

## Effects of University Students' Social and Teaching Presence on Learning Engagement and Perceived Learning Achievement in Online Courses

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Embracing the important roles of presence, this study focused on exploring how to enhance online learners' learning engagement and learning achievement in distance higher education settings. More specifically, this study examined the structural relationships among university students' teaching presence, social presence, learning engagement, and perceived learning achievement in online learning environments using structural equation modeling. Data were collected from 206 university students enrolled in online courses in the second semester of 2020 at two large universities. According to the results of the data analysis, there was a significant relationship between teaching and social presence. Teaching presence and social presence predicted learning engagement that positively affected perceived learning achievement. Teaching presence was strongly associated with perceived learning achievement while social presence had a negative impact on that. Additionally, learning engagement had a mediating effect on the relationship between teaching presence and perceived learning achievement. This study found that students who perceived higher levels of teaching and social presences tend to more engage in learning, leading to perceiving better learning achievement. The findings suggest that the design, development, and implementation of effective online instruction should be needed to promote learning engagement, which can be linked to enhancing students' learning achievement. Implications and discussion are addressed in this article.

*Keywords : Online learning, Social presence, Teaching presence, Learning engagement, Learning achievement*

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## Introduction

Educational institutions in many parts of the globe have distinctively switched to distance learning to continue education during the COVID-19 pandemic (Dhawan, 2020). Amid this global crisis in education, there has been an unprecedented rise in online teaching and learning. In spite of the forced switch to using distance education, teaching online has become in common using a variety of digital platforms, e-learning contents, and resources (Jeong, Roh, Jung, & Cho, 2020). Furthermore, the adoption of online learning is anticipated to persist in post-pandemic times through innovative information and communication technology (ICT) and online learning platforms (Aljawarneh, 2020). However, educational systems were limited to use instructional technologies, resources, and infrastructure for the smooth transition to online learning and students revealed the lack of technology literacy and positive learning experience during learning online (Barrot, Llenares, & del Rosario, 2021).

Recent research has found that students faced numerous challenges including low attention and engagement in learning, attributed to psychological isolation and disconnection among peers in online learning environments (Ju, Park, Jung, Son, & Jing, 2020; Lim & Lee, 2020; Park & So, 2021). To help remedy the current challenges, several studies focused on how to develop effective online learning environments in higher education settings such as instructor's teaching efficacy (Shin & Park, 2021), instructional design (Leem, Kim, & Lee, 2021), and technology integration (Lim & Kim, 2020). Among theoretical approaches, the Community of Inquiry (CoI) guides a process of developing a meaningful online learning experience through three interwoven elements: social, cognitive, and teaching presences (Garrison, Anderson, & Archer, 2000). Importantly, presence is the mutual act between teaching and learning that contributes to the construction of genuine learning experience (Rogers & Raider-Roth, 2006). That is, learners tend to perceive presence differently based on the learning activities within their learning environments, which determines the quality of learning experiences and differentiate learning outcomes (Joo, Ha, Yoo, &

Kim, 2010). Hence, paying attention to the perceptions of presence learners can perceive during the online learning process is essential since it can provide significant insights into how the effectiveness of online learning needs to be developed and facilitated.

UNESCO (2020) reported that students struggled to stay motivated and engaged in unfamiliar online learning environments, caused by school closures. Regarding a holistic perspective of online learning experience, Kim, Hong, and Song (2019) asserted that learning engagement is dynamically associated with students' perceptions towards the learning circumstances and process. However, cognitive presence predicted by teaching and social presences in the CoI framework reflects merely the learning and inquiry process in a community of reflection and discourse (Garrison, Cleveland-Innes, & Fung, 2010). Unlikely, since learning engagement is a multidimensional factor including behavior, emotion, and cognition, a holistic viewpoint is necessary to understand antecedents and consequences of learning engagement simultaneously (Fredricks, Blumenfeld, & Paris, 2004).

Although cognitive presence has been largely investigated to understand the mediating relationships between teaching presence, social presence and other outcome factors (see Joo, Lim, & Kim, 2011), not many researchers have closely looked at how students' perceptions of presence influence learning engagement, mediating their effects on perceived learning achievement in online learning during this pandemic. Thus, this study investigated the effects of students' perceptions of presence on learning engagement and perceived achievement in online learning contexts of higher education. Moreover, this study anticipates contributions to developing effective online learning environments by presenting empirical evidence on how the critical concept of presence can be associated with learning engagement and learning achievement. Also, this study will extend the importance of presence beyond a community of inquiry that supports active collaboration and meaningful inquiry by enhancing student engagement in ultimate online learning experiences.

## **Backgrounds**

### **Social presence and teaching presence**

As aforementioned, the CoI framework identifies presence that represents prerequisites for a successful online learning experience (Garrison et al., 2000). Rogers and Raider-Roth (2006) define presence as “a state of alert awareness, receptivity and connectedness to the mental, emotional, and physical workings of both the individual and the group in the context of their learning environments” (p. 266). As the definition of presence implies, early research discussed that social presence is a crucial component that contributes to organizing a learning community (e.g., online courses) and promotes learning online (Garrison et al., 2000). To provide a positive learning experience, instructors need to create the social nature of learning in which students comfortably interact and discuss learning contents with peers within an online learning community (Hew, 2015). Regarding learning challenges students encountered during the pandemic, social presence is particularly more important to foster a sense of belonging to a learning community through reducing feelings of separation and isolation among students and enhancing quality social interaction and communication in online courses (Joo et al., 2010).

Social presence has been defined in varied ways. According to Garrison et al. (2000), social presence is defined as “ability of participants in the CoI to project their personal characteristics into the community, thereby presenting themselves to the other participants as real people” (p. 89). Social presence means “the degree of feeling, perception, and reaction to another intellectual entity” (Tu & McIssac, 2005, p. 146). Also, social presence refers to the extent to which students identify a sense of community, feel free to open communication, and develop affective connectedness and positive relationships within the online class (Richardson, Maeda, Lv, & Caskurlu, 2017). However, Stodel, Thompson, and MacDonald (2006) contended that online learning experience should be beyond the development of social presence and the

primary goal of social presence is to support for actual learning achievement and cognitive development.

Besides facilitating the attainment of cognitive learning objectives by social presence, interactions between individual entities within a community of learners are not sufficient to optimize effective online learning (Garrison et al., 2000; Swan et al., 2008). To foster optimal learning experience there should be specific directions and defined instructions under the control of instructors. Thus, that is teaching presence, which supports in balancing and promoting social and cognitive presence (Anderson, Rourke, Garrison, & Archer, 2001). Teaching presence is divided into three sub-components: (1) instructional design and organization (e.g., communicating topics and goals and establishing curriculum content and timelines); (2) direct instruction (e.g., tracking needs and providing timely feedback and help); and (3) facilitation discourses (e.g., encouraging student contributions and prompting discussion) (Anderson et al., 2001). Garrison et al. (2010) confirmed the hypothesized causal relationships among teaching presence, social presence, and cognitive presence, based on the CoI framework. Consequently, the concept of presence suggests that learners with higher levels of social and teaching presences are likely to have better learning experiences since learners can be engaged in more purposeful social interaction and mutual understanding within effectively designed and delivered online learning environments.

### **Learning engagement**

In educational settings, engagement simply means the quality of efforts learners make to achieve defined learning goals and present better learning performance (Richardson & Newby, 2006). Likewise, Astin (1984) referred to learning engagement as the amount of physical and psychological effort that students devote to learning experiences. Not surprisingly, many researchers have found that critical factors such as academic self-efficacy (Jung & Lee, 2018), social interaction (Lu & Churchill, 2014),

and motivational regulation (Yun & Park, 2020) are positively associated with learning engagement in online education contexts. Furthermore, learning engagement was found to be a strong determinant for various learning outcomes including learning performance (Chen, 2017) and satisfaction (Wang, Yang, Li, & van Aalst, 2021). That is, learning engagement appears to be influential to making differences in the quality of online learning experience.

Learning engagement (Fredricks et al., 2004) is multifaceted, identified by three different types of engagement: behavioral engagement, emotional engagement, and cognitive engagement. Fredricks et al. (2004) enumerated that behavioral engagement means positive conduct (e.g., compliance with institutional rules and absence of disruptive behaviors), involvement in learning tasks and school-related activities; emotional engagement includes students' affective reactions to class (e.g., interest, boredom, happiness, and anxiety); and cognitive engagement refers to psychological investment in learning (e.g., a desire to go beyond the requirements) and flexibility in problem solving (as cited in Yun & Park, 2020, p. 274). Although previous research indicated that learning engagement is considered as a firmly mediating factor in understanding about student learning, through the literature review few studies have focused on examining the relationships between social and teaching presence, learning engagement and students' perceived achievement in an online learning context.

### **Relationships between presences, learning engagement, and perceived learning achievement**

Throughout the literature, there have been a number of studies that confirmed the effects of social and teaching presences on various learning outcomes in online learning contexts. For example, Doo and Bonk (2020) constructed a structural model that explains the relationships between self-efficacy, self-regulation, social presence, and learning engagement, using 390 Korean undergraduate students enrolled in a

flipped learning course. They found that social presence significantly predicted learning engagement and mediated the relationships between self-efficacy, self-regulation and learning engagement. Furthermore, Jung and Lee (2018) investigated how teaching presence can enhance learning engagement and learning persistence in massive open online courses (MOOCs) among 306 Korean students. The findings showed that teaching presence had a significant effect on learning engagement, which had an indirect effect on the relationship between teaching presence and learning persistence.

Likewise, students' perceived teaching presence was a critical predictor of course satisfaction since the quality of online learning experience depended on instructor's skills in designing, promoting, and delivering courses via appropriate instructional technologies (Khalid & Quick, 2016). Joo et al. (2010) reported that teaching presence had a significant influence on learning satisfaction among 802 students in a cyber university. On the other hands, Richardson et al. (2017) found that social presence positively influenced actual and perceived learning in online learning environments through a systematic analysis. In short, social and teaching presences learners perceived in online learning environments appear to be positively associated with various learning outcomes such as learning engagement, learning persistence, course satisfaction, and perceived learning.

In education settings, learning engagement has been extensively investigated and confirmed to be a crucial factor to significantly influence student learning achievement (Wang & Eccles, 2012). Obviously, empirical evidence has indicated that learning engagement in technology supported learning environments is positively related to student learning performance (Chen, 2017) and achievement (Kim et al., 2019). Chen (2017) suggested that engaged students tend to have positively affective learning experiences, which connected to better learning performance. Similarly, Kim et al. (2019) assumed that students who are engaged in university e-learning environments could have positive learning experiences and confidence in using digital technologies for academic success. In their article, they

found that the higher level of academic engagement was strongly linked to better learning achievement.

As a result, in this study we investigated how learning engagement influence students' perceived learning achievement in online learning environments and additionally, whether there is an indirect effect of learning engagement on the relationships between teaching presence and perceived learning achievement as well as social presence and perceived learning achievement.

According to reviewing the literature, the research questions of this study are addressed as follows:

1. Is there a relationship between online learners' perceived teaching presence and social presence?
2. How do teaching presence and social presence affect learning engagement and students' perceived learning achievement in online learning?
3. How does learning engagement indirectly affect the relationships between presences and perceived learning achievement in online learning?

## **Methods**

### **Research model**

This study aimed to examine the structural relationships among teaching presence, social presence, learning engagement, and perceived learning achievement in online learning contexts among higher education students. Thus, this study constructed a comprehensive model that intends to identify the structural relationships between teaching presence, social presence, learning engagement and perceived learning achievement among online learners in higher education settings. Hence, we developed a research model, as presented in Figure 1.



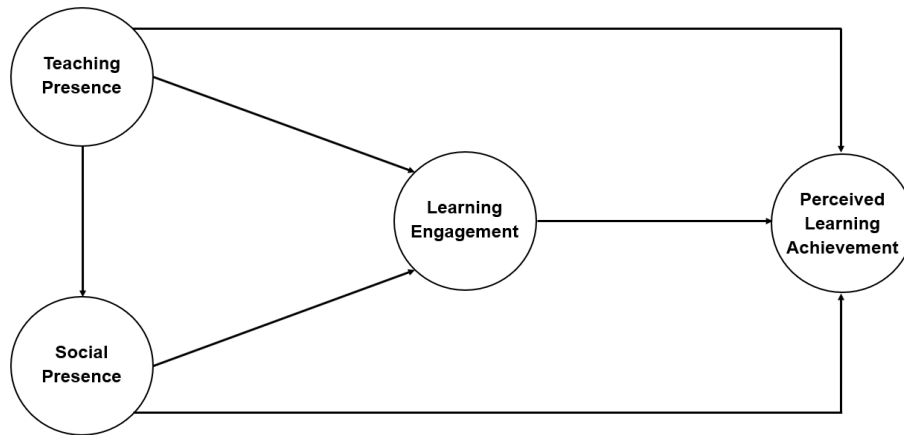


Figure 1. Research Model

### Participants and data collection procedures

After the required approval of the Institutional Review Board (IRB), this study was conducted with 10 online courses at two large public and private universities in the second semester of 2020. Using convenience sampling, a total of 212 students were recruited for this study. In this study, a synchronous mode of course delivery refers to learning that is delivered at a specific time to all students using a video conferencing tool like ZOOM. An asynchronous mode means learning in which learning materials and recorded lectures are accessible whenever students want. A mixed mode means blended learning combining with synchronous and asynchronous modes. There were 83 students enrolled in five teacher education courses, 41 students enrolled in two early childhood courses, and 46 students enrolled in a nursing course, delivered in a mixed mode. Forty-two students enrolled in counseling and communication courses, delivered in a fully asynchronous mode. Among the entire participants, 6 cases were removed because of the incomplete responses in online survey questionnaires, and the data from 206 participants were used for the final data analysis. These participants consist of 163 female (79.1%) and 43 male (20.9%) students with the mean age of 21.55 (SD = 3.17). Table 1 shows the

Table 1. Demographic Characteristics of Study Participants (n = 206)

Variable	Categories	No. (%)
Gender	Female	163 (79.1)
	Male	43 (20.9)
Academic Level	1 <sup>st</sup> Year	84 (40.8)
	2 <sup>nd</sup> Year	24 (11.7)
	3 <sup>rd</sup> Year	61 (29.6)
	4 <sup>th</sup> Year	26 (12.6)
	Graduate	11 (5.3)
Affiliated College	Humanities	22 (10.7)
	Arts	10 (4.9)
	Engineering	5 (2.4)
	Education	100 (48.6)
	Natural Sciences	11 (5.3)
	Business	5 (2.4)
	Nursing	53 (25.7)
Type of Online Course	Synchronous	0
	Asynchronous	42 (20.3)
	Mixed (synchronous + asynchronous)	164 (79.7)

demographic characteristics of the participants in this study.

In this study, online survey was conducted for data collection at the end of the second semester of 2020. An online survey link including an informed consent form was distributed to all the students enrolled in the participating online courses. They were asked to complete a self-report survey questionnaire. All participants who agreed to disclose their contact information for receiving a reward were given mobile coupons.

## Measures

This study employed the online survey, developed through the Korean Social

Science Data Center (KSDC) online survey software. The online survey questionnaire consisted of five subsections including demographic items, teaching presence, social presence, learning engagement, and perceived achievement sections. All survey items except for demographic items used a 5-point Likert scale with a response range from 1 (*strongly disagree*) to 5 (*strongly agree*).

### **Teaching presence**

This study used the teaching presence items of the CoI survey developed by Swan et al. (2008). According to Kang, Kim, Kim, Kim, and Lim (2011), the original teaching presence survey items were translated into Korean, except for one item related to collaborative learning and modified to their research context. Finally, 8 teaching presence items were extracted through exploratory factor analysis. Thus, to measure students' perceptions of teaching presence in online learning environments, the eight teaching presence items consisting of two scales: instructional design and organization (4 items), and direct facilitation (4 items) were used in this study. As shown in Table 2, the internal consistency coefficient (Cronbach's alpha) was .93 for instructional design and organization and .95 for direct facilitation.

### **Social presence**

To examine students' perceived social presence, they study employed the Korean version of social presence survey instrument developed by Kim (2011). Through exploratory and confirmatory factor analyses, Kim (2011) generated and verified four constructs of social presence instrument (19 items) including affective connectedness (5 items), open communication (4 items), sense of community (4 items), and mutual attention and support (6 items). Table 2 showed that the internal consistency coefficient was .92 for affective connectedness and .94 for open communication, sense of community, and mutual attention and support.

### Learning engagement

This study used the learning engagement scales, originally developed by Fredricks et al. (2004) and verified through exploratory factor analysis by Sun and Rueda (2012). This learning engagement instrument was translated into Korean, modified, and adapted to the online learning context (Yun & Oh, 2021). A set of 19 learning engagement survey items consists of three scales: behavioral (5 items), emotional (6 items), and cognitive (8 items) engagement. The internal consistency coefficient in Table 2 was .62 for behavioral engagement, .78 for emotional engagement and .88 for cognitive engagement.

### Perceived learning achievement

To measure students' perceived learning achievement, this study employed the perceived learning achievement, originally developed by Eom, Wen, and Ashill (2006). Likewise, Kim (2011) translated the four survey items into Korean, revised and adapted them to the research context. In this study, the internal consistency coefficient was .94 for perceived learning engagement as seen in Table 2.

Table 2. Internal Consistency Coefficient of Scales

Measure	Scale	Sample Item (No. of Items)	Cronbach's Alpha
Teaching Presence	Instructional Design & Organization	The instructor clearly communicated important course goals. (4)	.93
	Direct Facilitation	The instructor helped to keep the course participants on task in a way that helped me to learn. (4)	.95
Social Presence	Affective Connectedness	I was able to be personally close to other participants in the class. (5)	.92
	Open Communication	I felt the other participants acknowledged my point of view. (4)	.94
	Sense of Community	I was able to form a sense of community. (4)	.94
	Mutual Attention & Support	I respected the other's opinions in making decisions. (6)	.94

**Table 2. Internal Consistency Coefficient of Scales (continued)**

Measure	Scale	Sample Item (No. of Items)	Cronbach's Alpha
Learning Engagement	Behavioral Engagement	I followed the rules of the online class. (5)	.62
	Emotional Engagement	I felt excited by my work at the online class. (6)	.78
	Cognitive Engagement	I read extra materials to learn more about things we do in the online class. (8)	.88
Perceived Learning Achievement		I learned a lot in the online class. (4)	.94

### Data analysis

In this study the IBM SPSS version 22 was used to analyze the descriptive statistics of constructs including means, standard deviations, skewness, kurtosis, Pearson's reliability, and correlations and Mplus version 7.4 was employed to conduct structural equation modeling (SEM) to examine structural relationships between constructs using a two-step approach: confirmatory factor analysis (CFA) for assessing a measurement model and SEM for a structural model. The estimation method used for SEM would be maximum likelihood (ML) parameter estimates if the assumption of the multivariate normal distribution in the collected data was satisfied or maximum likelihood robust (MLR) parameter estimates if not.

In order to reduce the number of parameters to be estimated in a complex model with relatively a small sample size, Bagozzi and Edwards (1998) suggested item parceling. Item parceling means aggregating or averaging item (measured/observed variable) scores from two or more individual items and using these parcel scores to replace the item scores in a SEM analysis (Bandalos, 2002). Because item parceling can increase the stability of parameter estimates and improve the model-fit within the collected data, this solution was applied to the latent constructs.

As a preliminary analysis, we conducted CFA to assess the fit and validity of the measurement model. Regarding appropriate factor loadings of observed variables, a threshold for factor loadings needs to be at least greater than .50 and ideally greater than .70 for estimating good construct reliability (Hair, Black, Babin, & Anderson,

2010). Then, we evaluated the model-fit indices Mplus generated including  $\chi^2$  statistics, comparative fit index (CFI), Tucker-Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root mean square residual (SRMR). With a small sample size, the  $\chi^2$  statistics tend to be significant since a discrepancy between the observed and estimated covariance matrices is typically large (Kline, 2016). We used the following model-fit criteria (Hu & Bentler, 1999). An acceptable model-fit cutoff for CFI and TLI should be greater than .90. RMSEA less than .05 is regarded as a good fit and between .05 and .08 as a fair fit. SRMR less than .08 can be a good fit. The same model-fit index criteria were applied for assessing the validity of the structural model.

## Results

### Descriptive statistics and correlations of variables

Prior to conducting the two-step SEM, the means, standard deviations, skewness, kurtosis of measured variables were analyzed to examine the multivariate normal distribution of the collected data as seen in Table 3.

The mean values of the measured variables ranged from 3.20 to 4.50 with standard deviations ( $.57 \leq r \leq 1.08$ ), skewness ranged from -1.79 to .20, and kurtosis ranged from -.75 to 5.70. Thus, the multivariate normal distribution of the variables was met since absolute skewness smaller than 3 and absolute kurtosis less than 10 were identified (Kline, 2016). Using Pearson's correlation, the correlation coefficients between the variables were computed ranging from .32 to .85 except for a correlation coefficient (.91) between sense of community and mutual attention & support, which carefully assumed that multicollinearity between the variables was not detected. To ensure no multicollinearity between the variables, the variance inflation factors (VIF) were examined. As a result, VIF values ranged from 2.69 to 4.01. Thus, there was no multicollinearity between the variables because all VIF values were below 10.

Table 3. Descriptive Statistics and Correlations of Variables (n = 206)

Variable	1	2	3	4	5	6	7	8	9	10	
Teaching Presence	1	1									
Social Presence	2	.78**	1								
Learning Engagement	3	.32**	.54**	1							
Perceived Learning Achievement	4	.37**	.59**	.84**	1						
Mean	5	.49**	.68**	.78**	.85**	1					
SD	6	.51**	.66**	.72**	.83**	.91**	1				
Skewness	7	.45**	.52**	.51**	.50**	.52**	.47**	1			
Kurtosis	8	.54**	.68**	.59**	.55**	.55**	.50**	.73**	1		
	9	.55**	.65**	.57**	.58**	.58**	.57**	.74**	.78**	1	
	10	.75**	.77**	.41**	.41**	.50**	.49**	.49**	.66**	.63**	1
Mean		4.50	4.26	3.20	3.56	3.75	3.91	3.91	3.76	3.85	4.37
SD		.61	.69	1.08	.99	.97	.89	.57	.63	.68	.69
Skewness		-1.79	-.91	.09	-.35	-.52	-.76	-.18	.20	-.38	-1.42
Kurtosis		5.70	1.39	-.75	-.25	-.34	.28	1.47	.02	.80	3.84

Note. 1 = Instructional Design & Organization; 2 = Direct Facilitation; 3 = Affective Connectedness; 4 = Open Communication; 5 = Sense of Community; 6 = Mutual Attention & Support; 7 = Behavioral Engagement; 8 = Emotional Engagement; 9 = Cognitive Engagement; 10 = Perceived Learning Achievement; SD = Standard Deviation; \*\* $p < .01$ .

### Measurement model

Through CFA, we assessed the fit and validity of the measurement model using ML parameter estimates. According to the model-fit indices of Mplus, the measurement model was confirmed to fit adequately to the collected data ( $\chi^2 [47] = 135.143, p < .001$ ; CFI = .967; TLI = .955; RMSEA = .082 [90% confidence interval = .064, .099], SRMR = .041). Additionally, in Table 4 all computed factor loadings were presented sufficiently higher than .70, ranging from .80 to .96 at the significance level of .001. Hence, good construct reliability was estimated.

Table 4. Factor Loadings of the Measurement Model (n = 206)

Latent Construct	Measured Variable	Estimate (B)	Standardized Coefficient ( $\beta$ )	SE.
Teaching Presence	TP1	1.000	.832***	.042
	TP2	1.282	.944***	.020
Social Presence	SP1	1.000	.802***	.036
	SP2	1.025	.890***	.026
	SP3	1.085	.965***	.023
	SP4	.965	.933***	.023
Learning Engagement	BE	1.000	.814***	.038
	EE	1.211	.891***	.020
	CE	1.313	.899***	.020
Perceived Learning Achievement	PA1	1.000	.923***	.022
	PA2	.975	.837***	.037
	PA3	1.136	.923***	.019
	PA4	1.059	.899***	.025

*Note.* TP1 = Instructional Design & Organization; TP2 = Direct Facilitation; SP1 = Affective Connectedness; SP2 = Open Communication; SP3 = Sense of Community; SP4 = Mutual Attention & Support; BE = Behavioral Engagement; EE = Emotional Engagement; CE = Cognitive Engagement; PA = Perceived Learning Achievement Item; \*\*\* $p < .001$ .

### Structural model

After identifying the validity and adequate fit of the measurement model, this study investigated the structural relationships between teaching presence, social presence, learning engagement, and perceived learning achievement using SEM. Likewise, the structural model was confirmed to have an adequate model fit within the collected data ( $\chi^2 [37] = 104.822, p < .001$ ; CFI = .963; TLI = .940; RMSEA = .085 [90% confidence interval = .068, .103], SRMR = .043). According to the results of SEM, there is a statistically significant relationship between teaching presence and social presence ( $\beta = .713, p < .001$ ). Also, teaching presence and social presence have



significant influences on learning engagement ( $\beta = .575, p < .001$ ;  $\beta = .260, p = .003$ , respectively). Teaching presence positively predicts perceived learning achievement ( $\beta = .844, p < .001$ ), while social presence negatively predicts perceived learning achievement ( $\beta = -.229, p = .001$ ). Learning engagement has a significant impact on perceived learning achievement ( $\beta = .214, p = .009$ ). There is the significant indirect effect of teaching presence via learning engagement on perceived learning achievement ( $\beta = .123, p = .007$ ). Approximately 74% of variance in perceived learning achievement is explained by teaching presence, social presence and learning engagement.

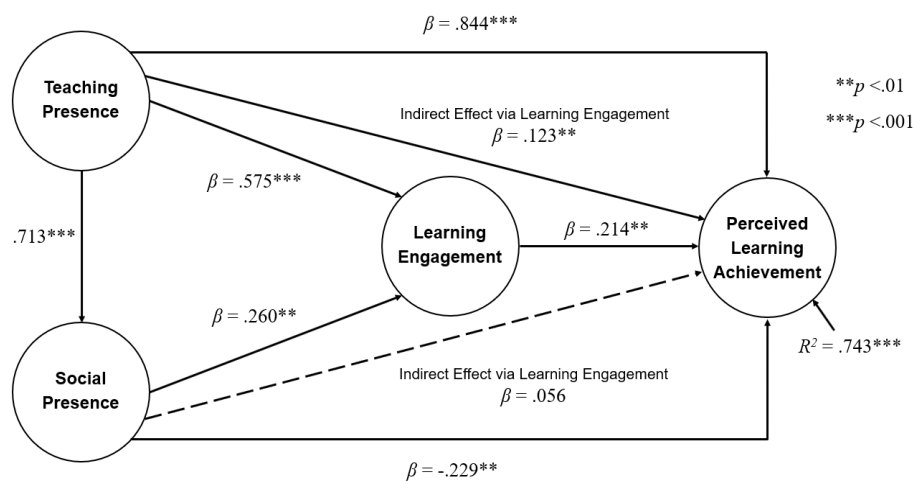


Figure 2. Standardized Path Coefficient of Structural Model

## Discussion and Conclusions

This study aimed to examine the structural relationships among online learners' perceived teaching presence, social presence, learning engagement, and learning achievement in distance higher education settings. The research model was developed based on empirical evidence from the critical literature related to presence

in the CoI framework and learning engagement. This study provides significant insights and new perspectives in the literature and vital implications for instructors and educational practitioners to optimize student learning in online learning environments in higher education.

Within the CoI framework, many researchers have believed that online learning environments may be developed through designing effective instruction and organization, providing helpful instruction, and promoting productive discourses. Obviously, teaching presence was noted to have a powerful impact on social presence students perceived in online learning. This study confirmed that students' perceived social presence in online learning environments was developed as a result of teaching presence. Hence, online instructors should be in total control of teaching presence. This is consistent with findings of previous research by Shea, Li, Swan, and Pickett (2005) which showed that teaching presence was associated with students' perceived social presence.

Especially, a stronger sense of learning community was captured by students when online instructors presented stronger teaching presence behaviors in learning (Shea et al., 2005). Also, online instructors need to focus on effectively utilizing instructional strategies and paying attention to their managerial responsibilities related to teaching presence (Lim & Richardson, 2021). Therefore, this study suggests that teaching presence in the form of instructor actions guides learners for successful online experience (Swan et al., 2008).

Social presence has been considered as an important factor in successful online learning experience. This study indicated that social presence was strongly influenced by students' perception of teaching presence, as mentioned above. It is believed that student with higher social presence tend to have more positive perceptions about the roles and importance of instructors. This finding highlights the importance of teaching presence in online courses (Wise, Chang, Duffy, & del Valle, 2004). For example, whenever possible, online instructors need to help students have the immediacy of interaction taking place in online classrooms.

On the other hand, the concept of social presence was often considered as a psychological concept since social presence is basically related to an individual's perception on how they interact and communicate with others within community (Kim, 2011). This aspect of social presence was discussed by Wise et al. (2004), which contended that students with greater social presence would participate and engage in learning more actively with higher motivation for learning. Similarly, this study emphasizes that increased social presence is connected to higher learning engagement in online courses.

However, students' social presence failed to support the enhancement of perceived learning achievement, although there was a positive correlation between social presence and learning achievement. That is, social presence had no positive influence on perceived learning achievement unlike the relationship between social presence and learning engagement. This unexpected finding appears to be consistent with the previous research by Joo et al. (2010), which showed that social presence had no significant influence on learning achievement due to the different online learning environments in a specific cyber university. In addition, a lack of the positive effect of social presence on perceived learning achievement can be associated with a wide variety of contextual factors such as different academic disciplines, target populations, and learning lengths of online courses (Richardson et al., 2017).

Regarding the relationships with learning engagement, this study suggests that learning engagement is one of the most commonly used factors to examine learning outcomes in online learning environments. Clearly, high teaching and social presence encouraged students to engage actively in online learning activities. These findings from this study support results from prior research by Jung and Lee (2018). In addition, the results of this study highlight the mediating effect of learning engagement on the relationship between teaching presence and perceived learning achievement. In other words, students with higher teaching presence are willing to exhibit more active engagement in learning as managing difficulties and challenges of tasks (Chen, 2017). As a result, engaged individuals can become satisfied with online learning and perceive better learning achievement.

This study primarily focused on investigating how to facilitate learning engagement and perceived learning achievement through investigating the effects of teaching and social presences in online learning environments. Given the findings we discussed above, we cautiously draw conclusion and provide practical implications to enhance learning engagement and perceived learning achievement that online instructors and educational practitioners need to be aware.

First, this study highlights that teaching presence plays a vital role in successful online learning experiences for students. Importantly, the CoI framework guides for online instructors to promote students' perception of teaching presence through instructional design and organization, facilitating discourse, and direct instruction (Swan et al., 2008). Because many students participated in this study enrolled in blended (synchronous + asynchronous) online courses, they must have ability to effectively participate in learning activities and utilize digital learning contents. Hence, designing and developing effective online courses is a priority for online instructors. Furthermore, instructors need to encourage students to engage in interacting among peers and construct knowledge with course materials through facilitating discourse. To ensure facilitating discourse in online environments, instructors continuously observe students' activities, comment upon their discussions, raise productive questions, and keep actively involving collaborative learning. As subject matter experts, instructors should have no fear to share knowledge and information with students and provide adequate scaffolding in useful directions.

Second, the results of this study suggest that social presence is a critical factor to influence learning engagement. According to the previous research by Kim (2011), the concept of social presence was confirmed with the four constructs including mutual attention and support, affective connectedness, sense of community, and open communication and validated its measurement. It seems that the constructs of social presence work as a useful set of strategies to promote students' perception of social presence. Instructors must create online learning environments in which students are able to feel interdependence and support to each other. Also, students can feel free to share feelings, ideas, and thoughts and make critical points through

creating an open communication climate. Since sense of community means students' collective feelings about community itself that provides support and satisfaction, instructors are expected to help them feel sense of community while participating in online learning. Affective connectedness is a useful strategy to encourage students to have the psychological bonds among peers who are physically separate and remotely learning. Overall, it is important to use appropriate applications to promote the concept of presence in online learning contexts since teaching presence and social presence are closely linked to learning engagement and perceived learning achievement.

Obviously, we acknowledge that this study includes several limitations to be resolved in future research. First, a small number of participants in this study was limited to apply SEM for data analysis and be generalizable to other research contexts. Although item parceling in SEM was applied to reduce this limitation in this study, future research will be needed to use a larger sample size. Then, a more complex model can be used to precisely analyze for the appropriate interpretation of collected data. Second, quantitative mediated educational researchers have highly relied on self-report instruments when collecting data. The results of analysis often can be deemed to be "robust" when there are statistically significant results despite measurement error (Kobayashi & Boase, 2012). Hence, this study suggests that future research needs to use electronic learning data related to learning engagement and perceived learning achievement for increasing the validity of research because learning analytics supports to understand unobserved patterns and underlying information in the online learning process. Last, this study partially used the CoI framework to understand the concept of teaching presence and social presence because of the importance of instructors' roles in online learning environments. Thus, this study recommends that future research needs to use the entire CoI framework and its original measurement (Garrison, Cleveland-Innes, & Fung, 2004) in order to provide significant insight into how the genuine concept of presence plays a role in distance higher education settings.

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