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Empirical Research on Key Factors of Social Presence: Comparison of Three Universities

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Abstract: This study investigates how cognitive presence and affective connectedness impact social presence. We employed Partial Least Square (PLS-SEM) to analyze the data (N=679). Respondents were gathered from an online survey questionnaire by Indonesian and Malaysia undergraduate students in three universities: Universitas Negeri Medan (n=405), Universitas Negeri Malang (n=215), and Universiti Putra Malaysia (n=59). The result of this study indicates that in terms of the overall sample, cognitive presence and affective connectedness were found to have a positive and significant effect on social presence. If we peel the sample based on three universities, the result is consistent in Universitas Negeri Medan and Universiti Putra Malaysia samples. However, not the case in Universitas Negeri Malang. In this sample, affective connectedness was found to not significantly impact social presence. The findings are discussed in detail related to the key factors of social presence that have unique characteristics from the three campuses. This study suggests that in establishing students' social presence, the teacher needs to utilize learning that intensifies cognitive presence and affective connectedness in order to foster the social presence.

Keywords: Affective presence; Cognitive presence; Online learning; Social presence

Introduction

In March 2020, the Covid-19 pandemic hit the world and greatly impacted various fields of life, including the field of education. As a result, the government declared a large-scale social restriction (*Pembatasan Sosial Berskala Besar-PSBB*) policy to reduce the spread of the virus, resulting in all activities being carried out indoors. This also impacts the learning process that must migrate and adapt to online learning, causing a shift in student interactions, attitudes, character, and cognitive, as well as impacting students' social presence when learning online (Dalimunthe et al., 2022; Kreijns et al., 2022; Oyarzun et al., 2018; Wut & Xu, 2021).

Social presence is an important aspect and is a current issue in understanding students' psychosocial processes when learning takes place (Weidlich et al., 2022). Given the importance of online teaching and learning methods, technology-mediated communication (Hillman et al., 1994; Weidlich & Bastiaens, 2018) has become extensively important and challenging to consider psychosocial aspects of online learning (Boling et al., 2012). Various challenges faced by academics related to the social presence in online learning include the lack of quantity and quality of interaction (Bailey, 2022), ack of togetherness (Yaman & Muhlis, 2020), low cognitive (Bagustari et al., 2019; Joksimović et al., 2015), lack of learning interactions (Al-dheleai et al., 2020; Djatmika et al., 2022; Tasir & Al-Dheleai, 2019), lack of confidence in learning outcomes (Bailey, 2022), and lack of infrastructure and instructor readiness (Oyarzun et al., 2018; Rahmawati & Sujono, 2021). As a result, concepts and theories related to the social domain have

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become popular for research in the online learning literature. One concept that stands out for research is the social presence which refers to a person's level of meaningfulness in communication interactions (Weidlich et al., 2022).

Social presence theory explains the ability of lecturers and students to interact socially by utilizing technology (communication media) in online learning (Joksimović et al., 2015; Weidlich et al., 2022; Weidlich & Bastiaens, 2018). The concept of social presence has three dimensions: awareness, cognitive social presence, and affective social presence (Ning Shen & Khalifa, 2008; Shen et al., 2010). In building a social presence in online learning, self-awareness is needed to increase personal interaction (Chang & Hsu, 2016) by utilizing digital platforms (Hillman et al., 1994). Through this digital platform, students can increase their knowledge by exploring available information, then solve problems and find solutions to these problems with interactions built between students and lecturers (Bailey, 2022; Ning Shen & Khalifa, 2008). With online dialogue between students and lecturers, it will increase understanding among students.

Furthermore, it can build an affective social presence related to attitudes, emotions, and actions through online interactions. Affective social presence refers to the level of meaningfulness of interpersonal relationships, feelings towards the virtual environment, and building intimacy and closeness. While cognitive presence refers to knowledge, and beliefs about mental social actors in a virtual environment (Shen et al., 2010). In other words, cognitive and affective presence can influence social presence through the exchange of information, contribute to the formation of social identity, and consequently increase knowledge even though they are scattered places (Bailey, 2022; Shen et al., 2010). At the same time, self-awareness is needed to increase personal interactions that reflect each user to feel the presence of other participants and the consequences of psychological involvement and mutual understanding even though they are not in the same place (Ning Shen & Khalifa, 2008; Shen et al., 2010).

The purpose of this research, in general, is to analyze the effect of awareness, cognitive, and affective on social presence. Then describe the comparison of student social attendance at three universities, namely Universitas Negeri Medan, Universitas Negeri Malang, and Universiti Putra Malaysia. This goal is a trigger to improve relations between universities and strengthen research between domestic and foreign universities that face the challenges of online learning. This research presents various collaborations on the latest topics between universities that complement each other to produce solutions to problems in post-pandemic online learning.

Method

Authors employed Partial Least Square Structural Equation Modeling (PLS-SEM) with Multigroup Analysis (MGA) to analyze the data. In term of data collection, authors utilized online survey questionnaire, since this method has effectiveness and efficiency compare to other data collection method (Creswell & Creswell, 2017). There are some rules of thumbs form sampling size in SEM-PLS, however, referring to Hair et al. (2017), to be guided by desired power analysis. To do that, authors utilized G* power to calculate the effect size (Faul et al., 2007).

Results and Discussion

The findings of this study support the social presence theory developed by Short et al. (1976) and Ning Shen et al. (2008) which briefly explains that social presence is formed by affective and cognitive in online learning. This paper describes two stages to prove this theory using a structural equation model approach. The first step is to evaluate the measurement models. After this step has completed, the second step is to evaluate the structural models. The description for the first step and the second step described in the following section.

Evaluation of Measurement Models

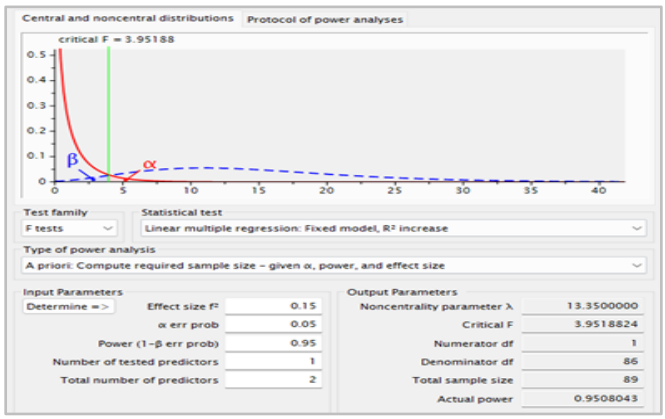

Figure 1. Required sample size

In measurement models evaluation, we need to assess the convergent validity, internal consistency reliability, and discriminant validity. For convergent validity, we analyze the outer loading and AVE for each construct and indicators. Hair et al. (2017) recommended loading factors and Average Variance Extracted (AVE) to exceed 0.5. The minimum sample size needed in this study shows in Figure 1. However, the sample size in

this study is exceeded the minimum sample size already. With total sample of 679, respondents participated in this study divided into students from 3 universities, consists of students of Universitas Negeri Medan (n=405), Universitas Negeri Malang (n=215), and Universiti Putra Malaysia (n=59) (Table 1).

Table 1. Description of the Respondents' Characteristics

Characteristics		Count	Percentage
Gender	Male	129	19.00
	Female	550	81.00
University	Universitas Negeri Medan	405	59.60
	Universitas Negeri Malang	215	31.70
	Universiti Putra Malaysia	59	8.70

In term of internal consistency reliability, we can see the value of composite reliability and Cronbach's Alpha for each construct. According to Hair et al. (2017) both need to be > 0.6. The last evaluation in measurement models is discriminant validity. We conducted analysis for the discriminant validity using Heterotrait-monotrait ratio (HTMT), as recommended by Henseler. As a threshold, HTMT interval must not include 1, and a value < 0.8 is preferable (Henseler et al., 2015). Table 2 shows the results summary for convergent validity and internal consistency reliability. As you can see, all indicators and constructs exceed the minimum value, except the AVE for affective connectedness, that have 0.345 for AVE value. This value below the recommended level of 0.5. However, according to Fornell & Larcker (1981), the AVE may be conservative, or on the basis of composite reliability alone. Since composite reliability for affective connectedness is above the minimum value, the authors conclude that this constructs still relevant to used. Furthermore, in measuring the discriminant validity (using HTMT), as Table 3 shows, no construct includes 0.8.

Table 2. Results Summary for Convergent Validity and Internal Consistency Reliability

Construct	Indicator	Convergent Validity		Internal Consistency Reliability	
		Outer loading	AVE	Composite reliability	Cronbach's Alpha
Cogitive presence	CP1	0.61	0.51	0.92	0.92
	CP10	0.83			
	CP11	0.78			
	CP12	0.81			
	CP2	0.59			
	CP3	0.66			
	CP4	0.68			
	CP5	0.58			
	CP6	0.86			
	CP7	0.68			
	CP8	0.69			
	CP9	0.69			
Affective connectedness	AC1	0.61	0.34	0.61	0.61
	AC2	0.56			
	AC4	0.59			
Social presence	SP1	0.85	0.60	0.88	0.88
	SP2	0.75			
	SP3	0.77			
	SP4	0.77			
	SP5	0.72			

Table 3. Results for Discriminant Validity-HTMT

	Afective connectedness	Cognitive presence	Social presence
Afective connectedness	-	-	-
Cognitive presence	0.50	-	-
Social presence	0.59	0.50	-

Evaluation of Structural Models

After the measurement models known to be adequate and met the requirements, the next step is to evaluate the structural models. However, as reminder, the goodness-of-fit in PLS-SEM is not same to CB-SEM. The most common criteria in assessing the structural model in PLS-SEM are path coefficients, R^2 values, f^2 effect size, and SRMR. There are two main results in this section, they are results summary for structural model evaluation for all sample, and the second is results summary for structural model evaluation for each sample group (university based). Table 4 shows results summary for structural model evaluation for all sample. As Table 4 shows, both affective connectedness (β = 0.30,

p = 0.00) and cognitive presence (β = 0.35, p = 0.00) found to have positive and significant effect on social presence. Table 4 also shows the goodness-of-fit relevant with PLS-SEM, namely r square, f square, and SRMR. Social presence known to have r square 0.299.

Hair et al. (2017) stated that even though to present the rules of thumb for the measurement is somewhat hard, value 0.2 is considered adequate. From this perspective, r square in this model is sufficient. Regarding the predictive value (F square), both affective connectedness and cognitive presence has adequate F square. values of 0.02, 0.15, and 0.35, sequentially represent small, medium, and large effects (Cohen, 2013). By this view, affective connectedness is known to has small predictive value, while cognitive value know to has medium predictive value. The last evaluation in structural models is SRMR. SRMR value less than 0.08 indicates good fit, while a value of zero indicates perfect fit. As we can see in table 4, SRMR for this model for all sample has value of 0.07, indicates good fit of the model.

Table 4. Results Summary for Structural Model Evaluation

	Coefficient	Mean	Standard Deviation	t Values	P Values
Path					
Afective connectedness -> Social presence	0.30	0.30	0.03	7.72	0.00
Cognitive presence -> Social presence	0.35	0.35	0.04	8.24	0.00
R square					
Social presence	0.29	0.30	0.03	8.79	0.00
F square					
Afective connectedness -> Social presence	0.11	0.11	0.03	3.51	0
Cognitive presence -> Social presence	0.14	0.15	0.04	3.65	0
SRMR	0.07				

Table 5. Results Summary for Each Group

	Coefficient			Mean			Standard Deviation			t Values			P Values		
	Unimed	UM	UPM	Unimed	UM	UPM	Unimed	UM	UPM	Unimed	UM	UPM	Unimed	UM	UPM
Path															
Afective connectedness -> Social presence	0.41	0.13	0.24	0.41	0.14	0.25	0.04	0.06	0.09	9.18	1.91	2.48	0.00	0.04	0.01
Cognitive presence -> Social presence	0.29	0.38	0.55	0.29	0.39	0.55	0.05	0.06	0.09	5.32	5.72	6.13	0.00	0.00	0.00
R square															
Social presence	0.35	0.19	0.49	0.36	0.21	0.52	0.04	0.05	0.08	8.51	3.47	6.19	0.00	0.00	0.00
F square															
Afective connectedness -> Social presence	0.21	0.02	0.09	0.22	0.03	0.12	0.0	0.02	0.08	3.89	0.77	1.04	0.00	0.44	0.29
Cognitive presence -> Social presence	0.10	0.16	0.46	0.11	0.19	0.52	0.04	0.07	0.22	2.37	2.17	2.06	0.01	0.03	0.03
SRMR	0.07	0.08	0.11												

This study also analyze how affective connectedness and cognitive presence impact the social presence specific in particular group of sample. Table 5 shows the results summary for structural model evaluation for each group. The interesting results come from the path coefficient. While all group of sample known to have positive and significant effect towards social presence, however, not the same for affective connectedness.

For the relation of affective connectedness on social presence, the group of sample form Universitas Negeri Malang know to be positive, albeit insignificant. The structural model with coefficient for all sample group can be seen in Figure 2.

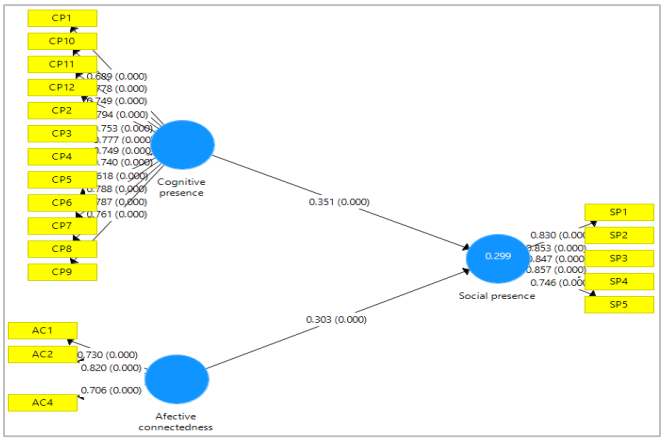

Figure 2. Research model with coefficient

Conclusion

The analysis results show that cognitive presence and affective connectedness positively and significantly affects social presence. Regarding the group specifically, these results applied for all group, except the sample of group from Universitas Negeri Malang. Based on this finding, the authors recommend for all educators to put attention to cognitive presence and affective connectedness. Regarding the results for group of samples from Universitas Negeri Malang, further research needs to be conducted, to investigate what reason lied behind the insignificant relation of affective connectedness on social presence.

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Authors Contributions
The authors played an effective role in completing the research and preparing this manuscript. Researchers from Universitas Negeri Medan and Universitas Negeri Malang served as data analysis and interpretation. Meanwhile, researchers from the Universitas Muhammadiyah Sumatera Utara served as research assistants for tabulation and data collection.

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Conflicts of Interest
The authors declare no conflict of interest.

References

Al-dheleai, Y., Tasir, Z., Al-Rahmi, W., Al-Sharafi, M., & Mydin, A. (2020). Modeling of Students Online Social Presence on Social Networking Sites and Academic Performance. *International Journal of Emerging Technologies in Learning (IJET)*, *15*(12), 56–71. https://doi.org/10.3991/ijet.v15i12.12599

Bagustari, B. A., Sari, A. M., Juraida, E., & Sensuse, D. I. (2019, October). Anonymity Supporting Tool for Community of Inquiry-Based Platform in Encouraging People to Share Knowledge: A Case Study of Pusilkom Universitas Indonesia. In *2019 4th International Conference on Information Technology (InCIT)* (pp. 12-17). IEEE. https://doi.org/10.1109/INCIT.2019.8912055

Bailey, D. (2022). Interactivity during Covid-19: mediation of learner interactions on social presence and expected learning outcome within videoconference EFL courses. *Journal of Computers in Education*, *9*(2), 291–313. https://doi.org/10.1007/s40692-021-00204-w

Boling, E. C., Hough, M., Krinsky, H., Saleem, H., & Stevens, M. (2012). Cutting the distance in distance education: Perspectives on what promotes positive, online learning experiences. *The Internet and Higher Education*, *15*(2), 118–126. https://doi.org/10.1016/j.iheduc.2011.11.006

Chang, C.-M., & Hsu, M.-H. (2016). Understanding the determinants of users' subjective well-being in social networking sites: an integration of social capital theory and social presence theory. *Behaviour & Information Technology*, *35*(9), 720–729. https://doi.org/10.1080/0144929X.2016.1141321

Cohen, J. (2013). *Statistical power analysis for the behavioral sciences*. Academic press.

Creswell, J. W., & Creswell, J. D. (2017). *Research design: Qualitative, quantitative, and mixed methods approaches*. Sage publications.

Dalimunthe, M. B., Dewi, R., Lubis, W., Setyosari, P., Dalimunthe, R. Z., & Lubis, M. A. (2022). The Quality of Students Character on Learning in the Pandemic: A Survey Study. *Jurnal Pendidikan Dan Kebudayaan*, *7*(1), 54–64. https://doi.org/10.24832/jpnk.v7i1.2625

Djatmika, E. T., Setyosari, P., Pratikto, H., Dalimunthe, M. B., Asimiran, S., & Aditia, R. (2022). How to Shape Students' Social Presence? An Evidence from Indonesia. *International Conference on Teacher Education*, *2*, 378–384. Retrieved from http://icte2022.com/images/vol4.pdf

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, *39*(2), 175–191. https://doi.org/10.3758/BF03193146

Fornell, C., & Larcker, D. F. (1981). Structural Equation Models with Unobservable Variables and Measurement Error: Algebra and Statistics. *Journal of Marketing Research*, *18*(3), 382–388. https://doi.org/10.1177/002224378101800313

Hair Jr, J. F., Hult, G. T. M., Ringle, C., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling (PLS-SEM)* (2nd ed.). Sage publications. Retrieved from https://us.sagepub.com/en-us/nam/a-primer-on-partial-least-squares-structural-equation-modeling-pls-sem/book244583

Henseler, J., Ringle, C. M., & Sarstedt, M. (2015). A new criterion for assessing discriminant validity in variance-based structural equation modeling. *Journal of the Academy of Marketing Science*, *43*(1),

115–135. https://doi.org/10.1007/s11747-014-0403-8

Hillman, D. C. A., Willis, D. J., & Gunawardena, C. N. (1994). Learner-interface interaction in distance education: An extension of contemporary models and strategies for practitioners. *American Journal of Distance Education*, *8*(2), 30–42. https://doi.org/10.1080/08923649409526853

Joksimović, S., Gašević, D., Kovanović, V., Riecke, B. E., & Hatala, M. (2015). Social presence in online discussions as a process predictor of academic performance. *Journal of Computer Assisted Learning*, *31*(6), 638–654. https://doi.org/10.1111/jcal.12107

Kreijns, K., Xu, K., & Weidlich, J. (2022). Social Presence: Conceptualization and Measurement. *Educational Psychology Review*, *34*(1), 139–170. https://doi.org/10.1007/s10648-021-09623-8

Ning Shen, K., & Khalifa, M. (2008). Exploring Multidimensional Conceptualization of Social Presence in the Context of Online Communities. *International Journal of Human–Computer Interaction*, *24*(7), 722–748. https://doi.org/10.1080/10447310802335789

Oyarzun, B., Barreto, D., & Conklin, S. (2018). Instructor Social Presence Effects on Learner Social Presence, Achievement, and Satisfaction. *TechTrends*, *62*(6), 625–634. https://doi.org/10.1007/s11528-018-0299-0

Rahmawati, A., & Sujono, F. K. (2021). Digital communication through online learning in Indonesia: Challenges and opportunities. *Jurnal ASPIKOM,* *6*(1), 61-76. http://dx.doi.org/10.24329/aspikom.v6i1.815

Shen, K. N., Yu, A. Y., & Khalifa, M. (2010). Knowledge contribution in virtual communities: accounting for multiple dimensions of social presence through social identity. *Behaviour & Information Technology*, *29*(4), 337–348. https://doi.org/10.1080/01449290903156622

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications*. Toronto, London, New York: Wiley.

Tasir, Z., & Al-Dheleai, Y. (2019). Web 2.0 for fostering students' social presence in online learning-based interaction. *JOTSE: Journal of Technology and Science Education*, *9*(1), 13–19. https://doi.org/10.3926/jotse.552

Weidlich, J., & Bastiaens, T. J. (2018). Technology Matters–The Impact of Transactional Distance on Satisfaction in Online Distance Learning. *International Review of Research in Open and Distributed Learning*, *19*(3). https://doi.org/10.19173/irrodl.v19i3.3417

Weidlich, J., Göksün, D. O., & Kreijns, K. (2022). Extending social presence theory: social presence divergence and interaction integration in online distance learning. *Journal of Computing in Higher Education*. https://doi.org/10.1007/s12528-022-09325-2

Wut, T., & Xu, J. (2021). Person-to-person interactions in online classroom settings under the impact of COVID-19: a social presence theory perspective. *Asia Pacific Education Review*, *22*(3), 371–383. https://doi.org/10.1007/s12564-021-09673-1

Yaman, N., & Muhlis, M. (2020). Students' Social Presence and Perceived Learning toward CCU Course in Online Classroom (An Evaluating of Learning Process during Pandemic Coronavirus). *English and Literature Journal*, *7*(1), 61–73. https://doi.org/10.24252/elite.v7i1a6