Students' Perceptions of a Designed Online Asynchronous Learning Activity Regarding the Community of Inquiry (CoI) Framework

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Abstract
The COVID-19 pandemic situation has instigated a rapid shift in higher education with the adoption of online instruction or distance learning. This sudden change has forced instructors around the globe to transform or re-design offline courses to utilize online instruction. To effectively design an online course, the Community of Inquiry (CoI) framework has become key for distance learning over the past two decades. In this study, online learning modules were designed in an asynchronous environment for graduate students (N=9) during the second half of the Psychology for Teachers course. The online course content is organized into five modules. Each module includes four phases of learning activities with learning support. The four phases of the learning activities consist of engagement, exploration, group discussion, and individual writing tasks. After completing the course, a CoI survey was applied to investigate students' perceptions of learning activities, covering three elements: Teaching; social; and cognitive presence regarding the CoI framework. The CoI survey results indicate that students were moderately positive towards the teaching, social, and cognitive presence of the CoI framework, while they were highly positive regarding certain aspects of each element. Additionally, the designed learning activities can reflect various dimensions of teaching presence, social presence, and cognitive presence within the CoI framework. The findings of this study can be utilized for the designation of an asynchronous online learning module embedded with learning activities that more effectively support the CoI framework.

Keywords: Community of Inquiry (CoI), Asynchronous, Distance Learning, Online Learning, Higher Education

Introduction

Distance education is a form of education that takes advantage of communication technology by connecting teachers and students, even if they are in different locations (Moore & Anderson, 2007). For a long time, distance learning developed in parallel with technological developments in communications and distance learning has been recognized for its potential to disrupt the shape of higher education (Hanna, 2003). The COVID-19 pandemic has accelerated the transformation of teaching and learning in higher education toward online instruction or distance education. This sudden change has necessitated instructors around the world to transform or re-design offline courses to utilizes online instruction.

Changing from offline to online instruction requires the development of pedagogy that can be used as an effective model in online distance education. Based on a social constructivist perspective, the Community of Inquiry (CoI) framework was developed as a guideline to design, develop, and implement online learning. This framework is outstanding in terms of emphasizing the social element of learning (Garrison, Anderson, & Archer, 1999, 2003). Originally, the CoI framework in online education mainly focused on three key presences: Teaching; social; and cognitive presence. During the past twenty years, the CoI framework has been gradually revised to add more presences that must be further investigated to positively impact online learning practice (Kozan & Caskurlu, 2018).

In online learning, the teaching presence is defined as the designation, facilitation, and direction of students' learning; the social presence is defined as the student's ability to realize themselves as part of the learning community; the cognitive presence is described as the student's ability to construct knowledge through sustained communication in a meaningful way (Garrison et al., 2003). The research report strongly confirmed a distinction between the three key elements, however integrating the elements should be designed, facilitated, and directed based on various contexts (Akyol & Garrison, 2008). The CoI framework plays a key role in the designation and implementation of the online learning experience in a more effective manner (Cooper & Scriven, 2017).

Since the CoI framework has been implemented for the designation of online instruction, a research tool was developed to prove the efficacy of the framework. One of the most popular instruments that has been developed to test a measure of the CoI framework was the CoI survey (Arbaugh et al., 2008). The CoI survey consists of 34 items to represent each presence within the CoI framework (see Table 2). The CoI survey has been used as a tool to examine students' perceptions of a designed online course that provided by instructors to identify the specific, actionable areas to improve the learning process in an online learning program (Burgess, Slate, Rojas-LeBouef, & LaPrairie, 2010; Kovanović et al., 2019; Swan, Day, Bogle, & Matthews, 2014; Swan, Matthews, Bogle, Boles, & Day, 2012). The CoI survey also was used as a course survey to measure students' perceptions of the three presences in a developed online learning course (Burgess et al., 2010; Kovanović et al., 2019). The CoI survey results indicate that the tool is valid and reliable to examine learning experiences and in order to compare different premises in various contexts of online and blended learning (Stenbom, 2018; Swan, Richardson, et al., 2008; Swan, Shea, et al., 2008).

In this study, online learning modules were developed in an asynchronous environment for the Psychology for Teachers Course. The online course content is organized into five modules, including classroom management, teaching strategies, teaching models, learning assessment, and the power of teachers. Each module includes four learning activity phases with learning support (see Figure 1). After completing the course, the CoI survey was applied to investigate students' perceptions toward the learning activities in three elements: Teaching; social; and cognitive presence.

A Designed Online Asynchronous Learning Activity

The 'Psychology for Teachers' course was divided into two parts. In the first half, students were required to learn the fundamental theory and concepts of educational psychology. In the second half, students were required to learn how educational psychology can be applied to the classroom. In response to the COVID-19 pandemic, the Thai government locked down all educational organizations in Thailand, so the second half of the course was transformed into an online course. The online course content was organized into five modules, including classroom management, teaching strategies, teaching models, learning assessment, and the power of teachers. Each module included four phases of learning activities with learning support. The four phases of learning activities consisted of engagement, exploration, group discussion, and individual writing tasks (see Figure 1).

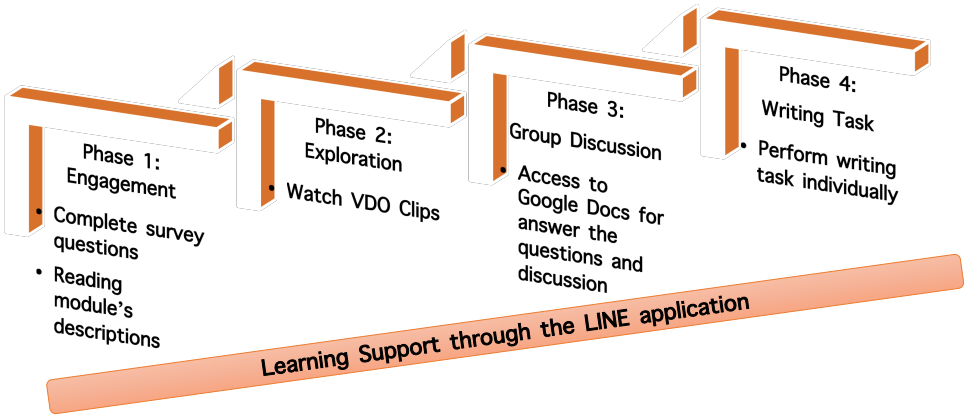

Figure 1: A designed online asynchronous learning activity

Phase 1: Engagement

In the beginning phase, students answered survey questions so that the teacher could ascertain their prior knowledge of the content. Furthermore, students were assigned to read the module description. The clarification included explanation sentences regarding what students were required to do to complete the learning module and a key question posed to engage the students to explore the video clips in the second phase. The survey and module description were published in LEB2 (Learning Environment version B2) that was created as an online learning platform to support the academic staff at King Mongkut's University of Technology Thonburi in order to design and organize learning activities and to assess students' learning based on the learning outcomes of the course.

Phase 2: Exploration

After the students read the posed key question in the first phase, they were assigned to individually watch short video clips that were published publicly on YouTube. In each module, students were required to watch three to four video clips to explore and gather content knowledge (see Table 1). The video clips that were selected for the students' exploration were required to meet two important criteria. First, the video clips must visualize how the educational psychology provided in the module can be applied to the real classroom. Second, the duration of each video clip must not exceed ten minutes, else the students could lose concentration while watching the clip.

Table 1: Sources of Video Clips

Modules	Sources of video clips
1. Classroom Management	https://youtu.be/eUiWFntut00 https://youtu.be/w6vVXmwYvgs https://youtu.be/-Sg1lFE3dfw
2. Teaching Strategies	https://youtu.be/9gNjGD_W3dM https://youtu.be/DVfOJjKV5QE https://youtu.be/txdxPJcMzKE
3. Teaching Models	https://youtu.be/mAYh4nWUkU0 https://youtu.be/hnzCGNnU_WM https://youtu.be/zrR-KIoggf4 https://youtu.be/-Mb9-At2Ss0
4. Learning Assessment	https://youtu.be/HFimMJL3Wz0 https://youtu.be/Ecp5tFwXA_M https://youtu.be/ZB8LHwqRcaU https://youtu.be/a2UgtgyEDss
5. The Power of Teachers	Students were assigned for searching to watch from their interests.

Phase 3: Group Discussion

A discussion sheet was created using Google Docs as an online collaboration platform. Google Docs can an effective online collaboration tool, in terms of both promoting student collaboration through writing collaboratively in addition to influencing student learning (Zhou, Simpson, & Domizi, 2012). The teacher opened the group discussion by posting the key question and allowing students to write their answers individually. In addition to answering the key question, students were also required to read other responses and use the comment tool in Google Docs to show whether they agreed or disagreed with them. The group discussion was designed to be an asynchronous learning activity. Students could access the discussion sheet at any time, but were required to schedule themselves to participate by answering questions and comment on the other responses at least once per day. This activity was conducted on three days. In the final section, the teacher posted a summary and conclusion of what the students could learn from the module in the discussion sheet.

In this phase, the teacher played an important role to facilitate student participation by asking extended questions. For example, the teacher can use the comment tool to

highlight certain parts of a student's answer and ask the student to clarify the answer. Moreover, the teacher could raise new issues and post new questions to allow students to answer individually, discuss with others, and extend their knowledge. In other words, students were motivated by questions from both the teacher and their peers in order to help them grasp the concept of the module and apply their understandings to explain related issues.

Phase 4: Individual Writing Task

This final phase was an evaluation phase. Students were assigned to perform a writing task individually to show their understanding of the content that they had learned during the learning module. The writing task topic was posted in LEB2. For some learning modules, this phase could be integrated with the third phase, in which the teacher would be able to evaluate students' understanding through their answers in the group discussion, thereby skipping this phase.

Learning Support

In addition to the four phases of learning activities, the support tool for student learning was created using the LINE application. The LINE application is the most popular social media and communication application in Thailand and can be accessed using any internet connected device. The teacher created a group in the LINE and then invited students to join the group. Students and teachers could take advantage of this platform. Teachers could use this tool to announce when the learning module was launched and remind students to participate on time. Moreover, students could use this tool to informally communicate with the teacher when they did not understand what they were required to do during the learning activities.

Research Method

This study aims to answer the research question:

"What are students' perceptions of the designed online asynchronous learning activity regarding the CoI framework?"

The students' perceptions of the designed online asynchronous learning activities were evaluated using the Community of Inquiry survey. After completing all the learning modules, students were asked to complete the CoI survey. The purpose of the CoI survey is to evaluate student perceptions through the three main constructs of the CoI framework: 1) Perceptions of the teaching presence (items 1-13), 2); perceptions of the social presence (items 14-22); and 3) perceptions of the cognitive presence (items 23-34) (see Table 2). The CoI survey was divided into two sections, with the first aiming to investigate student perceptions of the CoI framework in general, and the second section aiming to investigate student perceptions of the CoI framework specific to the learning activities.

In the first section, students were asked how they perceived each statement of the CoI survey using a five-point Likert-scale, from 1- strongly disagree to 5- strongly agree. The results from this section were analyzed and interpreted using the following criteria: Highly negative (1.00-1.50); moderately negative (1.51-2.50); neutral (2.51-

3.50); moderately positive (3.51-4.50); and highly positive (4.51-5.00) (Duangpummet, Chaiyen, & Chenprakhon, 2019), as shown in Table 2.

In the second section, students were asked to choose which learning activities were consistent with the statement of the CoI survey. Consequently, the responses were changed to be the learning activities including completing survey questions, reading module descriptions, watching video clips, group discussions, performing writing tasks, and communicating through the LINE group. For each statement, students were allowed to select more than one response. The results of this section were analyzed and interpreted using mode statistics. If more than 6 out of 9 students (>67%) responded to the proposed learning activities that were be interpreted to be the activities that students could perceive to be consistent with the statement (see Table 3).

Findings

The findings are reported in two parts according to the two sections of the CoI survey. The results from the first CoI survey portrays student perceptions of the three key elements of the CoI framework in general. The results of the second CoI survey indicate student perceptions of the learning activities related to specific elements within the CoI framework.

In the first part of the CoI survey (see Table 2), the students' perceptions toward the teaching presence were moderately positive, with a mean score of 4.07 ± 0.93. The most positive student perceptions regarded how the teacher could clearly communicate important schedules for learning activities, with a mean score of 4.89 ± 0.33. The students also highly positively perceived the teacher's ability to provide clear instructions on how to participate in the course learning activities and to give feedback in a timely fashion, which both had a mean score of 4.56 ± 0.73. In terms of social presence, the mean score of students' perceptions was moderately positive, at 3.80 ± 0.53. The students had the highest positive perception regarding getting to know each other which gave them a sense of belonging in the course, with a mean score of 4.78 ± 0.67. In terms of cognitive presence, the mean score of students' perceptions was moderately positive, with a mean score of 3.90 ± 0.39. They showed the highest positive perception of the provided questions in the course allowed them to utilize a variety of information sources to explore, with a mean score of 4.78 ± 0.44.

Table 2: Results from the Community of Inquiry (CoI) Survey Part 1

Items	Mean ± SD
Perceptions of the teaching presence (Item 1-13)	
1. The instructor clearly communicated important learning topics.	4.00 ± 0.50
2. The instructor clearly communicated important learning goals.	3.89 ± 0.78
3. The instructor provided clear instructions on how to participate in course learning activities.	4.56 ± 0.73
4. The instructor clearly communicated important due dates/timeframes for learning activities.	4.89 ± 0.33
5. The instructor was helpful in identifying areas of agreement and disagreement on learning topics that helped me to learn.	4.00 ± 0.71
6. The instructor was helpful in guiding the class towards	3.89 ± 0.60

understanding learning topics in a way that helped me clarify my thinking.	
7. The instructor helped to keep course participants engaged and participating in productive dialogue.	3.89 ± 0.78
8. The instructor helped keep the course participants on task in a way that helped me to learn.	4.11 ± 0.78
9. The instructor encouraged course participants to explore new concepts in this course.	4.11 ± 0.78
10. Instructor actions reinforced the development of a sense of community among course participants.	3.67 ± 0.87
11. The instructor helped to focus discussion on relevant issues in a way that helped me to learn.	3.89 ± 0.60
12. The instructor provided feedback that helped me understand my strengths and weaknesses.	3.44 ± 0.88
13. The instructor provided feedback in a timely fashion.	4.56 ± 0.73
Overall	**4.07 ± 0.39**
Perceptions of the social presence (Item 14-22)	
14. Getting to know other course participants gave me a sense of belonging in the course.	4.78 ± 0.67
15. I was able to form distinct impressions of some course participants.	3.33 ± 0.71
16. Online communication is an excellent medium for social interaction.	3.22 ± 0.67
17. I felt comfortable conversing through the online medium.	3.56 ± 0.73
18. I felt comfortable participating in the course discussions.	3.33 ± 0.71
19. I felt comfortable interacting with other course participants.	4.00 ± 1.00
20. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	4.44 ± 0.73
21. I felt that my point of view was acknowledged by other course participants.	3.78 ± 0.67
22. Online discussions help me develop a sense of collaboration.	3.78 ± 0.67
Overall	**3.80 ± 0.53**
Perceptions of the cognitive presence (Item 23-34)	
23. Key questions posed increased my interest in learning issues.	3.67 ± 0.50
24. Learning activities piqued my curiosity.	3.56 ± 1.13
25. I felt motivated to explore content related questions.	4.13 ± 1.05
26. I utilized a variety of information sources to explore problems posed in this course.	4.78 ± 0.44
27. Brainstorming and finding relevant information helped me resolve content related questions.	4.33 ± 0.71
28. Online discussions were valuable in helping me appreciate different perspectives.	4.22 ± 0.83
29. Combining new information helped me answer questions raised in course activities.	3.67 ± 0.71
30. Learning activities helped me construct explanations/solutions.	3.78 ± 0.67
31. Reflection on course content and discussions help me understand fundamental concepts in this class.	3.67 ± 0.50
32. I can describe ways to test and apply the knowledge created in this course.	3.56 ± 0.53

33. I have developed solutions to course problems that can be applied in practice.	3.56 ± 0.73
34. I can apply the knowledge created in this course to my work or other non-class related activities.	3.89 ± 0.60
Overall	**3.90 ± 0.39**

As mentioned previously, the learning activities in phase 1 (the engagement phase) were divided into two sections, namely completing survey questions and reading module descriptions and key questions. The results of the second part of the CoI survey (see Table 3) indicate that the majority of students perceived there was a teaching presence when reading the module description and posted question activities. This finding is supported by the survey result in part 1 of the CoI survey. If the teacher can clearly communicate the learning topics, learning goals, how to participate in course learning activities, and provide feedback in a timely fashion, the students would be able to perceive the teaching presence element in the design of an online asynchronous course.

Table 3: Results from the Community of Inquiry (CoI) Survey Part 2

Domain	**Phase 1: Engagement**	**Phase 2: Exploration**	**Phase 3: Group discussion**	**Phase 4: Writing task**	**Learning supporting**
Teaching Presence	Item 1 (100%) Item 2 (89%) Item 3 (100%) Item 4 (89%)	Item 9 (67%)	Item 5 (89%) Item 6 (78%) Item 7 (100%) Item 8 (89%) Item 9 (78%) Item 10 (78%) Item 11 (100%) Item 12 (89%) Item 13 (89%)	Item 9 (67%)	-
Social Presence	-	-	Item 14 (78%) Item 15 (78%) Item 16 (67%) Item 18 (78%) Item 19 (67%) Item 20 (89%) Item 21 (89%) Item 22 (89%)	-	Item 16 (67%) Item 17 (78%)
Cognitive Presence	-	Item 24 (78%) Item 27 (78%)	Item 23 (67%) Item 24 (67%) Item 25 (78%) Item 26 (100%) Item 27 (100%) Item 28 (100%) Item 29 (100%) Item 30 (100%) Item 31 (100%) Item 32 (89%) Item 33 (89%) Item 34 (89%)	Item 26 (67%) Item 30 (67%) Item 33 (67%) Item 34 (67%)	-

Students also agreed that watching video clips activity in either phase 2 or the exploration phase can represent both teaching presence and cognitive presence. In addition to the video VDO clips playing an important role by encouraging students to explore new concepts in terms of teaching presence, the activity also piqued students' curiosity. Moreover, it also prompted students to brainstorm and find relevant information to solve key questions in terms of cognitive presence. It is noted that social presence was not perceived by the students because this type of learning activity did not require group work.

Interestingly, the group discussion in phase 3 played a dominant role in promoting all the presences in the online learning modules. For teaching presence, the students agreed that the role of the teacher in the group discussion could help them to focus the discussion on relevant issues, identifying areas of agreement and disagreement on learning topics, and leading the class to understand the learning topics. This finding supports the role of teachers in monitoring and guidance discussion activities so that they are successful are still essential for an online discussion forum (Junus, Santoso, Sadita, R-Suradijono, & Suhartanto, 2018). Besides, asking extended questions could keeping students to engage and participate in productive dialogue, encourage them to explore new concepts, and reinforce the development of a sense of community among course participants. Moreover, students perceived that providing feedback by commenting on students' answers or asking further questions in a timely fashion could help them to understand their strengths and weaknesses.

Group discussions also promoted the social presence of the course in almost all aspects of the CoI survey. In the designed course, the students felt comfortable to participate and interact with others in the group discussion. They also felt comfortable to share their point of view with others because some of their opinions could form distinct impressions and were acknowledged by others. Even if some opinions might contrast with others, they still maintained a sense of trust. It is noticed that the majority of students considered that using Google Docs as an online discussion platform did not make them comfortable in place of using the LINE group application, which might because they were less familiar with Google Docs compared to LINE. Overall, the students agreed that online communication is an excellent medium for social interaction and that it helped them to develop a sense of collaboration in the designed course. The findings are related to previous research that found a strong relationship between student perceptions of motivation, enjoyment, and learning through online discussions (Hobgood, 2007).

In terms of cognitive presence, the students agreed that group discussions could promote their learning throughout the course. They perceived that the guiding questions prompted an interest with learning issues, piqued their curiosity, and motivated them to explore and utilize various sources of information to answer the questions. Students also agreed that during the discussion process, they had opportunities to brainstorm with others, appreciate other perspectives, combine new information with their prior knowledge, allow them to reflect for greater understanding, and construct explanations or solutions by themselves. Moreover, they perceived that the group discussions increased their confidence to apply their understanding and knowledge in order to solve related problems in real practice. The findings are related to previous research that claimed that asynchronous online

discussions can promote students' active learning, even in the absence of face-to-face interaction (Comer & Lenaghan, 2013; Krasnova & Ananjev, 2015).

The phase 4 writing task results indicate that this designed activity can represent teaching presence and cognitive presence but is limited to social presence. In terms of teaching presence, students perceived that they were encouraged to explore new concepts in the course through writing about the assigned topic. In terms of cognitive presence, they agreed that writing tasks had a role in helping them to formulate their explanations by utilizing a variety of information sources. Students also considered that they could bring the developed solutions in addition to created knowledge from writing tasks to apply in their work or other non-class related activities.

Finally, the supporting system of student learning allowed students to access through the LINE application. The result clearly shows that communication through the LINE application can promote students' perception of social presence. The majority of the students considered that the LINE application was an excellent medium for social interaction for the course. Interestingly, they felt more comfortable conversing through LINE than Google docs. The result may indicate that conversing through an informal platform such as LINE is an essential part of online communication in addition to the formal conversation.

In summary, the study results indicate that the students can perceive the existence of the teacher in all phases of the learning modules, even in the absence of face-to-face student-teacher interaction. It is noted that during phase 2 (exploration) and phase 4 (writing task), no teachers interacted with students at all, but students perceived that they were taught because the instructor encouraged the course participants to explore new concepts during the course. That might be the reason that in an asynchronous learning environment, teachers play an important role in choosing effective educational media that could help students do self-study effectively, even in the absence of teachers. Besides, the writing task in phase 4 could promote students to explore further knowledge to clarify their thoughts. In terms of social presence, the results indicated that students could perceive they were socialized when they had the opportunity to communicate with others, both formally and informally. Group discussion was the main space for them to interact with others through learning activities. The students perceived that both the discussion sheet and the LINE application provided them with excellent mediums for social interaction, yet they felt more comfortable communicating via the LINE application. In terms of cognitive presence, the students considered that they gained knowledge and understanding of the content in phases 2 (exploration), 3 (group discussion), and 4 (writing task). The results indicate that well-organized online learning activities in an asynchronous environment can reflect teaching, social, and cognitive presence according to the CoI framework.

Conclusion and implications

In this study, online learning modules were designed in an asynchronous environment using the Community of Inquiry (CoI) as a framework and implemented with graduate students (N=9). The learning activities comprised five modules, and in each module the students were required to complete learning activities including answering survey question(s), self-study with posted video clips, group discussion of key

questions, and performing an individual writing task. After completing the course, the CoI questionnaire was used to investigate students' perceptions of learning activities in the three elements of the CoI framework, namely teaching, social, and cognitive presence. The results of this study clearly indicate that students showed moderately positive perceptions of the three key elements of the CoI framework and highly positive perceptions for certain aspects of each element. Additionally, the designed learning activities in the four phases and one supporting system for students' learning can reflect various dimensions of the teaching presence, social presence, and cognitive presence within the CoI framework. This study provides an effective example for the design online learning activities in an asynchronous environment in order to reflect teaching, social, and cognitive presence according to the CoI framework. Moreover, these can be utilized in the design of an asynchronous online learning module embedded with learning activities that support the CoI framework more effectively.

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