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Verifying Causal Relationships Among the Presences of the Community of Inquiry Framework in the Chinese Context

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Abstract

The purpose of this study was to verify a Chinese version of Community of Inquiry (CoI) instrument with learning presence and explore the causal relationships of the factors in the instrument. This study first examined the reliability and validity of the instrument. All four presences had acceptable levels of reliability (all Cronbach's $\alpha > .765$ or higher). The confirmatory factor modeling approach was used to assess its validity. Then, the study used path analysis and regression analysis to explore the causal relationships of the presences. The key findings showed that teaching and social presences directly influenced the perceptions of learning presence. Learning presence was a partial mediating variable of interactional relationship within CoI constructs.

Keywords: community of inquiry, learning presence, social presence, teaching presence

Introduction

China has the world's largest higher education population, with more than 36 million (Ministry of Education, 2016). In recent years, Chinese universities have devoted great effort to the development of online courses such as Massive Open Online Courses (MOOCs) to serve university students and adult learners (Zhang, Perris, Zheng, & Chen, 2015). A large number of online courses have been developed, but the learning experience of online course needed to be examined and improved (Songhe & Xuan, 2014). It is well known that creating and sustaining a learning community is valuable to enhance the online learning experience (Akyol, Garrison, & Ozden, 2009). Therefore, generating a reliable instrument to measure learners' perception of online learning community in China becomes essential.

The Community of Inquiry Framework

The internationally recognized Community of Inquiry (CoI) framework seems to be a valid theoretical framework to understand learners' perceptions of online learning experience (Shea & Bidjerano, 2010; Traver, Volchok, Bidjerano, & Shea, 2014). It has been adopted and adapted by a lot of researchers worldwide (Garrison, Anderson, & Archer, 2010; Swan & Ice, 2010). It provides collaborative-constructivist perspective and methodology for studying online learning experiences through the development of three core presences (Arbaugh et al., 2008; Garrison & Arbaugh, 2007): teaching presence, social presence, and cognitive presence (Garrison, Anderson, & Archer, 2010).

The CoI framework contains three conceptual elements: teaching presence, cognitive presence, and social presence (Garrison, Anderson, & Archer, 2000). Teaching presence refers to the online instructor's "design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson, Rourke, Garrison, & Archer, 2001, P. 5). Teaching presence depends on instructional design and organization of the curriculum and activities, as well as the maintenance of online discussion and organization of instruction (Ice, Gibson, Boston, & Becher, 2011). Cognitive presence is defined as the degree to which learners are able to construct knowledge through sustained self-reflection and dialogue (Swan, Garrison, & Richardson, 2009). It consists of four interconnected and cyclical phases: triggering event, exploration, integration, and resolution (Garrison, Anderson, & Archer, 2001). Social presence is defined as the ability to which participants demonstrate "real people" socially and emotionally through computer-mediated communication (Garrison & Arbaugh, 2007). It depends on the expressions of personal emotion, the sense of group identity and the group cohesion of learners (Ice et al., 2011). The CoI framework with the three core presences offers a theoretical perspective and methodology for studying the potential and effectiveness of online and blended learning (Garrison et al., 2010).

Recently, some researchers suggested the CoI framework can be further extended (Traver et al., 2014), as it lacks attention to behaviors and attitudes as learners adjust to metacognitive, motivational, and behavioral activities in online learning (Shea et al., 2013). For example, learners' discourse about individual and collaborative efforts to regulate their learning process could not be accounted for by the existing three presences in the CoI framework (Hayes, Uzuner-Smith, & Shea, 2015).

Shea and Bidjerano (2010) proposed that learning presence could be a new form of presence in the CoI framework. Learning presence is described as "the proactive stance adopted by students who marshal thoughts, emotions, motivation, behaviors, and strategies in the service of successful online learning" (Shea & Bidjerano, 2012, p. 90). Learning presence has been used to explain self-regulated learning, which includes the planning of learning tasks, monitoring of learning process, and the application of strategy in online learning (Shea & Bidjerano, 2012). The addition of learning presence into the CoI framework helps to enhance the understanding of successful online learning experiences through individual differences of self-regulation (Shea & Bidjerano, 2010).

The viewpoint of whether learning presence should be added into the CoI framework is contested among researchers. Several researchers suggested adding learning presence as a missing dimension into the CoI framework (Hayes et al., 2015; Traver et al., 2014). However, Garrison (2016) believed

that the re-conceptualization of the CoI framework must be strictly validated. There seem to be a common acceptable view that regulation is an important factor in the CoI framework (Garrison, 2016; Garrison & Akyol, 2015; Shea et al., 2013). Therefore, whether to incorporate the regulation into the CoI framework through learning presence needs more research.

The Reliability and Validity of the CoI Instrument

Much existing research has attempted to develop instruments to examine the CoI framework and reported its reliability and validity. For instance, the 34-item survey instrument developed by Arbaugh et al. (2008) to measure students' perception of the three presences, has been proved to be a valid and reliable tool for the CoI framework (Garrison, Cleveland-Innes, & Fung, 2004; Shea & Bidjerano, 2009; Swan & Ice, 2010). This instrument is a valid and reliable survey measure of social presence, teaching presence, and cognitive presence (Arbaugh et al., 2008). Swan et al. (2008) reported that the internal consistency reliability of the survey instrument was: a Cronbach's Alpha of 0.91 for social presence, 0.95 for cognitive presence, and 0.9 for teaching presence. Kozan and Richardson (2014a) examined the validity of the CoI instrument conducting exploratory factor analysis (EFA) and found that the final three-factor structure explained 64.83% of the variances in the pattern of relationships among the items (e.g., teaching presence 48.21%, cognitive presence 10.64%, and social presence 5.98%). Confirmatory factor analysis (CFA) found that the hypothesized model of the three factors was verified and exhibited a reasonably good fit for the data (Kozan & Richardson, 2014a). After adding learning presence to the CoI model, the reliability of learning presence was examined. The internal consistencies of self-efficacy and effort regulation scales (called the learning presence) were .95 and .75 (Shea & Bidjerano, 2010). The CFA examined factorial validity and found that the new model has reasonable factor structure (Shea & Bidjerano, 2010).

Some research studies attempted to translate and validate the CoI instrument into other languages and use it in non-English speaking countries. For example, Portuguese researchers translated and adapted the CoI instrument into Portuguese, and validated the CoI instrument in a blended learning setting (Moreira, Ferreira, & Almeida, 2013). Yu and Richardson (2015) examined the reliability and validity of a Korean version of the CoI instrument. Through reliability analysis, Cronbach's α of teaching, social, and cognitive presences were .954, .913, and .956 respectively. The CFA results showed that the hypothesized model of the CoI instrument was verified as an excellent fit for the data in Korean context (Yu & Richardson, 2015). It is worth noting that the reliability and validity were different between Korean and English versions of the CoI instrument. So, it is necessary to examine the reliability and validity of different language versions of the CoI instrument before using it in another different context.

The Causal Relationships Among the CoI Presences

Much existing research focused on examining the direct and indirect causal relationships of the CoI presences (Garrison, Cleveland-Innes, & Fung, 2010; Shea & Bidjerano, 2008, 2009). Shea and Bidjerano (2009) found that teaching presence and social presence have direct effects on cognitive presence. Garrison, Cleveland-Innes, and Fung (2010) revealed significant direct effects of teaching presence and social presence on cognitive presence, and a direct effect of social presence on cognitive presence. The above two studies confirmed the direct relationships of the three presences. The

indirect relationships focus on the mediating effect of social presence and cognitive presence. Shea and Bidjerano (2009) confirmed that social presence had a partial mediating effect between teaching presence and cognitive presence. The follow-up studies further confirmed that cognitive presence is a full mediator and social presence is a partial mediator in the CoI presences (Kozan, 2016; Kozan & Richardson, 2014b).

After the addition of learning presence, there is a lack of research revealing the relationship between learning presence and the other factors of the CoI framework. Shea and Bidjerano (2010) confirmed a correlation existed between self-efficacy (one component of the learning presence) and other presences in the CoI framework. They further suggested that learning presence should be connected with the CoI constructs (see Figure 1) (Shea & Bidjerano, 2010). Based on correlation between factors, researchers may further look for mediators and explore the interdependence behind the relationships (Frazier, Tix, & Barron, 2004). So, the mediators and causal relationships among the presences need to be further validated. Meanwhile, the relationships between the presences may change depending on the learning context (Shea et al., 2014). It is therefore necessary to examine the relationships among the presences in a different learning context.

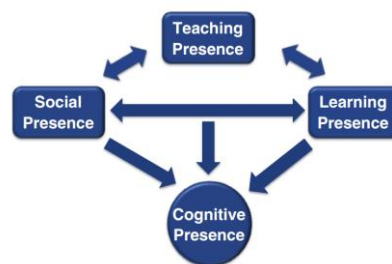


Figure 1. A revised CoI model (Source: Shea & Biderjano, 2010).

In conclusion, the CoI instrument with learning presence has been popularly used in English speaking countries (Shea & Bidjerano, 2010, 2012; Shea et al., 2012). It is important to develop validation and refinement of the CoI instrument using different learner groups and learning contexts (Kozan & Richardson, 2014b). Meanwhile, the relationships between the presences need to be further validated and explored in different learning contexts. In China, there is a distinct lack of research to examine the reliability and validity of the Chinese version of the CoI instrument and verify the causal relationships of the CoI framework consisting of learning presence.

Therefore, the purpose of this study is to examine the reliability and validity of the CoI instrument with learning presence and explore the causal relationships between the four presences in the Chinese context. Hopefully, this instrument can provide a valid tool for measuring learners' perception of online and blended learning in the Chinese context. It could also further verify the applicable scope of the CoI instrument and causal relationships of presences in different learner groups and learning contexts.

Accordingly, in this study we aimed to answer three interrelated questions. The first question attempted to examine the reliability and validity of the Chinese version of the CoI instrument. The second question explored the causal relationships between learning presence and CoI. The goal of the third question is to provide deeper understanding of the relationship between learning presence and CoI constructs. The proposed hypothetical relationships of the variables are stated below and shown

in Figure 2:

RQ1: Is the Chinese version of the CoI survey instrument reliable and valid?

RQ2: Are teaching and social presences perceived to positively influence learning presence?

RQ3: Does learning presence mediate the relationships between cognitive and teaching presences and between cognitive and social presences?

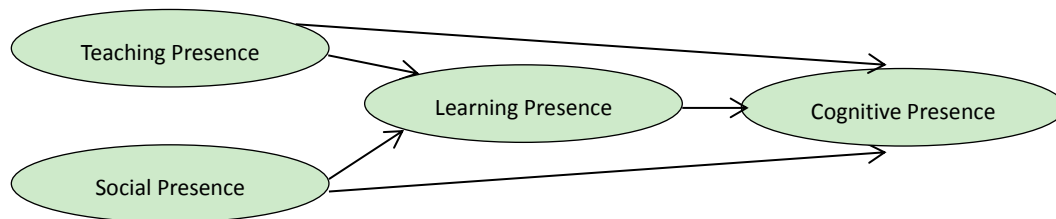


Figure 2. Hypothesized model of the four presences.

Methods

Context

The research was conducted in the School of Humanities, is an institute of Jiangnan University in Southern China. This school began to implement blended learning in 2010. At the time of this study, there were 375 courses on the online platform, including about 50 active courses and 2,725 registered students. The blended learning mode used in this study includes asynchronous online learning and face-to-face teaching with the use of the online learning platform.

The courses involved in this study covered three academic disciplines: the first discipline included three Educational Technology courses: Accounting, Design and Development of E-learning Platform, Educational Video Edition and Studio, and Multimedia Courseware Design; the second discipline included two Primary School Education courses: Primary Computer-assisted Instruction, and Foreign History of Education; and the third one included two Chinese Linguistic Literature courses: Chinese Contemporary Literature(I) and Chinese Contemporary Literature(II). The data collection process lasted for over five weeks (March–April 2015)

Participants

The participants of this study were 350 Chinese undergraduate students, chosen from three majors in the School of Humanities, including 122 Chinese Linguistic Literature students, 111 Primary School Education students, and 117 Educational Technology students. Among them, 184 were sophomores (52.6%) and 166 were juniors (47.4%). The participant had at least a year of blended learning experience and studied two to three blended courses. They were asked to respond to a survey during

class time. A total of 325 students completed the survey questionnaire, and the response rate was 92.9%.

Instrument

The CoI survey instrument was originally created by Arbaugh et al. (2008), with 34 items used for data collection. It was provided on a 5-point Likert scale, ranging from 0-Strongly Disagree to 4-Strongly Agree. The scale employed in this study ranged from 1 (strongly disagree) to 5 (strongly agree). The numbers of items are 13 (for teaching presence), 12 (for cognitive presence), and 9 (for social presence). The learning presence (self-efficacy and effort regulation) was measured by 14 items (Shea & Bidjerano, 2010; Traver et al., 2014).

Two translators who had prior knowledge of the CoI framework and a teacher of English linguistics participated in the translation of the instrument. All three translators were native speakers of Chinese and fluent in both Chinese and English. Four stage translations in Chinese were undertaken from the original English language version of the CoI Survey instrument. Firstly, the translation from English into Chinese was undertaken by one translator. Secondly, another translator translated the reconciled Chinese language version back into English independently. Thirdly, the teacher of English linguistics reviewed the back-translation in meaning and identified problematic items. In the last step, the problematic items were discussed by the three translators until the discrepancies were resolved. Throughout the translation process, the three translators ensured the validity of the Chinese version of the COI instrument. The 34-item of the English and Chinese CoI instruments were shown in the Appendix.

Procedure

Confirmatory factor analysis (CFA) and path analysis (PA). LISREL v. 8.7 was used to run a full structural equation model. The full structural equation model included four measurement models and a structural model. Confirmatory factor analysis (CFA) was used to examine the four measurement models (relationships among the latent and manifest variables). The main purpose of running CFA was to verify the proposed structure of the CoI instrument along with learning presence. The goodness of fit indices, such as comparative fit index (CFI), Non-Normed Fit Index (NNFI), Root Mean Square Error of Approximation (RMSEA), and the ratio of Chi-Squared to the degree of freedom (χ^2/df) were used to examine the predictive validity of the proposed structure of the CoI instrument. According to Schreiber, Nora, Stage, Barlow, and King (2006), for a good-enough fit, χ^2/df value should be between 2 to 5. At the same time, above 0.9 of NNFI and CFI, below 0.08 of RMSEA, and all values of t in the key matrixes should be greater than 2.

Path analysis (PA) was used to assess the structural model (direct relationships among teaching, social, cognitive presences, and learning presence). Unstandardized path coefficients (B), Standard path coefficients (β), standard error and significance (p) were used to test the significance of the relationships.

Regression analysis. The mediating effect of learning presence was tested by regression analysis. According to Baron and Kenny (1986), in the equation $Y=cX$, $M=aX$, $Y=c'X+bM$, if c , a , b , c'

were all significant, then M could be seen a significant partial mediating factor between X and Y. If c, a, b were all significant but c' was not, then M could be seen a complete mediating factor between X and Y. In this research, we regarded cognitive presences (Cg) as Y, learning presences (Lp) as M, teaching presences (Tp) and social presences (Sp) as X1 and X2 respectively. Regression equation, standard error, and t value were calculated.

Reliability analysis. SPSS 17.0 was used to validate the reliability of each dimension as well as the total instrument. We used the parameter of Cronbach's α . Since the number of items in each dimension is small, Cronbach's α value higher than 0.7 was accepted. For the whole scale, the Cronbach's α higher than 0.9 could be considered excellent (George & Mallery, 2003).

Results

This part will report the validity of the Chinese version instrument (CFA results) and the relationships of the factors (PA results) respectively. The results of descriptive statistical analysis, the correlation between the four presences, reliability, and mediating effect will also be presented.

Descriptive Statistical Analysis

Table 1 shows descriptive statistics including means, standard deviations, skewness, kurtosis, minimum value, and maximal value of the four presences. For the sample used in this research, no abnormal value was found. In addition, the results presented in the data in this study were normally distributed based on the degrees of Skewness and Kurtosis, because both were less than the absolute value 1.

Table 1

Descriptive Statistics of Four Dimensions

	Mean	Std. deviation	Skewness	Kurtosis
Teaching presence	3.60	.51	-.107	.223
Social presence	3.61	.53	-.385	.358
Cognitive presence	3.60	.51	-.107	.223
Learning presence	3.61	.50	-.112	.176

*Note. N=325, Min=1.00, Max=5.00.

It seems that learners' perceptions of presences were generally lower than that of international studies. For example, Kozan and Richardson (2014a) reported the average individual item ratings of three presences ranged from 4.17 to 4.57. In this study, the average individual item ratings of the three presences were below 3.61. We noticed that similar results existed in the context of South Korea as well. The South Korean students' perceptions of the three presences were below 3.87.

Three possible reasons may explain this discrepancy. The first is the context differences between

North America and China. Previous studies compared the perceptions of students across countries and confirmed the influence of group and cultural differences on perceptions of online learning (Ashong & Commander, 2012). We hypothesized that the inclination of inquiry learning influences students' perception of CoI. Specifically, Chinese learners were found to be less critical and questioning in online discussions than American learners (Thompson & Ku, 2005). They are more likely to get a definite answer from teachers, rather than getting answers from the interaction (Liang & McQueen, 1999). So, the significant differences of students' perceptions of the CoI presences in Chinese and western contexts may depend on the inclination of inquiry learning. The second may be the issue of translation. Although we adjusted the translation content for Chinese students, students may still have difficulties in understanding specific options. The third reason seems to be that the participants' perception of the online learning community could be a little bit lower than that of some previous studies (Swan, Matthews, Bogle, Boles, & Day, 2012).

The strength of the linear relationships among learning presence, teaching presence, social presence, and cognitive presences were examined by Spearman's rho. As Table 2 shows, the four constructs are moderately to strongly correlated. The largest correlations are between cognitive presence and social presence ($\rho=.698, p<0.01$), and between cognitive presence and teaching presence ($\rho=.665, p<0.01$). Learning presence shows strong correlation with cognitive presence ($\rho=.648, p<0.01$)

Table 2

Spearman's Rho Correlation Coefficients Between the Four Presences

Variables	Cognitive presence	Teaching presence	Social presence	Learning presence
Cognitive presence	—			
Teaching presence	.665**	—		
Social presence	.698**	.565**	—	
Learning presence	.648**	.520**	.562**	—

** $p<0.01$ (2-tailed).

Validity of the Chinese version Instrument

In this research, the validity of the Chinese version instrument was tested during two rounds. Separate model analysis rounds were conducted on the first 48-item model and the second model.

The first round of model analysis. The first round of model analysis was conducted on the 48-item model. In this research, fit indices for the hypothesized structural equation model were as follows: $\chi^2/df=2.44$, NNFI=0.927, CFI=0.931, RMSEA =0.0723. All items loaded significantly on the four factors because all the values of t in the matrixes of LX, LY, GA, and BE were greater than 2 (the smallest values of t in LX, LY, GA were 5.752, 5.523, and 2.660 respectively, and the value of t in BE was 3.383). An obviously high modification index (393.21) was found in the matrix of TD, which indicated a high relationship between the item of Sc7 and Sc9. So we decided to delete the item Sc9. The description of Sc7 was more specific.

The second round of model analysis. To test whether we could come up with a better fit, the

second round of model analysis was conducted on the modified data. The overall model fit statistics were as follows: $\chi^2/df = 2.29$, NNFI=0.933, CFI=0.936, RMSEA =0.0674. The CFA results indicated the hypothesized model of the 47-item structure of the four-factor CoI instrument was verified as an excellent fit for the data. We accepted the 47-item model as our final version (See Fig.3). The results of the CFA confirmed that the model fit is excellent between the proposed model and the observed data.

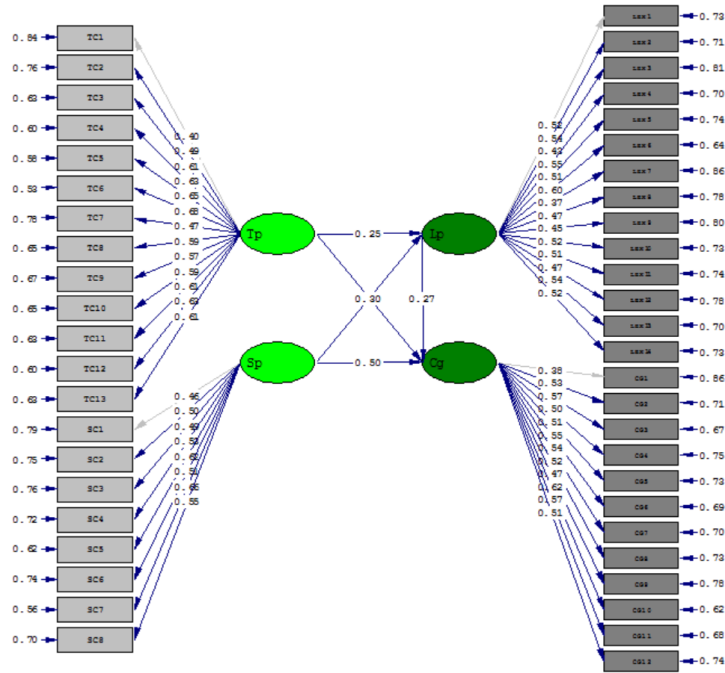


Figure 3. Final model of the 47-item structure (TP = Teaching presence; SP = Social presence; Lp=Learning presence; Cg= Cognitive presence).

Reliability of the Chinese Version Instrument

Table 3 presents Cronbach's α values of the four presences. All four presences had acceptable reliabilities (all Cronbach's $\alpha > .765$ or higher). The instrument overall has a Cronbach's α of 0.934, which indicated the instrument was overall highly reliable (Meyers, Gamst, & Guarino, 2013).

Table 3

Reliability of the Instrument

	Cronbach's α	Number of items
Teaching presence	0.867	13
Social presence	0.765	8
Cognitive presence	0.817	12
Learning presence	0.824	14
Total	0.934	47

The Causal Relationships Among the Four Presences

For the structural equation in this model, teaching presence and social presence have significant direct effects on learning presence ($\beta=0.251$, $p<0.001$; $\beta=0.533$, $p<0.001$). Meanwhile, learning presence was perceived to positively influence cognitive presence ($\beta=0.272$, $p<0.001$). Teaching and social presence have direct influence on cognitive presence ($\beta=0.295$, $p<0.001$; $\beta=0.504$, $p<0.001$) (See Table4).

Table 4

Results of the Path Analysis

Path	Direct effects			
	B	β	Standard error	Significance
Tp to Lp	0.328	0.251	1.123	$P<.001$
Sp to Lp	0.611	0.533	0.137	$P<.001$
Lp to Cg	0.195	0.272	0.058	$P<.001$
Sp to Cg	0.415	0.504	0.100	$P<.001$
Tp to Cg	0.276	0.295	0.079	$P<.001$

To further test the mediating effect of learning presence, regression analysis was carried out in six steps. Regression equations and results are shown in Table 5. As Table 5 shows, in the first three steps, the regression coefficients $c(0.697)$, $a(0.518)$, $c'(0.482)$, and $b(0.417)$ were all significant, so learning presence (M) was verified as a significant partial mediating factor between teaching presence (X_1) and cognitive presence (Y). In the last three steps, the regression coefficients $c(0.716)$, $a(0.565)$, $c'(0.499)$, and $b(0.384)$ were all significant, so learning presence (M) was verified as a significant partial mediating factor between social presence (X_2) and cognitive presence (Y).

Table 5

Mediating Effects of Learning Presence

Step	Independent variable	Dependent variable	Regression equation	Std. error	t
1	Tp(X_1)	Cg(Y)	$Y=0.697X_1$	0.036	17.487***
2	Tp(X_1)	Lp(M)	$M=0.518X_1$	0.043	10.873***
3	Tp(X_1)	Cg(Y)	$Y=0.482X_1$ $+0.417M$	0.037 0.040	11.895*** 10.286***
4	Sp(X_2)	Cg(Y)	$Y=0.716X_2$	0.034	18.425***
5	Sp(X_2)	Lp(M)	$M=0.565X_2$	0.040	12.303***
6	Sp(X_2)	Cg(Y)	$Y=0.499X_2$ $+0.384M$	0.037 0.042	11.872*** 9.143***

*** $P<0.001$.

Discussion and Conclusions

The first question of this study was to confirm the reliability and validity of a Chinese version of the CoI instrument with learning presence. It was verified that the internal consistency reliabilities of the Chinese version instrument were acceptable. Consistent with previous studies (e.g., Garrison et al., 2010; Shea & Bidjerano, 2010, 2012), the CFA results showed the CoI instrument with a learning presence structure was verified as highly valid. The results of the study indicated that the instrument is a reliable tool for researchers in China to measure students' perception of learning experience.

For the second research question, this study found importance about the causal relationships between the learning presence and the CoI constructs. Teaching and social presences directly influence perception of learning presence. Perception of learning presence also has a direct effect on cognitive presence. Meanwhile, teaching and social presence have direct influence on cognitive presence. Shea and Biderjano (2010) suggested the CoI framework should be expanded to reflect the influence of learner's characteristics on the three presences and learning presence should be associated with teaching and social presences. They proposed the revised CoI model with four factors and provided the correlative relationship between the four factors. However, the causal relationships between the four factors still need further validation. This study verified the direct influential relationship between teaching presence, social presence, and learning presence. This result confirmed that causal relationships exist between the CoI constructs and learning presence. Based on the result, we believe that the CoI framework may need additional emphasis on the role of learning presence.

The last question concerned the mediating effect of learning presence. We identified that learning presence had an important partial mediating effect on the teaching presence–cognitive presence and social presence–cognitive presence relationships. Kozan and Richardson (2014b) argued that previous research had shown conflicting results between the interdependence of the three presences. The interdependent relationship may change based on learners' characteristics and learning context, which means additional factors related to learners' characteristics and learning context are needed to explain conflicting results. In this study, learning presence as a partial mediator is defined. The mediator is used to explain “how” or “why” one variable causes an outcome variable (Frazier et al., 2004). The learning presence has emerged to be a possible effect approach between teaching presence, social presence, and cognitive presence. This means higher levels of teaching presence and social presence may increase the perception of learning presence, and in turn promote the level of cognitive presence. This might help to explain why the interdependence relationship within the CoI model may be influenced by learners' certain characteristics (Shea & Bidjerano, 2010, 2012).

Based on the understanding of the mediating effect of learning presence, we should pay more attention to the self-regulatory effect of learning presence in maintaining CoI. We suggest that the effort to increase learning presence may automatically result in increased cognitive presence. From a teaching presence perspective, this might suggest that teaching presence should focus not only on instructional management, building understanding, and direct instruction (Szeto, 2015), but also on adopting pedagogical strategies to help foster self-regulatory behaviors and strategies of online learners. These results also suggest that CoI should encourage students to take personal responsibility (self-regulation) for their learning.

This study expanded the CoI instrument to a different language and cultural context. Firstly, we verified a Chinese version of the CoI instrument. The result confirmed that the CoI instrument to evaluate social, teaching, cognitive, and learning presence was a reliable tool for measuring the perception of learning experience in China. The study confirmed that the causal relationships between learning presence and CoI constructs. The results extended the CoI framework's components with an additional focus on self-regulatory behaviors and strategies of learners in online and blended learning.

The present study engaged a mid-range sample size of 350 students in a university of China. Although this sample from China helped to diversify the research context of the CoI framework, comparatively a mid-range sample size may limit the generalizability of findings. In addition, some researchers suggested that it was necessary to examine the CoI framework across disciplines and institutions (Garrison & Arbaugh, 2007; Garrison et al., 2010). Future research should increase the number of participants and explore the dynamic relationships among the presences across disciplines and institutions. Lastly, exploratory factor analysis should be conducted to further identify the dimensionality of the Chinese version of the CoI instrument.

This study provided a reliable instrument for researchers and practitioners in China to measure their students' perception of online and blended learning. It will contribute to the development and application of the CoI framework in other contexts. We hope our validated survey will not only enable Chinese researchers and practitioners to assess the quality of the existing online courses, but also guide them to design and develop more high-quality online courses.

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References

- Akyol, Z., Garrison, D. R., & Ozden, M. Y. (2009). Online and blended communities of inquiry: Exploring the developmental and perceptual differences. *The International Review of Research in Open and Distributed Learning*, 10(6), 65-83. doi: 10.19173/irrodl.v10i6.765
- Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conference context. *Journal of Asynchronous Learning Networks*, 5, 1-17.
Retrieved from
http://cde.athabascau.ca/coi_site/documents/Anderson_Rourke_Garrison_Archer_Teaching_Presence.pdf
- Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K.

- P. (2008). Developing a community of inquiry instrument: Testing a measure of the community of inquiry framework using a multi-institutional sample. *The Internet and Higher Education, 11*(3), 133-136. doi: 10.1016/j.iheduc.2008.06.003
- Ashong, C. Y., & Commander, N. E. (2012). Ethnicity, gender, and perceptions of online learning in higher education. *Journal of Online Learning and Teaching, 8*(2), 98. Retrieved from http://jolt.merlot.org/vol8no2/ashong_0612.pdf
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of personality and social psychology, 51*(6), 1173. Retrieved from <http://comp.uark.edu/~whlevine/psyc5143/baron&kenny.pdf>
- Frazier, P. A., Tix, A. P., & Barron, K. E. (2004). Testing moderator and mediator effects in counseling psychology research. *Journal of counseling psychology, 51*(1), 115. doi: 10.1037/0022-0167.51.1.115
- Garrison, D.R. (2016). *Thinking collaboratively: Learning in a community of inquiry*. Routledge: New York & London.
- Garrison, D. R., & Akyol, Z. (2015). Toward the development of a metacognition construct for communities of inquiry. *The Internet and Higher Education, 24*, 66-71. doi: 10.1016/j.iheduc.2014.10.001
- Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: Computer conferencing in higher education. *The Internet and Higher Education, 2*(2), 87-105. doi: 10.1016/S1096-7516(00)00016-6
- Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23. doi: 10.1080/08923640109527071
- Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education, 13*(1-2), 5-9. doi: 10.1016/j.iheduc.2009.10.003
- Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education, 10*(3), 157-172. doi: 10.1016/j.iheduc.2007.04.001
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. (2004). Student role adjustment in online communities of inquiry: Model and instrument validation. *Journal of Asynchronous Learning Networks, 8*(2), 61-74. Retrieved from http://olc.onlinelearningconsortium.org/sites/default/files/v8n2_garrison_1.pdf
- Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry

- framework. *The Internet and Higher Education*, 13(1-2), 31-36. doi: 10.1016/j.iheduc.2009.10.002
- George, D., & Mallery, P. (2003). *Reliability analysis. SPSS for Windows, step by step: A simple guide and reference* (14th ed.). Boston: Allyn & Bacon, 222-232.
- Hayes, S., Uzuner-Smith, S., & Shea, P. (2015). Expanding learning presence to account for the direction of regulative intent: Self-, co-and shared regulation in online learning. *Online Learning Journal*, 19(3). doi:10.5209/rev_SJOP.2001.v4.n1.30616
- Ice, P., Gibson, A. M., Boston, W., & Becher, D. (2011). An exploration of differences between community of inquiry indicators in low and high disenrollment online courses. *Journal of Asynchronous Learning Networks*, 15(2), 44-69. Retrieved from <http://files.eric.ed.gov/fulltext/EJ935576.pdf>
- Kozan, K. (2016). A comparative structural equation modeling investigation of the relationships among teaching, cognitive, and social presence. *Online Learning Journal*, 20(3), 210-227. doi: 10.24059/olj.v20i3.654
- Kozan, K., & Richardson, J. C. (2014a). New exploratory and confirmatory factor analysis insights into the community of inquiry survey. *The Internet and Higher Education*, 23, 39-47. doi: 10.1016/j.iheduc.2014.06.002
- Kozan, K., & Richardson, J. C. (2014b). Interrelationships between and among social, teaching, and cognitive presence. *The Internet and Higher Education*, 21, 68-73. doi:10.1016/j.iheduc.2013.10.007
- Liang, A., & McQueen, R. J. (1999). Computer assisted adult interactive learning in a multi-cultural environment. *Adult Learning*, 11(1), 26-29. Retrieved from <http://journals.sagepub.com/doi/pdf/10.1177/104515959901100108>
- Ministry of Education. (2016). Statistical communique on the development of education in China in 2015. Retrieved from http://www.moe.edu.cn/jyb_sjzl/
- Moreira, J. A., Ferreira, A. G., & Almeida, A. C. (2013). Comparing communities of inquiry of Portuguese higher education students: One for all or one for each? *Open Praxis*, 5(2), 165-178. doi: 10.5944/openpraxis.5.2.50
- Meyers, L. S., Gamst, G. C., & Guarino, A. (2013). *Performing data analysis using IBM SPSS*. John Wiley & Sons.
- Schreiber, J. B., Nora, A., Stage, F. K., Barlow, E. A., & King, J. (2006). Reporting structural equation modeling and confirmatory factor analysis results: A review. *The Journal of educational research*, 99(6), 323-338. doi: 10.3200/JOER.99.6.323-338
- Shea, P., & Bidjerano, T. (2008). Measures of quality in online education: An investigation of the community of inquiry model and the net generation. *Journal of Educational Computing*

Research, 39(4), 339-361. doi: 10.2190/EC.39.4.b

- Shea, P., & Bidjerano, T. (2009). Community of inquiry as a theoretical framework to foster “epistemic engagement” and “cognitive presence” in online education. *Computers & Education*, 52(3), 543-553. doi: 10.1016/j.compedu.2008.10.007
- Shea, P., & Bidjerano, T. (2010). Learning presence: Towards a theory of self-efficacy, self-regulation, and the development of a communities of inquiry in online and blended learning environments. *Computers & Education*, 55(4), 1721-1731. doi: 10.1016/j.compedu.2010.07.017
- Shea, P., & Bidjerano, T. (2012). Learning presence as a moderator in the community of inquiry model. *Computers & Education*, 59(2), 316-326. doi: 10.1016/j.compedu.2012.01.011
- Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Gozza-Cohen, M., . . . Tseng, C.-H. (2013). Online learner self-regulation: Learning presence viewed through quantitative content-and social network analysis. *The International Review of Research in Open and Distributed Learning*, 14(3), 427-461. doi: 10.19173/irrodl.v14i3.1466
- Shea, P., Hayes, S., Smith, S. U., Vickers, J., Bidjerano, T., Pickett, A., & Jian, S. (2012). Learning presence: Additional research on a new conceptual element within the Community of Inquiry (CoI) framework. *The Internet and Higher Education*, 15(2), 89-95. doi: 10.1016/j.iheduc.2011.08.002
- Shea, P., Hayes, S., Uzuner-Smith, S., Gozza-Cohen, M., Vickers, J., & Bidjerano, T. (2014). Reconceptualizing the community of inquiry framework: An exploratory analysis. *The Internet and Higher Education*, 23, 9-17. doi: 10.1016/j.iheduc.2014.05.002
- Songhe, Y., & Xuan, L. (2014). Status and common problems of MOOC practice in China's universities from the reports of the MOOC practice in China's universities. *Modern Distance Education Research*, 4, 3-12. Retrieved from http://en.cnki.com.cn/Article_en/CJFDTOTAL-XDYC201404002.htm
- Swan, K., & Ice, P. (2010). The community of inquiry framework ten years later: Introduction to the special issue. *The Internet and Higher Education*, 13(1), 1-4. doi: 10.1016/j.iheduc.2009.11.003
- Swan, K., Matthews, D., Bogle, L., Boles, E., & Day, S. (2012). Linking online course design and implementation to learning outcomes: A design experiment. *The Internet and Higher Education*, 15(2), 81-88. doi: 10.1016/j.iheduc.2011.07.002
- Swan, K., Richardson, J., Ice, P., Garrison, D.R., Cleveland-Innes, M., & Arbaugh, J.B. (2008). Validating a measurement tool of presence in online communities of inquiry. *E-Mentor*, 2(24), 1-12. Retrieved from <http://www.e-mentor.edu.pl/arttykul/index/numer/24/id/543>
- Szeto, E. (2015). Community of inquiry as an instructional approach: What effects of teaching, social and cognitive presences are there in blended synchronous learning and teaching? *Computers*

& *Education*, 81, 191-201. doi: 10.1016/j.compedu.2014.10.015

Thompson, L., & Ku, H. Y. (2005). Chinese graduate students' experiences and attitudes toward online learning. *Educational Media International*, 42(1), 33-47. doi: 10.1080/09523980500116878

Traver, A. E., Volchok, E., Bidjerano, T., & Shea, P. (2014). Correlating community college students' perceptions of community of inquiry presences with their completion of blended courses. *The Internet and Higher Education*, 20, 1-9. doi: 10.1016/j.iheduc.2013.09.001

Yu, T., & Richardson, J. C. (2015). Examining reliability and validity of a Korean version of the community of inquiry instrument using exploratory and confirmatory factor analysis. *The Internet and Higher Education*, 25, 45-52. doi: 10.1016/j.iheduc.2014.12.004

Zhang, J., Perris, K., Zheng, Q., & Chen, L. (2015). Public response to “the MOOC movement” in China: Examining the time series of microblogging. *The International Review of Research in Open and Distributed Learning*, 16(5). doi:10.19173/irrodl.v16i5.2244

Appendix

Dimensions and Items of the Chinese Col Survey Instrument

教学性存在(13)

- 1、教师清楚地告知了重要的课程主题。
- 2、教师清楚地告知了重要的课程目标。
- 3、教师对如何参与课程学习活动给予明确说明。
- 4、教师清楚地告知了重要学习活动的截止日期或时间范围。
- 5、教师可以辨别课程主题中理解一致和分歧的部分，这能够帮助我学习。
- 6、教师会引导我们理解课程主题，这能帮助我理清思路。
- 7、教师帮助学生投入并参与到富有成效的对话中。
- 8、教师帮助学生持续地参与课程任务，这能帮助我学习。
- 9、教师鼓励课程参与者探索课程中的新概念。
- 10、教师的行为有助于课程参与者形成社区感。
- 11、教师能够帮助我们聚焦相关问题的讨论，这能帮助我学习。
- 12、教师通过提供反馈来帮助我了解自己的优点和缺点。
- 13、教师提供了及时的反馈意见。

社会性存在(9)

- 14、通过在课程中了解其他参与者的情况，我可以获得归属感。
 - 15、我能够对一些课程参与者形成清晰的印象。
 - 16、在线或基于网络的交流是参与社会交互的绝佳媒介。
 - 17、通过在线媒体开展对话让我感到很舒服。
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- 18、参与课程讨论让我觉得很舒服。
- 19、和其他课程参与者交互，我感到舒服。
- 20、即使与其他课程参与者意见不一致也让我感到舒服，我们仍然保持着信任感。
- 21、我觉得我的观点能够得到其他课程参与者认可。
- 22、在线讨论能帮助我发展协作感。

认知性存在(12)

- 23、课程中提出的问题增加了我对课程内容的兴趣。
- 24、课程活动激发了我的好奇心。
- 25、我感觉自己有积极性来探索与学习内容相关的问题。
- 26、我利用各种信息来源来探索课程中提出的问题。
- 27、进行头脑风暴并找到相关信息能够帮助我解决与课程内容相关的问题。
- 28、在线讨论能够帮助我欣赏不同的观点。
- 29、整合新信息能够帮助我回答课程活动中提出的问题。
- 30、学习活动可以帮助我形成对问题的解释思路或解决方案。
- 31、反思课程内容与讨论能够帮助我理解课堂所学的基本概念。
- 32、我能够说出检验和应用课程中学到的知识的方法。
- 33、我已经形成了课程中问题的解决方案，此方案可应用于实践。
- 34、我能将课程中所学知识应用到我的工作或其他非课堂的相关活动中。

Translated by Zhi-qiang Ma, Ya-jie Wu, and Li-li Kong.

Dimensions and Items of the English Col Survey Instrument

Teaching presences(13)

1. The instructor clearly communicated important course topics.
2. The instructor clearly communicated important course goals.
3. The instructor provided clear instructions on how to participate in course learning activities.
4. The instructor clearly communicated important due dates/timeframes for learning activities.
5. The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.
6. The instructor was helpful in guiding the class towards understanding course topics in a way that helped me clarify my thinking.
7. The instructor helped to keep course participants engaged and participating in productive dialogue.
8. The instructor helped keep the course participants on task in a way that helped me to learn.
9. The instructor encouraged course participants to explore new concepts in this course.
10. Instructor actions reinforced the development of a sense of community among course participants.
11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.
12. The instructor provided feedback that helped me understand my strengths and weaknesses.
- 13 The instructor provided feedback in a timely fashion.

Social presences(9)

14. Getting to know other course participants gave me a sense of belonging in the course.
-

15. I was able to form distinct impressions of some course participants.
 16. Online or web-based communication is an excellent medium for social interaction.
 17. I felt comfortable conversing through the online medium.
 18. I felt comfortable participating in the course discussions.
 19. I felt comfortable interacting with other course participants.
 20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.
 21. I felt that my point of view was acknowledged by other course participants.
 22. Online discussions help me to develop a sense of collaboration.
-

Cognitive presences(12)

23. Problems posed increased my interest in course issues.
 24. Course activities piqued my curiosity.
 25. I felt motivated to explore content related questions.
 26. I utilized a variety of information sources to explore problems posed in this course.
 27. Brainstorming and finding relevant information helped me resolve content-related questions.
 28. Online discussions were valuable in helping me appreciate different perspectives.
 29. Combining new information helped me answer questions raised in course activities.
 30. Learning activities helped me construct explanations/solutions.
 31. Reflection on course content and discussions helped me understand fundamental concepts in this class.
 32. I can describe ways to test and apply the knowledge created in this course.
 33. I have developed solutions to course problems that can be applied in practice.
 34. I can apply the knowledge created in this course to my work or other non-class related activities.
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The Community of Inquiry Survey Instrument is from:

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