

A comparative study of social presence in different blended learning environments

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Abstract

In the post-COVID-19 pandemic, blended learning is regarded as a topic of great importance. It has progressively spread in the higher education systems. Enquiring distinct blended learning environments with a queer focus on social presence should assist academics in the better formulation of highly effective and efficient learning platforms. This study investigated the social presence as one of the main elements of the community of inquiry framework sodality together with its blinkers relevant to three varying blended learning platforms within higher education. Whilst the responding sample population was 348 Malaysian undergraduates from multiple universities, the data collection tool was a questionnaire employed from past studies. A pilot study examined the reliability and validity of the deployed instrument and principal suppositions of simplex multivariate analysis of variance were screened before data analysis. Consequently, this analysis ascertained minor variations in participating students' perceptions regarding social presence and its components in terms of blended learning platforms.

Keywords: Blended learning; higher education; learning environment; Social presence.

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1. Introduction

The advance of blended learning environments in higher education institutions has been anticipated for years (Akkoyunlu & Soylu, 2006; Bonk & Graham, 2012; Demirer & Sahin, 2013; Eryilmaz, 2015; Jun 2017; Matosas-López et al., 2019; Yasin et al., 2020). It has been identified as one of the inventive and effective ways of delivering curriculum to students (Tømte & Gjerustad, 2020; Müller & Mildenerger, 2021; Ballouk et al., 2022) and reducing classroom time (Smith & Hill, 2019). Current research confirms that blended learning has become a flexible and student-centered active learning environment (Bizami et al., 2022; Capone, 2022; Müller & Mildenerger, 2021).

It has been foreboded as evolving trend in higher education primarily as technological evolution has briskly altered learning and teaching methodologies (Alismaiel, 2022; Müller, Mildenerger & Steingruber, 2023; Tlili, Burgos & Looi, 2023). For example, in the year 2005, the blended learning environment witnessed an illustrious 7% growth within the past 3 years in the US (Akkoyunlu & Soylu, 2006). Seemingly, about 70% of respondents anticipated at least 40% of higher education courses to be addressed utilizing blended sequences (Chen & Jones, 2007). Likewise, with their analysis of the transmutation potency of blended learning, Garrison and Kanuka (2004) added that blended learning optimizes the effectiveness of purposeful learning by arrogating the values of the traditional classroom environment.

In addition, blended learning is a rapidly developing industry. According to Insight (2011), the value of blended learning products and services earned 32.1 billion dollars by 2010. The compound annual growth rate over 5 years has been reported at 9.2%. A projection report by Insight (2011) predicted the blended academia-industry to reach approximately \$50 billion by 2015 whilst Asian countries were expected to follow America as the second-largest consumer base of blended methodologies. For instance, Wai and Seng (2015) precisely distinguished Malaysia to achieve third place within the top three Asian markets. Evidently, with stakes even higher in the blended approach, it is worthy that academic researchers preserve their dedication to better understand underlying instructional, and institutional challenges appearing as the complex matrix within the framework of blended environments.

Blended learning in Malaysia's higher education system has been taken a considerable amount of attention by scholars (Azizan, 2010; Bhagat et al., 2021; Chew, 2009; Haron et al., 2012; Jusoff & Khodabandelou, 2009; Stapa & Mohammad, 2019; Wai & Seng, 2015). In early research, scholars mostly focused on the acceptance or adoption of blended learning as a method of delivery format in Malaysian higher education institutions (Chew, 2009; Haron et al., 2012). Later, the effectiveness of blended learning was investigated (Wai & Seng, 2015). However, recently the research has focused on new trends such as designing learning experiences (Bhagat et al., 2021; Hassan et al., 2021), empowering blended learning via MOOCs (Nordin et al., 2021) and Flipped Classroom (Tan et al., 2022).

Although, the effectiveness of blended learning has been confirmed through a large scale of studies, however, there are some critiques on the effectiveness of blended learning environments. For example, Reasons et al. (2005) and Wu and Hiltz (2004) did not find that blended learning is more effective than fully online or face-to-face learning environments. Additionally, Vaughan and Garrison (2005) also did not find any evidence that blended learning can enhance cognitive presence among higher education students. These inconsistent results from a side and the existence of different types of blended learning environments (Chen, 2012; Hrastinski, 2019; Chaw & Tang, 2023) have motivated this study to compare different types of blended learning environments.

Concerning the current studies related to blended learning, it has been noted that there is a scarcity of knowledge and practice regarding the comparison between different types of blended learning environments particularly in the higher education context (Khodabandelou et al., 2014; Yilmaz & Malone, 2020). The understanding of comparative blended learning studies would help instructional designers to provide contributions to designing and developing high-quality instruction (Narayan, Herrington & Cochrane, 2019). Comparing different types of blended learning environments would

also help HEIs reformulate their curriculum and teaching approaches to maximize the effectiveness of all components of instruction including design, development, implementation, and evaluation. The question of which blended learning type/format is more effective is still open to discussion.

One of the main theoretical frameworks that play a significant role in blended learning research is the Community of Inquiry (CoI) model (Garrison et al., 2000; Garrison & Vaughan, 2008). The pertinent CoI is addressed and interpreted as a threshold model rendering assistance in the complex dynamics of blended learning platforms (Akyol et al., 2009). Additionally, several past studies have highlighted the CoI as a principal trait of productive blended learning (Chen, 2022; Cleveland-Innes, 2019; Dasplit & D'Souza, 2012; Vaughan, 2010; Vaughan & Garrison, 2006). Moreover, Garrison et al. (2004) have comprehensively argued that the CoI offers well-categorized, structured, and synchronized guidelines to formulate an effective learning community depicting sustained growth. Consequently, as a review of research shows, the CoI framework has rightly charmed academic researchers and educators within the discipline of blended learning.

The key element of the CoI model is presence. From the instructional perspective, presence involves '*planning, intention, and design to ensure effective learning outcomes and meet quality standards*' (Lehman & Conceição, 2010, p. viii). In a blended learning environment, the notion of presence tenably fixes interval segregation issues between students themselves and the instructor as well. Often provoking social isolation and solitary behavior among participants, such segregation also catalyzes learning dissatisfaction in the blended learning environment (Oliver & Trigwell, 2005).

Previous research studies show far too little attention on each element of the CoI (presence) and its indicators in the blended learning environment (Hostetter, 2013). Therefore, the current study is conducted in response to the call for additional research on social presence as one of the main components of the CoI (Rourke & Kanuka, 2009) by comparing itself and its indicators in different blended learning environments. Thus, Ruhlandt (2010) suggests that future research needed to focus on using the components of the CoI framework in different blended learning environments.

1.1. Purpose of study

This study aims to specify any notable disparity in social presence and relevant indicators in the context of three unique blended learning environments originating from Malaysian higher education institutes. The following research question was raised based on the study's purpose. Is there any statistically significant difference in the level of social presence among three different blended learning environments?

2. Materials and Method

2.1. Participants

Participants comprised 348 Malaysian undergraduate students from distance mode academic institutes from 3 universities. The universities (Uni1–Uni3) were offering blended learning courses with different modes. In one university (Uni1) students were offered the minimum face-to-face sessions (2 sessions). The second university was offering at least 5 sessions of face-to-face classes and the last university (Uni3) offered the maximum (of 7 sessions) of face-to-face classes. The gender composition of respondents was less balanced with 217 or 62% female respondents and 131 or 38% male respondents. There were 160 (46%) students from Uni1, 67 (19%) of them were from Uni2, and 121 (35%) of the respondents were from Uni3. 71.4% of respondents were Malays, 21% were Chinese, and only 4% were Indians. Of the 348 respondents who were included in the study, the overwhelming of the respondents 50% identified themselves as single, while 47% reported themselves as married students. The majority of respondents 42% were 0–10 miles from the main campus while 6% of them were 51–100 miles distance from the main campus. Moreover, a significant portion; 38% of participants ($n = 132$) exhibited 2–5 hours of daily internet usage while about 3% displayed internet usage of less than an hour. From a total of 348 participants, 34.5% were in the third semester, 25% in

the fourth semester, approximately 24% in the fifth semester and 17% identified themselves as sixth-semester students.

2.2. Data collection instruments

Mainly descriptive, this study has specifically employed the quantitative research methodology, with survey utilization as an appropriate data collection tool. Questionnaire content was exclusively adopted from past studies (Arbaugh et al., 2008; Garrison et al., 2010; Kim, 2011), reliability and validity of the deployed instrument were examined in a pilot study (Table 1) session. The social presence survey contains 17 questions, 8 questions for affective expression, 5 questions for open communication, and 4 questions for the group chosen (Table 2). The survey utilizes a five-point Likert scale. This questionnaire is selected because it is related to all dimensions of social presence and its influence on blended learning environments, and also it showed a strong internal consistency of the scale.

Table 1

The result of Reliability

Study	Social presence
Kim (2011)	0.92
Garrison et al. (2010)	0.87
Arbaugh et al. (2008)	0.91
Pilot test	0.85
Actual study	0.92

Table 2

Social Presence Subscales

Source	Items
Affective expression	6, 7, 9, 12, 13, 14, 15, and 16
Open communication	1, 2, 3, 10, and 11
Group cohesion	4, 5, 8, and 17

The participants were asked to respond on the five-point Likert scale which the confidence rating of social presence, ranging from 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. The score yielded a range of scores from 17 to 85; the high scores indicated a high social presence in the blended learning environment.

2.3. Procedure and ethics

Before distributing the questionnaires among the targeted respondents, the procedures and the ethics of conducting research were closely observed and complied with by the researcher. In particular, two types of research procedures were carried out, the first being obtaining permission from the relevant authorities. The second procedure is distributing the survey questionnaires among respondents. The quantitative data collection process involves surveying sample students. 440 undergraduate students were surveyed. They were informed about the main purpose of the study and they were assured the anonymity of their responses guaranteed. A cover letter containing an explanatory note of the purpose of the study was attached. The questionnaires were distributed in a face-to-face meeting. Participants were asked to respond to all questions in each section. The demographic information is separated by categories concerning student status. To ensure confidentiality and reduce the effects of response bias, participants are provided with a cover letter that had a written description of the purpose of the study. They were informed that participation in the study is voluntary and their responses would not be personally identifiable. The detail of data collection can be seen in Table 3.

Table 3

Detail of Data Collection

No	University	Undergraduate Program	Distributed	Returned
1	Uni1	Human Resource Development (BSHRD)	91	77
		Human Development (BSPM)	12	10

		Communication (BCOMM)	18	13
		Malay Language and Linguistics (BABM)	60	48
		English Language (BABE)	5	3
		Business Administration (BBA)	13	9
2	Uni2	Guidance and Counselling (GUIDP)	17	12
		Islamic Education (ISEDP)	44	35
		Teaching English as a Second Language (TESLP)	29	23
3	Uni3	Islamic Missionary & Leadership Studies	36	27
		Theology & Philosophy	11	7
		Sharia	71	59
		Al-Quran & Sunnah Studies	26	20
		Arabic Studies & Islamic Civilisation	7	5
	Total		440	348

2.4. Data analysis

Descriptive analysis was used to measure the frequency distribution and correlation matrixes. Moreover, a multivariate analysis of variance (MANOVA) was conducted to compare students' perceptions in 3 blended learning environments on social presence. MANOVA assumptions were verified before data analysis. Seven demographic items were included in the questionnaire: gender, age, university, race, and marital status, semester, distance from the main campus, use of internet per day, connection to the internet.

3. Results

To examine the research questions of the study, two statistical measures were used. First, descriptive statistics were used to show the means and the standard deviations. Second, to investigate the between-group and within-group differences, a one-way MANOVA was used. The goal of one-way MANOVA analysis is to look for an effect of one or more IVs on several DVs at the same time.

3.1. Differences of social presence subscale in the three blended learning environments

Testing assumptions usually involves obtaining descriptive statistics on one's variables. The means and SDs of each dependent variable by multiple universities are listed in Table 4.

Table 4

Summary Table of the Differences of Social Presence Subscale in the Three Blended Learning Environments

	Universities	Mean	SD	N
Affective expression	Uni1	28.92	4.50	160
	Uni2	29.80	3.90	67
	Uni3	29.99	3.93	121
Open communication	Uni1	18.91	2.52	160
	Uni2	18.77	2.58	67
	Uni3	18.99	2.65	121
Group cohesion	Uni1	14.77	2.36	160
	Uni2	15.16	1.95	67
	Uni3	15.73	2.27	121

Table 4 shows the social presence component scores in Uni1–Uni3 at affective expression (28.92, 29.80, and 29.99), open communication (18.91, 18.77, and 18.99), and group cohesion (14.77, 15.16, and 15.73) respectively. What is not known, however, is whether these differences are large enough to be considered statistically significant.

To sum up, although there are overall differences between the three groups, the magnitude of such differences between certain groups is not the same. In elaboration, there is a difference in students' perception of social presence (affective expression, open communication, and group cohesion), as shown by their mean scores. In other words, the differences show that the student's perception of

social presence (affective expression, open communication, and group cohesion) is different among undergraduate groups.

3.2. One-way MANOVA

Homogeneity of covariances, an assumption of MANOVA, is tested again by Box's Test of Equality of Co-variance Matrices. The assumption of covariances is considered violated if the 'Sig' values come to less than 0.001 ($p < 0.001$). The outcome of this study denies the violation of this assumption [$F(12, 201,771.16) = 4.31, p = 0.64$]. Hence, Box's tests confirm the equal distribution of covariance matrices of dependent variables across the group. The second assumption of the MANOVA is the homogeneity of variances, which can be referred to Levene's Test of Equality of Error Variances Table 5, as shown below.

Table 5

Levene's Test of Equality of Error Variance in the Social Presence Subscale

	<i>F</i>	df1	df2	Sig.
Affective expression	1.37	2	345	0.25
Open communication	0.03	2	345	0.96
Group cohesion	1.25	2	345	0.28

Tests the null hypothesis that the error variance of the dependent variable is equal across groups.

^a Design: Intercept + University.

It can be seen from the table above that affective expression, open communication, and group cohesion scores have homogeneity of variances ($p > 0.05$). Levene's test (Table 5) was non-significant for all variables, proposing that the groups contained equal error variances on part of these variables. Thus, MANOVA robustly responds to violations regarding covariance matrix assumptions (Tabachnick & Fidell, 2018) and homogeneous error variances. The actual result of one-way MANOVA was determined using the social presence scale in terms of the blended learning environmental table. Determining whether one-way MANOVA statistical significance required a close look at the 'Sig.' column. Wilks' Lambda was used as the statistical test. The results indicated that Wilks' Lambda = 0.96, $F(6, 686) = 1.96, p = 0.06$ (Table 3). It means that there is no difference among the independent variables (blended learning environments) in terms of social presence indicators.

In summary, a one-way between-groups MANOVA was performed to investigate blended learning environments' differences in social presence indicators. Three dependent variables were used: affective expression, open communication, and group cohesion. The independent variable was the blended learning environment (Uni1–Uni3). Preliminary assumption testing was conducted to check for normality, linearity, univariate and multivariate outliers, homogeneity of variance-covariance matrices, and multicollinearity, with no serious violations noted.

Table 6

One-Way MANOVA for the Social Presence Scale in Blended Learning Environments

	Effect	Value	<i>F</i>	Hypothesis df	Error df	Sig.	Partial squared	eta
Intercept	Pillai's trace	0.98	6,463.77 ^b	3	343	0.000	0.983	
	Wilks' lambda	0.01	6,463.77 ^b	3	343	0.000	0.983	
	Hotelling's trace	56.53	6,463.77 ^b	3	343	0.000	0.983	
	Roy's largest root	56.53	6,463.77 ^b	3	343	0.000	0.983	
University	Pillai's trace	0.03	1.96	6	688	0.068	0.017	
	Wilks' lambda	0.96	1.96^b	6	686	0.069	0.017	
	Hotelling's trace	0.03	1.95	6	684	0.069	0.017	
	Roy's largest root	0.02	2.49 ^c	3	344	0.060	0.021	

^a Design: Intercept + University.

^b Exact statistic.

^c the statistic is an upper bound on F that yields a lower bound on the significance level.

Based on Table 6, there was no statistically significant difference between blended learning environments on aggregated dependent variables namely Wilks' Lambda = 0.96, $F(6, 686) = 1.96$, $p = 0.06$ (Table 6). A closer review of mean scores showed a mildly higher concentration of perceived social presence in the third blended learning environment (Uni3) as compared to the first and second ones (Table 1). Hence this study justified no statistically notable disparity among multiple blended learning environments (Uni1–Uni3) distance education students' perception of affective expression, open communication, and group cohesion.

4. Discussion

In this study, the researchers did not find what they expected. The finding did not seem to indicate that there is a statistically significant difference in the three blended learning environments in terms of one of the components of the CoI. Although the one-way MANOVA did not show any statistical difference between the three blended learning environments, the mean scores for each component of social presence namely (Affective Expression, Open Communication, and Group Cohesion), were a bit higher in the blended learning environment with the more face-to-face session (Uni3). This finding supports Müller and Mildenerger (2021) that concluded 'overall differences between blended and conventional classroom learning are small' (p. 11). The results of the current study support the finding of Ruhlandt's (2010) study that did not find any statistical significance between online and blended learning environments on social presence.

One possible reason for the disparity could be the higher number of face-to-face sessions in the Uni3 blended learning environment. In this regrade, a blended learning environment with more face-to-face sessions making teaching and learning more comfortable and attractive. However, further study with more focus on social presence is therefore suggested. Another reason could be that in the third blended learning environment (Uni3), more student connections and face-to-face interactions with instructors were noted. Research supports that interaction is one of the main contributors to successfully blended learning environments (Taghizadeh & Hajhosseini, 2021). Additionally, it has been found to acceptance factors of blended learning led to higher learner satisfaction as well (Kintu et al., 2017). Consequently, it is narrated that adequate social behavior is a direct remnant of increased interaction and this might also answer less belonging sense exhibited by Uni1 and Uni2 participants.

Overall, these small differences suggest that face-to-face interaction might have significant advantages for the development of social presence in blended learning environments. Since students in the Uni3 group had more opportunities to work together, a higher level of the CoI among these students indicated that the CoI provided a new way to participate, and helped students to learn better in the third blended learning environment.

5. Conclusion

As blended learning platforms are constructively implemented in Malaysian HEIs, additional questions about this novel approach arise. Addressing this, the current study has thoroughly looked into the social presence and related perceived learning within the framework of three unique blended learning environments that were composed of undergraduate students in Malaysian Universities. As per the study objectives, it is concluded that this research aimed to find the difference in students' learning perceptions from online sessions and face-to-face blended learning environments. The purpose was to ascertain any difference in related indicators of social, cognitive, and teaching presence as well as perceived learning within three blended learning environments.

This research study would likely have produced a complete perspective if qualitative data had been included and if the study had a mixed-method research approach. Including an extensive amount of qualitative research, it may lead to support and properly interpreting the quantitative data. Therefore, additional and varied research tools deployment on a large scale involving multiple institutes would

confirm the empirical results of this study. For this sake, a qualitative component of future research is highly recommended. This study should be replicated at private universities to determine if similar results are found. Future research could focus to compare the same courses in the online and blended modes of delivery, and with the same instructors, if possible, for both modes of delivery.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author upon reasonable request.

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