

## THE EFFECTS OF SOCIAL MEDIA USE ON COLLABORATIVE LEARNING: A CASE OF TURKEY

Aysun BOZANTA

Department of Management Information Systems  
Bogazici University, Istanbul, Turkey

Sona MARDIKYAN

Department of Management Information Systems  
Bogazici University, Istanbul, Turkey

### ABSTRACT

The social media usage has penetrated to the many areas in daily lives of today's students. Therefore, social media can be effective tool to support their educational communications and collaborations with their friends and also faculty members. This study aims to determine the effects of social media on collaborative learning. For this purpose, a theoretical model is proposed based on comprehensive literature review. Using an online questionnaire, data are collected from the students of one of the largest university in Turkey. Structural equation modelling is employed as the major statistical analytic technique. The theoretical model is supported by the findings significantly. The findings indicate that perceived ease of use is a predictor of perceived usefulness and both of these have impact on social media use of students for educational purposes. Social media usage improves peer interaction and course engagement of students and also students' interaction with faculty members. Finally, peer interaction and course engagement have positive significant effect on collaborative learning. The results of the study might be helpful to students and educational leaders in their efforts to create initiatives to support, promote, and encourage the implementation and usage of social media in blended learning classes and provide adequate training for teachers to increase social media adoption.

**Keywords:** Social media, collaborative learning, structural equation modeling.

### INTRODUCTION

Social media use is an increasing trend among people in all around the world. 2.5 billion people on earth use internet and .,8 billion of those have accounts on social media sites. In recent years, usage of social media has become widespread in Turkey as well as all over the world. The number of internet users is 55.9% of all people in Turkey in 2015 (Household Information Technology Usage Survey, 2015). 80.9% of people who have internet access in Turkey use it for social networking (Household Information Technology Usage Survey, 2015). The number of Facebook users is nearly 40 million in 2015 and Whatsapp, Facebook Messenger and Twitter follow it as the mostly used social platforms in Turkey (Global Digital Statistics, 2015). The average time that is spent by the people in Turkey for social media is 2 hours and 56 minutes per day (Global Digital Statistics, 2015).

This intensive use of social media has penetrated to each and every area of our lives in recent years. Especially, the use of social media in education has been investigated by many institutions and researchers. The most of the universities in the world use social media as a communication tool for current and prospective students and also for alumni. Moreover, social media is used as a supportive tool for learning. There are many examples in literature in which social media has been used in an educational context and enriched the communication and collaboration in the class.

This study aims to investigate the effects of social media on collaborative learning. Literature is reviewed comprehensively and findings are explained in part two. Theoretical model and hypotheses are explained in part three. The questionnaire, sample, and statistical method are explained in part four. Data are analyzed and results are discussed in part five. Finally, the study is discussed and its limitations are written in part six.

## LITERATURE REVIEW

Social media is defined as “... *web-based services that allow individuals to construct a public or a semi-public profile within a bounded system, articulate a list of other users with whom they share a connection and view and traverse their list of connections and those made by others within the system*” (Boyd & Ellison, 2008). In addition, it is defined as internet-based applications and tools that provide the creation and exchange of user-generated content including videos, pictures, and written information (Kaplan & Haenlein, 2010; Li & Bernoff, 2008). Social media provides active participation, connectivity, collaboration, and sharing of knowledge and ideas among users (McLoughlin & Lee, 2007). These benefits provided by social media are very relevant and necessary for educational context. For this reason, the research of social media use in education is an increasing topic among researchers. There are both qualitative and quantitative studies in the literature which investigate the relationship of social media and education.

Different social media platforms were used to examine the effects of social media sites on education and collaborative work. Bongdanovs et al. (2012) created their social platform in order to measure the effects of self-created social media platforms for collaborative work. They observed that it is much more effective than typical social networks because it is created for a special purpose. Some of the studies handle social media sites separately and investigate the effects of specific one or specific kind of them in educational context. For instance in the study of Quincey and his colleagues (2012), the effects of social bookmarking sites were examined and it was found that they are very useful for storing, sharing and discovering resources. They are also helpful for creating learning communities (Quincey et al., 2012). Microblogs are another type that was investigated in the study of Ebner and his colleagues (2010) in which it was found that they are new type of communication that can help informal learning at outside of the classrooms. Moreover, the use of social media for educational purposes was analyzed also qualitatively by interviewing with university students and results showed that they use social media intensively for educational purposes such as exchanging practical and academic information, experiences, social support and also connecting with peers and sharing documents (Hrastinski and Aghaee, 2012).

It is stated that there is a positive significant relationship between academic uses of information technology and the occurrences of collaborative learning, and also academic uses of technology increases the interaction between students and also student and faculty members (Laird & Kuh, 2005; Junco et al., 2013). Grosseck and Holotescu (2010) also highlighted that microblogging is an effective tool for collaboration in educational context. Moreover, it was indicated that there is a correlation between the social media usage of students and the relationship between them (Rutherford, 2010; Rodriguez, 2011; Junco et al., 2013). It is appeared in the study of Hung and Yuen (2010) that students felt social connectedness more when social networking sites are used as supplementary tool for teaching.

On the other hand, the study of Wiid and his colleagues (2013) indicated that the most important factors according to the students' perceptions that affect the use of social media as an effective lecturing tool are 'Ease of use' and 'Accessibility'. Al-Rahmi and his colleagues (2014) also use two variables of technology acceptance model which are "perceived ease of use" and "perceived usefulness" and with these variables they also use "engagement", "peer interaction" and "faculty interaction" as the predictors of collaborative learning. In addition to this, they also investigate the effect of collaborative

learning and student satisfaction. Finally they examined the effects of collaborative learning and student satisfaction on student's academic performance. All relations were found as significantly effective on indicated variables.

In summary, there are researches exploring the effects of social media on collaborating learning. However in this study, main dimensions of technology acceptance model (TAM); perceived ease of use and perceived usefulness were used as the predictors of social media usage of students. It was claimed that social media usage of students is the indicator of interaction among students, also interaction among students and faculty members and course engagement. In addition, the effects of these three variables (student interaction, interaction between students and faculty members and course engagement) on collaborative learning were highlighted. All of these relationships are investigated in a single model which has not been proposed before in the literature.

## **THEORETICAL MODEL AND HYPOTHESES**

### **Perceived Ease of Use**

First of all, variables which affect the social media use are taken from basic Technology Acceptance Model (TAM) as "perceived usefulness" and "perceived ease of use" (Davis, 1989). Perceived ease of use has positive effect on perceived usefulness and also social media use and intention to use social media (Lim et al., 2013; Rauniar, 2013). Moreover, previous study from the literature revealed that perceived ease of use of social media has positive impact on social media use in educational concept (Wiid et al., 2013).

### **Perceived Usefulness**

Perceived usefulness is defined as "the degree that an individual thinks that utilizing a particular system would enhance his/her performance" (Davis, 1989). Recent studies in the literature show that perceived usefulness has a positive significant impact on social media use and intention to use social media (Lim et al., 2013; Rauniar, 2013). Moreover, previous study from the literature revealed that perceived usefulness of social media for education has positive impact on social media use for education (Wiid et al., 2013).

H1: Perceived ease of use of social media has positive significant impact on perceived usefulness of social media

### **Social Media Usage**

Social media usage variable measures students' actual usage of social media for educational purposes. Thus the discussion above leads to following hypotheses:

H2: Perceived usefulness of social media has positive significant impact on actual use of social media.

H3: Perceived ease of use of social media has positive significant impact on actual use of social media.

### **Student Interaction**

Student interaction is created to measure the communication and information sharing between students among each other. In previous studies, it was stated that social media usage may have increasing effect on interaction between students (McLoughlin & Lee, 2007; Laird & Kuh, 2005; Junco et al., 2013). In this study, it is claimed that social media usage increases student interaction:

H4: Actual use of social media has positive significant impact on student interaction.

### **Interaction between Students and Faculty Members**

Interaction between students and faculty members is created to measure the communication and information sharing between students and faculty members especially with instructors. In the literature, it was mentioned that the social media usage of students may have increasing effect on the interaction between students and faculty members (Laird & Kuh, 2005; Junco et al., 2013; Al-Rahmi, 2014). Based on the previous literature, following hypothesis was constructed:

**H5: Actual use of social media has positive significant impact on interaction of students with faculty members.**

### **Course Engagement**

Engagement means “the intensity and emotional quality of children’s involvement in initiating and carrying out learning activities” (Connell & Welborn, 1991; Skinner, 1991 cited by Skinner & Belmont, 1993). In many studies in the literature, it was found that there is a correlation between use of social networking sites and students’ engagement (Heiberger & Harper, 2008; Rutherford, 2010; Rodriguez, 2011; Junco et al., 2012, 2013). Therefore, the arguments above leads to the following hypothesis:

**H6: Actual use of social media has positive significant impact on students’ engagement.**

### **Collaborative Learning**

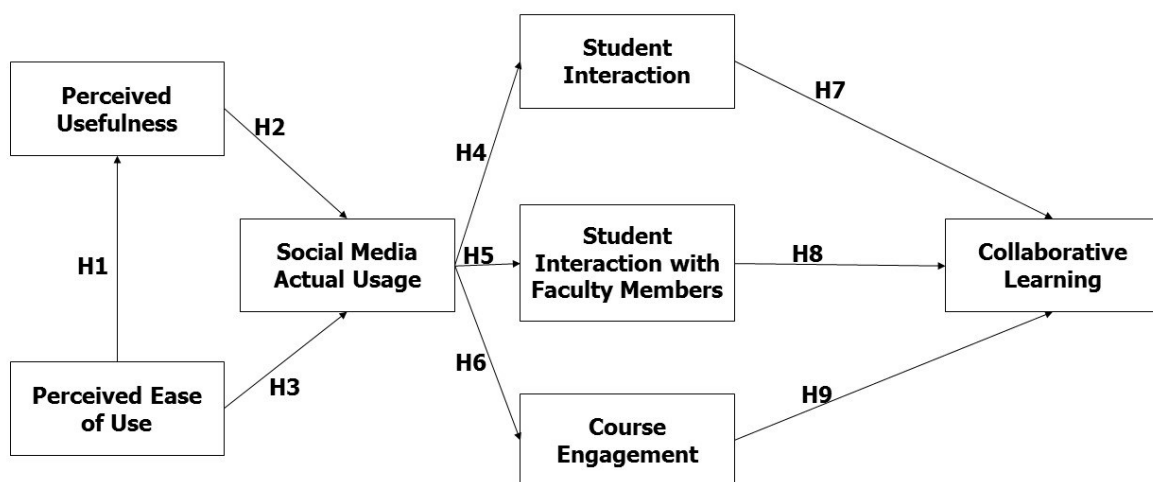
Collaborative learning is defined as following “it is a situation in which two or more people learn or attempt to learn something together” (Dillenbourg, 1999). In the study of Al-Rahmi (2014), it is found that perceived ease of use and perceived usefulness of social media student engagement, Student Interaction and interaction between students and faculty members are the predictors of collaborative learning. Grosseck and Holotescu (2010) also highlighted that social media is an effective tool for collaboration with students. Thus the argument above leads the following hypotheses:

**H7: Student interaction has positive significant impact on collaborative learning.**

**H8: Interaction of students with faculty members has positive significant impact on collaborative learning.**

**H9: Students’ engagement has positive significant impact on collaborative learning.**

In order to measure the effects of social media on collaborative learning, the theoretical model (Figure 1) was proposed by depending on the literature review. As a result of literature review, there is no such a complete theoretical model investigating the effects of social media usage of students on collaborative learning. Although, relationships between constructs in the model are investigated partially in different studies, this model is novel from various perspectives. For instance, the model is not only includes all related variables in a complete theoretical model, but also indirect and direct effects of independent variables were also measured in this model.



**Figure 1. Theoretical Model**

## METHOD

### Data

In line with the research objectives of this study, an online survey was developed and applied to a convenience sample of students of one of the largest university in Turkey. To be able to reach students from different levels (undergrad and grad) and departments, the survey was e-mailed to the students registered in that specific semester by institutional communication office. Out of 231 respondents, 166 complete surveys were used in structural equation modeling (SEM) by handling missing values with the complete case analysis. Hair et al. (2010) indicate that it requires minimum 150 sample size with a research model including seven or less constructs, modest communalities, and no unidentified constructs for SEM.

### Measures

The questions from previous studies were adopted or directly retrieved from the existing scales for this study. The survey consists of 8 sections.

The first section of the survey includes 3 demographic questions which ask for gender, age and educational level of the respondents. 7-point Likert scale questions were used in the remaining parts of the survey. Perceived ease of use and perceived usefulness which are the basic variables of TAM were asked in second and third parts of the survey respectively. The fourth part of the survey which has a question with 3 items is about actual use of social media. This scale was adopted from the study of McGowan and his colleagues (2012). The fifth, sixth and seventh sections of the survey includes questions about student interaction, faculty member interaction of students and course engagement level of students, having 4, 4 and 3 items respectively. Question about collaborative learning was asked as the eighth part of the survey having 4 items. The scales except from fourth one were adopted from the study of Al-Rahmi (2014) (Appendix A).

Although all questions were adopted or directly retrieved from the existing scales, validity and reliability analyses were applied in the confirmatory factor analysis part.

## FINDINGS

### Descriptive Statistics

The demographic profile of the respondents is presented in Table 1. 65% of the respondents were female and 35% were male. The age range varies from 18 to 45, mean value of age is 23.14 and the standard deviation is 3.54. 72% of the respondents are at the bachelor's level, 19% of the respondents are at the master level and 9% of the respondents at the PhD level.

Table 1. Demographic Profile of Respondents

Age	Min	Max	Mean	Standard Deviation
	18	45	23.14	3.54
Gender	Female	Male		
	108	58		
	65%	35%		
Education	Bachelor's Level	Master	PhD	
	119	32	15	
	72%	19%	9%	

### Structural Equation Modeling

Structural equation modeling (SEM) which examines a set of relationships between one or more observed independent variables, either continuous or discrete, and one or more dependent variables, either continuous or discrete; both of which can either be factors or measured variables (Ullman, 2000) by combining factor analysis and path analysis (Kaplan, 2000), was applied in this study. Analysis of Moment Structure (AMOS version 22) software was benefitted in the analyzing the data that was gathered from the students of one of the largest university in Turkey.

### Confirmatory factor analysis

The skewness and kurtosis values of each indicator and also standardized residual covariance matrix were examined for multivariate normality. For each variable, skewness and kurtosis values were in the range between -2 and +2. In addition, the standardized residual covariance matrix and largest standardized residuals were analyzed for evidence of normality. With the use of covariance matrices, small residual values (<0.05) are indications of normality (Bentler, 1995). Large values of covariance residuals tend to be influential in lack of model fit and are another measure of normality when using covariance matrices (Bentler, 1995). A review of the largest standardized residuals revealed no large values. All absolute values were less than 2 for all indicators. Therefore, it can be stated that each variable satisfies the normality requirement. Thus, maximum likelihood model was chosen as estimation technique.

Confirmatory factor analysis that is the first step of SEM was applied and factor loadings, factor loading squared, measurement errors and p-values were calculated (Table 2). Measurement model and its standardized regression weights can be examined in Appendix B.

**Table 2. Confirmatory factor analysis results**

Latent Variable	Indicator	Factor Loading	Factor Loading Squared	p- Value
Perceived Usefulness	PU1	0.81	0.66	-*
	PU2	0.90	0.81	0.001
	PU3	0.91	0.83	0.001
	PU4	0.90	0.81	0.001
Perceived Ease of Use	PE1	0.55	0.30	-*
	PE2	0.84	0.71	0.001
	PE3	0.84	0.71	0.001
Social Media Actual Usage	SM1	0.85	0.72	-*
	SM2	0.76	0.58	0.001
Student Interaction	PI1	0.89	0.79	-*
	PI2	0.92	0.85	0.001
	PI3	0.90	0.81	0.001
	PI4	0.87	0.76	0.001
Interaction between Students and Faculty Members	FI1	0.93	0.87	-*
	FI2	0.96	0.92	0.001
	FI3	0.97	0.94	0.001
	FI4	0.91	0.83	0.001
Engagement	EN1	0.80	0.64	-*
	EN2	0.88	0.77	0.001
	EN3	0.89	0.79	0.001
Collaborative Learning	CL1	0.93	0.87	-*
	CL2	0.88	0.77	0.001
	CL3	0.80	0.64	0.001
	CL4	0.55	0.30	0.001

\*not estimated when loading set to fixed value of 1.0

According to Hair (2009) factor loadings should be at least 0.50 and ideally 0.70 or greater. Furthermore, squared of factor loadings should explain half of the variable even if at least 0.50 factor loadings are significant. Indicators PE1 and CL4 have both 0.55 factor loadings which is not ideal but more than acceptable level. They do not violate the construct integrity. Moreover, all values are significant with p value 0.001.

Table 3 shows the goodness of fit indices for the measurement model and acceptable fit intervals. Chi-square and the root mean square error of approximation were chosen as absolute fit indices and normed fit index (NFI) and comparative fit index (CFI) were determined as incremental fit indices, and parsimonious comparative fit index (PCFI) were determined as parsimony fit indices for this study. Chi-square value of measurement model is 427.892 and degree of freedom is 231. The ratio of chi-square over degrees of freedom is 1.85, ( $\leq 3.00$ ). RMSEA was found as 0.072 which satisfies the acceptable fit value ( $\leq 0.08$ ). Moreover, NFI and CFI were found as 0.90 and 0.95 respectively. These two incremental indices also satisfied the acceptable fit values ( $\geq 0.90$ ). All values of goodness of fit indices and their acceptable values can be seen in Table 4 under the model fit section. Overall, it can be said that the measurement model provided a good fit to the data.

**Table 3. Goodness of fit indices for the measurement model**

<b>Goodness of Fit Indices</b>	<b>Values</b>	<b>Acceptable Fits</b>
<b>Chi-Square</b>	<b>427.892</b>	
<b>Degrees of Freedom</b>	<b>231</b>	
<b>Absolute Fit Measures</b>		
<b>RMSEA</b>	<b>0.072</b>	<b>.05<math>\leq</math>RMSEA<math>\leq</math>.08</b>
<b>Normed Chi-Square</b>	<b>1.85</b>	<b>X<sup>2</sup>/df<math>\leq</math>3</b>
<b>Incremental Fit Indices</b>		
<b>NFI</b>	<b>0.90</b>	<b>.90<math>\leq</math>NFI<math>\leq</math>.95</b>
<b>CFI</b>	<b>0.95</b>	<b>.90<math>\leq</math>CFI<math>\leq</math>.95</b>
<b>Parsimony Fit Indices</b>		
<b>PCFI</b>	<b>0.80</b>	<b>.80<math>\leq</math>PCFI<math>\leq</math>.90</b>

Construct validity consists of convergent validity, discriminant validity and face validity. In order to ensure convergent validity of the constructs, factor loadings, average variance extracted and reliability of the constructs were calculated. It is observable at the standard loading column and their p-values that all indicators ensure adequate standard loading value ( $\geq 0.5$ ) at the alpha level 0.1% (Table 2). Table 4 shows reliability values (Cronbach's Alpha values), average variance extracted and composite reliability values. For each latent variable Cronbach's Alpha values are greater than 0.70 that supports instrument's reliability. Moreover, each AVE met the recommended minimum threshold of 0.50. All composite reliability values exceeded the recommended level of .70. Convergent validity was assessed using factor loading, construct reliability, and average variance extracted (Hair, Black, Babin, Anderson, & Tatham, 2006). Therefore, all factors in the measurement model had adequate convergent validity.

**Table 4. Convergent Validity Values**

Latent Variable	Reliability (Cronbach's Alpha)	Average Variance Extracted	Composite Reliability
Perceived Usefulness	0.93	0.78	0.94
Perceived Ease of Use	0.79	0.57	0.75
Social Media Actual Usage	0.79	0.65	0.84
Student Interaction	0.94	0.80	0.95
Faculty Interaction	0.97	0.89	0.99
Engagement	0.89	0.74	0.91
Collaborative Learning	0.87	0.65	0.83

Then discriminant validity of the model was examined. Each correlation between constructs and their AVE values can be seen in Table 5. Most of the AVE values of constructs are greater than the square of correlation between constructs except perceived usefulness and collaborative learning pair. However, these two constructs are totally different constructs and there isn't any similarity between their indicators so it can be said that nearly all constructs satisfy discriminant validity requirement.

**Table 5. Discriminant Validity**

Construct 1		Construct 2	Correlation	Square of Correlation	AVE of Const 1	AVE of Const 2
PerceivedUsefulness	<->	StudentInteraction	0,76	0,58	0,78	0,80
PerceivedUsefulness	<->	SocialMediaUse	0,65	0,42	0,78	0,65
PerceivedUsefulness	<->	FacultyInteraction	0,51	0,26	0,78	0,74
PerceivedUsefulness	<->	CollaborativeLearning	0,90	0,81	0,78	0,64
PerceivedUsefulness	<->	PerceivedEaseOfUse	0,81	0,65	0,78	0,57
PerceivedUsefulness	<->	Engagement	0,77	0,59	0,78	0,74
SocialMediaUse	<->	StudentInteraction	0,66	0,43	0,65	0,80
StudentInteraction	<->	FacultyInteraction	0,50	0,25	0,80	0,89
StudentInteraction	<->	CollaborativeLearning	0,71	0,50	0,80	0,64
PerceivedEaseOfUse	<->	StudentInteraction	0,75	0,56	0,57	0,80
StudentInteraction	<->	Engagement	0,63	0,40	0,80	0,74
PerceivedEaseOfUse	<->	SocialMediaUse	0,66	0,43	0,57	0,65
SocialMediaUse	<->	FacultyInteraction	0,46	0,21	0,65	0,89
SocialMediaUse	<->	CollaborativeLearning	0,67	0,45	0,65	0,64
SocialMediaUse	<->	Engagement	0,66	0,43	0,65	0,74
PerceivedEaseOfUse	<->	FacultyInteraction	0,36	0,13	0,57	0,89
FacultyInteraction	<->	CollaborativeLearning	0,55	0,30	0,89	0,64
Engagement	<->	FacultyInteraction	0,63	0,39	0,74	0,89
Engagement	<->	CollaborativeLearning	0,84	0,71	0,74	0,64
PerceivedEaseOfUse	<->	CollaborativeLearning	0,79	0,63	0,57	0,64
PerceivedEaseOfUse	<->	Engagement	0,69	0,48	0,57	0,74

"The term 'face validity' implies that a test which is to be used in a practical situation should, in addition to having pragmatic or statistical validity, appear practical, pertinent and related to the purpose of the test" (Nevo, 1985). In order to express each construct correctly, it is important to understand its meaning and content. Therefore, at the very beginning of the study, each construct should be investigated from the literature comprehensively. In addition, their relationship should be constructed correctly based on



a literature. In this study, all constructs were taken from the literature directly or adopted from the literature.

### Structural model validity

The structural model was tested for structural model validity which includes hypotheses testing and model fit. Chi-square was found as 545, 211 and degrees of freedom is 244 which implies that Chi-square in the acceptable range since it should be less than 3 degrees of freedom ( $\leq 3d.f.$ ).

Chi-square over degrees of freedom was chosen as absolute fit index and comparative fit index was determined as incremental fit index for structural model. It can be observed in Table 6 that, both indices are in the acceptable range. Therefore, it can be said that structural model also satisfies model fit requirements.

**Table 6. Goodness of fit indices for the structural model**

Goodness of Fit Indices	Values	Acceptable Fits
Chi-Square	545.211	
Degrees of Freedom	244	
<b>Absolute Fit Measures</b>		
Normed Chi-Square	2.23	$\chi^2/df \leq 3$
<b>Incremental Fit Indices</b>		
CFI	0.92	$.90 \leq CFI \leq .95$

Afterwards, regression weights and their p-values that can be seen in Table 7 were calculated. It can be seen that, all regression weights are significant at the alpha level 0,05 except the hypothesis 8 which shows the effect of interaction between students and faculty members on collaborative learning. Therefore, this relation was deleted from the model. The structural model's regression weights were calculated again for the updated version of the model and the regression weights were found as same with the previous model. The updated version of structural model and its standardized regression weights can be examined in Appendix C.

**Table 7. Regression Weights**

Relationships of Constructs	Regression Weight	p-value
H1: Perceived Usefulness <-- Perceived Ease Of Use	0.807	.000
H2: Social Media Use <-- Perceived Usefulness	0.639	.000
H3: Social Media Use <-- Perceived Ease Of Use	0.319	.004
H4: Student Interaction <-- Social Media Use	0.82	.000
H5: Interaction between students and faculty members <-- Social Media Use	0.599	.000
H6: Course Engagement <-- Social Media Use	0.88	.000
H7: Collaborative Learning <-- Student Interaction	0.22	.006
H8: Collaborative Learning <-- Interaction between students and faculty members	-0.001	.992
H9: Collaborative Learning <-- Course Engagement	0.73	.000

Modification indices were examined to determine whether there is a relationship that was unnoticed and can improve structural model. It is recommended that "Modification indices of approximately 4.0 or greater suggest that the fit could be improved significantly by freeing the corresponding path to be estimated" (Hair et al., 2009). However, any modification index that causes a change in our model haven't been appeared in the analysis.

## **DISCUSSIONS and CONCLUSION**

This study proposes a model that investigates the effects of social media usage of students for educational purposes on collaborative learning. This model was constructed by depending on the findings of previous literature and tested by structural equation modeling. The basic technology acceptance model was applied on social media usage of students for educational purposes. Then, the effects of social media usage of students for educational purposes on student interaction, faculty member interaction with students and course engagement of students were examined. Finally, the overall effects of student interaction, faculty member interaction with students and course engagement of students on collaborative learning were determined.

The main research results are summarized as follows. Perceived ease of use has positive significant effect on perceived usefulness; they both affect social media usage of students for educational purposes positively. Social media usage of students improves student interaction and course engagement of students and also interaction between students and faculty members. Student interaction and course engagement have positive significant impact on collaborative learning. However, interaction of students with faculty members doesn't have significant effect on collaborative learning.

Results of this study are consistent but not limited to results in previous studies. Both direct and indirect effects of perceived ease of use on actual usage of social media are measured in this study. As it was indicated in the literature, active technology use for educational purposes increases the interaction between students and also students and faculty members (Laird & Kuh, 2005; Junco et al., 2013). Moreover, it was also supported that the use of social media has significant impact on student engagement (Rutherford, 2010; Rodriguez, 2011; Junco et al., 2013). In the study of Al-Rahmi (2014), it was found that perceived ease of use and perceived usefulness, engagement, student interaction and interaction between students and faculty members as the predictors of collaborative learning. However, in this study, the effects of perceived ease of use and perceived usefulness on social media usage. The effects of social media usage on student interaction, interaction between students and faculty members and course engagement were measured and positive significant impact was determined. Student interaction and engagement have direct impacts on collaborative learning. In addition, social media usage, perceived usefulness and perceived ease of use have indirect effects on collaborative learning. All these relationships were analyzed in a single model.

Some limitations should be noted in this study, and the following suggestions for further research will be worth future efforts in this field. First, the sample of this study is limited to students of a large university in Turkey. Therefore, this study can be applied to other university students in the same country and also in other countries for generalizability.

## BIODATA and CONTACT ADDRESSES of AUTHORS



**Aysun BOZANTA** is a PhD candidate and Research Assistant in the Department of Management Information Systems at Bogazici University, Turkey. She earned M.A. degree from Bogazici University Department of Management Information Systems and B.Sc. double major degree in Management Information Systems and Mathematical Engineering Departments. Her primary research interests include data analysis techniques, quantitative methods, information systems analysis, design and development. She has 4 journal articles published in international indexes, 3 international and 2 national proceedings, and 1 national book section.

**Aysun BOZANTA**  
Department of Management Information Systems  
Bogazici University, 34342, Istanbul, Turkey  
Phone: +90 2123597258  
E-mail: [aysun.bozanta@boun.edu.tr](mailto:aysun.bozanta@boun.edu.tr)



**Sona MARDIKYAN** received her BS degree in Control and Computer Engineering from Technical University of Istanbul, MS degree in Industrial Engineering from Bogazici University, and PhD in Quantitative Methods from Istanbul University. She is working in Management Information Systems department of Bogazici University as an associate professor. In the meantime, she is the head of Business Information Systems Master of Arts Program (without thesis). During her 22 years working experience in MIS department, she has taught more than 12 different courses and involved in various research and administrative activities. Her research areas are statistics, quantitative methods, information systems & technologies, and data mining.

**Sona MARDIKYAN**  
Department of Management Information Systems  
Bogazici University, 34342, Istanbul, Turkey  
Phone: +90 2123596942  
E-mail: [sona.mardikyan@boun.edu.tr](mailto:sona.mardikyan@boun.edu.tr)

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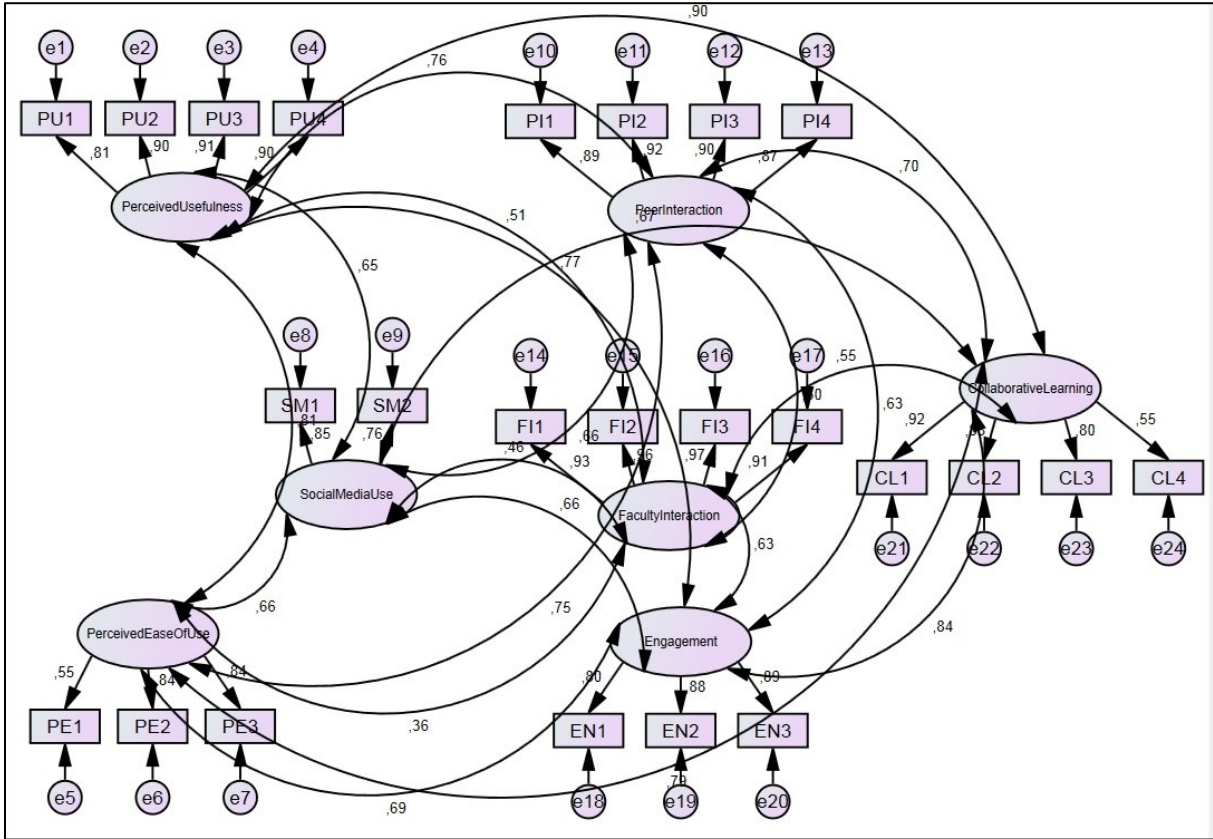
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## APPENDIX A

Scale Name	References
<b>2. Perceived Ease of Use</b>	Adopted from Al-Rahmi, Othman, (2013).
a. I feel that using of social media is easy.	
b. I feel that using social media is easy to incorporate in my classroom.	
c. I feel that using social media makes it easy to reach peers.	
d. I feel that using social media makes it easy to reach teachers.	
<b>3. Perceived Usefulness</b>	Adopted from Al-Rahmi, Othman, (2013).
a. I believe that using social media is a useful learning tool.	
b. I feel that using social media will help me to learn more about my class.	
c. I believe that using social media enhance my effectiveness.	
d. I believe that using social media will improve students' satisfaction with collaborative learning.	
<b>4. Actual Usage</b>	Adopted from McGowan, B. S., Wasko, M., Vartabedian, B. S., Miller, R. S., Freiherr, D. D., & Abdolrasulnia, M. (2012).
a. What is your overall frequency of using social media for educational purposes?	
b. What is your overall frequency of using social media for sharing educational information with your friends?	
c. What is your overall frequency of using social media to communicate with your faculty member for educational purposes?	
<b>5. Student Interaction</b>	Adopted from Al-Rahmi, Othman, (2013).
a. Using the social media for educational purposes facilitates interaction with peers.	
b. Using the social media for educational purposes gives me the opportunity to discuss with peers.	
c. Using the social media for educational purposes facilitates dialog with peers.	
d. Using the social media for educational purposes allows the exchange of information with peers.	
<b>6. Faculty Interaction</b>	Adopted from Al-Rahmi, Othman, (2013).
a. Using the social media for educational purposes facilitates interaction with faculty members.	
b. Using the social media for educational purposes gives me the opportunity to discuss with faculty members.	
c. Using the social media for educational purposes facilitates dialog with faculty members.	
d. Using the social media for educational purposes allows the exchange of information with faculty members.	
<b>7. Engagement</b>	Adopted from Al-Rahmi, Othman, (2013).
a. Using the social media for educational purposes has favored my personal relationships with my peers and teachers.	
b. By using the social media for educational purposes, my peer and faculty interactions made me feel valuable.	
c. By using the social media for educational purposes, I felt that my opinions have been taken into account in the class.	
<b>8. Collaborative Learning</b>	Adopted from Al-Rahmi, Othman, (2013).
a. I felt that using social media for collaborative learning in the class was effective.	
b. I was able to develop research skills through peer collaboration with using social media.	
c. I was able to develop new skills and knowledge from other members of the class.	
d. Collaborative learning experience in the social media environment is better than in a face-to-face learning environment.	



**APPENDIX B**



**APPENDIX C**

