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The Effect of Blended Learning on Academic Achievement and Attitudes at Social Studies Courses

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Abstract

As a result of scientific and technological developments reflection, improvements on education science moved from teacher centered to student and learning centered system. Learning concept is not only seen a at schools and some learning centers but in all areas and places of life. The aim of this study is to search the achievement and persistency of blended learning method at social studies lesson. With the empirical method used at research, the impact of independent variable examined on experimental group is blended learning method. The independent variable used at control group is face to face learning method. The impact of same dependent variable has been searched on experimental and control group. As a dependent variable the results of social studies academic success test has been searched. For the determined dependent variables, between groups assessment has been applied according to pre-test and post-test scores. The experimental application of the research has been applied to 52 students at 7th grade. 26 students take place from experimental group and 26 students take place from control group. According to the findings, no difference has been found between pre-test scores. According to post test and persistency test a significant difference has been appeared in favor of experimental group which is blended learning method. According to repeated measures analyses results between pre-test and post-test, and between post-test and persistency test; comparison of pre-test and post-test, both effect the student achievement. But according to impact results; the effect of blended learning is larger. According to post-test and persistency score results; it came out that for the persistency of knowledge blended learning is more effective than face to face learning. According to the results of persistency test and final application which is a comparison of blended learning and face to face learning, blended learning group is more effective than face to face learning group. While face to face learning group final application score lessen 12 points, blended learning group score lessen 8 points. It can be confessed that according to the persistency of student achievement, blended learning method is more effective than face to face learning method.

Keywords: blended learning, academic achievement, social studies.

1. Introduction

Due to reflections of science and technological developments upon the field of education, developments in the field of education have started to be student- and learning-centered than teacher-centered. Learning is seen as a concept that can occur not only in schools and special institutions, but also in every second of life (Reigeluth, 1999).

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Blended learning is a method of distance education that uses technology (high technology such as television, Internet and low technology such as e-mails by voice and conferences) with traditional teaching and learning (Smiths, 2001).

On the other hand, Horton (2009) defined blended learning as a combination of advantaged aspects of both web-based learning and in-class learning. By blended learning, it is usually meant a use of two or more methods for a need of learning. To define blended learning, it is a use of the most effective ways of learning for achieving learning outcomes for certain purposes (Wilson & Smilanch, 2004).

Electronic media such as the Internet and web will not take place of face-to-face learning and approaches to teaching as claimed by advocators of e-learning a few years ago. Electronic media have not questioned the existence of a teacher or an educational institution. This media will take place with face-to-face learning approaches (Kerres & Witt, 2003). In web-based learning, teacher's role cannot be underestimated. As learning has not been possible without teachers for centuries, the role of teachers will be of great significance in further learning processes as well. Drucker (2006) said that teachers who are inspectors and mentors will explore strength of learners and guide them to the success, developing their abilities. Gates (1999) claimed that teachers who create synergy in the classroom, are creative, and who have strong relationships with students will be successful. Moreover, the author argued that the worth and salaries of teachers will get higher thanks to technology.

1.1 *Problem statement*

What is the effect of blended learning in social studies on student performance and retention?

1.2 *Sub-problems*

(1) Is there any difference among students' academic achievement pre-test scores based on group variable?

(2) Is there any difference among students' academic achievement post-test scores based on group variable?

(3) Is there any difference among students' academic achievement retention-test scores based on group variable?

(4) Is there any difference between social studies achievement pre-test and post-test scores of students both in experimental and control groups?

(5) Is there any difference between social studies achievement post-test and retention-test scores of students both in experimental and control groups?

2. Material and method

In this study aimed to explore the effect of blended learning on student performance in social studies, experimental design was used. Common characteristics of experimental designs are as follows: (1) More than one group is used and (2) groups are formed through random sampling. That is why there is a need for the existence of one experimental and one control group.

It can be said that pre-test – post-test control group design is a design frequently used in behavioral sciences that gives statistical power to the study, testing the effect of the

experimental process on the dependent variable, giving an opportunity of interpreting findings regarding cause-effect relationships (Buyukozturk, 2001).

The independent variable whose effect on the experimental group was blended learning. However, face-to-face learning was initiated in the control group. In both experimental and control groups, effects on the same dependent variable were investigated. As a dependent variable, social studies achievement test results were used. Using pre- and post-test scores regarding the dependent variable, comparisons between groups were made.

The first group of study consisted of 57 seventh graders from Ataturk Elementary School, Afyonkarahisar, Turkey. There were 34 students in the experimental group and 33 students in the control group. However, students who could not take pre-test, post-test and retention-test were excluded from the study. As a result, the experimental group consisted of 26, and the control group comprised 26 students. Students were randomly assigned to both experimental and control groups. Students were not informed of to which group they were belonged to and studies were conducted in both classrooms by usual teachers.

Two hours a week were devoted for this study which lasted in four weeks. Hence, a total of 8 hours were devoted for the whole study. In the experimental group, students were exposed to blended learning. But, they were exposed to face-to-face instruction in the control group. Beforehand, a social studies pre-achievement test was administered to students. Then, post-achievement test was administered. Six weeks after the intervention, achievement test was administered again for retention.

While developing an achievement test, measurement begins with a plan called test plan (Özçelik, 1991; İşman & Eskicumalı, 2001). The first step to do is to determine the content and then, the items according to the content (Tavşancıl, 2006). The content is about a unit or a theme that also highlights objectives and behaviors (Demirel, 2007). The achievement test consisted of 20 multiple-choice, five true-false, five fill–in-the-blank, and two open-ended questions. Each of the two open-ended questions was five points while all the remaining was three points.

To check reliability, there are different techniques and formulas. The ones most frequently used are Kuder-Richardson 20 (KR-20), Kuder-Richardson 21 (KR-21) and Cronbach alpha techniques (Erkuş, 2006). KR-20 is used when item scores are not discrete (1–0) (Atılgan et al., 2006). Correct responses of multiple-choice, true-false and fill-in-the-blank questions were given three points while wrong ones were given zero point. It was found that KR-20 reliability coefficient the achievement test produced was .89, average difficulty .52, and average discriminatory power .40.

3. Results

The results of the study were presented and interpreted according to each sub-problem below.

Table 1. Results of experiment and control groups' pre-practice of academic success test

Group	N	Rank average	Rank total	U	p
Experiment	26	25.40	660.50	309,500	,597
Control	26	27.60	717.50		

In Table 1, Mann-Whitney U pre-achievement test results of students exposed to blended learning and face-to-face instruction were presented. According to this, there were

nonsignificant differences between pre-achievement test scores of students in both groups (U=309,500, p>.05). The rank averages showed that there are not any significant differences between the experimental and the control group. That is, both groups were similar in terms of achievement in social studies at the outset of the study. This result was useful for the purpose of this study.

Table 2. Results of experiment and control groups' post-practice of academic success test

Group	N	Rank average	Rank total	U	p
Experiment	26	38.46	1000	27	,000
Control	26	14.54	378		

In Table 2, Mann-Whitney U post-achievement test results of students exposed to blended learning and face-to-face instruction were presented. According to this, there were significant differences between pre-achievement test scores of students in both groups (U=27, p<.05). The rank averages showed that there are significant differences between the experimental and the control group, in favor of the experimental group exposed to blended learning. That is, blended learning was more effective that face-to-face instruction. A reason for this might be a use of maps, pictures, and videos more than the other ways of learning.

Table 3. Academic success permanency test results of experiment and control groups

Group	N	Rank average	Rank total	U	p
Experiment	26	38.87	1010.50	16,500	.000
Control	26	14.13	367.50		

In Table 3, Mann-Whitney U retention test results of students exposed to blended learning and face-to-face instruction were presented. Results indicated that there are significant differences between the experimental group and the control group (U=16,500, p<.05). To the rank averages, there was a gap between both groups. That is, blended learning was more retentive than face-to-face instruction.

Table 4. Academic success test averages and standard deviation values

	Pre-test			Post-test		
	N	$\overline{X}$	S	N	$\overline{X}$	S
Experiment	26	19.00	3.48	26	86.96	4.82
Control	26	20.03	1.28	26	75.76	3.98

As can be seen, students in the experimental group exposed to blended learning earned a mean score of 19.00 before the intervention while 86.96 after the intervention. Besides, students in the control group exposed to face-to-face instruction earned a mean score of 20.03 before the intervention. Also, they earned a mean score of 75.76 after the intervention. Accordingly, both groups earned higher mean scores after the intervention.

Table 5. Academic success test pre-practice and post practice points' ANOVA results

Variance Resource	**Square total**	**Sd**	**Square average**	**F**	**P**
Among subjects	1326,652	51			
Group Experiment/Control	670,153	1	670,153	51,040	.000

Error	656,499	50	13,130		
In subjects	101088,999	52			
Calculation pre-test – post-test	99448,615	1	99448,615	7443,330	,000
Group* calculation	972,346	1	972,346	72,776	,000
Error	668,038	50	13,661		
Total	102415,6511	103			

Repeated-measures factors had a significant interaction effect both on achievement and retention in both groups. In light of this, blended learning and face-to-face instruction had also main effects on student performance in social studies. The experimental group exposed to blended learning, gaining more from the achievement test before the intervention, has achieved more than the control group exposed to face-to-face instruction.

Table 6. Academic success test average and standard deviation values

	Pre-test			Post-test		
	N	$\overline{X}$	S	N	$\overline{X}$	S
Experiment	26	86.96	4.82	26	77.69	4.64
Control	26	75.76	3.98	26	63.07	4.69

As can be seen, mean scores of students exposed to blended learning have changed from 86,98 to 77,69 after the practice. Also, mean scores of those exposed to traditional teaching and learning have changed from 75,76 to 63,07. In both groups, it can be mentioned about a decline in mean scores of students they obtained from the achievement test.

Table 7. Academic success test post-practice and permanency points ANOVA results

Variance resource	**Square total**	**Sd**	**Square averages**	**F**	**P**
Among subjects		51			
Group Exp./Control	4329,240	1	4329,240	119,749	.000
Error	1807,635	50	36,153		
In subjects		52			
Calculation pre/post test	3135,010	1	3135,010	595,269	.000
Group* calculation	76,163	1	76,163	14,462	.000
Error	263,327	50	5,267		
Total		103			

Accordingly, two different types of learning have caused significant differences from post-intervention to retention. In other words, both blended learning and face-to-face instruction had an interaction effect on retention which was positively affected by both. However, blended learning was found more retentive than face-to-face instruction when post-test and retention-test scores compared.

4. Discussion and conclusions

Nonsignificant differences were found between pre-achievement test scores of students both in the experimental and the control group. According to this, it can be concluded that both groups were similar in terms of achievement in social studies. This can be regarded as important to understand the effectiveness of an intervention. Results that are in parallel to this study's findings have also been concluded by Akbaba (2009), Yapıcı (2011), and Ünsal (2007).

Post-achievement test scores of students in both groups were found in favor of those exposed to blended learning. Blended learning, compared to face-to-face instruction, is more effective with improving student performance. The reason might be that blended learning is enriched with lots of visuals and supported more with visual content. There have also been studies in parallel to this one. According to Usta (2007), Akyol (2009), and Arıkan (2007), blended learning has significant effect on student performance. A study conducted by Garrison and Kanuka (2004) also supports this finding. Doo, Mitchel, and Virginia (2006) found that blended learning affects student performance positively. This result has also been supported by the related literature (She & Fisher, 2003; Navarro & Shoemaker, 2000; Frederickson et al., 2005; Aladejana, 2009; Tuckman, 2002; Boyle et al., 2003; Godfrey & Gyles, 2003; Cüez, 2006; Pereira et al., 2007). El-Deghaidy and Nouby (2008) found significant differences in favor of pre-service teachers exposed to blended learning according to their post-test achievement scores. However, in the literature, there have also been contradictory studies. Ünsal (2007), Deliağaoğlu (2004), Lesh (2000), and Olapiryakul and Scher (2006) did not found significant differences between experimental and control groups according to post-test scores. Moreover, Matches and Asher (2000), and Demirli (2002) concluded that there were not any significant differences between groups. Achievement levels of groups exposed both to web-based learning and face-to-face learning were found close to each other. Colesca, Dobrica and Alpopi (2009) did also not found any significant difference between experimental and control groups in studies they conducted in 2005 and 2008. Nevertheless, in most of the studies, blended working has been found to be more useful to student performance. It can also be thought that blended learning will contribute student performance in social studies.

Comparing mean retention-test scores of both groups, significant differences were detected in favor of the experimental group. According to students' retention-test results, students in the control group showed a decline in their performance more than those in the experimental group. It has been represented in many studies that students do not forget what they learn by sight and hearing.

The results of repeated-measures analysis of variance showed that methods had a significant interaction effect on student performance in social studies when pre- and post-test scores considered. Yet, blended learning was found more effective than face-to-face instruction. Besides, differences were found significant in favor of the experimental group exposed to blended learning. These findings are also supported by the studies of Şahin (2000) and Gültekin (2006). According to Kert and Tekdal (2004), Taşçı (2006), Demirel (2006), Tutaysalgır (2006), Yekta (2004) and Çelik (2007)'s studies, the experimental group has been more successful in light of post-test results. Altınışık and Orhan's (2002) study showed no significant differences according to analysis of covariance of pre- and post-test results.

According to the results of post-achievement test and retention-test, blended learning was found more effective than face-to-face instruction. While means scores of students exposed to face-to-face instruction had a decline of 12, means scores of those exposed to blended learning had a decrease of 8. It can be said that blended learning method is more retentive than face-to-face instruction.

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