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Research Article

Development of Educational Applications on the Social Network of Facebook and Its Effects on Students' Academic Achievement*

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Abstract

Nowadays Facebook with a population of over 1 billion members is one of the biggest communities in the world. Besides this, educational computer games are the applications that make learning more fun. In this study, an educational game was designed and developed through the model of Digital Game-Based Learning-Teaching in relation to the OSI Model in the Computer Networks Course and integrated into the social network of Facebook. After that, the effect of this application on the students' academic achievements was investigated. Therefore, a game called "the Osi Network Game" was developed and put online on Facebook as an educational application. There were two scales of attitude used for the analysis stage of the model of Digital Game-Based Learning-Teaching: to determine the students' attitude towards the educational computer games and the educational use of social networks. The quantitative research was conducted with a group of 70 volunteer students taking the Computer Networks course at the vocational school of Computer Programming and at the department of Computer Education and Instructional Technology at Amasya University. According to the results of the study the students' attitudes towards educational games and the educational use of social networks were found to be positive and "the Osi Network Game" had positive effects on the students' academic achievements. It can be suggested that such applications be used in other areas such as mathematics, science and so on.

Keywords

Social networks • Educational Games • Facebook • Students' achievement

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The technological advances in the 21st century urged educational institutions to keep up with the times as a result of the changes in the scope of learning-teaching methodology. Consequently, the educational needs of individuals and the technology employed to meet these needs have also changed considerably, providing the education systems with a different point of view. There has been a change in the process of learning-teaching from a traditional classroom-based formal structure to a more social and more informal way of learning. Individuals communicate and interact with each other around the world by way of the internet, which is regarded as one of the greatest inventions today, and they lead a life in a global village. The way they do this has brought about some changes in the educational systems and institutions. It is now possible to have various types of information and skills education beginning from basic level to advanced level through internet from one side of the world to the other (Neuman et al., 2005).

In Turkey where the internet is growing rapidly, there are 20.4 million registered internet subscribers and 45 million internet users (BTK, 2013). In a research conducted by Comscore (2013), 37.3% of the internet users are aged between 15-24 and 31.3% of them are aged between 25-34, which represent the youngest internet user groups in Europe. When looked at the hours per month on the internet, the Turkish internet users ranked second with 31 hours after England. According to Comscore research, Turkey is the fifth country in the world with 11.2 hours in regards to the time spent on the social networks. It is clear that Turkish internet users spend a third of the total time on the social networks. Internet users averaged 13 hours 55 minutes on Facebook in April, 2013 (Connectedvivaki, 2013). In a recent report (Kemp, 2016), of all the social networking websites, Facebook is the most preferred one with a population of 42 million members. It is the most visited website with over 1 billion members in the world (Kemp, 2016). Turkey is the second country in Europe and the sixth in the world in terms of the time spent on Facebook (Kemp, 2016; Socialbakers, 2013). Facebook has educationally significant potential regards to the tools of communication and interaction, and to the application development infrastructure. Recently there has been considerable research about the integration of social networks also called Web 2.0 (Ajjan & Hartshorne, 2008; Albion, 2008; An & Williams, 2010; Anderson, 2007; Ferdig, 2007; Lin, Hou, Wang, & Chang 2013; Sharma, Joshi, & Sharma, 2016; Sobaih, Moustafa, Ghandforoush, & Khan, 2016).

Facebook applications are interactive web applications developed to work on the social network of Facebook. These applications can be developed by firms or amateur software developers using many programming languages and offered for use on Facebook. Social add-ons or Graph APIs provided by Facebook are used to develop applications on the Facebook Platform. Through the FQL Query Language and according to the permission taken from the user during the installation of the application, it is possible to access such information as date of birth, gender, number

of friends, number of likes and number of share and to share them or post messages on behalf of the user. Of the first 10 applications with the most active users on Facebook, 7 are games. The most widely used games are Candy Crush Saga, Farmville, Angry Bird and Texas HoldEm Poker, just to name a few. The company Zynga is the top game developer with members of over 175 million active users per month among the companies putting applications on offer on Facebook. King is the second, and Wooga is the third game development company (AppData, 2013). For this reason, games can be said to be the most popular applications on Facebook.

Educational computer games are applications designed to make learning fun (Garris, Ahlers, & Driskell, 2002). Demirel, Seferoğlu, and Yağcı (2003) define educational computer games as software designed to enable students to learn the course subjects or improve problem-solving skills by making use of the game format. Games have been employed as a tool for learning for ages. Computer games are also regarded as potential tools for learning. It is not yet clear to integrate games into learning despite the fact that games which have grown into an industry over time are believed to be appropriate for educational purposes (Torrente, Moreno-Ger, Martinez-Ortiz, & Fernandez-Manjon, 2009).

Akpınar (1999) suggests that educational computer games are resemblances equipped with entertaining mechanism. What basically makes educational computer games different from other games is the fact that they bear pieces of formal information peculiar to the domain they are prepared for. The following skills, aptitude and knowledge can be developed through games:

- phenomena, scientific concepts and principles; (Anderson, Anderson, & Tylor, 2009; Nerantzi & Despard, 2012).
- higher-order thinking skills, and social skills during the learning process (Jan, 2013; Shute, 2011; Thomas & Brown, 2011)
- mental, social, emotional, and motor skills through games (Egemen, Yılmaz, & Akil, 2004).
- new discoveries, providing immersive, authentic, and fun learning opportunities (Garris et al., 2002; Laghos, 2010; Nerantzi & Despard, 2012).
- methodological information (Akpınar, 1999)
- skills of decision-making, analytical thinking and problem solving (Eow, Wan Zah, Rosnaini, & Roselan, 2009; Li & Tsai, 2013).
- communicative skills and learning (Egemen et al., 2004; Chen & Huang 2013; Şahin, Demir, & Önen, 2012).

- attitudes, perceptions, active engagement and motivation (All, Castellar, & Van Looy, 2015; Byun & Loh, 2015; Karadağ, 2015; Papastergiou, 2009; Tham & Tham, 2012; Young et al., 2012).

According to Karadağ (2015) games also provide a rich learning environment for students getting new ideas to flourish, change opinions and explore new outcomes and experiences. Karadağ (2015) also state that games contribute students' learning process and sharing individual perspective to their classmates.

It could be difficult for students to link virtual environments through games with real-life situations. This can be regarded as a negative element in realizing expected learning outcomes. Games are the type of software which aim to support teaching, rather than teaching. Therefore, it is a must to combine the software with other types of environment in the context of attaining the expected learning outcomes (Şimşek, 1998). Summing up the results of the literature conducted on the use of computers in education, Tüzün (2007) stated in a research that computer games are often used to improve such skills as strategical thinking and problem solving in science, maths, medicine, and engineering.

In recent years, the growing use of computer games and Facebook make it necessary to use them in the learning-teaching environment. Facebook is an effective platform in order to disseminate computer games and enable social communication via games. It is obvious that there will be better communication among teachers and students wherever the social networks are used, and teachers are in a better position to get to know their students (Grant, 2008; Mazman & Usluel, 2009). Literature review shows that there is research on both computer games and the social networks such as Facebook being used in the process of learning and teaching. However, the educational applications using Facebook and their effects on students are very rare.

In a study conducted on describing the educational themes in using Facebook, Selwyn (2007) states that it plays an important role in setting social networks and establishing communication in students' daily lives. It has also been proven that roles are learnt, values are understood and identities are shaped in a cultural informal learning environment through the online interaction on Facebook. It is claimed that it helps students get over the difficulties of role conflicts in communicating with teaching staff in the academic works of students.

English and Duncan-Howell (2008) investigated in to a process done on Facebook group as part of the course in Teaching Practice. The purpose was to present findings by defining pedagogical strategies concerning the Facebook use of the teachers in communicating with the students in the teaching practice, and by discussing the cons and prons of transferring the tools of accessible social networks to the learning environment.

A closed group was created by the teacher and the students were encouraged to become a member of the group on a face-to-face basis before the practice began. The Wall feature of Facebook was used as a forum in sharing all the group activities.

Kert and Kert (2010) stated that social networks overlap principles pertaining to the learning processes of constructivist approach and social cognitive theory due to the fact that they foster communication among individuals, multi-media sharing, and collaboration. In a study, they investigated into the use of the social networking websites of high school students and collected data on their perception of these environments for educational purposes. The study showed that social networks were used widely by high school students to communicate with one another, and the students thought positively its use for educational purposes.

In this recent study, an educational game was developed as a Facebook application to find out its effects on the academic results of students. The model of Digital Game-Based Learning-Teaching was used in designing the game (Zin, Jaafar, & Yue, 2009). It consists of 5 stages: Analysis, design, development, quality control and implementation, and evaluation. At the stage of analysis, the model aims to determine the general characteristics of the students, to set up the learning objectives, and to decide on the goal and the platform of the game. At the stage of design, the teaching method and strategies are determined and the constituents of the digital game are established. At the stage of development, the educational game prototype is prepared. At the stage of quality control, the alpha and the beta tests of the game prototype are done. At the stages of implementation and evaluation, the prototype of the educational game is finalized, installed into the application environment, and evaluated (Zin et al., 2009).

Method

The Sample of the Study

The study group consists of 70 volunteer students taking the Computer Networks course at the vocational school of Computer Programming and at the department of Computer Education and Instructional Technology at Amasya University.

The sample consisted of 70 students, 44 of whom were female and 36 were male. 69 of all the students reported that they had personal computers. Based on students' report, 66% of these computers could process computer games and 24% were only for some games. All the students had Facebook accounts and logged into Facebook every day.

Processes of the Study

An educational game was developed through the model of Digital Game-Based Learning-Teaching about the OSI (Open Systems Interconnection) Model in the Computer Networks Course in the curriculum and integrated into the social network of Facebook.

The model of Digital Game-Based Learning (DGBL). In this model, games are environments into which learning contents are incorporated (Zin et al., 2009).

The stages of the model are as follows (Zin et al., 2009).

1. Stage of Analysis
2. Stage of Design
3. Stage of Development
4. Stage of Quality Control
5. Stage of Implementation and Evaluation

Digital games based learning environment that draw learners from the ordinary classroom environment into an intriguing virtual world, provide multifaceted interaction with learning objects and increase learners' engagement (Byun & Loh, 2015). In addition to this, it is expected that a computer game will have a pedagogical positive effect on the educational quality of the students.

Zin et al. (2009) proposed five pedagogical components in their study design using DGBL approach as followings;

- Learning goal setting,
- Learning theory setting,
- Teaching and learning process,
- Curriculum needs,
- Moral value,
- Process of learner memorization

These pedagogical elements and game characteristics (the story, multi-media technologies, rules, feedback, ambience, struggle and competition, entertainment and rewards) which are based on collaborative learning and DGBL (Akıllı & Çağıltay, 2006; Zin et al., 2009) was basis of this study.

The observations of the learners and interviews with the students interacting with the educational computer game integrated into the teaching process and the questionnaire applied to the learners after the application will provide important data in the evaluation of the pedagogical dimension of the educational game (Akgün, Nuhoğlu, Tüzün, Kaya, & Çınar, 2011).

This study was implemented through the stages in the digital game based model. The OSI layers developed on the social network of Facebook are based on the Digital Game Based Learning (DGBL) (Zin et al., 2009). The DGBL model has 5 main stages like analysis, design, development, quality control, and implementation and evaluation. In each stage, there are some sub-tasks which act as a pre-requisite to move on to the next stage. In the analysis stage, the general features of the learners, the goals, the purpose of the game, the platform are specified. In the stage of design, teaching method and strategies, and the components of the digital game are determined in the scope of the educational game. In the development stage, the prototype is prepared and in the control stage the alpha and the beta tests are carried out. In the implementation and evaluation stage, the prototype is finalized, and the installation of the game is completed.

Stage of Analysis

Zin et al. (2009) explain this stage as following;

- Requirement learning and problem analysis,
- Determination of students' characteristics such as their learning style, readiness, gender and so on,
- Statement of learning objective
- Determination of game idea
- Definition of teaching environment via game

Thus, considering the strengths and weaknesses of the game platforms, the most suitable game environment is prepared for the students' learning (Zin et al., 2009).

When designing the game, the teaching staff at the vocational school of Computer Programming and at the department of Computer Education and Instructional Technology were consulted about the subject of the game. The OSI model that describes how the applications on a network of devices communicate was chosen as it was one of the subjects that the students had difficulty learning. The skill that they needed to acquire was the knowledge of protocols working in the layers in the OSI model.

Two types of data-collection tools were employed in order to determine the students' attitude towards the educational games and the educational use of the social networks. The data collection tool for the educational use of the social networks was the questionnaire used by Toğay, Akdur, Yetişken, and Bilici (2013) and developed by Onyebuchi in 2009 in order to determine the effects of social media on learning and teaching processes. "The Scale of Attitude towards the Educational Computer Games and the Scale of Attitude towards the Computer Games" developed by Can (2003) were used to determine the students' attitude towards the educational computer games.

The reliability analysis of the study concerning the data collection tools was done. The first scale had a Cronbach's alpha coefficient of .76 and the second one had a Cronbach's alpha coefficient of .85.

Furthermore, an achievement test developed by researchers through expert views was used to measure the achievements of the students. Students' attitude towards computer games, educational computer games and the educational use of social networks was tested on the SPSS program by using statistical analysis such as descriptive and t tests. According to the results, weekly Facebook usage hours averaged 15 hours while playing computer games averaged 5 hours. The results concerning the mean value are as follows:

Table 1

The Mean of the Responses Given by the Students

Variable	N	Mean	S.D.
Attitude towards computer games	70	3.36	.48
Attitude towards educational computer games	70	3.64	.75
Attitude towards the educational use of social networks	70	3.47	.76

As in Table 1, the attitude of students towards computer games ($\overline{X}$ = 3.36), the attitude of students towards educational computer games ($\overline{X}$ = 3.64), the attitude of students towards the educational use of social networks ($\overline{X}$ = 3.47) and the general attitude are apparently high. The responses of the students are presented in detail in the Appendix.

Stage of Design

The design of a platform called Osi Networking Game in order to develop desired skills was decided. In the stage of design, instructional design and game design are taken into consideration by following issues;

- Determining the teaching method and strategies (interrogative, problem-based or narrative) in the educational game
- Determining the digital game components (the story, roles, difficulties, traps, multi-media elements, software and hardware properties)

- To sum up, the integration of the instructional design and the designing processes of the game based on pedagogical elements and game characteristics is done (Zin et al., 2009).

The application divides into 3 parts: The first part is the start screen which gives the students an insight into the subject and measures it with an achievement test. After that, the second part consists of the OSI layers and the matching activity about the protocols. The last part is the platform game which is developed in two dimensions and where the user moves the character (the hero) through the platforms by running, jumping or climbing.

There are two different platforms called "the Osi Network Game" and "the Osi Labyrinth Game" as of the skills to be acquired. Moreover, the period and the points that a student has in each part are all recorded in a database all the way during the game. Platform games like the OSI model have 7 levels. Protocols are distributed into these layers in a mixed manner. A player moves through the levels by gathering the protocols in each layer. Whenever he/she gets the correct protocol, he/she earns more lives. The wrong protocol will result in losing lives.

Stage of Development

According to Zin et al. (2009) following steps are taken into account;

- Develop lesson plan for subject
- Develop teaching resources
- Develop game prototype

In this stage, detailed lesson plan are prepared and learning resources are integrated into game menu. Moreover, type of game technology are defined and modeling of game characters, role of player, preparation of game level designs, provision of database links to record game points, etc. are carried out during the prototyping phase (Akgün et al., 2011).

In this study, at the stage of design were planning and pre-design processes for both of the games called "the Osi Network Game" and "the Osi Labyrinth Game". The game environment and the characters were designed with the Adobe Flash program. The Osi Labyrinth Game was cancelled during the Alpha test as it was deemed unsuitable for the age of the students. The Osi Network Game was encoded by using programming languages such as Actionscript and PHP in order to decide on the points, movements of the characters, life levels, game duration and database connections. User information such as name, surname, age, sex, e-mail, number of friends, and number of wall shares were recorded into the database with the Facebook FQL Query language.

A Facebook social add-on was used to maintain interaction and communication among the students. With this add-on, the students can communicate with each other simultaneously and chat with each other about the game through the message section on the game page. A website was designed in order to integrate the game into the Facebook platform and then the game was brought to the testing stage with the website http://apps.facebook.com/osigame/ created on the Facebook Developers page. The following screen images (Figure 1, 2, 3 and 4) are given as an example;

Figure 1. The Osi Labyrinth Game prepared at the stage of design and then cancelled due to the alpha test results.

Figure 2. The beginning of the Osi Network Game.

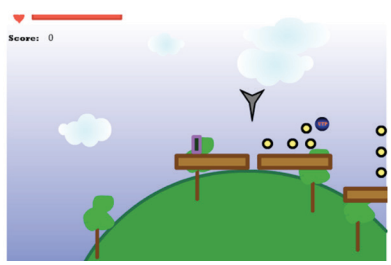

Figure 3. The beginning of the first level of The Osi Network Game.

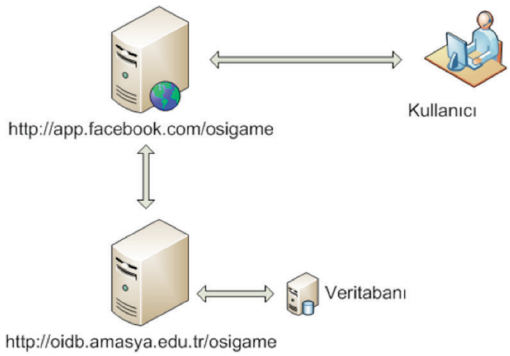

Figure 4. The working principle of the application.

Stage of Quality Control

In this stage, following issues are important;

- Check game's quality
- Check game's content
- Improve game's quality (Zin et al., 2009)

In the stage of quality control educational game prototype developed during development stage is evaluated by game test, alpha test and beta test. The purpose of these tests was to spot and correct the possible mistakes before the game reached the users. The alpha test was carried out to see if the game could be played from start to finish and the mistakes were corrected. In the beta test, the errors are checked and the possible errors are corrected. The content of the developed game is also checked to ensure compliance with learning outcomes and learning content based on the lesson syllabus (Akgün et al., 2011)

In this study, the Osi Labyrinth Game was cancelled because of the alpha test results as it was deemed unsuitable for the age of the students. In the beta test, the texture of the game, the movements of the character, the interaction, and the factors that make the game more difficult were checked out and the mistakes were fixed. Some of the problems encountered and fixed during the alpha and beta tests were the passages unable to open during the level changes and the high levels of gravity.

Stage of Implementation and Evaluation

In this stage, the developed prototype are integrated and tested completely. Developed game is set up in prepared learning environment prepared for educational applications and evaluation. The effectiveness and usability of the educational game is tried to be determined by the applications made by the target students and by their feedbacks (Akgün et al., 2011; Zin et al., 2009).

The Osi Network Game integrated into the Facebook social network was used by the volunteer students. The database showed that the game was played 226 times by 69 students and the times during which they played the game averaged between 00:00-03:00 hours and 18:00-20:00 hours. It also indicated that the number of friends of the female students was X = 250.25 and that of the male students was X = 381.82. The wall shares of the female students were X = 135.25 whereas the wall shares of the female students were X = 87.47.

An achievement test was done at the beginning of the game in order to measure students. This achievement test developed by the researchers by taking into expert opinions consisted of 40 questions and recorded into the database. 10 of these questions appear randomly when a student enters the game. Screenshot of the achievement test is shown in figure 5.

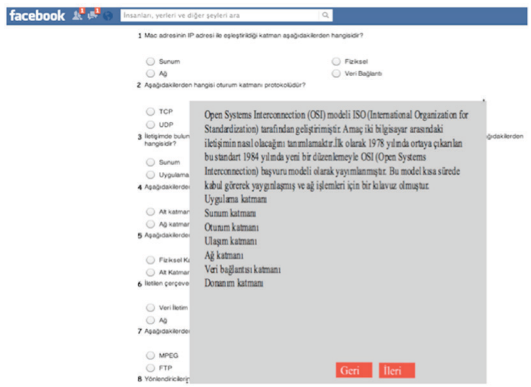

Figure 5. The start screen of the achievement test.

The achievement of a student during the game was determined by recording the answers in the database. The results in the first test and the last test were compared and the findings in Table 2 were found. The students who took the questions lightly were taken out of the evaluation. Those who have played once, haven't finished the game by playing the game in an irregular way or have finished the game many times have been excluded from the analysis.

Table 2

Analysis of the Points Given by the Students

Achievement test	Gender	N	Mean	S.D.
First	Female	24	6.67	2.16
	Male	17	5.35	3.10
Last	Female	24	8.04	1.71
	Male	17	7.35	2.73

In Table 2, the female students are said to be more successful than the male students.

Table 3

Comparative Analysis of the Answers to the Questions Given by the Students in the First and the Last Test

Achievement test	Mean	N	S. D.	*t*	df	*p*
First	6.12	41	2.64	-3.60	40	.001*
Last	7.76	41	2.19			

The paired sample t-test was used to see if the answers given by the students were different in the first and the last test. As seen in Table 3, the results reveal that there is a difference in terms of the mean in the first ($\overline{X}$ = 6.12) and the last achievement test ($\overline{X}$ = 7.76), which shows that the difference is significant [t(40) = -3.60, $p < .05$].

The second stage of the game is the matching activity in which the students were asked to match the layers of the OSI model with the protocols in the layers. Following figure is an example of the matching activity.

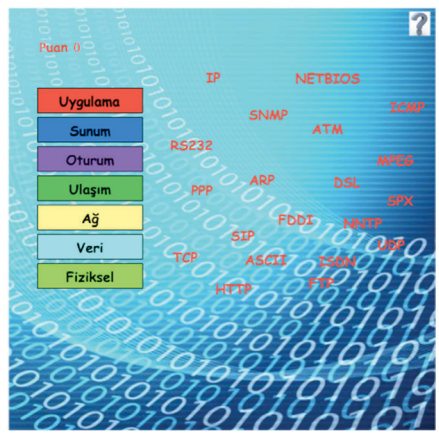

Figure 6. The matching activity.

The duration in which the students completed the activity was recorded in the database as seconds. The findings are as follows:

Table 4

Analysis of the Duration in Which the Students Completed the Activity

Duration of Activity Completion	Gender	N	Mean	S. D.
First	Female	24	470.50	159.54
	Male	17	366.76	151.96
Last	Female	24	354.92	159.74
	Male	17	271.24	118.75

In Table 4, the last practices took less time to complete. Also, the findings show that the male students are more successful than the female students.

Table 5
Comparative Analysis of the Duration of Activity Completion

Duration of Activity Completion	Mean	N	S. D.	*t*	df	*p*
First	418.63	41	155.75	3.86	40	.000*
Last	313.08	41	278.49			

In Table 5, there is a difference between the duration of activity completion in the first test ($\overline{X}$ = 418.63) and the duration of activity completion in the last test ($\overline{X}$ = 313.08) in terms of the mean values. In the paired sample *t*-test, the findings indicate that there is a significant difference [t (40) = 3.86, $p < .05$].

Moreover, interviews were conducted with 4 volunteer students (2 male and 2 female) in order to find out what they thought of the application. They stated that they liked the application quite a lot. They emphasized that such applications helped them learn as well as communicate with their friends. For example, a student expressed his opinion like this:

> Computer labs are quite boring. We aren't allowed to access Facebook. At home, we are always online. So, learning this way is way too much fun. We can send messages, play games and learn.

They also pointed out that these applications should be more comprehensive. A student said:

> There are a lot of games on Facebook. We play them at times. At first, I found it awkward to play games in class. Over time I have begun to think that this is absolutely fun and educating. I think we should have more of them in class.

Another student:

> I would never have thought that I would be playing games on Facebook and learning as well. I would like to spend more time on Facebook playing games and learning about the OSI model. I wish we could do the same in other subjects, too.

Conclusion and Discussions

People have begun to do shares on the social networks and in the virtual environments with technology everywhere in daily life and fast growing internet as its by-product. Of all the social networks, Facebook is no doubt the most recognized one with more users than the rest of them (Brenner, 2013). In 2010, it had more than 400 million users and, in 2015, it was the fastest growing social network with its members exceeding 2 billion (Kemp, 2016). Facebook has a great potential for education thanks to its interaction, tools of communication and infrastructure for application development (Lin et al., 2013). Characteristics like collaboration, personalization, user-friendly content development and metadata enrich user experience and make these website more attractive (Alper, 2012; Durmuş, Yurtkoru, Ulusu, & Kılıç, 2010; Pérez, Araiza, & Doerfer, 2013; Şener,

2009). Therefore, this makes social networks more important for educational purposes (Manca & Ranieri, 2016; Tonta, 2009). It can be said that even if social networks such as Facebook and Youtube make sense to students for their own personal and social activities, they also bear qualities of instructional technology for organizations as these applications are convenient for receiving feed-back and the social learning context. In this regard, they are important to instructors in terms of learning and teaching.

This study done to develop an educational game application on Facebook has the following outcomes:

The findings reveal that the students spend a lot of time on Facebook (15 hours a week). This is similar to the findings in national as well as international research (Cheung, Chiu, & Lee, 2011; Çetin, Sözcü, & Kınay, 2012; Junco, 2012; Kirschner & Karpinski, 2010; Sharma et al., 2016; Shin & Shin, 2011). In a study with 2359 university students, Junco (2012), for example, found that students spent 1 hour 40 minutes a day on Facebook. He also observed that they played games on Facebook apps while they were spending time on Facebook.

For this reason, what can be inferred from the study is that students learn and have fun while using educational game-based applications integrated into the Facebook network. Cross (2006) states that 80 % of learning occurs outside formal teaching. Social networks seem to be practical in increasing learning effectiveness and in disseminating teaching services.

Research suggests that social networks boost learning for students, fosters interaction between teacher - student and student - student, and increases student satisfaction related to courses if supported educationally in addition to daily use (Ajjan & Hartshorne, 2008; Kert & Kert, 2010; Lockyer & Patterson, 2008; Özmen, Aküzüm, Sünkür, & Baysal, 2011; Pérez et al., 2013). There is similar research in literature. In a study entitled "Using Social Networks in Educational Context", Ekici and Kıyıcı (2012) concluded that students using applications based on social networks were academically more successful than control group students that were educated traditionally. In a study conducted with 248 students at primary school, Çetin et al. (2012) found that games played by students on social networks contributed to their command of a foreign language.

There are similar research findings in educational games, too. Moreno-Ger, Burgos, Martínez-Ortiz, Sierra, and Fernández-Manjón (2008) stressed that there was a growing tendency towards educational games in education. In another study on educational computer games, the results showed that students had a positive attitude towards maths (Çankaya & Karamete, 2008). In a study with student teachers of maths, Kablan found that playing materials followed by teaching increased the level of learning in student teachers (Kablan, 2010).

One of the striking findings of the study is that female students use Facebook applications more actively. In a study on digital game-based learning, Papastergiou (2009) pointed out that despite the fact that male students seemed more eager and more experienced, both male students and female students were equal in motivation. Top, Yukselturk, and Cakir (2011) found that sex didn't play a significant role in the teachers' using Web 2.0 tools (Blog, Facebook, twitter etc.). However, Junco (2012) stated that there was an inconsistency between male and female students in using Facebook and that male students spent more time on Facebook than female students or vice versa

In conclusion, the tendency towards the use of social networks makes it inevitable to use such applications in education. This study suggests that the application developed for students to learn the OSI model in the Computer Networks course and integrated into the Facebook social network should be developed enough to cover other subjects and courses. In addition, further research into the possible differences between such practices and the traditional ways of learning can be conducted through experimental studies.

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Appendix

The Results of the Responses Given by the Students to Instruments

Bilgisayar Oyunları	**X**	**S.S.**
Bilgisayar oyunu oynamak önemli bir boş zaman değerlendirme uğraşıdır.	2.66	1.37
Bilgisayar oyunu oynamak vakit kaybıdır.	3.09	1.39
Bilgisayar oyunu oynamak çok vakit alan bir uğraşıdır.	3.53	1.28
Bilgisayar oyunu oynamak insanlarda bir şeyler öğrenmeye karşı merak uyandırır.	3.51	1.18
Bilgisayar oyunu oynamak bazı yararlı bilgi ve becerilerin gelişmesine yardım eder.	3.80	1.06
Bilgisayar oyunu oynamak sadece küçük yaşlardaki çocuklar için uygundur. (ilk ve ortaokul çocukları)	1.93	1.19
Bilgisayar oyunu oynamak her yaş grubu için uygundur.	3.64	1.37
Kızlar ve erkekler farklı türde bilgisayar oyunlarını oynamayı tercih ederler.	3.93	1.13
Bilgisayar oyunu oynamak bağımlılık yapar.	3.90	1.11
Bilgisayar oyunu oynamak kişilerin sosyal yaşamını olumsuz yönde etkiler.	3.41	1.28
Bilgisayar oyunları bir grup (arkadaş grubu. aile vs.) ile birlikte oynandığında kişilerin sosyal becerilerinin gelişmesini sağlar.	3.34	1.21
Şiddet unsuru içeren bilgisayar oyunlarını oynamak, insanları olumsuz yönde etkiler.	3.61	1.31

Eğitsel Bilgisayar Oyunları	**X**	**S.S.**
Tüm derslere uygulanabilir.	3.72	1.21
Tüm öğrenim düzeylerine uygulanabilir.	3.54	1.29
Okullardaki eğitim programlarının amaçlarıyla paralel kullanılabilir.	3.70	1.12
Okullardaki eğitim programlarında zaman konusunda sorun yaratmayacak şekilde kullanılabilir.	3.93	.93
Okullardaki eğitim programlarında sınıf yönetimi konusunda sorun yaratmayacak şekilde kullanılabilir.	3.66	1.07
Derslerde öğretime yardımcı olarak kullanıldığında öğrenmede etkili olabilir.	4.07	.86
Derslerde asıl öğretim aracı olarak kullanıldığında öğrenmede etkili olabilir.	3.40	1.19
Derslerde bir ödül olarak kullanıldığında öğrenmede etkili olabilir.	3.93	.99
Derslerde. öğrencilerin boş zamanlarını doldurmak için kullanıldığında öğrenmede etkili olabilir	3.30	1.28
Ortak öğrenme ortamı sağladığında öğrenmede etkili olabilir.	3.67	1.05
Yarışmacı öğrenme ortamı sağladığında öğrenmede etkili olabilir.	3.81	1.10
Oyunda belirli bir hedef verildiğinde öğrenmede etkili olabilir.	3.94	1.01
Oyunda belirli bir hedef verilmediğinde öğrenmede etkili olabilir.	3.01	1.23
Oyunda öğrencilerin kendi hedeflerini seçmelerine izin verildiğinde öğrenmede etkili olabilir.	3.50	1.22
Gerçekçi amaçlara dayandıklarında öğrenmede etkili olabilir.	3.75	1.14
Düşsel/fantezi amaçlara dayandıklarında öğrenmede etkili olabilir.	3.20	1.22

Sosyal Ağların eğitsel kullanımı	**X**	**S.S.**
Sosyal ağların eğitim amaçlı kullanımını faydalı buluyorum.	3.79	.96
Eğitimimde sosyal ağları kullanmam. daha iyi notlar almamı sağlıyor.	2.99	1.19
Eğitimimde sosyal ağları kullanmam. ödevlerimi daha çabuk bitirmemi sağlıyor.	3.21	1.22
Eğitimde sosyal ağları kullanmak verimliliğimi arttırıyor.	3.24	1.18
Sosyal ağ kullanımını kolay buluyorum.	4.06	.99
Sosyal ağlarda deneyimli bir kullanıcı haline gelmek benim için çok kolay oldu.	3.91	1.03
Sosyal ağların eğitim amaçlı kullanımını öğrenmeyi kolay buluyorum.	3.69	1.00
Sosyal ağ uygulamalarını basit ve anlaşılır buluyorum.	3.83	.84
Eğitimim sırasında ulaştığım internet erişim imkânları. sosyal ağları kullanmamı kolaylaştırıyor.	3.70	1.09

Sosyal Ağların eğitsel kullanımı	**X**	**S.S.**
Derslerimize giren öğretim görevlileri ve okulumuzun yöneticileri eğitim süreçlerinde sosyal ağ araçlarının kullanımı konusunda beni teşvik ediyorlar.	3.13	1.27
Ailem ve akrabalarım eğitim sürecimde sosyal ağları kullanmamın gerekli olduğunu düşünüyorlar.	2.94	1.21
Arkadaşlarım eğitim sürecimde sosyal ağları kullanmamın gerekli olduğunu düşünüyorlar.	3.25	1.19
Bir sosyal ağın üyesi ve kullanıcısı olmak. bende bir topluluğun parçası olduğum hissi uyandırıyor.	3.38	1.16
Bir sosyal ağ topluluğuna bağlı olduğumu hissediyorum.	3.46	1.19
Eğer bir ders çalışma konusuyla ilgili olarak bir cevap almaya ihtiyaç duyarsam. üye olduğum sosyal ağ grubuna çözüm ile ilgili cevap almak için mesaj atabiliyorum.	3.76	1.20
Benim sosyal ağ topluluğumla aramdaki arkadaşlık ilişkileri ve birliktelik benim için çok şey ifade ediyor.	3.44	1.17
Bana göre. geleneksel eğitim yöntemlerine ilave olarak sosyal ağların öğretim etkinliklerinde kullanımın daha çok çekici olduğunu düşünüyorum.	3.40	1.14
Geleneksel eğitim yöntemlerine ilave olarak sosyal ağların öğretim etkinliklerinde kullanımın çok daha iyidir.	3.49	1.11
Eğitim etkinliklerinde sosyal ağları kullanmaktan hoşlanıyorum.	3.63	1.04
Eğitim etkinlerinde sosyal ağları kullanmak öğrenmeme yardımcı oluyor.	3.51	1.11
Geçmiş öğretim yıllarında okulumuzdaki eğitim etkinliklerinde sosyal ağları sıklıkla kullandık.	3.21	1.17
Okulumuzdaki eğitim süreçlerinde sosyal ağları bu öğretim yılında sıklıkla kullandık.	3.19	1.20