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How Should We Blend? The Impact of Blending Social Networks on High School Students' Achievement and Social Networking Behaviors *

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Abstract

This study examines the effect of blended learning environment, where social networks are utilized to supplement or enrich classroom environment, on the academic achievement and social network usage behaviors of high school students. The study was carried out with a total of 104 students in 10th grade of a state high school in İstanbul. It involved one control and two experimental groups. The students in the first experimental group were obliged to use social networking which aimed at complementing the class environment. The social networking environment was presented to the students in the second experimental group with the purpose of enriching the class environment. Yet, participation to this networking was voluntary. For the control group, all activities were held in face-to-face classroom setting. A 24-item test was developed to measure students' academic achievement and administered as pre- and post-test. In addition, all activities of students on the social network were recorded to measure their social networking behaviors, and these records were used to calculate total activity scores, and course-related activity scores. Academic achievement test scores of both experimental groups were found to be significantly higher than those of the control group. Another finding of the study is that, in the social network, total course related activity scores did not significantly differ between experimental groups. Findings indicate that using social networks to supplement or enrich classroom setting increases student achievement. This increment is higher when the social network is used to supplement classroom setting instead of using social network as enriching medium. Suggestions were also provided.

Keywords

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Introduction

Current and emerging information and communication technologies (ICT) tools are closely connected with education as they offer multiple opportunities to keep the connection among teacher-student-material after students leave face-to-face environment. The intensive use of the Internet and mobile technologies in the last 20 years has led to their inclusion into the face-to-face instruction by blending different learning models. In the same context, social networks are also technological environments through which learners and teachers who do not share the same time and place can continue to engage in uninterrupted communication and interaction and with these qualities they have the potential to be employed as part of blended learning.

For blended learning environments, blending can be done at activity, course, program or institution levels (Graham, 2006), and the blending ratios of the media and environment can be different at each level (Ekici & Karaman, 2011). Staker and Horn (2012) define a program in which activities such as small and large group studies, projects, and individual assignments are given on a pre-determined sequence by the teacher as rotation model of blended learning. According to another definition, the integration of online additional resources and supplementary materials to face-to-face learning environments is called enhanced blending (Graham, 2006). On the other hand, Jin, Zhigang, and Gough (2010) call formal and informal group practices such as group discussions and e-mentoring as augmented platform. In addition to these definitions, Anohina (2005) mentions lack of consensus on the use of a number of terms such as supported, directed, aided, assisted, facilitated, based, enriched, and mediated that define the ways of integrating ICT into instruction. On the other hand, for all levels of education, it is possible to encounter practices to enrich instruction in which social networks are used for instant random sharings and socialization without a fixed schedule. Through social networks, both teachers and students can keep socialization that originates from the atmosphere of the class/course and make co- and extra- curricular activity sharings. However, these practices do not fulfill blended learning definitions.

In this context; it can be said that there may be differences in learning in terms of student performance between

- a learning environment (*complementary*) where learning activities on the social network are done in coordination with and under the guidance of a teacher and are evaluated as if they were done in the classroom environment, and are integrated into face-to-face classroom environment, and
- an environment (*enriched*) where students do course-related activities without a teacher and the activities on the social network are not evaluated and neither are they integrated into face-to-face classroom environment.

Correspondingly, it is important to determine in what way social networks, very important communication tools with ever increasing users, should be integrated into learning environments and how such integration would affect student performance.

Literature Review

Despite the fact that Internet technology is a very important social context for the youth of our day, the line between real world and virtual world have recently become blurred for young people (Subrahmanyam & Greenfield, 2008). Social networks make it possible for individuals to show themselves, form their own social circles and keep in touch with other people (Ellison, Steinfield, & Lampe, 2007). Additionally, as such platforms are extensively used and contain various technologies, and connect online and real worlds to each other, they constitute an attractive field for educational research. In a meta-analysis study it was determined that the following three themes were observed in research related to the integration of social networks into education: 'communication between students and teachers and appropriate professional behaviors; pedagogical and technological challenges related to incorporating social networking practices into teaching and academic practices; how social networking can be exploited for teachers' professional training and development' (Manca & Ranieri,

2017, p. 608). The second one of these themes has been observed to focus especially on improving the quality of students' learning through social networks.

The use of social networks in education requires students' regular and continuous access to the Internet. According to 2016 statistics, four out of every five teenagers aged 15-24 are Internet users (Turkish Statistical Institute, 2016b). By 2016, 22.9% of the total number of houses in Turkey have desktop computers while 36.4% have portable computers, constituting a total of 59.3%. Mobile phone ownership increased to 96.9% with 42.9 million fixed-broadband or mobile internet subscriptions (Turkish Statistical Institute, 2016a). In addition to this giant leap, another striking point is that 65.2% of all Internet connections are made via mobile phones (Turkish Statistical Institute, 2016a). Ownership by Turkish users of social media accounts was shown as 52% for 2015, and it was reported that 82.4% of Internet users participated in social networks (Turkish Statistical Institute, 2016a). In line with such intensive use of the Internet, for children in Turkey, the age dropped to 8, 9, and 10 for starting to use the computer, the Internet, and the mobile, respectively (Turkish Statistical Institute, 2013). These children use the Internet to do their homework and learn new things (84.8%), play games (79.5%), do search (56.7%), and use social networks (53.5%) (Turkish Statistical Institute, 2013). Looking at these figures, it can be readily concluded that four out of five of children between the ages of 6 and 15 use the Internet to learn things, and more than half use social networks on the Internet. In other words, social networks become the massive media for communication between children. This figures suggest that there is a significant potential of social network as an educative tool.

Ours is an age in which technology, particularly social networks and social media have invaded people's lives, and in which virtual and real worlds are psychologically connected (Subrahmanyam & Greenfield, 2008). Therefore, with a view to approaching students through their own world, it is essential to incorporate the technologies and social networks that are intensively used by the youth into the classes. In this context, social networks can be considered as informal learning networks. They carry opportunities for engaging, autonomous, and self-regulated learning opportunities while offering current, authentic, and diverse knowledge skills (Czerkawski, 2016). Junco (2012) states that time spent on social networks is significantly and positively related to out-of-class engagement which implies the importance of using social network sites to improve student engagement.

Social networks create a learning-promoting environment by way of combining social, cognitive and teaching presence in an inartificial manner (Rap & Blonder, 2016). Consequently, in-class (or academic) engagement and out-of-class engagement in educationally relevant (or co-curricular) activities are important to student success (Kuh, 2009). In other words, student engagement is an important factor that accompanies achievement. In the literature, there are studies that displayed positive correlation between the amount of social network usage and student engagement (Heiberger & Harper, 2008); Higher Education Research Institute [HERI], 2007). When integrated into traditional learning environments, social networks provide easy-to-use tools to promote blended learning as they support it with social learning (Jenewein, 2013).

Technology enhanced blended learning environments enable students to learn in their own pace, to use their preferred learning strategies, and to experience a high-quality learning by receiving instant feedback, thus they make students feel they are successful and render them successful (Horn & Heather, 2011). In addition, researchers agree that collaborative activities carried out on the social networks increase students' commitment to the course and foster their academic achievement (Ram, Ai, Ram, & Sahay, 2011). In this line, in the literature, in most of the studies in which ICT or social networks are integrated into the class, it was seen that integration of social network and other Internet applications into learning environment positively contributed to student performance (Al-Qahtani & Higgins, 2012; Barış, 2011; Bilgin, 2013; Ekici, 2012; Karahan & Roehrig, 2016; Karal, Kokoç, & Çakır, 2017; Nee, 2014; Özmen, 2012; Rap ve Blonder, 2016; Taradi, Taradi, Radić, & Nikša, 2005; Toğay, Akdur, Yetişken, & Bilici, 2013; Van Vooren & Bess, 2013). Each of these studies were conducted in different grades. For example, the studies by Nee (2014) and Van Vooren and Bess (2013) were conducted in secondary school, the study by Barış (2011), Karahan & Roehrig (2016), Karal et al. (2017), and Rap and Blonder

(2017) was conducted in high school, the studies by Al-Qahtani and Higgins (2012) , Taradi et al. (2005), Toğay et al. (2013), Ekici (2012), Özmen (2012) and Bilgin (2013) were conducted at tertiary level.

On the other hand, although few in number, there are other findings from research that indicate the opposite. For instance, in his research in which he investigated the effect of activities done on Edmodo social networking site on students' academic performance, Shockney (2013) found no statistically significant difference between academic performances of experimental group using social network and control group using only classroom environment for activities. In the integration process of social networks into learning, it is essential to notice that both the students and the teacher may not always share the same physical environment. This necessitates consideration of restrictions of distance learning. According to Willging and Johnson (2009), in learning environments where distance learning takes place, low intrinsic motivation and busy lifestyles of learners are important factors. Taking these factors into account, the question arises as to how compulsory or optional use of the environments in which face-to-face instruction and social networks are blended effects students in terms of achievement and behavior.

Learning interactions such as uploading files, discourse concerning the learning material, etc. on social networks demonstrate a potential for those environments to serve as additional tools for teachers in improving the learning of students (Rap & Blonder, 2016). Junco's (2012) study revealed that Facebook activities (commenting on user content, sending private messages, uploading photos, etc.) are strong predictors of student engagement, and time spent preparing for class. In their study, Michikyan, Subrahmanyam, and Dennis (2015) found that college students' self-presentation through their activities on Facebook predicted their academic achievements. Likewise, Imlawi, Gregg, and Karimi (2015) suggest that college instructors who create course-based online social networks to communicate with their students can increase their engagement, motivation, and satisfaction. According to their findings, students' and teachers' co-curricular and particularly humorous posts provide more engagement compared to only course-related posts (Imlawi et al., 2015). In this case, the question of how social networks could be integrated into teaching to maximize their efficiency becomes a key question to be answered.

Objective of the Study

Within the scope of this research, the purpose was to study how students' learning activities on social network would affect their learning and co-curricular and free interactions on social network when such activities are conducted under teacher supervision and guidance or without teacher supervision and guidance. However, as any direct integration of very popular social networking sites into learning environment would mean incorporating the many inherent dangers of these sites into learning environment, instead of available social networking sites, we preferred to form a platform that offers the same technologies but serves solely to learning purposes. Thus, we aimed at preventing the negative aspects that students could experience in general-purpose social networking sites such as Facebook. The following research questions guided the study:

1. Is there a significant difference among academic achievement post-test scores of the experimental group which used educational social networks as a complement, of the experimental group which used them for enrichment, and of the control group which used no social network at all?
2. Is there a significant difference between social network usage behaviors of the experimental group which used educational social networks as a complement to learning environment and the experimental group which used them for enrichment?
    a. Is there a significant difference between "total activity scores on the social network" of the experimental group which used educational social networks as a complement to learning environment and the experimental group which used them for enrichment?
    b. Is there a significant difference between "class-related activity scores on the social network" of the experimental group which used educational social networks as a complement to learning environment and the experimental group which used them for enrichment?

Method

Research Design

In this research, "pretest-posttest comparison group model" was employed as a semi-experimental research design model. Three out of seven classes were randomly appointed as experimental and control groups. All three groups are taught by the same teacher. All groups were given pre- and post-experimental measurements. Pre- and post-test scores were used together, in order to determine the degree of effectiveness of the teaching method used in the study.

Participants

Participants are 104 tenth grade students who attend a state school located in Istanbul, Turkey. First experimental group (EG1) consists of 36 students (22 boys, 14 girls), while second experimental group (EG2) consists of 35 students (21 boys, 14 girls), and control group (CG) consists of 33 students (18 boys, 15 girls).

The school was a regular state high school, and enrolled in neighborhood without any enrollment protections. Students' families belong to middle or low income group. 50% of the students browse the Internet at least once a day, while the other 50% use the internet for 1 to 5 hours a week. All participating students are users of Facebook and 66.3% have Facebook application installed on their mobile phones. Data regarding students' frequencies of visits to Internet sites were given in Table 1.

Table 1. Averages and Standard Deviations for Students' Frequencies of Visits to Internet Sites

Group	N	Facebook		Twitter		Youtube		Instagram		Blogger		Google +	
		$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S	$\overline{X}$	S
EG1	36	3.97	1.46	2.11	1.54	3.50	1.50	1.13	.59	1.19	.62	2.11	1.65
EG2	35	4.42	1.17	2.77	1.78	3.88	1.18	1.22	.77	1.25	.88	1.88	1.49
CG	33	4.42	1.29	2.24	1.78	3.27	1.77	1.18	.76	1.09	.52	2.00	1.67
Total	104	4.26	1.32	2.37	1.71	3.55	1.50	1.18	.70	1.18	.69	2.00	1.59

$\overline{X}$ → 5.00 – 4.20: Always; 4.19 – 3.40: Frequently; 3.39 – 2.60: Sometimes; 2.59 – 1.80: Rarely; 1.79 – 1.00: Never

According to the data presented in Table 1, the Internet site that students "always" visit is a social networking site, Facebook, ($\overline{X}$ = 4,26). This site is followed by youtube.com, a video sharing network, which is "sometimes" visited ($\overline{X}$ = 3,35). Drawing on the information in Table 1, it can be concluded that students use social networks intensively.

Students were asked about their use of the Internet site Facebook. Their answers revealed that students use this social network "frequently" to keep in touch with their current friends ($\overline{X}$ = 3,96), to have fun ($\overline{X}$ = 3,67), to pass time ($\overline{X}$ = 3,41); "sometimes" to keep in touch with old friends ($\overline{X}$ = 3,05) and gain new information ($\overline{X}$ = 3,25). Meeting new people ($\overline{X}$ = 2,33) and establishing and continuing communication with people sharing common interests ($\overline{X}$ = 2,63) are the type of activities students "rarely" do. In his meta-analysis, Hew (2011) documents research results which indicate that students use Facebook to maintain existing relationships, to meet new people, to have fun, to make themselves more popular, to pass time, to express or present themselves, to learn something new, and as a task management tool for student activities. In the light of the findings, it can be said that participating students use Facebook for similar reasons.

Şener (2009) mentions that Facebook has become a part of the daily practices of its users and they use Facebook to maintain existing friendships rather than expanding their friend circles. The facts that all participants in the present study use Facebook, and 66,3% have Facebook application installed

in their mobile phones show that Facebook has also become a part of the daily routines of these students. Correspondingly, students in this study indicated that they use Facebook "frequently" to maintain communication with their current friends and "sometimes" to communicate with their old friends. In the light of these data, it can be concluded that participants reflect the characteristics of ordinary users of this popular social network.

Data Collection Tools

The data obtained from the social network application and academic achievement test scores were used in the analysis. Details related to these data collection tools are presented below.

Social Network Application: The social network developed for this study had educational purposes. However, its interface was made in a way to resemble Facebook, which students extensively use and are accustomed to. The daily log files on the database used in the social network were mined for data regarding students' log-in frequencies, log-in times, and intensity of sharings. Additionally, sharings by students on class pages were classified according to the type of content. Upon this evaluation, the following two different types of scores were calculated for each participating student;

a) *Total activity score*: It refers to the score automatically calculated by social networking site according to the number of ordinary actions (make friends, share, like, comment, form a group) by student.

b) *Class-related activity score*: It refers to the score that student obtains through class-related sharings on the social network. This score was counted and calculated by the first researcher on the basis of each student's sharings in the class groups. The score represents the number of sharings by a student related to the class topics.

Academic achievement test: Academic achievement test was a 24-item multiple choice test developed by the researchers and course teacher. Some sample questions was "What is the opposite of 'stingy'?", and "Samantha always tells good jokes. She has a __". 33 percent of questions had visual clue whether in its root or in its multiple choices. Content validation and face validation were controlled and corrected if necessary by three different experts from EFL department in a state university. 40 questions were asked to groups, and depending on item difficulty and item discrimination levels 16 questions were eliminated. For the remaining questions, item difficulty levels ranged between 0,38 and 0,83 and item discrimination levels were between 0,30 and 0,73. KR-20 value of the test was found as 0,77.

Learning Environment

Learning environment was formed by blending face-to-face learning environment with the social network environment. Wang's (2008) Generic Model of Pedagogy, Social Interaction, and Technology was used for blending two different environments for both experimental groups. The most significant element of the Model, "Facilitation of Online Discussions", was found suitable to develop an instructional design that can be supported by social networking activities. Dimensions and sub-dimensions of the generic Model were applied to the study: lesson plans, materials to be selected, the features of the social network to be used, activities to be conducted before, during, and after each lesson were determined within the framework of this Model.

Development of an Educational Social Networking Environment: In the Internet environment there are many social networking platforms used for various purposes. Although general-purpose social networking platforms could be used for instructional purposes, a new social network called 'kalemlink.com' was developed for the experiment only for educational purposes. It was used to control its modules and features to full extent, to keep daily logs for student activities, and to instantly intervene to undesired content. During the development of the social network, Facebook was taken as a model

for the interface. In line with the preferences of the teachers, the items that can be shared on the social network were determined (Çimen & Yılmaz, 2014). These items consisted of documents, videos, images, as well as collaborative documents, survey tools, crosswords, games, etc. Students were allowed to share things related / unrelated to the course and make comments, and they were encouraged to collaborate. Our aim was to increase the time students spend on the site and their engagement as indicated by Junco (2012).

Instructional Design: For the experimental activities, "I Love Rollerblading", a subject that lasts three weeks (a total of six hours), was chosen from the theme "Personality and Character" from the English Curriculum for 10th Grade. The research took three weeks in the spring term of 2013-2014 academic year. Two hours of face-to-face sessions were held with every group throughout the process each week. No time limit was set for social networking activities of experimental groups.

The teacher, under the guidance of the researchers, prepared three different instructional designs taking into consideration the English curriculum for tenth grade. These were a learning environment for EG1 which social network was complementary to the class, a learning environment for EG2 in which social network was for enriching the class environment and solely face-to-face learning environment CG.

The following instructional strategies were developed to guide course design: Students in CG who only took face-to-face classes did not conduct any activities on the social network. Students in EG1 for whom social network was used as a complement to class environment carried out compulsory social networking activities as a continuation of the class. Enriching environment was designed to enrich the classroom environment for students in EG2. The students in this group were recommended to use this platform. The instructional strategies for three groups were formed as the following:

For the CG which only face-to-face learning environment was used, social activities, pair work and group work in face-to-face environment as well as out-of-class writing activities were preferred to enable student cooperation in reciprocal knowledge-building process.

For the EG1 which social network was used as a complement to learning environment; a spiral combination of face-to-face sessions and social networking activities were intermingled and they supplemented each other on the time schedule. The supplementary material found from Internet such as drawings, photos, and videos was shared on the social network regularly on a daily basis. While some of those materials were related the course content, the others were shared just for entertainment. The students were asked to create groups of three or four, choose one of the given topics (e.g. Likes – Dislikes, Good at / Bad at / Crazy about, Personal Qualities, develop an interview or role-play video and upload it into social network. Students' products were interpreted both in social network and classroom environment.

In this context, in addition to course design where face-to-face sessions were employed;

- it was compulsory for students to participate in activities on the social network,
- teacher was present during the activities on the social network,
- activites carried out on the social network were discussed in face-to-face learning environment,
- sharings and comments made and homework done on the social network were given extra scores. As all groups would be administered the academic achievement test, which should be the same for all three groups, the teacher of the class gave these grades as oral assessment scores during the term.

For the EG2 which social network was used to enrich learning environment, face-to-face sessions and learning activities on the social network were designed differently from each other on the time schedule and the activities in each environment were planned independently from each other. In this context, in addition to course design where face-to-face sessions were employed;

- students were advised to perform activities on social networking environment, but participation was not compulsory,
- teacher participated in social networking activities as a facilitator – only when students demanded,
- teacher did not bring the activities done on social networking environment to face-to-face learning environment,
- sharings and comments made and homework done on the social network by students were not included in the assessment.

Management of Research Process: One month prior to application, social networking web pages were implemented under the class names of EG1 and EG2 student groups and it was ensured that students registered to the system. It was checked whether students were listed in the system with their real names and double records were corrected for the operationality of information collected in the social networking environment. Students were given orientation training before the experiment and IT class was always kept open for students who could not have access to the system at home.

Students in both experimental groups were encouraged to participate freely and both the teacher and first researcher shared posts and comments to encourage students. Students were informed that they could receive help from the IT teacher and the first researcher related to problems in the system. In addition, the teacher was scheduled to be online at certain hours throughout the experiment to answer students' questions.

As the content of the social network would be gradually formed by students, no materials were uploaded to the social networking page in advance. Only for EG1, the teacher initiated each activity by posting on the page once. However, students in EG2 were advised in the face-to-face session that posting and adding activities on the social network would be beneficial for their learning.

Furthermore, students in both experimental groups were assigned to develop a video and a visual in small and large groups, and individually; and upload them to the social networking system. These assignments and other activities done on the social network were also discussed in face-to-face environment with EG1.

Data Analysis

All statistical analyses were conducted with "IBM SPSS Statistics 21" statistics software. Shapiro-Wilk test was used to determine the normality of data set distributions used in the study. In addition, central tendency and distribution measurements were performed. The study also used dependent/independent group t-tests, one and two-factor analyses of variance, Mann Whitney U-test, Kruskal Wallis H-test and Wilcoxon signed rank tests to determine whether there were significant differences in data sets. The level of significance to be used in the statistical analyses was accepted as 0,05.

Results

Results Obtained for the First Research Question

Academic achievement test was administered as pre-test and post-test before and after the experimental process. The descriptive statistics for groups' academic achievement pre-test and post-test scores are given in Table 2.

Table 2. Descriptive Statistics for Experimental Groups' Academic Achievement Scores Before and After Experiment

Group	N	Pre-test (24 items)				Post-test (24 items)			
		$\overline{X}$ (%)	Sd	Min	Max	$\overline{X}$ (%)	Sd	Min	Max
EG1	36	7.38 (30.7%)	.463	2	14	17.69 (73.7%)	.563	10	23
EG2	35	7.00 (29.1%)	.498	1	17	14.17 (59.0%)	.748	6	24
CG	33	7.12 (29.6%)	.576	2	16	11.66 (48.5%)	.702	5	19
All groups	104	7.17 (29.8%)	.293	1	17	14.59 (60.7%)	.455	5	24

Table 2 shows that the average score for all groups in pre-test is 7,17 (29,8%), while the average score for all groups in post-test is 14,59 (60,7%). Pre-test scores for all groups were found close to each other. ($\overline{X}_{EG1}$=7,38 (30,7%), $\overline{X}_{EG2}$=7,00 (29,1%), $\overline{X}_{CG}$= 7,12 (29,6%)). One-way analysis of variance test on the academic achievement pre-test scores of the groups showed that the difference between groups was not statistically significant ($F(2,98)=.319$, $p>.05$), in other words, all groups were equivalent to each other in terms of the objectives of course before the experiment.

According to Table 2, control group scored below average ($\overline{X}_{CG}$=11,66 (48,5%)), EG2 scored on average ($\overline{X}_{EG2}$=14,17 (59,0%)) and EG1 scored over average ($\overline{X}_{EG1}$=17,69 (73,7%)) in the academic achievement post-test. One-way analysis of variance was employed to determine whether there was a statistically significant difference between groups' academic achievement post-test scores. The results are presented in Table 3.

Table 3. One-way Analysis of Variance Results According to Experimental and Control Groups for Academic Achievement Post-Tests

		Square of Sums	Sd	Square of Averages	F	P
Post-test scores	In groups	654.781	2	327.390	22.475	.000
	Between groups	1427.576	98	14.567		
	Total	2082.356	100			

Data presented in Table 3 shows that there is a statistically significant difference between the post-test scores of all groups ($F_{(2,98)}$=22.475, $p<.001$). Post hoc tests were conducted to determine the significantly different groups. As group members were not equal, Scheffe test was applied and the results of analysis is shown in Table 4.

Table 4. Scheffe Test Results for EG1, EG2, and CG Academic Achievement Post-Tests

1st Group	2nd Group	Average Difference	Sd
DG1	DG2	3,74622*	,91491
	KG	6,19107*	,89491
DG2	DG1	-3,74622*	,91491
	KG	2,44485*	,98765
KG	DG1	-6,19107*	,89491
	DG2	-2,44485*	,98765

*p<0,05

Table 4 indicates that differences between all pairs of groups are statistically significant in academic achievement tests. The averages of academic achievement test scores show that the academic achievement of EG1, where social networking application is complementary to classroom environment, is higher ($\overline{X}$=17,69), achievement of EG2 came second ($\overline{X}$=14,17), and the CG came third in terms of achievement ($\overline{X}$=11,66).

Results Obtained for the Second Research Question

Students got two types of activity scores according to the activities they did on the social network. The first of these is total activity score which covers students' all activities irrespective of being course related or not such as making friends, sharing posts, likes, making comments, forming groups, etc. and the other is course-related activity score which refers to the number of sharings only related to course content. As previously mentioned, total activity scores were recorded on the social media, and course-related activity scores were formed by examining the sharings of the students one by one.

Means, standard deviations, minimum and maximum values for total activity scores and course-related activity scores were calculated and presented in Table 5.

Table 5. Means and Standard Deviations of Total Activity Scores and Class-Related Activity Scores

Group	Total Activity Scores					Course-Related Activity Scores			
	N	$\overline{X}$	Sd	Min	Max	$\overline{X}$	Sd	Min	Max
EG1	36	36.11	10.59	1	276	2.66	.35	1	9
EG2	35	7.28	1.56	1	45	1.88	.152	1	5

When the data in Table 5 is examined, it is seen that students in EG1 conducted 36,11 activities on the social network, while only course-related activities had a mean of 2,66. Students in EG2 achieved a mean of 7,28 activities while the average course-related activities remained at 1,88.

The data set of activities does not indicate a normal distribution. Transformation formulas were used in order to normalize the distribution of the data set, but calculations did not yield normal distribution. Therefore, Mann-Whitney U-test, one of the non-parametric tests, was used in order to determine whether there was a significant difference students' total activity scores between learning environments where social networks were used as for complementary and enrichment purposes. The results related to the analysis are provided in Table 6.

Table 6. Mann-Whitney U-Test Results of Students' Total Activity Scores According to Experimental Groups

Group	N	Mean Rank	Sum of Ranks	U	P
EG1	36	40.19	1447.00	479.000	.081
EG2	35	31.69	1109.00		

In Table 6, it is seen that mean rank for total activity scores of students in EG1 (40,19) is relatively higher than mean rank for total activity scores of students in EG2 (31,69). However, according to Mann-Whitney U-test results in Table 6, the difference between total activity scores of EG1 ($\overline{X}$=36,11) and EG2 ($\overline{X}$=7,28)) is not statistically significant (U=479.000, p>,05).

Mann-Whitney U-test was also examined in order to determine whether there is a significant difference between students' course-related activity scores in learning environments where social networks are used as complementary and enriching. The results of the analysis is presented in Table 7.

Table 7. Mann-Whitney U-Test Results of Students' Course-Related Scores According to Experimental Groups

Group	N	Mean Rank	Sum of Ranks	U	P
EG1	36	37.67	1356.00	570.000	.463
EG2	35	34.29	1200.00		

When the data in Table 7 is analysed, it can be seen that mean rank for course-related activity scores of students in EG1 (37,67) is relatively higher than the mean rank for course-related activity scores of students in EG1 (34,29). In addition, the data in Table 5 show that students in EG1 were more active on the social network in course-related activities compared with EG2. However, the analyses of Mann-Whitney U-test revealed that the difference between course-related activity scores of EG1 and EG2 students is not statistically significant (U=570.000, p>,05).

Discussion and Conclusion

Academic Achievement

The result shows that students at the beginning of the experiment were academically at equivalent levels which interpreted that post-test scores can be seen as achievement levels of students. It was also found that the experimental group for which social network was used as a complement to learning environment had the highest level of achievement, while the experimental group for which social network was used to enrich learning environment came second in terms of level of achievement, and the control group who only had face-to-face classroom sessions came third in terms of achievement level, and these level differences were seen to be statistically significant. Correspondingly, in his study, Shockney (2013) reveals that there is a link between social network usage rate and academic achievement.

When literature is reviewed, although there are few studies indicating the opposite, a remarkably high number of studies indicate that students in learning environments blended with social networks are more successful than those who have only face-to-face classes (Al-Qahtani & Higgins, 2012; Barış, 2011; Bilgin, 2013; Ekici, 2012; Karal et al., 2017; Nee, 2014; Özmen, 2012; Rap & Blonder, 2016; Taradi et al., 2005; Toğay et al., 2013; Van Vooren & Bess, 2013). This situation is attributed to factors including students working at their own pace and receiving prompt feedback, emphasis on the notions of support and social community, increasing familiarity with the course and an increase in academic engagement through cooperative activities (Horn & Heather, 2011; Meishar-Tal, Kurtz, & Pieterse, 2012; Ram et al., 2011; Rap & Blonder, 2016).

The fact that students in both experimental groups – whether compulsory or not– continued to do course-related work through activities and assignments on the social network could be considered as a factor which led to higher academic achievement compared to the control group. Rap and Blonder (2016) reveals that students become more accustomed to the language of course in time when they are participating on social networks. Bilgin (2013) also feels that higher academic achievement obtained by the blended learning environment group could be due to their longer interaction with course-related material compared to the face-to-face learner group. Correspondingly, in this study it was found that EG1 students were more active than EG2 students in social network, and had more course-related shares and that, in a statistically significant way, EG1 students attained a higher level of academic achievement than EG2 students. Similarly, EG2 students were also more successful than CG students who never used social network. In a study conducted with university students, it was revealed that Facebook usage intensities predicted academic achievement and this was explained by the positive effect of increased socialization (Ainin, Naqshbandi, Moghavvemi, & Jaafar, 2015). The available findings appear to support the findings of this study and lead us to assume that increased activities on the social network also increase the level of academic achievement.

Schmidt and Werner (2007) reported that students' lack of self-discipline is an important factor in distance learning applications. In distance learning settings where students have to self-discipline themselves and are not monitored and have more autonomy, they need to possess more of these qualities (Sampson, 2003). Karal et al. (2017) reveal that learning process in social network can occur in the presence of a teacher. They are key player in the social network learning environments by initiating and providing social support along with teaching and cognitive presences (Rap & Blonder, 2016). From this point of view, the difference in the academic achievement levels of the abovementioned experimental groups in favor of EG1 can be thought to have stemmed from students' being in monitored

(EG1) and non-monitored (EG2) social network settings. This might be an explanation as to why EG2 students have a lower academic achievement on the social network.

McCarthy (2009), who kept Facebook activity log in his study, observed that participation in class activities increased when students were given an assignment that was considered in the assessment. In the present study, it can be concluded that the key reason for EG2 students' having less achievement than EG1 students in the social network is that the activities they made on the net were not assessed. In this case, it is possible for assessment to be utilized as a tool of self-discipline.

While it was compulsory for students in EG1 to carry out the whole set of tasks, it was optional for EG2 students. Additionally, students in EG1 and EG2 were engaged in out-of-class activities on the social network. Activities made on the social networks have a dynamic character which puts cooperation and social community concepts on the foreground, in addition to supporting collaborative learning (Meishar-Tal et al., 2012). Interactions between students on social networks present a potential as an additional tool for teachers in terms of learning (Rap & Blonder, 2016). Imlawi et al. (2015) suggest that college instructors who create course-based online social networks to communicate with their students can increase their engagement, motivation, and satisfaction. Accordingly, in the present study, students in both experimental groups socialized as they shared things related/unrelated to the class, collaborated to a certain extent, and benefitted from each other through peer-learning. Therefore, the fact that students in both experimental groups had significantly higher achievement levels than the control group could be accounted for by this aspect of the social network which makes it possible for students to socialize and learn from each other.

On the other hand, the cause of the experimental groups' higher level of academic achievement when compared to the control group may be their higher level of academic engagement. According to literature, there is a positive correlation between academic engagement and the use of social networks (Heiberger & Harper, 2008; HERİ, 2007; Junco, 2012; Rap & Blonder, 2016). Such studies seem to support the findings of the present study and indicate that increasing the activities on social networks will result in an increment in the level of academic engagement and, in turn, academic achievement.

When it comes to academic achievement, the findings of this study demonstrate that activities made on social network environments – whether compulsorily or not - had a positive effect on students' academic achievement, and this positive contribution increased with compulsory participation.

Social Network Usage Behaviors

The findings of the study show that students who used the social network as a complement to learning environment were more active compared to students who used the social network developed to enrich learning environment. Nevertheless, there is not a statistically significant difference in terms of total activity scores and course-related activity scores in both learning environments where social networks were used for complementary and enriching purposes.

According to Sampson (2003), for all learning activities, it is essential that students should have a certain amount of motivation, be adequately self-disciplined, and be free. In this context, it can be concluded that the conditions of required self-discipline could not be met due to the fact that social networking activities were optional and the activities conducted in the social network were not included in the assessments. This might be an explanation why EG2 students were less active on the social network. This might be an explanation why EG2 students were less active on the social network.

The literature suggests to use of extra-curricular sharings such as comments, direct messages, visuals, etc. on course-based online social networks to reach higher academic engagement (Imlawi et al., 2015; Junco, 2012; Michikyan et al., 2015; Rap & Blonder, 2016). Karahan and Roehrig (2016) explain this situation through the positive effect of social presence of students in social network environment on their motivation and performance. According to Imlawi et al. (2015), students' and teachers' particularly humorous posts provide more engagement compared to only course-related posts. In this setting, teacher's requirement of student participation in activities in social network as a compulsory

task or at least his/her recommendation to use this platform and allow them to share extra-curricular contributions might have played an important role in increased student engagement and academic interest which led to their academic achievement.

When all findings are construed together, it is important to stress that students' using instructional social networks which contain regular, structured assignments have a direct positive contribution to their academic achievement, while students' academic achievement increases relatively less when students' use of instructional social networks are left to their preferences. Junco (2012, p. 169) emphasizes that "in a natural setting and when left unguided, students will use social networks in ways that are both positively and negatively related to their engagement, and studying." From this point of view, the present findings seem to underline the importance of integrating face-to-face settings with social networks in a structured way in order to attain positive engagement.

On the other hand, that students in EG2 achieved significantly higher than students in control group is another finding that should not be ignored. This finding demonstrates that in case teachers refrain from being involved in activities that integrate social networks with the course content by presenting excuses such as busy schedules, interaction with a high number of students and heavy work load, they should at least be informed about the benefits of preparing such an environment and inviting and encouraging students to participate in this environment.

As a conclusion, it is seen that the positive effect of social network settings where teacher supervision is low leads to a relatively lower student achievement compared to social network settings where supervision is provided by the teacher and activities are subject to assessment; but even so, it is seen that educational activities conducted on social networks have a positive impact on achievement in all instructional settings. The thing that was amiss was instructors' effort to blend formal and informal network usage.

Limitations

Our findings provide important guidance for future research and practice, but there are inherent limitations that must be considered in interpreting the findings. One of these is the fact that the study group was comprised of students from the same high school. The size of the group and the lacking variety of high school types worked on make it difficult to generalize the findings of the study. Another limitation is that the views of experts was considered sufficient in terms of the validity and reliability of administered achievement test. Lastly, despite the fact that their regular access to the internet was confirmed by themselves at the beginning of the research, it is simply a hypothesis that in the time that the experiment took place, the students used social network in the frequency and time that they pleased, and that they used it freely and in equal conditions.

Suggestions

Under the light of the discussions and limitations based on the findings of this study, suggestions for further research as well as suggested school practices of the present study include the following:

Findings belonging to this study indicate that using social networks in high schools to supplement or enrich classroom setting increase student achievement. For this reason, use of social networks integrated to face-to-face classes in high schools in an attempt to increase course-based student achievement is strongly advised.

The findings of this study indicate that use of social networks, when used to supplement classroom setting, increases student achievement more than when they are used as enriching medium. Furthermore, it is also among the findings of this study that when social networks are used to supplement classroom settings students are more active on the social network environment. Depending on the findings, it is suggested that teachers should monitor the activities the students do on the social network, comment on and evaluate their posts and actively join these activities rather than leaving their students without supervision and direction.

The findings show that integration of social networks into class in one way or another has a positive impact on student achievement in all cases. Therefore, in case teachers are not able manage the process of integrating social networks into class, they are suggested to at least encourage their students to use social networks related to course content.

The findings of the study revealed the significance and impact of teachers' integration of face-to-face settings with social networks. Therefore, it is suggested that decision-makers in education should encourage high school teachers to put such applications into practice and offer mechanisms for this purpose.

To put the above suggestions into practice, it is essential that current teachers receive complementary training with concrete examples regarding how they can integrate classes with social networks. Similarly, it is essential that pre-service teachers experience such practices and receive due training before their graduation. For these reasons, it is suggested that integration of social networks into teaching-learning process should be included as a subject in teachers' pre-service and in-service education.

This study was conducted in a general high school. Examples of social network integration into learning settings at high school level are quite sparse in the literature. For this reason, it is suggested that similar studies should be conducted in different types of high schools.

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