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Abstract. *The study attempts to determine whether or not Facebook is an environment suiting the Community of Inquiry Framework by investigating the cognitive, social, and teaching presence perceptions of students in Facebook groups and to examine the impact of group size on the Col model. Additionally, whether or not these three types of presences predicted academic success and motivation were investigated.*

The data were analyzed through logistic regression analysis, independent samples t-test and the Pearson correlation coefficient. The study was conducted in a blended course, where Facebook was utilized for online discussions. The study revealed that the relation between cognitive, social, and teaching presences was significant and at a high-level. The high correlation determined among the social, cognitive, and teaching presence perceptions of students in learning communities created on Facebook leads to the consideration that Facebook is a suitable online environment for the COI framework.

It is understandable, that all presence perceptions are higher in smaller groups when group impacts are investigated. Other conclusions derived from the study are that academic success was only predicted by cognitive presence and motivation was predicted by both cognitive and teaching presences.

Key words: *academic success, cognitive presence, Facebook, motivation, social presence, teaching presence.*

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FACEBOOK AS A NEW COMMUNITY OF INQUIRY ENVIRONMENT: AN INVESTIGATION IN TERMS OF ACADEMIC ACHIEVEMENT AND MOTIVATION

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Introduction

The popularity and frequency of the use of social networking websites in our daily lives is ever-increasing. They are dramatically changing our traditional communication, interaction, and learning patterns. Furthermore, they appear to be appealing to students of today (digital natives), who wish that the learning process was more autonomous, interactive, and based on social experience (Prensky, 2001) and instructors looking for the ways to have these students participate in courses in a more active and motivated manner (Jones & Fox, 2009; Paul, Baker and Cochran, 2012; Junco, Heiberger, & Loken, 2010; Greenhow, Robelia, & Hughes, 2009; Crook, 2008; Grosbeck & Holotescu 2009; Schroeder et al. 2010). Even though this lies within the area of interest of communication, psychology, and sociology, it also lies within the area of interest of educational science in terms of variables such as its impact on human learning and motivation.

According to Boyd & Ellison (2007), social network sites (SNSs) can be defined as "web-based services that allow individuals to (1) construct a public or semi-public profile within a bounded system, (2) articulate a list of other users with whom they share a connection, and (3) view and traverse their list of connections, and those made by others within the system. Among social networks such as Facebook, Twitter, LinkedIn, Google+, Myspace, Instagram, Foursquare, and Vine (Jones & Fox 2009; Junco, Heiberger & Loken, 2010; Hughes, Rowe, Batey & Lee, 2012) Facebook is by far the most popular one (www.socialbakers.com, 2013). Moreover, 85-99% of undergraduate students use Facebook (Jones & Fox, 2009; Paul, Baker & Cochran, 2012; Arteaga Sánchez, Cortijo & Javed, 2014).

With the increase in social network sites, the number of users of these sites has increased both in Turkey and across the world. According to the March 2014 data of the SocialBaker Report, Turkey is the sixth on the list of countries by the number of Facebook users with 2,797,120 Facebook users, and this indicates that approximately 42.15% of the country's population



has a Facebook account. When the age distribution of users is examined, it can be seen that the 18-24 age group (34%) covering undergraduate students is the largest group just like it is across the world (socialbaker.com, 2014). The second largest group is the 25-34 age group (29.8%) (www.checkFacebook.com).

Even though students consider Facebook to be a social technology instrument rather than a teaching instrument, studies suggest that Facebook has a significant effect on student performance (Madge, Meek, Wellens & Hooley, 2009; Mazman & Usluel, 2009; Selwyn, 2009; Arteaga Sánchez et al, 2014). For instance, Facebook has the potential to support students in areas such as self-respect development, social acceptance, and adaptation to university culture, which all have a favorable impact on the learning outcomes of students (Madge, et al., 2009; Yu, Tian, Vogel & Kwok, 2010). Additionally, studies investigating the relation between attitudes of students towards Facebook, Facebook use behavior, the effect of Facebook on academic outcome, Facebook use and learning performance, participation in academic discussions in courses, social capital, and student engagement indicate that there is a significant relation between learning and Facebook (Gray, Annabell, & Kennedy, 2010; Junco, 2012a; 2010; Kirschner & Karpinski, 2010; Abramson, 2011).

Facebook is more user-friendly compared to educationally approved learning management systems such as WebCT or Blackboard and it also has many users across the globe and many educational tools that can be used by students and instructors (Munoz and Towner, 2009; Miller, 2013; Toland, 2013). Thanks to these features, all users can share sources of information such as pictures, course presentations (slides), articles, and videos on their Facebook accounts. On the other hand, discussions can be performed through message sharing on timelines or Facebook's real-time chat and e-mail tools. According to Munoz and Towner (2009), Facebook can be utilized as a discussion forum and it provides an environment for students, enabling them to discuss various opinions and cooperate through tools such as walls, live group chat, and mail lists and create learning communities among themselves (Garrison, 2009). Furthermore, Facebook also provides other advantages, such as the spread of information, arousing curiosity, motivation, the opportunity for interaction, and transforming education into entertainment (Çoklar, 2012). Facebook also provides the opportunity to be independent of time and space (asynchronous), think about the issue of discussion thoroughly and reflect it, read old discussions or watch videos over again and think in-depth on the issue (Garrison, Anderson, & Archer, 2001) similar to asynchronous online discussions. Due to the previously mentioned features, it is expected that Facebook develops the cognitive presence of students.

Social networks are regarded to be an environment fit for cooperation, creating a new product, receiving and sending timely feedback, and organizing social relations for supporting the development of identity (Greenhow, 2011; Dron & Anderson, 2009a; cited by Veletsianos & Navarrete, 2012). Therefore, the use of social networks for educational purposes is recommended in overcoming problems such as the feeling of isolation from the group, which is frequently encountered in learning processes and has an adverse impact on learning, time limitation or the "inability to speak in public" due to shyness. Within this context, it is pointed out that social network sites support processes suggested by the constructivist approach such as forming communities, creating the sense of social presence, and interactive participation in discussions and also have a positive impact on learning (Brady, Holcomb, & Smith, 2010; Naveh, Tubin, & Pliskin, 2010; Toland, 2013).

Facebook also provides students with an opportunity to get to know their instructors or classmates better (Çoklar, 2012). Thus, it has a positive impact on the student's course motivation, affective learning, and the feeling of being a part of that group (Mazer, Murphy, & Simonds, 2007; Junco, 2012). Furthermore, Facebook provides a social environment, enabling the student to interact with instructors and peers and facilitates the process of knowledge construction (Çoklar, 2012).

Many reasons can be pointed for undergraduate students using Facebook. Joinson (2008) concluded that students used Facebook for reasons such as communicating with their friends, social capital, and informal learning and there was a positive relation between their perception of achieving these purposes and their frequency of using it. Another study suggested that the use of Facebook supported relations between friends and enhanced the psychological well-being of that individual (Ellison, Steinfield, and Lamp, 2007) and therefore, the student believed Facebook to be a network facilitating learning without feeling isolated in the course setting (McInerney and Roberts 2004; Wodzicki, Schwammlein, and Moskaliuk 2012). Cheung, Chui, and Lee (2011) investigated the reasons why students used Facebook and suggested that social presence perceptions were significant in Facebook use. These studies reported that Facebook, which is based on the notion of creating social networks and communities, supported social presence perception and was suitable for courses designed with blended learning. Cheung et al (2011) investigated social presence according to "the social presence theory" (Short, Williams, & Christie, 1976; cited by Cheung et al, 2011), which is different to the Col Framework. Thus, the condition of Col model elements



(social, cognitive, and teaching presences) in learning processes blended with Facebook groups is a focus of interest. Furthermore, investigating the relation of the creation of learning communities in Facebook according to the Col model and the cognitive, social, and teaching presence perceptions of students in these communities with their academic success and motivation can be considered as contributing to the field.

Facebook and Community of Inquiry Framework

An educational community of inquiry can be defined as a group consisting of persons cooperating for critical discussions, in-depth thinking for constructing their personal meanings, and mutually approving meanings constructed as a community (Akyol & Garrison, 2011). The community of inquiry framework represents a process, in which deep and meaningful learning experiences are created jointly through the development of the interdependent cognitive, social, and teaching presences (Figure 1) (Garrison, Anderson, & Archer 2001; Akyol & Garrison, 2011; Miller, 2013).

The three elements of the framework are defined as social, cognitive and teaching presences. Social presence refers to the ability of an individual to develop interpersonal relations and concerns sense of belonging to the community based on the communication he/she has established in a trustworthy environment (Garrison, 2009). Teaching presence is the process of designing, facilitating, and managing social and cognitive processes for the realization of learning outcomes with meaningful and educational value similar to learning processes in face-to-face settings. Cognitive presence is the extent of the ability of students to construct and approve meaning by constantly discussing and critical thinking. It is the process of making sense of and constructing knowledge through discussion and reflection (Garrison, Anderson, & Archer, 2001).

Garrison and Akyol (2011) explain cognitive presence as stages of practical inquiry providing the solution of a problem or dilemma. According to the practical inquiry framework, the development of cognitive presence consists of four stages: 1) Triggering event stage: the process starts with this stage where the student notices a problem or defines a problem. 2) Exploration: Students explore certain topics and problems by asking questions to each other. In this stage, they share their experiences and knowledge, discuss ideas, and add new ones to the explained information (Swan, Shea, Richardson, Ice, Garrison & Cleveland-Innes, 2008). The students are required to grasp the nature of the problem and then move on to fuller exploration of relevant information (Tekiner Tolu, 2010). 3) Integration: In this stage, students construct personal meaning drawing on the ideas generated in the exploratory stage. They focus on establishing a connection between information and suggesting solutions (Garrison & Arbaugh, 2007). 4) Resolution stage: The students determine ways of implementing and testing new information they have acquired. At the same time, they should be able to translate these new ideas, information, and suggestions in new circumstances (Tekiner Tolu, 2010).



Figure 1: Community of Inquiry Framework.



Social presence, the other element of the framework, is the skill of the student to socially and emotionally represent him/herself in the community (Rourke, Anderson, Garrison, & Archer, 2001). Social presence consists of three stages. 1) Affective expression: the students share their personal emotions, feelings, beliefs, and values, 2) open communication: the students develop a connection to the course group, and this connection is supported with open communication, and 3) group cohesion: the group interacts while fulfilling the tasks given in the scope of the online course and during intellectual activities. Social presence in learning communities should be supported in order to promote the students to question, to ensure the achievement of educational objectives and to enhance quality of interactions (Garrison, 2007). Additionally, it will help in constituting a social identity instead of an individual identity (Garrison, Anderson, & Archer, 2010). At the same time, it requires the participants to explain their ideas to other participants and supports their choice in group selection and cooperation (Rourke et al, 2001). Just like other social network sites, we consider that social presence could be developed in Facebook. It is known to be a suitable environment for developing the student-instructors and student-student interaction and cooperation, while they are all physically away from each other. Furthermore, Facebook is a user-centered type of technology and owing to its social aspect, it has a powerful potential in creating learning-teaching communities rather than any type of community (Usluel & Mazman, 2009).

Teaching presence is the other element of the framework and just like in face-to-face learning environments, it is the process of designing, facilitating, and managing cognitive and social processes for valuable learning outcomes in terms of education and realizing individual meaning (Anderson, Rourke, Garrison, & Archer, 2001). Teaching presence consists of three stages: 1) Design and organization: the instructor develops programs and organizes activities and lesson plans, 2) Facilitation of discourse: In order to facilitate discourse, the instructor may review and comment upon student posts, raise questions and make observations to direct discussions as desired, keep discussions moving efficiently, draw out inactive students and limit the activities of dominant students if detrimental to the group and 3) Direct instruction: the instructor directly presents content and directs online discussions. On the other hand, direct instruction is described as providing intellectual and scholarly leadership from a subject matter expert in order to diagnose comments for accurate understanding, inject sources of information, direct useful discussions, and scaffold learner knowledge to a higher level (Swan & et all, 2008).

Findings of Facebook Studies

Many studies indicate Facebook is an effective discussion environment in the online dimension of blended learning developed for undergraduate education (Mazer, Murphy & Simonds, 2007; English & Duncan-Howell 2008). These studies have revealed that Facebook, which facilitates communication, interaction, and cooperation, has favorable effects on social presence, the sense of community, and course satisfaction and supports and reinforces educational efforts with its discussion oriented technological feature (Ku, Ho, & Lam, 2012; Greenhow, Robelia, & Hughes, 2009; Schroeder & et all, 2010; Mazer & et all, 2007). It was also demonstrated that students have a positive perception about instructors using Facebook and this boosted the motivation of students in the course by reinforcing the instructor-student relation and had a favorable impact on affective learning and the classroom atmosphere. Nevertheless, the number of practical studies with an effective theoretical and pedagogical basis in order to enhance the learning of students on social network sites is limited (Aghili, Palaniappan, Aghabozorgi and Sardareh, 2014). Therefore, it is considered that investigating whether or not the community of inquiry framework is a suitable framework for Facebook groups would be beneficial for the field.

Purpose of Study and Research Questions

Social presence concerns feeling of being a part of a group and in the context of Facebook groups, interaction and solidarity between users to construct knowledge are supported (Cheung et all, 2011) so as to enhance the student-student coherence and synergic interaction. Thus, it is considered that social presence perceptions, which are the skill of establishing interpersonal relations, will develop easier in Facebook groups through the self-introduction of participants to the community, establishment of communication in a reliable environment, and reflection of personal characteristics (Garrison, 2009). Therefore, examining the potential of Facebook groups as communities of inquiry, and measuring their impact on academic success could contribute to teaching staff in a way of utilizing Facebook in their courses. It is thought that the digital investigation of the relationship between the quality of learning outputs in learning media developed in line with community of inquiry frameworks and



cognitive presence could inform the teaching of designers and field researchers (Akyol & Garrison, 2011). To this end, this study quantitatively investigates the relation between the cognitive, social, and teaching presences in Facebook groups created according to the Col framework and academic success will contribute to the field. Furthermore, it was questioned how the number of students in research groups on Facebook impacted cognitive, social, and teaching presence perceptions and it was thought that the findings for this question could be beneficial for teaching designers who want to use Facebook as a learning medium.

The purpose of the study is to evaluate the relation between cognitive, social, and teaching presence in Facebook groups created according to the community of inquiry framework and to investigate whether or not these three structures predict academic success. A further variable focused on this research is the motivation of the students as a likely predictor of cognitive, social, and teaching presences. The sub-problems, for which answers have been sought in line with the overall objective of the study, have been determined as follows:

- Is there a significant relation between the cognitive, social and teaching presence perceptions in Facebook groups created for blended learning environments?
- Are the cognitive, social, and teaching presence perceptions of students in Facebook groups created for blended learning environments a significant predictor of academic success?
- Are the cognitive, social, and teaching presence perceptions of students in Facebook groups created for blended learning environments a significant predictor of motivation?
- Does Facebook group size, whether big or small, have a significant impact upon cognitive, social, and teaching presence perceptions?

Methodology of Research

Model of Research

The study was conducted in the Philosophy of Education course for undergraduate students, in which face-to-face and online learning processes were applied together (blended learning). A semi-experimental design was used in this study. The variables investigated in the study are the Col elements of cognitive, social, and teaching presences, academic success, group size and motivation.

Sample

Research was conducted in the mandatory Education Philosophy courses at Eastern Mediterranean University Education Faculty Pre-School Teacher Education (PSTE) and Psychological Counseling and Guidance (PCG) programs during the 2011-2012 spring and 2012-2013 fall semesters.

One hundred seventeen students in the 2011-2012 spring semester and 111 students in the 2012-2013 fall semester, for a total of 228 undergraduate students took the course. However, as the study was conducted with volunteer students, the number of students joining Facebook groups was limited to 198, while the number of students replying to the scale was 158. Hence, the statistical analysis in the study was conducted with data from 158 students.

The group consisted of 123 female (77.8%) and 35 male (22.2%) students. Among the participants, 143 were first year students (90.5%), 8 were second year students (5.1%), and 7 were third year students (4.4%). The mean age of the group was 20, the oldest participant was 37 and the youngest 18 years old.

The group variable, being one of the independent variables of the study, has been defined with two factors as large and small. In order to investigate the impact of group size on cognitive, social, and teaching presence perception, small groups were formed at the first semester of the course and a total of 121 students were randomly assigned to five smaller Facebook groups composed of 25 students each. To test the large group factor, in the next semester of the study, 77 volunteer students were assigned to a Facebook group formed for the online dimension of the course. Hence, during the course of the study, 77 students were present in the large Facebook group, whereas 125 students were present in the smaller Facebook groups. The difference between total student numbers in the Facebook groups and the number of students for statistical analysis is due to the fact that the study was conducted with volunteer students. Group figures are shown below in Table 1.



Table 1. Distribution of students within groups.

	Number of students participating in Facebook as an online process of the course	Number of students replying scales	Number of data tested with t-test *
Large Group	77	73	
Small Group A	26	16	
Small Group B	23	18	
Small Group C	24	15	
Small Group D	24	18	
Small Group E	24	18	
Total	198	158	154*

*Note: Related information is explained under the "data analysis" section title in detail

Procedures

This section presents online discussions and content in Facebook groups. The study was conducted in the Philosophy of Education course designed as a blended course. The course instructor and each undergraduate student joined the Facebook groups with their own Facebook account. As the groups were closed groups, each post or feedback could only be viewed by the course instructor and students in the group.

In an attempt to evaluate the impact of a group size on cognitive, social, and teaching presence perception, a total of 228 undergraduate students were defined as the study group composed of three groups receiving educational philosophy in the 2011-2012 spring semester and two groups receiving educational philosophy in the 2012-2013 fall semester. As seen in Table 1, students who were in three different groups in the first semester were assigned to five separate Facebook groups (small group) of 25 students each as an online dimension for the course planned as a blended course. On the other semester, all two student groups receiving this course were assigned to a 77-member Facebook group (large group).

The created Facebook groups participated in four different discussion events in each academic term of the study (eight weeks for each semester). For the discussion activities, short videos with duration of no longer than 3 minutes were shared once a fortnight in each Facebook group as well as an article was shared with the students which criticizes philosophy of Turkish Education system for the final discussion task.

The learning process in each Facebook group was aligned with the Community of Inquiry Framework. Therefore, the expression "Welcome" was posted on the wall of each Facebook group when creating the groups in order to support the social presence perception and care was taken so that students were addressed with their names during discussions. Messages regarding holidays and special days in Turkey and wishes for success on exam weeks were also shared in all Facebook groups and communication in an attempt to create a sense of community. Additionally, curiosity arousing videos and articles as well as discussion triggering questions were shared in all Facebook groups in order to support the cognitive presence perception. When the students had difficulties in solving the problems, their discussions were supported in a way of enriching their perspectives with new thought provoking questions. Furthermore, a course outline covering the learning objectives, method, source book, and links of the course and the course curriculum were put on the webpages of Facebook groups in order to ensure teaching presence. Moreover, for the purpose of sharing teaching presence between students and instructors, students were granted the responsibility of managing and facilitating the discussion process. Anderson Rourke, Archer, and Garrison (2001) stated that the distribution of teaching presence between the instructor and students can reduce the authoritarian effects of instructors during discussions and encourage a freer discussion (Akyol & Garrison, 2011).

Instrument and Measures

Data was gathered through a form which was administered after the course and the records of discussions on Facebook. The form consisted of demographic questions, the Community of Inquiry Index, and the Motivation Scale. This form was completed at the end of the term by 158 students enrolled in the course. The Community



of Inquiry Index was developed by Arbaugh, Cleveland-Innes, Diaz, Garrison, Ice, Richardson, & Swan, (2008) and adapted to Turkish by Öztürk (2012). The scale has three factors as cognitive presence, social presence and teaching presence. The Cronbach Alpha internal consistency coefficients calculated for evaluating these factors and their reliability were 0.92 for teaching presence, .88 for social presence, and 0.75 for cognitive presence. The item-total correlation of the items under these factors varied between 0.45 and 0.73.

The Motivation and Learning Strategies Scale (MLSQ) is the Turkish-adapted version of the Motivated Strategies for Learning Questionnaire developed by Pintrich, Smith, Garcia, and McKeachie (1993). The Cronbach Alpha internal consistency coefficients calculated in order to evaluate the reliability of the sub-factors of the scale are as follows: Intrinsic Goal Orientation (0.59), Extrinsic Goal Orientation (0.63), Task Value (0.80), Control Beliefs (0.52), Self-Efficiency for Learning and Performance (0.86), and Test Anxiety (0.69). Only the Motivation Scale was employed in this study and the Strategies for Learning section was excluded from the study.

Data Analysis

The voluntary students were completed the Col Index (cognitive, social, and teaching presences) and the motivation scale at the end of the term. The students' final grades at the end of Philosophy of Education course were obtained. Homogenous and normal distribution analysis was performed on the obtained data and it was determined that it suited parametric statistic techniques. The substantially important extreme values were also determined with the Mahalanobis distance in the logistic regression analysis and data which had extreme values were removed from the data set (Çokluk, Şekecioğlu and Büyükoztürk, 2010; Büyükoztürk, 2005). Also, a multi-collinearity problem was investigated by examining the tolerance and Variance Inflation Factor (VFI). For the determination of a multi-collinearity problem, Menard (1995) (cited by Çokluk et al, 2010) reports that the tolerance value of <0.1 indicates a severe multicollinearity problem. In the examination of the data of the study herein, it was observed that the tolerance value was >0.1 for all dependent variables. This indicates that the logistic regression of the data set addressed the assumptions. When determining the Mahalanobis distance values utilized in determining whether or not there are extreme values meeting linearity and normality assumptions in the logistic regression analysis, the Mahalanobis values determined was compared .001 with the chi-square table value accepted to be the degree of freedom of the independent variable coefficient. Based upon the suggestion of Büyükoztürk (2005) the Mahalanobis value and the data greater than the value in the relevant matrix were excluded from the analysis. Therefore, the data set of 158 was decreased to 154. All statistical analyses were realized based on data from 154 students.

The academic success score, which is one of the dependent variables of the study, was derived from the total scores obtained by students in a term from the philosophy of education course (book review project score + midterm + final). The content validity of the midterm and final exams utilized to evaluate course success was achieved by considering the opinions of experts in the field. Book review scores were determined through a rubric prepared in line with the objectives of the course.

The relation between social, cognitive, and teaching presence perceptions was determined with the Pearson Correlation Coefficient. Whether or not social, cognitive, and teaching presences predicted academic success and motivation was evaluated through the logistic regression analysis. Independent samples t-test was used to evaluate group impact (small-large).

Results of Research

The relation between the cognitive, social, and teaching presence perceptions of the students who were the members of Facebook groups were evaluated in the study (Table 3). Moreover, social, cognitive, and teaching presences as a likely predictor of academic success (Table 4) and motivation (Table 5) were examined. Associated findings have been presented in Table 3, Table 4, and Table 5.

The relation between cognitive, social, and teaching presences, which are elements of the community of inquiry, were analyzed with the Pearson Correlation Coefficient, as all variables meet the normality assumption (Skewness and Kurtosis coefficient had a value in the ± 1 range)

There are results of descriptive statistics in Table 1 on cognitive, social, and teaching presence perceptions derived with the Col index. According to the data obtained from the participant group of 154 (data from four participants were excluded from the study as they were detected as extreme values). The teaching presence



perception of the group was determined to be higher compared to the other elements. Cognitive presence is the second and social presence is the third. This finding is similar to the study results when ordered by values of presence perceptions.

Table 2. The descriptive statistics of student's perceptions of Col elements.

	N	Mean	Std. Deviation
Social presence	154	3.01	0.54
Teaching presence	154	3.49	0.36
Cognitive presence	154	3.21	0.48

Table 3. Relation between the elements of the community of inquiry.

	(1) Teaching presence	(2) Cognitive presence	(3) Social presence
(1) Teaching presence	-	0.75	0.64
(2) Cognitive presence	0.75	-	0.75
(3) Social presence	0.64	0.75	-

As it can be observed in Table 3, there is a high-level and positive relation between cognitive presence and other elements ($r=0.75$). There is also a positive and high-level relation between teaching and social presence ($r=0.64$). These findings can be interpreted as a reciprocal and a robust relation between the cognitive, social, and teaching presences in Facebook groups. The results of this study are similar to the results of some studies investigating learning models in online learning communities on Facebook and various LMS (Learning Management Systems) according to the Col Framework. This similarity between study results supports the interpretation that blended learning environments created with Facebook groups are suitable for the Col Framework.

Table 4. Results of the logistic regression analysis on the prediction of academic success by the Col framework.

Variables	β	S.E	Odds	95 % CI	Wald	p
Teaching presence	-0.092	0.071	0.912	0.795-1.048	1.690	0.194
Social presence	0.049	0.066	1.050	0.923-1.195	0.549	0.459
Cognitive presence	0.172	0.070	1.188	1.036-1.363	6.079	0.014
Constant	-2.024	2.118	0.132		0.913	0.339

The level of cognitive, social and teaching presences predicting academic success was examined with the logistic regression analysis. First of all, the Mahalanobis distances of the 3 factors (cognitive, social, and teaching presences) were designated as the variable of this sub-problem in order to determine the extreme values in the data set for the analysis was calculated. The determined Mahalanobis values were then compared with the constant values accepted to be the degree of freedom in the chi-square table (the table value determined for 3 independent variables and the significance level of .001). As a result of this comparison, it was determined that the Mahalanobis value for the data was above 16.268 and was the extreme value, and it was omitted from the data set. The analysis was continued with 154 data. On the other hand, academic success which is the dependent variable was converted into a variable of two categories with students receiving F and D accepted to be "unsuccessful" and those achieving C and higher to be "successful." Findings pertaining to the logistic regression have been provided in Table 3.

When the results of the logistic regression indicated in Table 4 are examined, it can be observed that social and teaching presences do not significantly predict academic success however, cognitive presence seems to significantly predict academic success. The results suggest significantly that cognitive presence had the Odds ratio [OR]= 1.188, 95%CI (1.036-1.363) $p < 0.05$ fold positive effect on the status of success ($p=0.014$). This finding shows that students



with a higher cognitive presence perception also have higher academic success compared to the students with a lower cognitive presence perception. On the other hand, it seems that social and teaching presence perceptions do not have a significant effect on the prediction of academic success.

Table 5. Results of the logistic regression analysis on the prediction of motivation by the Col framework.

Variables	β	S.E	Odds	95 % CI	Wald	p
Teaching presence	0.142	0.066	1.152	0.795-1.048	4.664	0.031
Social presence	0.103	0.063	1.108	0.923-1.195	2.654	0.103
Cognitive presence	0.120	0.061	1.127	1.036-1.363	3.870	0.049
constant	-13.952	2.511	0.000		30.867	0.000

The relation of cognitive, social, and teaching presence perceptions and motivation was investigated with the logistic regression analysis. The motivation score, which is the constant variable, was converted into a variable with two categories (low and high motivation) in order to make it suit binary logistic regression analysis. Motivation scores were separated into low and high scores to this end. As motivation scores had a normal distribution ($p > 0.05$ for Kolmogorov-Smirnov values), the arithmetic mean was determined as the orthocenter in grouping. The mean score achieved by the group from the scale was 159. This score and lower scores were included under the "low motivation" category, and higher scores were included in the "high motivation" category and the analysis was conducted accordingly. Findings pertaining to the logistic regression analysis have been provided in Table 5.

When the results of the logistic regression in Table 5 are examined, it can be observed that cognitive and teaching presences have a significant effect on motivation. However, it appears that social presence did not significantly predict motivation. The results indicate that cognitive presence positively affected motivation by the Odds ratio [OR]= 1.127, 95%CI (1.036-1.363) $p < 0.05$ and teaching presence positively affected motivation by the Odds ratio [OR]= 1.152, 95% CI (0.795-1.048) $p < 0.05$. This finding indicates that students with high-level teaching presence and cognitive presence perceptions had higher motivation on the other hand, while social presence was expected to significantly predict motivation, the result obtained to the contrary was surprising in terms of the study.

Table 6. t-test results related to cognitive, social and teaching presence group factors.

	Group Types	N	\bar{X}	Std. Deviation	df	t	p
Cognitive presence	Small Group	81	3.3683	0.42550	152	4.912*	0.000
	Large Group	73	2.9945	0.52552			
Social presence	Small Group	81	3.2099	0.49504	152	5.198*	0.000
	Large Group	73	2.7778	0.54644			
Teaching presence	Small Group	81	3.5774	0.33200	152	3.600*	0.000
	Large Group	73	3.3300	0.51499			

The impact of the group variable on cognitive, social, and teaching presence was positive in favor of small groups (Table 6). As can be seen in Table 6, all presence perceptions of students assigned to smaller groups were significantly higher than students in the larger groups. We can comment that it is relevant to compose research communities on Facebook with 25 students or less, as the presence perceptions of smaller groups are higher than larger groups. Students in larger groups with more than 25 students might have lower perceptions for social presence and related to this, lower cognitive and teaching presences as the groups are more crowded. It can be suggested that the number of students in Facebook groups intended for research communities is limited to a certain size as the presence perceptions are lower for larger groups. Students in larger groups might have trouble in knowing their peers and introducing themselves to the group. Also, students who joined discussions in a large group might have problems in being a part of the group and feeling safe. Hence, it can be concluded that students who do not feel a sense of community might be reluctant to share and discuss their ideas and might fail in delivering content and



learn what should be structured in online media. In other words, the lower social presence perception on larger groups might have prevented discussions related to learning activities on Facebook to be perceived sufficiently as deep and critical as they should be. Also, the reason why students in larger groups perceive teaching presence as lower than those on smaller groups might be because they think the tutor could not design and support learning process as effectively as it should be in a large group.

Discussion

The community of inquiry model (Garrison & Akyol, 2013; Garrison, Anderson & Archer, 2001) is a theoretical framework that focuses on the quality of education in the online learning environment, supports the enhancement of the level of cognitive, social, and teaching presence, and assumes that there is a relation between these presences (Kozan & Richardson, 2014). However, Akyol & Garrison, (2008) and Ke, (2010) consider that the relation between the Col elements needs to be investigated with the studies conducted in various environments. For this reason, this study is held in a social sharing network like Facebook, different to other online media preferred in other studies. Cognitive, social, and teaching presence perceptions of students in learning communities formed in Facebook, were defined by the Col scale and the relationship between these structures was examined. At the end of the study, as identified by similar research investigating the Col model on learning management systems developed for educational purposes, there was a significant and high relationship between cognitive, social, and teaching presence (Shea & Bidjerano, 2010; Shea & Bidjerano, 2012; Garrison, Cleveland-Innes, & Fung, 2010; Kozan & Richardson, 2014).

A positive and significant relationship between cognitive, social, and teaching presence scores, as well as the acquisition of similar results with other studies in literature, are most striking results of the study. High presence values obtained from Facebook are important, as it demonstrated that Facebook is not only a network where social relations are carried out, but also it is a medium suitable for learning, critical thinking, discussion, and cooperation. Another point worth mentioning is that nearly all the studies designed based on the Col model in the literature are held in LMS, while online discussion process in this study was carried out in a social network like Facebook.

This result suggests that Facebook is a suitable medium for community of inquiry framework, supports the view that Facebook and similar SNSs can be effective in the learning process of digital natives, who were born after 1980, use ICT actively in their personal and professional interactions, and request their education to integrate with such technology (Prescott, Stodart, Becket & Wilson, 2013). Also, some researchers suggest that the educational usage of Facebook increases the interaction between peers and creates a suitable medium for informal learning (Hurt, Moss, Bradley, Larson, Lovelace, and Prevost, 2012). These types of research support the finding that Facebook is suitable for educational usage and community of inquiry framework. Facebook facilitates educational micro learning communities in particular, and students can effectively use Facebook for academic purposes (Bosch, 2009; Grosseck, Bran, and Tiru, 2011).

As a result of the evaluation of the relation between Col elements developing in the academic success and blended learning process, which is the other issue discussed in the study, the data suggest that the cognitive presence significantly predicted academic success and on the other hand, social and teaching presences did not predict academic success.

The finding that implies that cognitive presence predicts academic success could be summarized as students with high cognitive presence perception are more active in information exchange in research communities and discussions based on easy travel collaboration, hence they improve their critical thinking abilities (Garrison, Anderson, and Archer, 2001) resulting in increased academic success. It is thought that the main reason why academic success could be predicted by cognitive presence is the discussion and interaction process that occurred in the Facebook groups.

According to literature, cognitive presence is highly related to academic achievement (Kang, Kim & Park, 2008). With a high level of cognitive presence, knowledge construction can be facilitated and learners could better manage learning resources, the learning environment, and performance (Kang, 2010). As an example, Kang, Kim, and Park (2008) investigated the relationship between the Cybergogy model composed of cognitive, social, and emotional presence and academic success and learning satisfaction (Wang, 2008), to determine whether cognitive, social, and emotional presence of students in blended learning environments predicted academic success and learning satisfaction. Kang et al. (2008) revealed that cognitive presence predicted academic success, while cognitive and emotional presence predicted learning satisfaction.



However, there are studies in literature that state that there are no significant relations between academic success and presences in the Col model. For example, in a study of Maddrell (2011), it was concluded that there was no significant relationship between actual course success reached by lecturer evaluations and students' presence perceptions based on the Col model; there was only a significant relationship between learning satisfaction and overall presence perceptions (Maddrell, 2011).

Another important finding of this study is that educational and cognitive presence perceptions of students in mixed learning environments predict motivation on a significant level. However, it is a surprising result that social presence did not predict motivation. There are many studies showing that there are significant relations between social presence and variables like participating in online discussions and motivation (Yilmaz, Topu, Goktas, and Coban, 2013; Weaver and Albion, 2005). As an example, exhibited that as social presence indicators of teaching staff in online environments increase, students' social presence perceptions also increase and related to that, student motivation increased. Similarly, Skaalvik and Skaalvik (2013) showed that when students perceived their teachers as emotionally supportive or perceived their relation with their teachers as positive, variables like internal motivation, academic individuality perception, help-seeking behavior, engagement and effort could be predicted (Skaalvik and Skaalvik, 2013).

The relation between social presence and motivation appears to be insignificant in this study, contrary to other studies. The insignificant relationship between social presence and motivation could be due to the reason that it was more important for students to have tasks to debate academic discussions in online discussion environments, the presence of the tutor, the contribution of the tutor to the discussions or tutors explanations and feedback; hence, they might have missed placing value on social communication with their peers.

Lastly, when we investigated the impact of group size (Akyol et al., 2009), which is a fairly important factor in course design, on cognitive, social, and teaching presence perception, it is observed that all presence perceptions were impacted in favor of smaller groups. Similarly, Akyol et al. (2009) conducted a study based on student opinions related to the impact of group size on presence, and they showed that students perceive smaller groups as a more reliable environment in terms of sharing opinions, looking at others' comments, and collaboration. Hence, it is recommended that in order to have deep, effective, and significant learning in blended or online courses occurring in Facebook, student groups should be composed of smaller numbers of students.

Conclusions

The study revealed that there was a high-level significant relation between the cognitive, social, and teaching presence perceptions of students in Facebook groups created according to the Community of Inquiry Framework. This is important because it indicates that the Col framework adequately and correctly reflects the learning processes in online environments and that Facebook is an environment fit for the Col framework. The relation between the elements of the Col framework tested in the Facebook environment was in line with expectations and suggested that Facebook is a suitable setting for the online discussion dimension of university courses requiring high-level thinking skills and critical thinking. Teaching presence has a significant and high-level relation with both cognitive and social presences. This has suggested that teaching presence has a key role in instructor participation, which ensures the designing of the course environment, facilitation of online discussions, performance of online discussions in a sound manner, and also having students feel confident and structure their own learning.

The second most important conclusion of the study is that academic success is predicted only by cognitive presence and also social and teaching presences were not effective in predicting academic success. This conclusion revealed that students, who actively participate in discussions in Facebook groups, develop their own perspective based on views in discussions, and make reflections, are academically more successful. However, the conclusion that social and teaching presences do not predict academic success renders future in-depth qualitative studies necessary on the relation between the Col framework with academic success.

The results on the relation between motivation and the Col framework have revealed that teaching and cognitive presences are significant predictors of motivation. This finding is important because it indicates that the course motivation of students, who can structure learning based on discussions and develop their own perspectives by benefitting from the perspectives of teachers and other students, is higher. However, on the contrary to many studies in the literature, this study has concluded that social presence does not predict motivation. An evaluation based only on scores obtained from the Col index and motivation scale was conducted in this study without taking the content of messages on Facebook into consideration. This may have prevented the complete



and in-depth evaluation of the relation between social presence and motivation. Therefore, a content analysis can be performed on discussion records, and their relation with motivation can be evaluated utilizing qualitative methods in future studies.

Also, based on the results of the study, we can say that the students who debate and express their opinions in small Facebook groups feel more relaxed and safe and therefore their ability to learn in online platforms is more deep and significant. It can even be argued that they can comprehend their teacher regarding the issues such as designing the process in online platform, facilitating the discussions, efficient and in time feedback. For this reason, it is suggested that teachers who prefer performing online learning process, which has been designed based on Col model, in Facebook should work in small groups rather than big ones.

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