study in secondary schools that are connected to the Ministry of National Education (MoNE), the settings in which the data are gathered have similar structures. The data were collected from all participants with the same data collection tools. During data-gathering, the interaction between the participants in the same environment was prevented as much as possible. In mixed methods research, internal-external validity (the researcher both

acts as an insider and also an outsider with objective point of view), weakness minimization validity (weakness from one approach is compensated by the strengths from the other approach), sequential validity (the sequence in which the researcher carries out qualitative and quantitative designs will not have an effect on the research results), sample integration validity (developing appropriate arguments for quantitative and qualitative sampling) and multiple validity (employing all of the relevant validities of quantitative, qualitative and mixed methods studies) are sought (Christensen, Johnson, & Turner, 2015). In line with this information, some reliability and validity studies carried out within the context of the research were presented below:

Characteristics of the subjects: Experimental and control groups were randomly selected. When the demographic characteristics of the students in the experimental and control groups were analysed, it was seen that the students had similar characteristics.

Subject Loss: Although there were students who could not participate in the implementation during the study, there was no complete loss in the experimental and control groups. Since the number of students in the study group at the beginning and at the end of the study were not the same, the data was obtained from 20 participants, and it was subjected to the analysis process in the study.

Environment: The entire research process, achievement test, democratic attitude scale, interviews and implementations were carried out in an online environment that the students were not quite familiar with. The tests used in the study were designed with electronic forms and then presented to the students. The students and parents were informed that the scores obtained from these tests would be only used as research data. While administering the tests, Information was given to the parents to ensure that students do not cheat during the tests and the students were asked to switch on their cameras when possible. The lessons were held online, and they were recorded. Observations and camera recordings were started 2 weeks before the interventions so that the students could get used to the observer and camera recordings in the classroom environment.

Background of the Subjects: It can be stated that the students in the study groups have similar educational backgrounds since they were subjected to the same programme because the students were educated in schools affiliated to the Ministry of National Education (MoNE).

Development: The implementation process, including the administration of the pre-tests and post-tests, ranged between 27 lesson hours (9 weeks). Retention tests were conducted 4 weeks after the post-tests were administered. During this period, no development other than natural development was observed in the students.

Attitudes of Subjects: Because the implementations in experimental and control groups were completely carried out by the teachers, the students did not encounter a different, new situation.

Application: All implementations carried out in the experimental and control groups in the same region and at the same grade level were conducted by the same teacher. It was observed that teachers treated their students equally in different groups.

Data collection tools: Pre-test, post-test, and retention tests were used as they were prepared at the beginning of the research process. No changes were made throughout the implementation.

Regression: Normal distributions of the data were examined at the beginning of all analyses. It was determined that the data followed characteristics of normal distribution. In this case, it can be stated that randomisation in the experimental and control groups was effective.

Interaction between time and experimental procedures: The experiments were carried out within the given time frame recommended in the MoNe curriculum and did not constitute a special time frame for teachers and students.

Direct quotations: Examples of participant responses that support the research results are cited.

Reflective thinking: During the data collection and analyses, the researchers did not have any expectations and there was not any researcher bias that could negatively affect the results of the research.

Conclusions

Quantitative Findings of the First Research Question

The findings of the first research question, which aims to examine the effect of the methods on cognitive learning including the levels of academic achievement, are presented below.

The results of the dependent samples t-test analysis conducted to determine the effects of the methods implemented in the experimental and control groups on students' academic achievements were presented in Table 1.

Table 1. *The Results of the Dependent Samples t-test Analysis Conducted to Determine the Effects of the Implementations on Students' Academic Achievements*

Group	Measurement	N	X	ss	df	t	p*
Experimental	Pre-test	30	48,83	21,40	29	-5,205	,000
	Post-test	30	76,33	17,90			
Control	Pre-test	30	50,50	21,67	29	-2,528	,017
	Post-test	30	65,00	22,74			

*p<0,05

Considering the findings presented in Table 1, educational comics practices carried out in the experimental group had a significant effect on enhancing students' academic achievements ($t(29)=-5,205$; $p<0,05$; $\eta^2=0,48$). Eta-squared effect size was determined as 0,48. This effect size is classified as large by Cohen (1988). According to this classification, it can be stated that students' academic achievements rose by 48% at the end of the implementation and this is due to the use of educational comics as an instructional material. Likewise, it was observed that the academic achievements of the students in the control group increased as a result of the implementation of traditional teaching method and this increase was found to be at a significant level ($t(29)=-2,528$; $p<0,05$; $\eta^2=0,18$). The eta-squared effect size was found to be 0.18, which is considered large by Cohen (1988). Considering all these, it can be stated that this change that occurs in students' academic performance as a result of the implementation is due to the traditional teaching method.

The results of the independent samples t-test analysis carried out to determine whether there was any difference between the experimental and control group students regarding their prior knowledge of the subject were presented in Table 2.

Table 2. *The Results of the Independent Samples t-test Analysis Conducted to Determine Students' Prior Knowledge of the Subject*

Group	N	X	ss	df	t	p
Experimental	30	48,83	21,40	58	-,300	,765
Control	30	50,50	21,67			

Examining the analysis results in Table 2, there is no significant difference between the experimental and control group students in terms of their prior knowledge levels of the subject before the implementation (t(58)=-,300; p>0,05). Kilmen (2015) interprets the significance [Sig.] value found as a result of the independent samples t-test as follows: If the Sig. value is larger than 0,05 (Sig.>0,05), there is no difference between the means of the two groups, but if the Sig. value is smaller than 0,05 (Sig.<0.05), there is a difference between the means of the two groups.

The results of the independent samples t-test analysis carried out to compare the effects of implementations administered in experimental and control groups on students' academic achievements were presented in Table 3.

Table 3. *The Results of the Independent Samples t-test Analysis Conducted to Compare the Effects of Implementations on Students' Academic Achievements*

Group	N	X	ss	df	t	p*
Experimental	30	76,33	17,90	58	2,145	,036
Control	30	65,00	22,74			

Considering the results of the analysis presented in Table 3, it is seen that the students' academic achievement in the experimental group was significantly higher than the students' academic achievement in the control group(t(58)=2,145; p<0,05; η^2=0,07). The eta-squared effect size was found to be 0,07, which is considered medium by Cohen (1988). Thus, it can be reported that the variability observed by 7% with students' academic achievements is due to the implementation of educational comics tasks.

Quantitative Findings of the Second Research Question

The findings of the second research question aimed to examine the effects on cognitive learning including the levels of knowledge retention and they were presented below.

The results of the dependent samples t-test analysis carried out to determine the effects of educational comics application on knowledge retention were presented in Table 4.

Table 4. *The Results of the Dependent Samples t-test Analysis Conducted to Determine the Effects of Educational Comics Application on Knowledge Retention*

Application	N	X	ss	df	t	p*
Post-test	30	76,33	17,90	29	1,732	,094
Retention	30	67,83	19,42			

According to the analysis results given in Table 4, there is no significant difference between the post-test scores and retention scores of the experimental group students who were exposed to educational comics applications (t(29)=1,732; p>0,05). Thus, it was determined that educational comics practices were effective in increasing knowledge retention.

Quantitative Findings of the Third Research Question

The findings of the third research question which aims to examine the effects of affective learning including the democratic perception levels were presented below.

The dependent samples t-test analysis was carried out to reveal the effects of implementations on students' democratic perceptions in experimental and control groups and the test results were presented in Table 5.

Table 5. *The Results of the Dependent Groups t-test Analysis Conducted to Determine the Effect of Implementations on Students' Democratic Perceptions*

Group	Measurement	N	X	ss	df	t	p*
Experimental	Pre-test	30	92,80	14,260	29	-6,368	,000
	Post-test	30	115,83	12,81			
Control	Pre-test	30	92,17	16,70	29	-3,138	,004
	Post-test	30	106,10	15,22			

Considering the analysis results presented in Table 5, the educational comics implementations carried out in the experimental group had a significant effect on increasing students' democratic perceptions (t(29)=-6,368; p<0,05; η^2=0,58). The eta-squared effects size was found to be 0,58 and this value is classified as ü large by Cohen (1988). Therefore, it was observed that students' democratic perceptions rose by 58% and thus it can be stated that educational comics practices are responsible for this. Similarly, it was determined that traditional teaching practise carried out in the control group was effective in increasing students' democratic perceptions at a significant level (t(29)=-3,138; p<0,05; η^2=0,25). The eta-squared effects size was found 0,25 and this value is classified as large by Cohen (1988). Therefore, it can be stated that due to the traditional teaching implementation, students' democratic perceptions increased by 25%.

The results of the independent samples t-test analysis carried out to determine whether there was a difference between the experimental and control group students' levels of democratic perceptions before the implementation were presented in Table 6.

Table 6. *The Results of the Independent Groups t-test Analysis Conducted to Determine the Students' Levels of Democratic Perceptions*

Group	N	X	ss	df	t	p
Experimental	30	92,80	14,26	58	,158	,875
Control	30	92,17	16,70			

According to the analysis results given in Table 6, there is no significant difference between the experimental and control group students' levels of democratic perceptions before the implementation (t(58)=,158; p>0,05).

The results of the independent samples t-test analysis conducted to compare the effects of the practices in the experimental and control groups on students' democratic perceptions were given in Table 7.

Table 7. *The Results of the Independent Groups t-test Analysis Conducted to Compare the Effect of Implementations on Students' Democratic Perceptions*

Group	N	X	ss	df	t	p*
Experimental	30	115,83	12,81	58	2,679	,010
Control	30	106,10	15,22			

Analysing the results in Table 7, it is seen that the democratic perceptions of the students in experimental group are significantly higher than the control group students' democratic perceptions (t(58)=2,679; p<0,05; η^2=0,11). The eta-squared effects size was found 0,11, which is considered medium by Cohen (1988). Accordingly, it can be stated that the variability observed by 11% with students' democratic perceptions is due to the educational comics tasks.

Whether the assumptions of parametric tests were met by the data were examined. Shapiro-Wilk's test for normality was used to check if a variable follows a normal distribution. The results of the analysis were shown in Table 8.

Table 8. *The Analysis Results of Shapiro-Wilk's Test for Normality*

Test	Measurement	Group	Statistics	df	p
Academic achievement	Pre-test	Experimental	,952	30	,192
		Control	,947	30	,143
	Post-test	Experimental	,934	30	,063
		Control	,940	30	,089
	Retention	Experimental	,956	30	,238
Democratic perception	Pre-test	Experimental	,933	30	,058
		Control	,939	30	,083
	Post-test	Experimental	,950	30	,168
		Control	,915	30	,070

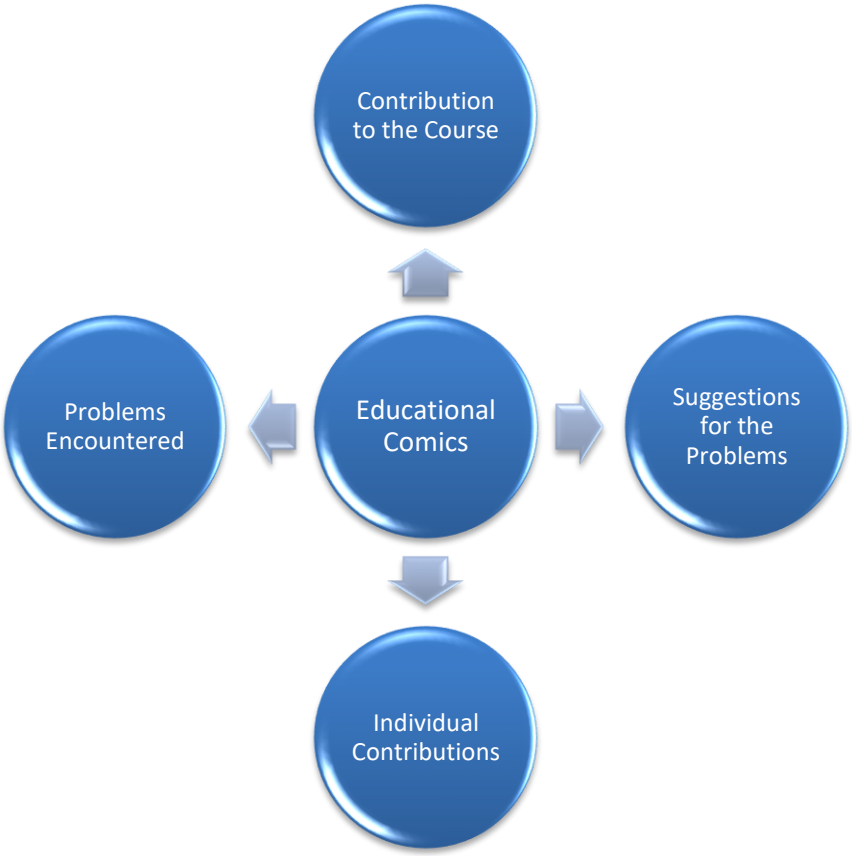
Looking at the results of analysis in Table 8, the data obtained from the academic achievement test and democratic perception scale show normal distribution($p>0,05$). Thus, dependent samples t-test and independent samples t-test, parametric tests, were used to analyse data.

Qualitative Findings of the Fourth Research Question

An interview was performed to determine the students' opinions about the use of educational comics in the experimental group in which they were used as a teaching material in the social studies course. The interview was carried out online, and the students were asked to answer the interview questions. As a result of the interviews executed with focus group interview, the data obtained were analysed via content analysis and in line with the obtained data, some codes were created to categorize the data.

As a result of the interviews carried out with the students in the experimental group in which educational comics were used as an instructional material, the main theme called "The Use of Educational Comics" was composed. Four sub-themes were created including positive views, negative (limited) views, and desire to use it in other courses, and problems encountered and suggestions.

Figure 1. *The Use of Educational Comics*



Findings Related to the Contributions of Using Educational Comics to the Course

The codes related to the sub-theme "Contributions to the Course" obtained from the students' experiences about the use of educational comics as a teaching material in the social studies course were presented in Table 9.

The direct statements taken from the students' opinions that enabled to develop the sub-themes and codes were given below.

Table 9. *Contributions of Using Educational Comics to the Course*

Sub-theme	Codes	Frequency
Contributions to the course	Drawing attention	9
	Making the lesson enjoyable	9
	Creating a desire to participate in the lesson	8
	Making the subject understandable	8
	Facilitating the subject by storytelling	7
	Making the subject gripping	6
	Visualizing the topic	6
	Enhancing comprehensibility by projecting comics on the screen	5
	Using comics also in other courses	5

Students' own statements regarding positive opinions about the educational comic books were cited below:

Student-1: *"...Sir, what attracted my attention is that the topics were like stories. The subjects were quite adventurous. The topics became more permanent in my mind. I attended the lesson more often."*

Student -2: *"...It was as if the topics were taken from the real life. In addition, reading the comics was very easy and fun. It also drew my attention as the comics were very well-organised."*

Student -3:" *... I constantly wanted to attend the lesson, sir. I normally don't like comics, but these comic books drew my attention, and our lesson was great fun."*

Student-4: *"... The lessons were quite boring before and I did not want to attend the lessons, but when I saw the comics, I started to enjoy the lessons more. I was listening attentively, and I constantly attended the lessons."*

Student-5: *"...Sir, well, while listening to the teacher, I was bored because s/he was teaching from the coursebook. But when were used visuals for the lesson, I started to understand the lesson much better. In addition, the stories in the comic books drew my attention. I remembered the topics much better with the visuals. The lessons were fun."*

Student-6: *"... Because everybody could see the comics on their screens, we did not have a problem with reading them. We were not able to see the visuals projected on the interactive whiteboards. We read and understood much better on our screens. We could zoom the pictures on our screens."*

Student -7: *"...Sir, if these comics were also used in other courses, they would be more enjoyable. The lessons are not boring because we both learn and have fun."*

Findings Related to the Individual Contributions of Educational Comics

The codes related to the sub-theme of "Individual Contributions" obtained from the students' experiences about the use of educational comics as a teaching material in the social studies course were given in Table 10. The direct statements taken from the students' opinions that enabled to develop the sub-themes and codes were given below.

Tablo 10. *Individual Contributions of Educational Comics*

Sub-theme	Codes	Frequency
Individual Contributions	Providing motivation	7
	Increasing success	6
	Applying what you learn in daily life	5
	Increasing imagination	5
	Increasing democratic attitude	4

Individual contributions of educational comics were presented below using examples from students' own statements.

Student-1: *"...Thanks to these comics, I understood the subjects that I had difficulty with understanding, and I learned the lesson much better. Sir, I believe that I am more successful."*

Student -2: *"Sir, I started to have a more democratic attitude towards my friends thanks to the lessons carried out with comics. I realised their rights better and that they must be respected."*

Student -3: *"Sir, what I learnt in this course was very useful for me in the private teaching institution. Thanks to the information I have learnt, I can talk about the forms of government of countries while talking to my friends in everyday life."*

Student -4: *"I focused more on the lesson because visuals were used to teach it. This subject was difficult, and I had difficulty in understanding it. But with these drawings, I listened to the lesson more attentively and understood the subject."*

Student -5: *"While my teacher was teaching the lesson with these comics, I put myself in the shoes of the comic books there for a moment. It was as if I was travelling around the countries".*

Findings Related to the Problems Encountered During the Use of Educational Comics

The codes related to the sub-theme of "Problems Encountered" obtained from the students' experiences about the use of educational comics as a teaching material in the social studies course were presented in Table 11. The direct statements taken from the students' opinions that enabled to develop the sub-themes and codes were given below.

Table 11. *Problems Encountered in the Use of Educational Comics*

Sub-themes	Codes	Frequency
Problems Encountered	Darkening of the screen due to internet problems	3
	While enlarging /zooming the image, screen shifting when using phones and tablets	2
	Sound problems while trying to participate in the lesson	2
	No problems encountered	6

Problems encountered during the use of educational comics were presented below using examples from students' own statements.

Student-1: *"... When the screen darkens, texts look fuzzy or blurry. But it was getting better later."*

Student -2: *"...Sometimes the screen was going on and off, teacher. This was a problem I encountered, for example."*

Student -3: *"... While reading on the screen, we can lose our place when we enlarge the screen with the phone and tablet."*

Student -4: *"...Sometimes the sound goes off, sir; we don't hear our friends.."*

Student -5: *"...Sir, I haven't encountered any problems Everything was fine."*

Findings Related to the Suggestions for the Problems Encountered During the Use of Educational Comics

The codes related to the sub-theme "Suggestions" obtained from the students' experiences about the use of educational comics as a teaching material in the social studies course were shown in Table 12. The direct statements taken from the students' opinions that enabled to develop these sub-themes and codes were given below.

Tablo 12. *Suggestions for the Problems Encountered During the Use of Educational Comics*

Sub-themes	Codes	Frequency
Suggestions	Projecting comic books in computer environment	2
	Providing faster internet access	1

The suggestions for the problems encountered during the use of educational comics were presented below using examples from students' own statements.

Student-1: *"…Sir, I wish we all had a computer. Then, we could see the slides/projections more clearly. Mobile phones and tablets are both slow and the sound is not good."*

Discussion

The Effect of the Use of Educational Comics on Students' Academic Achievement

Dependent samples t-test analysis was performed to determine the differences between the pre-test and post-test scores obtained from the unit "Participating in Administration". Academic Achievement Test was developed for the experimental group students in which the educational comics was used as a teaching material. According to the analysis results, the implementations of educational comics administered in the experimental group had a significant effect on increasing students' academic achievement. The eta-squared effect size was found to be 0,48, which is considered large value by Cohen (1988). Considering this, it can be stated that the students' academic achievement rose by 48% due to the educational comics practices. In addition, dependent samples t-test analysis was carried out to compare the effects of implementations on students' academic achievement.

When the results of the analyses were examined, it was determined that the academic achievement of the students in the experimental group was significantly higher than the students' academic achievement in the control group. It can be reported that the use of

educational comics through distance education is an effective material for students to achieve successful results in social studies course. The results obtained from the findings of this research and the results of similar studies were presented below:

The studies carried out by Sones (1944), Brocka (1979), Krashenn (1993), Hosler and Boomer (2011), and Miranda, Salazar and Larens (2018) examined the effects of texts and comics on learning, the effects of comic books on increasing student achievement, the effectiveness of comics compared to the other literary genres, the effects of comics on academic achievement, the effects of comics on language learning, and the effects of using comic books in biology course on academic achievement and thus these studies revealed that effective and successful results were obtained with the use of comics as an instructional material.

The above-mentioned studies and their results show similarities with the research results obtained from this study in which educational comics are practiced as a course teaching material through distance education. However, there are some studies which do not support these results. The results of these studies were examined, and the results were presented below:

Lin and Lin (2016) in their study entitled the effects of comic books on achievement levels compared to the science text booklets determined that comic books did not make a significant difference when compared to the science text booklets. However, the findings obtained from most of the studies revealed that visual materials such as educational comics used in education had a positive effect on cognitive learning.

The Effect of the Use of Education Comics on Knowledge Retention

According to the results of the dependent samples t-test analysis carried out to determine the effects of educational comics implementations on knowledge retention, there is not a statistically significant difference between the post-test scores and retention scores of the students in the experimental group in which educational comics were practised. Thus, it was determined that educational comics were effective in increasing retention of knowledge. It can be stated that educational comics implemented through distance education are effective teaching materials in making students' knowledge permanent and long-term. This result obtained from the research shows similarity with the results of the study conducted by Vassilikopoulou et al., (2011).

The Effect of the Use of Educational Comics on Students' Democratic Perceptions

Dependent samples t-test was conducted to determine the effects of the methods applied on students' democratic perceptions in the experimental and control groups in the study. According to the results of the test, it was determined that the educational comics applications administered through distance education in the experimental group were significantly effective in increasing students' democratic perceptions. There are no other studies that are similar to this result obtained from the research.

Students' Views About the Use of Educational Comics

Educational comics were used as a teaching material in the social studies course through distant education in this study. The data in the study were gathered via interviews developed to determine the experimental group students' opinions and suggestions about the educational comics applications. Some themes were created with the analysis of the data and some results were obtained. The similarities and differences between these results and the results obtained from different studies were specified below:

The codes related to the sub-theme "Contributions to the Course" involve the following: drawing attention, making the lesson fun, creating a desire to participate in the lesson making the subject understandable, facilitating the subject by storytelling, making the subject gripping, visualizing the topic, enhancing comprehensibility by projecting comics on the screen, and using comics also in other courses. The students, whose opinions were taken, stated that educational comics made the lesson fun and facilitated learning and they wanted them to be used in other online courses. In addition, the students stated that educational comics made the lesson more gripping and immersive as they presented the course topics by narrating them.

The codes related to the sub-theme "individual contributions" involve providing motivation, boosting success, applying what you learn in daily life, developing imagination, and increasing democratic attitude. The students, whose opinions were taken, remarked that educational comics boosted their individual success and thus the comics developed their creativity, and they stressed that the knowledge they learned made their daily life easier.

These results obtained from the research show similarity with results of the studies carried out by Hutchinson (1949), Haugaard (1973), Krashen (1993), Beard and Rhodes (2002), Cheesman (2006), Weitkamp and Burnet (2007), Ranker (2008), Olson (2008), Caruso and

Freitas (2009), Kılıçkaya and Krajka (2012), Lazzarich (2013), Spiegel et al., (2013), Ishikura (2013), Richter et al., (2015), Popa and Tarabuzan (2015), Lin and Lin (2016), and Miranda et al., (2018).

The codes related to the sub-theme "Problems Encountered" involve the following: darkening of the screen due to internet problems, screen shifting when using phones and tablets while enlarging /zooming the image, sound problems while trying to participate in the lesson, and no problems encountered. The students, whose opinions were taken, stated that educational comics used as a teaching material caused some problems during the lesson. They added that these difficulties mostly resulted from the internet connection and the technological equipment and tools they used during online learning. As in other teaching materials, the online presentation of the materials prepared in the study through distance education caused some technology problems that cannot be intervened. In addition, even if everything goes well, it will not be correct to expect everyone participating in the implementation to enjoy online educational comics application and express positive opinions.

The codes related to the sub-theme "Suggestions for Problems" involve projecting comic books in computer environment and providing faster internet access. The students, whose opinions were taken, stated that while attending the lessons, they mostly used tablets and mobile phones and their internet access was slow. The students suggested some solutions to prevent these problems such as sharing comic books in computer environment and providing a faster and uninterrupted internet connection.

These qualitative data support the results obtained from the quantitative part of the research that the use of educational comics in the social studies course through distance education is an effective teaching material in boosting students' academic achievement, increasing their democratic attitudes, and enhancing the level of knowledge retention.

Conclusions

This study was carried out to explore the effects of the use of educational comics on students' cognitive and affective learning in distance education in the social studies course. Thus, the findings obtained from the analyses carried out on the data gathered from the experimental and control groups with quantitative and qualitative data collection tools before and after the applications were interpreted and presented in this section of the study. It was determined that

the educational comics used through distance education increased the students' academic achievements and had positive effects on their democratic attitudes. In addition, educational comics were an effective teaching material in boosting knowledge retention and the students' opinions supported the quantitative data mentioned. Moreover, the results of this study were presented in the light of the data obtained from the literature review by associating the similar and different aspects of the relevant studies. In line with the results obtained, recommendations were presented to researchers and relevant institutions.

It was concluded in this study that the educational comics used online through distance education had positive effects on students' learning in the learning domain "Participating in Administration" in social studies course. Suggestions that can be made in the light of these results were presented below:

- Educational comics can be used as a teaching material, especially at the elementary and secondary school level in cases when education and training activities are required through distant education in order to increase success and retention and to reduce students' boredom in online distance learning and make the lesson fun.
- Teachers, especially social studies teachers, can be given training on how to design and use educational comics.
- Considering the research results, the benefits of using educational comics should be taken into consideration and thus educational comics can be used as a teaching material in different grade levels and different courses when education and training activities are required through distance education and its effects can be investigated.
- As a result of the interviews carried out with the students, it is suggested that when education and training activities are required through distance education, the courses that students have prejudices against, have difficulty in understanding, and find boring or abstract should be identified. Then, educational comics should be designed and used in these lessons as there are not overloaded sentences, students can learn topics better, and the lessons are more fun and immersive.

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