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# Applications of blended learning method enriched by developing materials and their effects on students

Mutlu Uygur [a*]

[a] *Mersin University, Mersin, Turkey*

## Abstract

This study investigated the effect of the blended learning method enriched by material development in the elementary school social studies courses on students' academic achievement and explored their views towards this model. In this study, information communication technologies (ICT) and manual tools were used together. In this respect, the map model developed as instructional material for classroom application and the web-supported digital contents for out of school utilization in the elementary school social studies courses were used in the study. The study was conducted with elementary fourth grade students. It consisted of two randomly selected classes with 60 students as the experimental group and two classes with 58 students as the control group. Activities were designed according to 12 learning outcomes in the "People, Places, and Environments" and "Culture and Heritage" units. An academic achievement test (alpha = 0.76) and an open-ended question form were utilized as data collections tools in the study. By the end, it was concluded that the experimental group, exposed to blended learning activities enriched by material development, scored statistically significantly higher in academic achievement than the control group and the students found the method entertaining and educational.

***Keywords:*** Blended learning; digital content; eLearning; information communication technologies (ICT); material development; technology-enhanced learning



## 1. Introduction

New methods and models are practiced in today's education to motivate students by stimulating their interest and curiosity and to turn them into active individuals in the class. Divergence of student interests and needs and the increase in educational opportunities have led to changes and improvements in instructional models. The

* Corresponding author: Mutlu Uygur. ORCID ID.: https://orcid.org/0000-0002-7756-2576
Email address: mutluygur@gmail.com

regulations for the teaching-learning process, characterized as traditional in-class activities that students tackle with, have begun to change, moving out of the school boundaries. In addition, along with the rise of educational opportunities in teaching-learning processes, the educational environments and the methods utilized have changed over time. Particularly, the use of computer and internet technology in different ways and for different purposes has multiplied the educational options (Osguthorpe & Graham 2003:2).

### *1.1. Literature review*

To apply this model, educators first determine the appropriate design and then plan the content and the learning outcomes accordingly. Different models and approaches are used in designing blended learning environments. There is no a single model or a prescribed application in the design of blended learning environments (Bliuc, Ellis, Goodyear & Piggott, 2010). The e-learning environments are divided into asynchronous (course websites, Learning Management System) and synchronous (virtual classroom applications, web conferencing systems) environments. In general, asynchronous learning environments are used in blending procedure (Dağ, 2011). Blended learning applications, which are most commonly utilized in high schools and colleges, have begun being used in elementary schools in recent years. According to Pratt (2019), blended learning practices have gained momentum in elementary schools in recent years. The rapid development of technology, the widespread use of mobile devices among the elementary school students, and, in the meantime, the development of online resources in the classroom and homes have enabled this method to be used as an effective method at elementary schools.

In order to support face-to-face education in Turkey, the Education Information Network (Eğitim Bilişim Ağı-EBA) is utilized for elementary school students within the scope of FATIH project. In EBA, there are tools for the students and teachers to communicate with each other outside the class hours plus tools for the exam and tool for sharing course-related issues (Koç, 2019). This study utilized out-of-school computer-assisted blended learning facilitated through EBA and Okulistik programs. In this study, the blended learning model was created by designing a teaching-learning process according to relevant learning outcomes.

In-class and face-to-face learning models have been dominant in most of the learning environments to date. Developing technology, ease of access to mobile and stationary devices, the spread of wifi, internet, and online networking have led to the emergence of some new teaching methods in the current teaching-learning models. In addition to face-to-face learning, the blended learning model that can be used effectively through stationary or mobile devices as part of the learning process during the non-class hours of students is being preferred and applied in teaching-learning process by the educators in

recent years (Asarta & Schmidt, 2020; Evans, Yip, Chan, Armatas & Tse, 2020; Green, Allan & Crough, 2019; Han & Ellis, 2019; Khachatryan, 2020; Lynch & Dembo, 2004; Mayisela, 2013). The blended learning model blends both the advantages of face-to-face learning such as in-class communication, cooperative learning, motivation, and the advantages of synchronous and asynchronous computer-based learning, which is quite flexible in terms of time and space considering the fact that learning activity can be performed anytime anywhere.

The majority of studies on the blended learning model in the literature are conducted in universities, high schools, and middle schools respectively. Though the access to and utilization of mobile devices are common amongst the elementary grade students (4-12 years old) today, this method is rarely used in some of the elementary school courses (Inal & Korkmaz, 2019; Schechter, Macaruso, Kazakoff & Brooke, 2015; Tucker, 2012). Besides, the use of blended learning has not been subject to any research in elementary school social studies.

Therefore, new instructional materials were developed in the study to use in the classroom activities in elementary school social studies and this material was used in the activities consistent with the blended learning methods. The significance of the study is that there is no study in the literature investigating the application of the blended learning method through material development in elementary school social studies.

### *1.2. Theoretical framework*

Face-to-face classroom education, which has been the most commonly used instructional model from the past to the present, has now been replaced by student-centered and technology-enabled methods that are defined as mixed, hybrid, or blended learning. Blended learning is an integrated learning process in which learning activities are continued beyond the school context through a digital platform in addition to in-class learning activities. There are many different definitions of blended learning. Integrating computer-aided and face-to-face education (Bonk & Graham, 2006), integrating face-to-face and distance education (Pesen, 2014), supporting traditional education with technological materials (Öner, Yıldırım & Bars, 2014), integrating the best in-class teaching approaches, supplementary instructional methods, and applicable teaching methods in education (Wilson & Smilanich, 2005:13), integrating any instructional technology (e.g. video cassettes, CD-ROM, web-based education, film…) with teacher-led education (Driscoll, 2002), are some of these definitions. To succeed in blended learning, designing, facilitating, and supporting blended learning experiences are of primary importance (Hoffman, 2006). Blended learning is advocated by many as a promising approach to overcome weaknesses of online and face-to-face learning and to combine their benefits. Besides, blended learning is believed to provide a harmonious balance between online access to information and face-to-face human interactions (Osguthorpe & Graham,

2003). Obiedat, Eddeen, Harfoushi, Montaha, Koury and Alassaf (2014) argue that flexibility and time management in blended learning is a significant advantage over face-to-face learning. Blended learning has become one of the most commonly used methods by educators and considering the technological advancements, the educational institutions will prefer it as a learning approach ever more in the future (Fook & Dig, 2005; Han & Ellis, 2019; Mtshali, Maistry & Govender, 2020).

### *1.3. The aim with the article*

The purpose of the study is to determine the effects of the blended learning method applied in grade four social studies on students' academic achievement and to explore their views on blended learning method.

### *1.4. Research question*

The main problem statement and sub-problems of the study were determined as in the following.

Main problem statement: "What is the effect of the blended learning method used in grade four social studies on students' academic achievement, and what are their views on the blended learning method?"

Sub-Problems:

1. Is there a statistically significant difference between the pretest and posttest academic achievement scores of the control group?
2. Is there a statistically significant difference between the pretest and posttest academic achievement scores of the experimental group?
3. Is there a statistically significant difference between the posttest academic achievement test scores of the experimental and control groups
4. What are the views of experimental group students on the blended learning method?

## 2. Method

### *2.1. General background of research*

This study employed quasi-experimental research. Similar to experimental designs, quasi-experimental research designs test casual hypotheses (Shadish, Cook & Campbell, 2002). There are experimental and control groups in quasi-experimental studies. The pretest and posttest are applied to both groups but the method is applied only to the experimental group (Creswell, 2003; Karasar, 2005:87). In other words, the key feature common to all experiments is still to deliberately vary something so as to discover what

happens to something else later to discover the effects of presumed causes (Shadish et al., 2002). This method was applied in this research to discover the effectiveness of blended learning. In order to test the effectiveness of blended learning method that was designed in relation to the learning outcomes of the "People, Places, and Environments" as well as "Culture and Heritage" themes in the grade four elementary school social studies, two distinct classes were assigned as experimental and control groups respectively. The experimental group was exposed to face-to-face and online activities that were organized based on the blended learning method carried out in the form of group research within the context of the subject. However, the control group was exposed to traditional face-to-face and in-class methods. In order to minimize the effect of the teacher variable and to increase the reliability of the study, the same teacher was assigned to the intervention and control group to deliver the course.

### *2.2. Research participants*

This study included 118 grade four students from a state school in Mersin, Turkey in 2019. The school, where the research was carried out, is located in the Southeastern Anatolia Region and in a district containing a large number of immigrants from Syria. The students were randomly divided into two, 60 in the experimental group and 58 in the control group. The pretest scores and the points averages from the past academic year indicated that the experimental and control groups were at the same academic level at the start of the study. Demographics of the participants is given in Table 1.

Table 1. Demographic information about participants

| Variables | | Experimental Group | Control Group |
|---|---|---|---|
| Grade | 4 | 60 | 58 |
| Age | 11 years old | 35 | 30 |
| | 12 years old | 25 | 28 |
| Gender | Male | 32 | 30 |
| | Female | 28 | 28 |
| Pretest Results | | 12.05 | 13.70 |
| Previous Academic Year Points Averages | | 3.96 | 4.02 |

### *2.3. Instrument and procedures*

To measure the cognitive entry behavior of the groups, a "Social Studies Academic Achievement Test" comprising of 30, 5-point multiple-choice questions on the learning outcome of "People, Places, and Environments" plus "Culture and Heritage" units of grade four social studies was prepared. The academic achievement test, prepared by conducting validity and reliability studies, was applied as pretest and posttest to the

experimental and control groups. Besides to explore student views and recommendations on blended learning, an opinion form containing an open-ended question was prepared and applied to the students in the experimental group.

### *2.4. Data analysis*

The data were analysed using the SPSS statistical program. The upper limit for the error margin was considered as 0.05. In addition, the data collected from the experimental and control groups were examined for normal distribution to ensure if the parametric test assumptions were met. Shapiro-Wilk test was used to test the normality distribution. According to these values, the data for all tests displayed normal distribution (Experiment pretest: 0.074; Experiment posttest: 0.081; Control pretest: 0.051; Control posttest: 0.076; $p>0.05$). Given that parametric test assumptions were met, the data were analysed with parametric tests of Independent Samples t-test for unrelated measures and a paired sample t-test. However, the qualitative data were analysed through content analysis. Ensuring the Miles-Huberman inter-coder reliability, the data analysed were organized into codes and categories.

### *2.5. Validity and reliability*

Validity and reliability issues are imperative in the measurements used in research (Yildirim, 2013). The reliability of the measurement tool used in the research is an important factor that supports the reliability of the experimental research as well. The findings on the academic achievement test developed indicate that the measurement tool is reliable ($\alpha= 0.82$). To ensure the validity, expert opinions were sought for all the measurement tools. At the outset, an academic achievement test of 40 multiple-choice questions was developed in relation to learning outcomes of "People, Places, and Environments" and "Culture and Heritage" themes in grade four social studies. To ensure the validity of this academic test, the expert opinion of eight people, including one lecturer in the field of classroom-teaching, two in the field of curriculum and instruction, and five classroom teachers, were sought. For evaluating the language and comprehensibility of the test, opinions of a Turkish language teacher were requested. Following expert opinions, the test was reduced to 34 questions. The content validity of the test was evaluated with the table of specifications and then the test was piloted to 115 grade four students to test its construct validity. The KR-21 reliability coefficient of the academic achievement test in the pilot test was found to be 0.86, within the reliable range ($\alpha > 0.70$; Büyüköztürk, 2011). Following the item analyses, four more questions were excluded from the academic achievement test and the final achievement test was decided to include 30 questions. In this study, the courses in the experimental and group were taught under the supervision and guidance of the researcher. Accordingly, the validity threat that may arise from the implementer differences is eliminated.

Yıldırım and Şimşek (2005) argue that the accuracy of the results, i.e. the validity, is more important in qualitative studies than is the reliability or, in other words, the reproducibility of the results. For the content validity and the face validity of the qualitative measurement tool used in the present study, two academicians were asked for their opinions. Setting up valid research in qualitative studies is possible by minimizing the bias (Roberts & Priest, 2006). Therefore, to minimize bias, two coders analysed the responses provided to the open-ended question and divided the findings into codes and categories. The Miles-Huberman coder reliability formula was applied for the coder reliability of the resultant findings from the open-ended question (Miles-Huberman, 1994). According to the coding control that provides internal consistency, the inter-coder consensus is expected to be at least 80% (Patton, 2002). As a result of applying the coder reliability formula, the consensus between the coders was found 0.86 (86%). This percentage indicates that the coding done is reliable.

### *2.6. Procedure of the research*

The Blended learning method, in which a manual portable map and digital platforms were developed for use in in-class face-to-face activities, was applied to the experimental group. As such, the map model, which was developed in the study to use in the lessons conducted in classroom face-to-face activities only, was applied in the control group. The preparation of the educational material and the procedures followed in the experimental and control groups are reported below.

### *2.7. Preparation of educational material*

The main emphasis on educational material is to be portable, safe, and durable. Considering these three key issues, the material was prepared in the form of a writing board with a thin metal surface for the magnet to stick on and with attached wheels for its portability. Safety measures were taken into account when manufacturing it in order to protect it from falling over and to ensure it does not have a cutting or hurting surface. While manufacturing its body, a thin iron sheet was used to ensure its durability. After completing the manufacturing process of physical material, the materials concerning the learning outcomes were prepared. The Blank Map of Turkey Regions was attached to its surface of thin metal sheet. A large regions jigsaw puzzle of 90*180 cm was prepared, which consisted of seven pieces concerning the lessons and learning outcomes, to use them on the map. After that, our provinces, our major lakes and mountains, directions, pictures of historical and touristic sites, picture of Bandirma Ferry, Nasreddin Hoca's picture, flags of countries, and the Turkey inscription were prepared, each having a magnetic bottom to attach them beneath the jigsaw puzzle. By completing all the pieces, the educational materials were all ready for use.


Figure 1. Front part of the material: regions and neighboring countries


Figure 2. Backside of the material: concepts designed as magnets


Figure 3. Regions and provinces in the same color

Figure 4. Geographical regions

### *2.8. Procedures carried out in the experimental group*

To organize the activities, five learning outcomes from the "People, Places, and Environments" and "Culture and Heritage" unites, given in grade four social studies that are suitable for the map use in the Blended Learning Model, were determined. These learning outcomes are presented in Table 2.

Table 2. Themes and learning outcomes

| Number | Learning outcomes | Concepts |
|---|---|---|
| 1 | Gives examples by looking for elements that reflect his/her family and the national culture in his/her environment. | Culture and Heritage |
| 2 | Understands the importance of national struggle pursuing the lives of national struggle heroes. | |
| 3 | Makes inferences about the location of any place in his/her environment. | People, Places, and Environments |
| 4 | Distinguishes between the natural and human factors in the environment s/he lives. | |
| 5 | Makes inferences about the landforms and population characteristics of the place and environment where s/he lives in. | |

A suitable design congruent with the blended learning method was applied in the experimental group. To that end, in addition to the face-to-face learning activities with usual course contents in the classroom, students were enabled to use the contents determined through digital platforms and to complete activities and assessments outside the school. The students in the experimental group were divided into five different groups. These groups conducted their research under the guidance of the teacher in 20 class hours within four weeks. Each group conducted joint studies concerning the learning outcomes and presented presentations by the end of the theme. Students utilized EBA and the Okulistic software (https://www.okulistik.com/teax/), where they could log in with a private password provided and share things on as the digital platforms. The procedures pursued in the experimental group are detailed in Table 3 as follows.

Table 3. The Procedures in experimental group

| Week | Procedure |
|---|---|
| 1. | a. Determining and organizing the digital platform and the content to use in blended learning<br>b. Creating the blended learning program<br>c. Introducing the map model (manual, portable, containing visual magnets, and used on both sides) to students, which was developed as educational material to be used in the blended learning<br>d. Applying the pretests |
| 2. | a. The classes were divided into groups of five. Each group was given information about the learning outcomes.<br>b. Activities were performed in relation to the learning outcomes of "elements reflecting the national culture". Students were given photo magnet of folk dances (folklore), local clothes, traditional Turkish foods and more, which reflect the national culture, to place them appropriately and correctly according to their group activities.<br>c. Accessing the EBA application through personal passwords, students completed the activities related to the learning outcomes outside the school by following the researches titled "Elements of National Culture", "Cultural Elements in the City We Live", "What Is Culture? What Are Our Cultural Elements?", "Our Cultural Elements", and "Do the Cultural Elements Change?".<br>d. Activities related to the learning outcome "Understands the importance of national struggle pursuing the lives of national struggle heroes" were conducted using the portable map. The map showing the battlefronts in the Social Studies Textbook was reviewed and the provinces where these fronts were located were marked on the map and the corresponding magnets were attached. As such, discussing which country was fought in the region we live in our province, the relevant battlefront was located on the map and the flag of the country we fought was placed.<br>e. Students completed the activities related to the learning outcomes by accessing the EBA and Okulistik programs outside the school through personal passwords and by following the researches titled "From Independence to Establishment" structured under the heading of "A Heroic Epic: The National Struggle". |

3.

a. Considering the principle of close to distant relationships and the relevant learning outcome (i.e. "Makes inferences about the location of any place in his/her environment"), students attached the corresponding magnets of the city we live in, our neighbouring provinces, the provinces in our region, and the region we live in on the map. To learn the concept of location, students attached the corresponding magnets of directions on the map. The activity continued by asking to which directions the regions in our country are located. Students discussed which regions are located in the north, south, east, and west of our country.

b. Accessing the EBA and Okulistik applications through personal passwords, students completed the activities and assessment tests as regards the learning outcomes outside the school following the studies titled "What are there in our environment?" and "Directions".

c. The geographical features of the place we live in related to the learning outcome (i.e. Distinguishes between the natural and human factors in the environment s/he lives) were reviewed on the physical map of Turkey opened from the interactive board. The mountains, plains, and streams were shown on the map. The seas surrounding our country were shown. Major natural and man-made elements were introduced in the environment where we live. Investigations were made about the neighboring countries. In addition, magnets showing the flags of the neighboring countries were placed on the model map developed as part of the study.

d. Accessing the EBA and Okulistik programs through personal passwords, students completed the activities and assessments tests outside the school by following the researches titled "Landforms" and "Physical and Administrator Map" given underneath the heading of "The Place We Live".

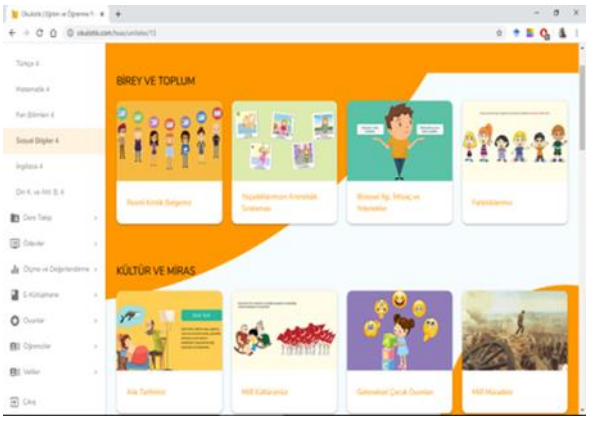


Figure 5. A Screen shot from okulistik program

4.

a. The landforms of the places and the regions we live in and the population characteristics originating from them were discussed relating to the learning outcome (i.e. "Makes inferences about the landforms and population characteristics of the place and environment where s/he lives in"). Seven regions of our country were introduced and large magnetic region models developed about geographical regions were place on the map. The concepts related to the fact that our country comprises of seven geographical regions and that the geographical regions comprise of

provinces were conveyed. Our capital, Ankara, was located and marked on our map and its magnet was attached. Students answered the questions lifting the regions that are located in the north, south, east, and the west of our country. In addition, students were asked to draw our regions and write their names on a blank map of Turkey as part of "I Draw My Regions" drawing activity. The study ended after painting each region with a different colour and writing the directions.

b. Accessing the EBA program through personal passwords outside the school, students completed the activities related to the learning outcome by following the research titled "Population and Settlement" under the studies titled "The Place We Live".

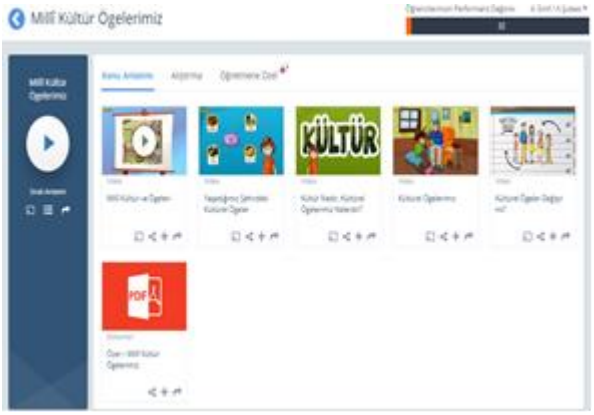


Figure 6. A Screen shot of EBA program

c. By the end of the study, the academic achievement test was applied to the students as the posttest. In addition, students' views were determined on the blended learning.

### *2.9. Procedures carried out in control group*

All the procedures carried out in the experimental group in the in-class face-to-face educational activities dimension of the blended learning method prepared by using the developed map model, was also applied to the control group. Activities organized in the control group according to the specified learning outcomes were conducted only with face-to-face learning activities in the classroom. First, the students in control group were divided into groups. As in the experimental group, student in the control group presented activities they had prepared according to the leaning outcomes in the themes at the end of the units. No digital platform and content were used as out-of-class teaching means and materials in the control group.

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## 3. Results

### *3.1. Findings on the first sub-problem*

Analyses were made in the control group, where in-class face-to-face educational activities were conducted, to see if there is a significant difference between the pretest and posttest achievement scores of the students. Hence, a paired-sample t-test analysis was performed to investigate the difference between the pre and post academic achievement test scores of students in the control. Table 4 below presents the t-test analysis results of the difference between the pre and posttest academic achievement scores of the students in control group.

Table 4. T-Test results regarding the difference between the pretest-posttest of control group

| Group | Measure | n | $\overline{X}$ | SD | t | p |
|---|---|---|---|---|---|---|
| Control | Pretest | 58 | 13.70 | 4.21 | -8.00 | 0.000* |
| | Posttest | 58 | 17.43 | 4.46 | | |

Note. *ρ < 0.05.

As shown in Table 4, the t-test result for the paired samples yielded a statistically significant difference between the pretest and posttest scores of the students' academic achievement levels in the control group (t [57] = -8, ρ <0.05 ). Analyses of the data indicate that the mean score is $\overline{X}$ = 13.70 (SD = 4.21) in the pretest and $\overline{X}$ = 17.43 (SD = 4.46) in the posttest.

### *3.2. Findings on the second sub-problem*

Investigations were made in the experimental group, where the blended learning method was applied, to see if there was a statistically significant difference between the pretest and posttest achievement scores of the students. Accordingly, a paired-samples t-test was run on the data collected. The results of paired-samples t-test on differences between the pretest and posttest achievement scores of experimental group students are presented in Table 5 below.

Table 5. T-Test Result regarding the difference between the pretest-posttest of experimental group

| Group | Measure | n | $\overline{X}$ | SD | t | p |
|---|---|---|---|---|---|---|
| Experimental Group | Pretest | 60 | 12.05 | 4.56 | -16.08 | .000* |
| | Posttest | 60 | 19.93 | 5.81 | | |

Note. *ρ < 0.05.

As shown in Table 5, the t-test result for the paired-samples yielded a statistically significant difference between the pretest and posttest achievement scores of the students in the experimental group (t [59] = -16.08, ρ < 0.05). Analyses of the data indicate that the mean score is $\bar{X}$ = 12.05 (SD = 4.56) in the pretest and $\bar{X}$ = 19.93 (SD = 5.81) in the posttest.

### *3.3. Findings on the third problem*

Considering this sub-problem, the presentence of a statistically significant difference between the post-test achievement scores of the students in the experimental and control groups was investigated. Thus, an Independent Samples t-test analysis was applied to the collected data. Independent Samples t-test results regarding the difference between the posttest achievement scores of the students in the experimental and control groups are given in Table 6 below.

Table 6. T-Test Results on difference between the posttest scores of the experimental and control groups

| Group | n | $\bar{X}$ | SD | t | p |
|---|---|---|---|---|---|
| Experiment Post-test | 60 | 19.93 | 5.81 | 2.61 | .01* |
| Control Post-test | 58 | 17.43 | 4.46 | | |

Note. *ρ < 0.05.

According to the results of independent samples t-test results presented in Table 6 above, a statistically significant difference was found between the posttest achievement scores of the students in the experimental and control groups (t [117]= 2.61, ρ < 0.05). A blended learning method, which was prepared in relation to the six learning outcomes in the "Culture and Heritage" and "People, Places and Environments" themes of grade four Social Studies fitting the map use, was applied in the experimental group. According to findings, the achievement levels of experimental group students are significantly higher than that of the control group students who only experienced in-class face-to-face learning activities. Results from the analysis of data indicate that the mean score is $\bar{X}$ = 19.39 (SD = 5.81) in the experimental group and $\bar{X}$ = 17.43 (SD = 4.46) in the control group.

### *3.4. Findings on the fourth sub-problem*

This sub-problem aimed to determine the students' views on the blended learning method designed in accordance with the learning outcomes given in the "Culture and Heritage" and "People, Places, and Environments" themes of grade 4 Social Studies. Being subjected to content analysis, students' views were categorized into advantages, challenges, and suggestions. The resultant findings are given in Table 7 below.

Table 7. Findings related to student views on blended learning method (N=60)

| Theme | Student Views Blended Learning Method | | |
|---|---|---|---|
| Category | Codes | f | % |
| Advantages | Entertaining | 34 | 56.66 |
| | Educational | 25 | 41.66 |
| | Provides reinforcement opportunities | 23 | 38.33 |
| | Provides repetition opportunities | 22 | 36.66 |
| | Makes research enjoyable through computer | 17 | 28.33 |
| | Teacher provides feedback and corrections | 13 | 21.66 |
| | Practicable outside the school | 10 | 16.66 |
| | Enables monitoring one's own progress | 4 | 6.66 |
| Total | | 148 | |
| Challenges | Access to the computers and mobile devices | 48 | 80 |
| | Access to the internet. | 39 | 65 |
| | Requirement of course-related research outside the school. | 21 | 35 |
| | Requirement of regular and systematic research | 16 | 26.66 |
| Total | | 124 | |
| Suggestions | Further exercises could be done. | 55 | 91.66 |
| | It could be applied in different courses. | 47 | 78.33 |
| | The computer-based activities could be more fun. | 23 | 38.33 |
| Total | | 125 | |

According to these findings, students had positive views towards the blended learning method, structured by blending the educational materials developed and the digital online educational materials, and believed this method is effective in achieving the determined learning outcomes.

## 4. Conclusions

The study indicated a significant difference between the posttest social studies achievement scores of the experimental group students who experienced the blended learning method implemented by material development and the control group students who experienced face-to-face in-class learning activities that could be described as a traditional teaching method. This difference was found in favour of the experimental group (Table 6). According to this result, the blended learning method positively affects the academic achievement of the students. In the blended learning method, the activities, conducted regarding the learning outcomes in the classroom, are repeated and reinforced by students using the internet and computer outside the school. This way, the learning process continues outside the school by the students' participation. It is believed that allowing students to perform their repetition and reinforcements by means of attractive and motivating technological tools such as the computer and the internet, increases academic achievement. Students soon adapted to blended learning practices.

In this study, students' views on the blended learning method were categorized as advantages, challenges, and suggestions. Students reported the advantages of this method in the following order: "it is entertaining and educational, provides reinforcement and repetition opportunities, makes research enjoyable through computer, teacher provides feedback and corrections, practicable outside the school, and enables monitoring one's own progress. Being entertaining and educational were among the first-order advantages of the blended learning method that they emphasized.

To sum up, the results indicate that the blended learning method has positive effects on students' academic achievement and opinions in elementary school social studies. It is thought that this method will have impacts that are more positive when used over longer periods and when connected with more learning outcomes.

## 5. Discussions

Student-student and student-teacher communication are thought to be effective in students' quick adaptation to practices (Arbaugh, 2014). In their study, Chen, Lambert and Guidry (2010) have found that using internet-based learning technologies has a positive effect on learning outcomes. Dağ (2011) found that blended learning method has a positive effect on students' academic achievement, their motivation towards learning, and their thoughts towards the learning environment. It could be argued that students' act of monitoring their progress in activities in congruence with the blended learning method, seeing their deficiencies concerning the learning outcomes by the end of exams, and seeking support from their teachers in this regard has a positive effect on their academic achievement and opinions. In the blended learning model applied in the experimental group, the teachers can monitor students' progress and improvements via online activities and deal with the students individually when deemed necessary. Therefore, the presence of a formative assessment environment could be another important factor that increases academic achievement. The results of this study is consistent with those in the literature, concluding that blended learning is a method that increases the academic achievement (Asarta & Schmidt, 2017, 2020; Ceylan & Kesici, 2017; Inal & Korkmaz, 2019; Obiedat, et al., 2014). In their study, Al-Husban and Shorman (2020) found that students possess positive opinions and perceptions about the blended learning method. As such, the findings of the present study support this idea.

Students' interest in research with computer and internet access could relate to the content supported by rich images, videos, and texts. Similar to these findings, the existing research indicates that students have positive opinions towards the computer-based and online activities and that they find computer-based education fun and educational (Altıok, 2020; Şahin, 2006; Uzel & Hangül, 2010). Students stated that the problems they encountered include "access to the computer and mobile devices, access to the internet, the requirement of course-related research outside the school, and the

requirement of regular and systematic research". Access to computers, mobile devices, and the internet were the first-order problems they had experienced. Similar findings are supported by some studies in the literature (Celen, Celik & Seferoglu, 2018; Dikmenli & Ünaldı, 2013; Pesen, 2014; Meşe, 2016). In their suggestions on blended learning practices, students stated that "further exercises could be done, it could also be applied in different courses, and the computer-based activities could be more fun. In the light of this information, the following are suggested:

- The activities in the blended learning method should be organized in accordance with the learning outcomes. The association of activities to the learning outcomes should be made clear.
- Student-centered practices should be preferred in face-to-face classroom activities.
- Attention should be paid to the compatibility of the face-to-face classroom activities and the web-based digital content.
- The extracurricular web-based digital applications in blended learning should be selected in accordance with the students' age, prior learning, and their readiness to the access internet, computer, or mobile devices.
- In this method, students should be given regular feedback and be provided with corrections when deemed necessary.

## References

Al-Husban, N. A., & Shorman, S. (2020). Perceptions of Syrian Student Refugees towards Blended Learning: Implications for Higher Education Institutions. International Journal of Emerging Technologies in Learning (iJET), 15(01), 45-60. https://doi.org/10.3991/ijet.v15i01.11431

Altıok, S. (2020). Artırılmış Gerçeklik Destekli Simetri Öğretiminin İlkokul Öğrencilerinin Akademik Başarılarına Etkileri Ve Öğrenci Görüşleri [The Effects of Augmented Reality Supported Instruction on Elementary Students' Academic Achievement and the Opinions of Students]. Eğitim Teknolojisi Kuram ve Uygulama, 10(1), 177-200. Retrieved from https://dergipark.org.tr/en/pub/etku/issue/52242/622871

Asarta, C. J., & Schmidt, J. R. (2017). Comparing student performance in blended and traditional courses: Does prior academic achievement matter?. The Internet and Higher Education, 32, 29-38. https://doi.org/10.1016/j.iheduc.2016.08.002

Asarta, C. J., & Schmidt, J. R. (2020). The effects of online and blended experience on outcomes in a blended learning environment. The Internet and Higher Education, 44, 100708. https://doi.org/10.1016/j.iheduc.2019.100708

Asarta, C. J., & Schmidt, J. R. (2020). The effects of online and blended experience on outcomes in a blended learning environment. The Internet and Higher Education, 44, 100708. https://doi.org/10.1016/j.iheduc.2019.100708

Bliuc, A. M., Ellis, R., Goodyear, P., & Piggott, L. (2010). Learning through face-to-face and online discussions: Associations between students' conceptions, approaches and academic performance in political science. British Journal of Educational Technology, 41(3), 512-524. https://doi.org/10.1111/j.1467-8535.2009.00966.x

Bonk, C. J., & Graham, C. R. (2006). The handbook of blended learning: Global perspectives, local designs. John Wiley & Sons.

Büyüköztürk, Ş. (2011). Deneysel desenler: öntest-sontest kontrol grubu, desen ve veri analizi[Experimental Designs: pretest-posttest control group design and data analysis]. Pegem Akademi.

Çardak, Ç.S. (2012). Harmanlanmış öğrenme sürecinde öğrencilerin etkileşimlerinin ve öğrenme düzeylerinin incelenmesi [The investigation of students' interactions and learning levels in blended learning process]. Doctoral Dissertation, Anadolu University, Institute of Educational Sciences, Eskişehir.

Celen, F. K., Celik, A., & Seferoglu, S. S. (2018). Yükseköğretimde çevrim-içi öğrenme: Sistemde yaşanan sorunlar ve çözüm önerileri [Online learning in higher education: problems in the system and solutions]. Journal of European Education, 1(1), 25-34.

Ceylan, V. K., & Kesici, A. E. (2017). Effect of blended learning to academic achievement. Journal of Human Sciences, 14(1), 308-320. https://doi.org/10.14687/jhs.v14i1.4141

Chen, P. S. D., Lambert, A. D., & Guidry, K. R. (2010). Engaging online learners: The impact of Web-based learning technology on college student engagement. Computers & Education, 54(4), 1222-1232.

Creswell, J. W. (2003). Research design. California: Sage Publication

Dağ, F. (2011). Hibrid (Karma) Öğrenme Ortamları ve Tasarımına İlişkin Öneriler [Hybrid (Mixed) Learning Environments and Suggestions on their Designs]. Journal Of Kırşehir Education Faculty, 12(2), 73-97.

Dikmenli, Y. ve Ünaldı, Ü. E. (2013). Harmanlanmış öğrenme ve sanal sınıfa dönük öğrenci görüşleri [Student opinions on blended learning and virtual classroom]. Amasya Üniversitesi Eğitim Fakültesi Dergisi, 2(2), 326-347.

Evans, J. C., Yip, H., Chan, K., Armatas, C., & Tse, A. (2020). Blended learning in higher education: professional development in a Hong Kong university. Higher Education Research & Development, 1-14. https://doi.org/10.1080/07294360.2019.1685943

Fook, F.S., Kong, N.W., Lan, O.S., Atan, H. & Idrus, R. (2005). Research in E-learning in a Hybrid Environment – A case for Blended Instruction. Malaysian Online Journal of Instructional Technology, 2(2), 124-136.

Green, D., Allan, C. N., & Crough, J. (2019). What Is the Purpose? Using Blended Learning Designs to Purposefully Focus on Student Engagement, Support and Learning. In Blended Learning Designs in STEM Higher Education (pp. 35-58). Springer, Singapore.

Han, F., & Ellis, R. A. (2019). Identifying consistent patterns of quality learning discussions in blended learning. The Internet and Higher Education, 40, 12-19. https://doi.org/10.1016/j.iheduc.2018.09.002

Hofmann, J. (2006). Why Blended Learning Hasn't (yet) fulfilled its promises: Answers to Those Questions That Keep You Up at Night. In C.J. Bonk & C.R. Graham (Eds.), The Handbook of Blended Learning: Global Perspectives, Local Designs (pp. 27-40). San Francisco: Pfeiffer.

Inal, M., & Korkmaz, Ö. (2019). The effect of web based blended learning on students' academic achievement and attitudes towards English course. Education and Information Technologies, 24(4), 2603-2619. https://doi.org/10.1007/s10639-019-09890-7

Karasar, N. (2005). Scientific method of research. Ankara: Nobel Publishing Distribution.

Khachatryan, G. A. (2020). Instruction Modeling: Developing and Implementing Blended Learning Programs. Oxford University Press, USA.

Koç, M. (2019). Harmanlanmış Öğrenme Ortamlarının Etkileşim Değeri Ölçeğinin Geliştirilmesi [Developing a scale on interaction value of blended learning environments]. Unpublished Master's Thesis, Institute of Science Education, Ege University, İzmir.

Lynch, R., & Dembo, M. (2004). The Relationship Between Self-Regulation and Online Learning in a Blended Learning Context. The International Review of Research in Open and Distributed Learning, 5(2). https://doi.org/10.19173/irrodl.v5i2.189

Mayisela, T. (2013). The potential use of mobile technology: Enhancing accessibility and communication in a blended learning course. South African Journal of Education, 33(1):1-18.

Meşe, C. (2016). Harmanlanmış öğrenme ortamlarında oyunlaştırma bileşenlerinin etkililiği [Effectiveness of gamification elements in blended learning environments]. Unpublished Doctoral Dissertation. Institute of Educational Science, Anadolu University, Eskişehir.

Miles, M, B., & Huberman, A. M. (1994). Qualitative data analysis: An expanded Sourcebook. (2nd ed). Thousand Oaks, CA: Sage.

Mtshali, M.A., Maistry, S,M., & Govender, D.W. (2020). Online discussion forum: A tool to support learning in business management education. South African Journal of Education, 40(2):1-9.

Obiedat, R., Eddeen, L. N., Harfoushi, O., Montaha, A. H., Koury, A., & Alassaf, N. (2014). Effect of blended-learning on academic achievement of students in the University of Jordan. International Journal of Emerging Technologies in Learning (iJET), 9(2), 37-44. http://dx.doi.org/10.3991/ijet.v9i2.3220

Öner, G., Yıldırım, İ., & Bars, M. (2014). Harmanlanmış öğrenme yaklaşımının 10. sınıf öğrencilerinin matematik dersi akademik başarılarına etkisi [The effect of blended learning approach on academic achievement of grade 10 students in mathematics course]. Bilgisayar ve Eğitim Araştırmaları Dergisi, 2(4), 152-165.

Osguthorpe, R.T., & Graham, C. (2003). Blended learning environments: Definitions and directions. Quarterly Review of Distance Education 4(3), 227-233. Retrieved February 3, 2020 from https://www.learntechlib.org/p/97576/.

Patton, M.Q. (2002). Qualitative research and evaluation methods (3rd Ed.). London: Sage Publications, Inc.

Pesen, A. (2014). Harmanlanmış öğrenme ortamının öğretmen adaylarının akademik başarısına, ders araştırma alışkanlıklarına ve güdülenme düzeylerine etkisi [The effect of blended learning environment on academic success, studying habits, and motivation of teacher candidates]. Doctoral Dissertation, Institute of Educational Sciences, Dicle University, Diyarbakır.

Pratt, C. J. (2019). Blended Learning In Elementary Schools: An Interdependent Enterprise.

Strand, S. (2003). Sex differences in cognitive abilities test scores: A national picture. Paper presented at the British Educational Research Association Annual Conference, Edinburgh, Scotland, 11-13 September.

Roberts, P., & Priest, H. (2006). Reliability and validity in research. Nursing Standard, 20(44), 41-45.

Şahin, B. (2006). Okul öncesi dönemde bilgisayar destekli fen öğretimi ve etkilerinin incelenmesi [Investigating computer-assisted science teaching during the pre-school period and its effects], Unpublished Master's Thesis. Yeditepe University, Institute of Social Sciences, Education Management and Supervision, Istanbul.

Schechter, R., Macaruso, P., Kazakoff, E. R., & Brooke, E. (2015). Exploration of a blended learning approach to reading instruction for low SES students in early elementary grades. Computers in the Schools, 32(3-4), 183-200. https://doi.org/10.1080/07380569.2015.1100652

Shadish, W. R., Cook, T. D., & Campbell, D. T. (2002). Experimental and quasi-experimental designs for generalized causal inference/William R. Shedish, Thomas D. Cook, Donald T. Campbell. Boston: Houghton Mifflin.

Tucker, C. R. (2012). Blended learning in grades 4–12: Leveraging the power of technology to create student-centered classrooms. Corwin Press.

Uzel, D. & Hangül, T. (2010). The Effect of the Computer Assisted Instruction (CAI) on Student Attitude in Mathematics Teaching of Elemantary School 8th Class and Views of Students towards CAI. Necatibey Faculty of Education Electronic Journal of Science and Mathematics Education, 4(2), 154-176. Retrieved from https://dergipark.org.tr/en/pub/balikesirnef/issue/3371/46531

Wilson, D., & Smilanich, E. (2005). The Other Blended Learning. A Classroom-Centered Approach. San Francisco, CA: Pfeiffer.

Yıldırım, A. & Şimşek, H. (2005). Sosyal Bilimlerde Nitel Araştırma Yöntemleri Güncelleştirilmiş Geliştirilmiş 5. Baskı [Qualitative Research Methods in Social Sciences (5th Ed, Revised), pp.366, Ankara: Seçkin Yayıncılık.

Yıldırım, A. (2013). Türkiye'de Öğretmen eğitimi araştırmaları: Yönelimler, sorunlar ve öncelikli araştırma alanları [Teacher Education Research in Turkey: Trends, Issues and Priority Areas]. Eğitim ve Bilim, 38(169), 175-191.