

## MICROBLOGGING IN HIGHER EDUCATION: A COMPARATIVE STUDY

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### ABSTRACT

Microblogging has become an increasingly popular phenomenon in educational context. There is currently little research regarding the educational advantages of microblogging dedicated to teaching and learning. Although educational microblogging provides great learning applications that can support formal learning environment, the advantages of these websites are oftentimes ignored. In order to investigate the largely unexplored benefits of educational microblogging, this research offers an opportunity to investigate the effect of microblogging using Community of Inquiry (CoI) model in a blended learning. The researchers used pre-questionnaire and post-questionnaire for evaluating the level of students' teaching, social and cognitive presence before and after using microblogging based on the CoI model. The questionnaires were distributed in two classes of 107 students in Universiti Teknologi Malaysia. Through statistical analysis by using t-test analysis, the usage of microblogging is proven to enhance students' cognitive, social and teaching presence. The results of this research offer an insight to the positive impact of the use of microblogging in higher education and its outcomes would open the door to new ways of learning and the nature of cooperative culture and new application tools.

Keywords: Cognitive Presence, Community of Inquiry, Edmodo, Microblogging, Social Presence, Teaching Presence

### INTRODUCTION

Over the past decade, there has been a rapid growth in the number of blended learning courses in which some online activities have replaced face-to-face teaching and learning. One of the latest web 2.0 technologies is microblogging. New generations are using Microblogging such as Twitter as an important tool to socialize and interact with their peers. According to Ndasauka et al. (2016), it has over 100 million active users; 50 million users who log-in every day and it hosts approximately one billion tweets every 5 days. As most of these youth are also learners, educators have been looking for ways to understand the phenomena in order to achieve its potential in education.

Microblogging is a new concept in higher education to support learning process by enhancement of effective, equitable, efficient educational processes (Veletsianos and Kimmons, 2016). Edmodo offers both learners and instructors great opportunities to support learning both in informal and formal contexts (Oyelere, Paliktzoglou, and Suhonen, 2016). It provides a secure e-learning for students and it is easy to be used in classrooms since its interface is very similar to Facebook. Not only students can study and do research more easily, they can also be interactive participants (Mirabolghasemi and Iahad, 2016).

Haythornthwaite et al. (2000) reported that students who fail to connect with other participants in their group feel more stress and isolation compared to learners who interact widely. In other words, the sense of community is very prominent in online course because students do not have opportunity to see lecturers and other students face to face. Furthermore,

the lack of interaction will negatively influence not only the participation points but it also has an impact on class performance (Iahad et al., 2013).

Garrison, Anderson, and Archer (2001) explored elements supporting the development of educational experience in Community of Inquiry (CoI) model. By focusing on the CoI constructs of cognitive, social and teaching presence instructors can enhance students' educational experience (Hersman and Schroeder, 2017). Cognitive presence is described as the extent to which students are able to confirm and construct meaning through sustained reflection, and teaching presence is conceptualized as the design, direction, and facilitation of cognitive and social processes of learning (Swan, Garrison, and Richardson, 2009). However, while the model has been used in a variety of ways in research and practice in blended learning, there is still lack of research using CoI model for assessing the effects of microblogging in blended learning. Therefore, the main research question of this research is the following:

- *To what extent does microblogging support teaching and learning?*

## LITERATURE REVIEW

The literature review of the present study mainly consists of blended learning, microblogging in educational context and the three elements of CoI model which are teaching, social and cognitive presence.

### MICROBLOGGING IN EDUCATIONAL CONTEXT

Blended learning consists of the combination of web-based and traditional face to face teaching and learning. Concept of e-learning has changed over time. Many higher education institutions are using a blended learning format. Lim, Morris, and Kupritz (2014) indicated that the blended delivery format provides clearer instructions to students and they experienced fewer challenges and obstacles in achieving similar learning levels. Osguthorpe and Graham (2003) defined blended learning as a balance between face to face interaction among individuals and online access to knowledge. This combines various activities such as e-learning, self-paced learning, and face to face classrooms.

Microblogging is defined as the web-based technologies that allow individuals to interact with others and produce information (Mishra and Koehler, 2009). The platform could provide an opportunity for the participants to post short messages and enhance the distribution of knowledge (Cleveland, Jackson, and Dawson, 2016). Johnson (2011) defined that microblogging is consisted of three elements which are link sharing, live searching and social networks. The most well known microblogging website is Twitter that had seven million users in 2009.

The opportunity afforded by microblogging served to draw attraction to this pedagogical tool. Edmodo is a secure and user friendly e-learning that provides a quick and fast way for recording and sharing notes and course materials. Furthermore, the interface of Edmodo is very similar to Facebook (Holland and Muilenburg, 2011). There are different learning tools such as uploading and downloading, RSS feed, library, alert, group discussion, poll, applications for iPhone in Edmodo.

### COMMUNITY OF INQUIRY MODEL

Garrison, Anderson, and Archer (2001) developed the CoI model as a research tool in online and blended learning. Teaching, social and cognitive presence are three interrelated constructs that provide a comprehensive framework to guide instructors in course design. The previous studies show that the learning platform is one the important reasons for achieving

the higher level of learning experience (Stein et al., 2007; Mirabolghasemi et al., 2014; Aghili et al., 2014; Wu, Hsieh, and Yang, 2017; Mirabolghasemi et al., 2018). Therefore, microblogging should be explored in blended learning. An effective e-learning will encourage students to participate in academic conversation, communicate in a social level, and achieve better learning outcomes (Chen, Zydney, and Patton, 2017). The effects of each presence in this model should be understood for creating and sustaining a collaborative CoI. Figure 1 shows the CoI model.

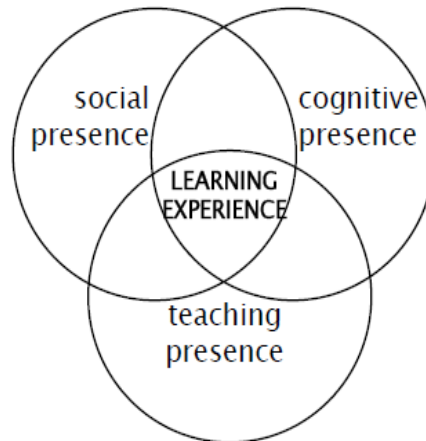


FIGURE 1. The CoI model

The first dimension of CoI is cognitive presence which is defined as the construction, resolution, exploration, and confirmation through reflection and collaboration in CoI model. Kozan and Richardson (2014) stated that cognitive presence can be conceptualized as the learners finding solution for solving a learning problem. The phases are definition of a task or problem, exploration for relevant knowledge, integrating ideas, and testing plausible solutions. All of these occur in an environment of reflection and discourse; analysis and synthesis (Garrison et al., 2010). Kozan and Richardson (2014) stated that cognitive presence means being cognitively active which learners seek the most efficient and effective ways of solving a learning problem, and apply these solutions at the end.

The second dimension is social presence in CoI model. It refers to students feeling emotionally and socially connected with others in blended learning and the degree of salience between two communicators using a medium and a critical attribute of a communication that can recognize the way people communicate and interact (Gunawardena and Zittle, 1997). It has also been found to impact on online interaction. Increase in level of communication as an important part of social presence leads to increase in individuals' satisfaction (Halimi et al., 2012; Mirabolghasemi and Iahad, 2013; Richardson et al., 2017). Different researchers have examined different ways to enhance social presence in educational context. For instance, DuVall et al. (2007) investigated the use of text messaging to establish social presence. Mirabolghasemi and Iahad (2016) used social network for enhancing social presence.

The third dimension of CoI is teaching presence. Teaching presence is needed to maintain a COI thoughtful, attentive and focused. It described as process, design and planning of the structure and evaluation aspects of the courses. The activities include sending video/audio mini-lectures, creating lecture notes and desirable schedule for students' group activities in e-learning platform. Previous studies highlighted the prominent role of teaching presence not only in terms of learning consequences but also in the alignment of cognitive and social presence (Garrison and Akyol, 2013).

## METHODOLOGY

### SURVEY INSTRUMENT

To increase the reliability and validity of instrument, the questionnaire were adopted from Garrison, Anderson, and Archer (2001) and Swan et al. (2008) using a five point Likert scale (1 = strongly disagree to 5 = strongly agree). The survey consists of three subparts (corresponding to the three presences) each of them includes a different number of items that measure each presence type (cognitive - 12 items for exploring construction, resolution, exploration, and confirmation through reflection and collaboration, social - 9 items for measuring the degree which students feeling emotionally and socially connected with others in blended learning, and teaching presence - 13 items for investigating process, design and planning of the structure and evaluation aspects of the course ).

The questionnaire included two parts. The first part asked questions regarding demographic information of respondents such as gender, educational level and the times of using e-learning and the second part of questionnaire consisted of students' perception on teaching, social and cognitive presence. Four experts with experience in educational technologies and scale development have estimated its content validity and the reliability of the instrument was .953. Meanwhile, SPSS version 16.0 was used to analyse data.

### PROCEDURE

Experimental design has been used for assessing students' perception on cognitive, social, and teaching presence using pre and post questionnaires. This design allows researchers to compare the results between two groups, giving an idea of the overall effectiveness of the intervention (Miller and Salkind, 2002). In this study, the pre-questionnaires were distributed at the beginning of the semester. The students were asked to use the selected microblogging which was Edmodo, and the post-questionnaires were administered to them after eight weeks from the beginning of the semester. The instructor asked students to answer the questionnaire for maximizing survey return. Figure 2 illustrates the screen capture of Edmodo and its learning application.

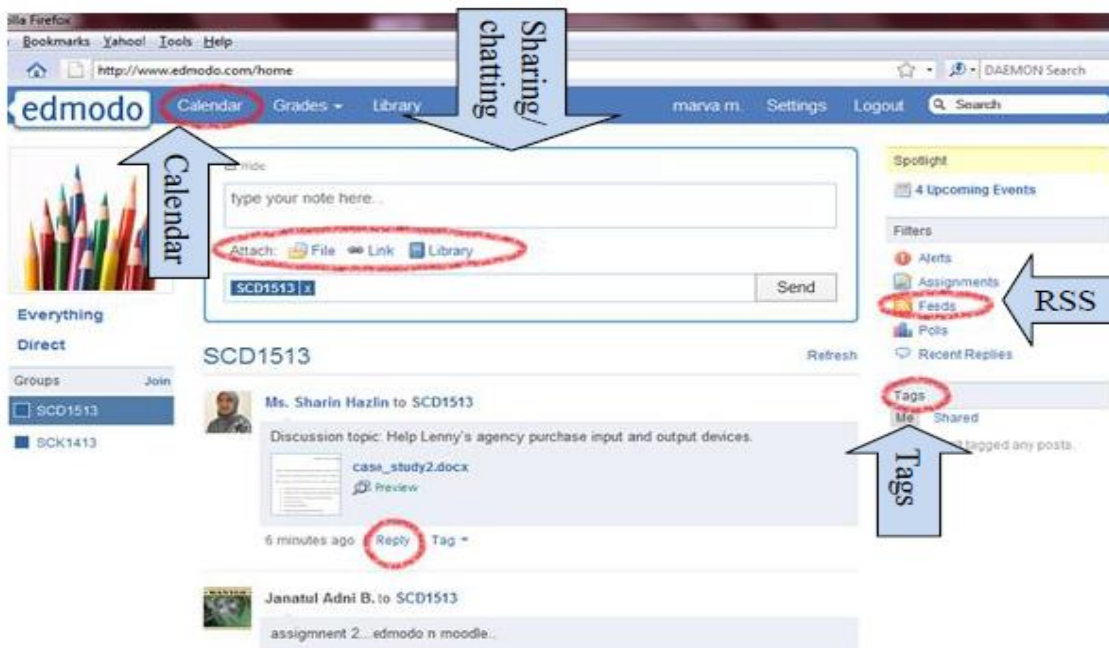


FIGURE 2. The screen capture of Edmodo

## RESEARCH HYPOTHESES

The pre-questionnaire and post-questionnaire include three dimensions which are cognitive, social, and teaching presence. For finding the difference between before and after microblogging intervention paired sample, T-Test has been used and for finding correlation between cognitive, social, and teaching presence, Pearson correlation which is a parametric test has been done (Takona, 2002). Therefore, the hypotheses are the following.

H1: There is a significant difference between cognitive presence before and after using microblogging.

H2: There is a significant difference between social presence before and after using microblogging.

H3: There is a significant difference between teaching presence before and after using microblogging.

H4: There is a significant correlation between cognitive and social presence in using microblogging.

H5: There is a significant correlation between social and teaching presence in using microblogging.

H6: There is a significant correlation between teaching and cognitive presence in using microblogging.

## DEMOGRAPHIC INFORMATION

The respondents were 107 first year undergraduate students participated in a course entitled Technology & Information Systems at the Faculty of computing in Universiti Teknologi Malaysia (UTM) based on the purposive sampling. 46 per cent of participants were male and 58 per cent were female. All students were aged between 18 to 24 years old. Table 1 illustrates the sample demographic information.

TABLE 1. The demographic information of the sample

Demographic Variable		Sample Composition (N=107)
Gender	Male	49 (46%)
	Female	58 (54%)
Age	18-24 years	107 (100%)
Average time spent on e-learning	Daily	61(57%)
	Several Times Per Week	35(33%)
	Weekly	11(10%)

More than half of the respondents use e-learning several times per week. The number of students who use e-learning daily is 29 per cent and 17 per cent use e-learning weekly. Figure 3 depicts average time spent on e-learning.

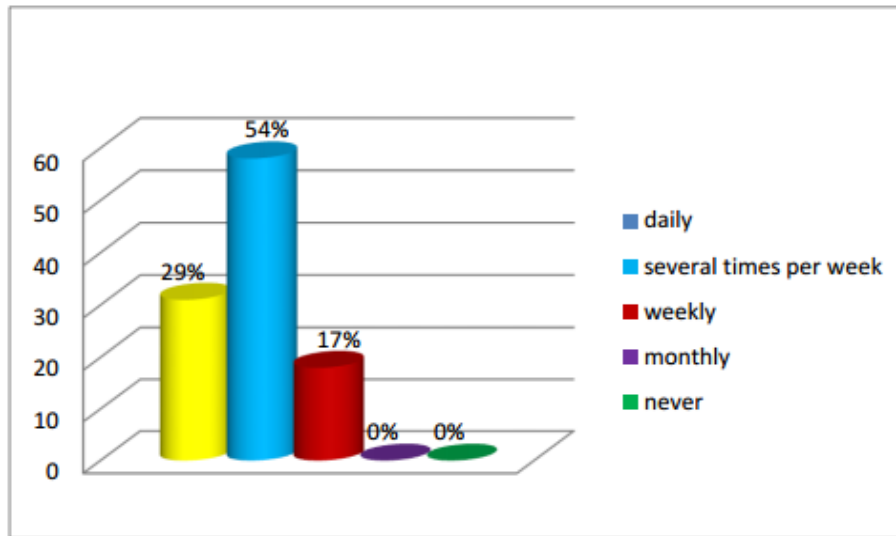


FIGURE 3. The times of using e-learning

## RESULTS

### COMPARISON BETWEEN BEFORE AND AFTER MICROBLOGGING INTERVENTION

T-test analysis has been used to consider whether there is a significant difference between the mean values of before and after microblogging intervention. The pre-questionnaire and post-questionnaire includes three dimensions which are: teaching, social and cognitive presence. Table 2 illustrates the results of t-test analysis on the three presences using SPSS version 16.0.

TABLE 2. The results of T -Test analysis

	Hypothesis	Paired Samples Correlations		Paired Samples Test				
		Correlation	Sig.	Paired Differences 95% Confidence interval of Differences		t	df	Sig. (2 – tailed)
				Lower	Upper			
Cognitive Presence	H1	.869	.000	-3.78056	-2.76150	-12.782	106	.000
Social Presence	H2	.761	.000	-7.04952	-5.56731	-16.876	106	.000
Teaching Presence	H3	.849	.000	-2.49756	-1.83889	-13.053	106	.000

According to Paired Samples Correlation, the variables before and after microblogging intervention are correlated significantly and the p-value for each construct is less than 0.05. Therefore, there is significant difference between means of teaching, social and cognitive presence before and after microblogging intervention. Because the 95% confidence interval of difference is negative for lower and upper, the average of before is less than average of after. Figure 4 shows comparison of dimensions before and after microblogging intervention in teaching and learning.

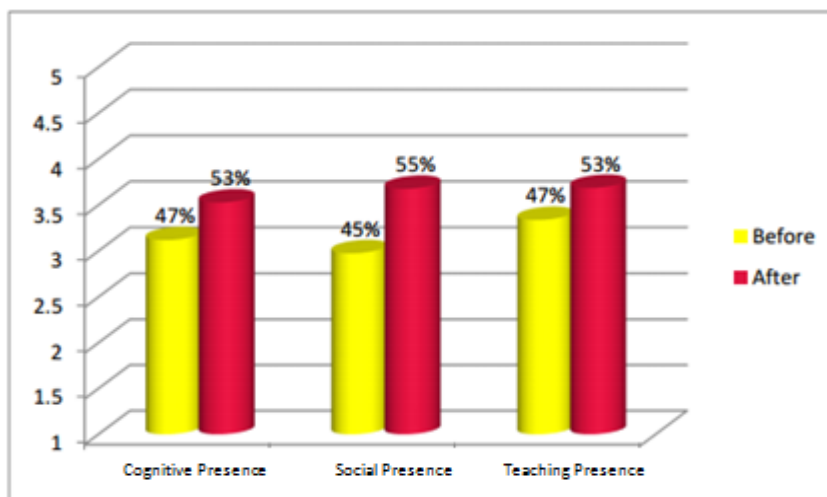


FIGURE 4. Comparison between before and after microblogging intervention

According to Figure 4, the percentage of teaching, social and cognitive presence are increasing, which are 6%, 10%, and 6%, respectively. It can be seen that social presence increase is greater compared to other dimensions after using microblogging in teaching and learning.

#### CORRELATION BETWEEN COGNITIVE, SOCIAL AND TEACHING PRESENCE

Correlation analysis has been conducted to investigate correlation between cognitive, social, and teaching presence of respondents using a parametric method known Pearson correlation. Table 3 shows the summary of correlation analysis.

TABLE 3. The results of correlation analysis

		Cognitive presence	Social presence	Teaching presence
Cognitive presence	Pearson Correlation	1	.776**	.761**
	Sig. (2-tailed)		.000	.000
	N	107	107	107
Social presence	Pearson Correlation	.776**	1	.775**
	Sig. (2-tailed)	.000		.000
	N	107	107	107
Teaching presence	Pearson Correlation	.761**	.775**	1
	Sig. (2-tailed)	.000	.000	
	N	107	107	107

\*\* Correlation is significant at the 0.01 level (2-tailed)

Table 1 shows cognitive, social, and teaching presence correlated significantly. Therefore, hypotheses H4, H5, and H6 are supported. The highest Pearson correlation value is .776 for correlation between cognitive and social presence, .775 for social and teaching presence, and .761 for teaching and cognitive presence.

#### DISCUSSION

The findings from this study confirm the results of previous studies (Gao, Luo and Zhang, 2012; Domizi, 2013; Paliktzoglou and Suhonen, 2014; Menkhoff et al., 2015; Cheh et al., 2016; Gomez-Sanz, Ortego and Pavón, 2016; Tang and Hew, 2017) that establish the educational benefits of using microblogging in education. However, little research has

specifically investigated and examined an experimental works on the integration of microblogging in higher education.

The results of t-test analysis illustrate a significant difference between students' teaching, social and cognitive presence before and after microblogging intervention. Moreover, the results of correlation analysis show cognitive, social, and teaching presence correlated significantly. Microblogging enables instructors and students to interact and connect with each other socially in an online environment and provide an opportunity for enhancing educational experience. Students could participate in microblogging anytime and anywhere to communicate and collaborate with classmates for sharing the latest information about assignments, examination results, course topics, and upcoming events. However, prior research strongly recommends that technology-rich intervention needs to be accompanied by pedagogical enhancements in order to be successful (Veletsianos, 2010; Mirabolghasemi and Iahad, 2013).

The design of course materials, learning activities and assignments can support or limit cognitive presence; for instance, assignments that require learners to define terms will enhance levels of critical thinking and cognitive engagement than assignments which require learners to diagnose loosely-structured, debate a position or authentic problems (Joo et al., 2011). Richardson and Ice (2010) found that learners involved in case analysis and discussion reached higher levels of critical thinking than they did when participating in a general, open discussion of topics, while other scholars have found that course design and instruction directed toward creating cognitive presence effectively created higher-order, "deep" thinking (Kozan and Richardson, 2014).

Social presence plays an essential role in the construction of meaningful teaching and cognitive discourse, higher-order sense-making and learning of individuals (Armellini and De Stefani, 2016). Research and theory have moved beyond an investigation of the medium's effects on social presence for examining the extent to which learners feel connected while engaging in mediated communication (Swan and Shih, 2005; Mirabolghasemi and Iahad, 2013; Ogara et al., 2014). Therefore, the process of using microblogging functionalities and features and creating a sense of belonging to the groups, proposing collaborative course activities, creating a sense of trust among learners can create social presence in blended learning community using microblogging.

The results of this study indicated that the highest enhancement occurred in students' social presence after using microblogging in teaching and learning. However, teaching presence plays a prominent role in facilitating social presence for better learning outcomes. The nature of a course also affects the instructional roles. For example, a course in education may cause more cognitive and social presence than teaching presence (Szeto, 2015). Moreover, many studies have highlighted the prominent role of the social dimension in cognitive activity that causes enhancement in learning (Armellini and De Stefani, 2016). Therefore, students have opportunities to represent their knowledge using a variety of formats and the knowledge construction and representation could be utilized by classmates to extend learning (Dawley, 2009).

## CONCLUSION

The evidence is growing that microblogging dedicated to education could be useful in blended learning. The results of this study illustrate the positive impact of microblogging for enhancing students' teaching, social and cognitive presence. However, the level of social presence of students shows the greatest increment in comparison with teaching and cognitive presence.



This study had some limitations. The data collection for this study is from two classes of 107 undergraduate first year students in a course entitled Technology & Information Systems. Since the CoI model can be applicable for applied and pure disciplines (Arbaugh, Bangert, and Cleveland-Innes, 2010). Future researches should consider how the elements of the CoI framework may be influenced by academic disciplines. The effects of demographic variables such as age and gender could also be explored further. Moreover, this study considered the usage of Edmodo as a microblogging platform that supports teaching and learning. Therefore, for future studies, other microblogging platforms could be used. Microblogging for educational purposes is still in the early stages of introduction and more research and practice that focuses on the implementation and integration of this new technology in the educational context is needed.

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