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Exploring students' learning experience in an international online research seminar in the Synchronous Cyber Classroom

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ABSTRACT

The development of computer-mediated communication enables teaching and learning to take place across geographical boundaries. An online synchronous learning environment with cyber face-to-face features affords students the sense of learning together online. This study reports a novel design of organizing a 16-week seminar for doctoral students across Canada, Italy, New Zealand, and Taiwan in the Synchronous Cyber Classroom, an online synchronous learning environment. Students' learning experiences were explored from the perspective of students' interactions with students, instructors, and the content, based on which the perception of being in a learning community was formed. This article reports how this international online research seminar was organized, how students' learning experience was analyzed, and what we learned about students' learning in this international online research seminar.

1. Introduction

Computer-mediated asynchronous communication has been successfully utilized in learning and instruction using various learning management systems such as WebCT, Blackboard and Moodle. For example, Giannini-Gachago and Seleka (2005) reported holding online discussion sessions between masters' students of the University of Botswana and the University of Georgia. Lajoie, Garcia, Berdugo, and Márquez (2006) also reported international collaboration activities by holding two online graduate seminars between Canada and Mexico. These two cases exemplify the use of computer-mediated asynchronous communications across geographically dispersed locations and bringing people together from different parts of the world. Partly because of its longer history, computer-mediated asynchronous learning has been widely documented. A relatively fewer number of studies have been done to explore student learning in computer-mediated synchronous learning environments, especially across different countries and cultures.

A computer-mediated synchronous learning environment rendering various communication resources, including audio-video conferencing, text messaging, desktop sharing, joint web browsing and electronic whiteboard, allows learners to participate in class meetings together at the same time from dispersed locations. Though participants are physically separated, these resources together constitute a context which underpins not only the real-time interactions among participants (Dennis, Fuller, & Valacich, 2008; Murphy & Laferriére, 2007), but also the formation of the sense of "being there together", the so-called "presence" (Short, Williams, & Christie, 1976). This sense of being together was found to be significantly related to students' perceived success and satisfaction of learning in online learning environments (Swan & Shih, 2005).

The present study reports a novel experience of holding an international online research seminar based at a computer-mediated synchronous learning environment, the Synchronous Cyber Classroom (SCC) (Chen & Ko, 2010; Chen & Wang, 2008; Hastie, Chen, & Kuo, 2007; Wang & Chen, 2007; Wang, Chen, & Levy, 2010a), for doctoral students in Canada, New Zealand, Italy, and Taiwan. With cyber face-to-face features, the SCC hosts a virtual learning environment resembles a physical face-to-face classroom, yet with higher complexity in teaching, administering relevant synchronous and asynchronous resources, and maintaining the flow of the learning activity, all at the same time (Leo et al., 2009).

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In an attempt to understand students' learning experience in the online synchronous research seminar, Garrison, Anderson, and Archer's (2000) model of Community of Inquiry was used. Students' perception of teaching presence, social presence, and cognitive presence were investigated. In the following sections, the practice of learning in the SCC will be addressed first, followed by the discussion about the perception of presence and Garrison et al.'s (2000) model of Community of Inquiry. Next, the methodology and findings will be presented, along with relevant discussions and suggestions.

2. Literature review

2.1. Learning in the Synchronous Cyber Classroom

A computer-mediated synchronous learning environment rendering multimodal communication functions such as real-time video–audio conferencing and text messaging provides a learning context resembling a physical face-to-face classroom (Dennis et al., 2008; Murphy & Laferriére, 2007). Among others, the Synchronous Cyber Classroom (SCC) is a good example of such systems. The SCC is a computer-mediated synchronous learning environment supported by the 3C platform (Collaborative Cyber Community; Wang et al., 2010a) using the JoinNet software tool, with the integrated features of real-time video and audio conferencing, text messaging, electronic whiteboard, and other asynchronous features such as discussion forum and class recordings. Recent studies found that students performed higher-order cognitive processes in the SCC, including mathematics problem solving and language learning, equally well as in a physical face-to-face learning environment (e.g., Hastie et al., 2007; Wang & Chen, 2007).

Most learners showed positive attitude towards online synchronous learning due to the perceived efficiency, flexibility and convenience (Northrup, 2002; Wang & Chen, 2007; Wang, Chen, & Levy, 2010b) and the preference for being self-paced (Wuensch, Aziz, Ozan, Kishore, & Tabrizi, 2008), but they may still feel frustrated when discrepancies are experienced in learning between the online synchronous environment and the accustomed face-to-face environment. For example, Stodel, Thompson, and MacDonald (2006) found that, in comparison with physical face-to-face learning, students associated online synchronous learning more with the robustness of online conversation, spontaneity and improvisation, perceiving and being perceived by other participants, and getting to know others. Park and Bonk (2007) investigated students' learning experiences in an audio-based synchronous learning environment and highlighted that spontaneous feedback, meaningful interactions, multiple perspectives, and instructor's timely support were valued by learners. However, the very same learning environment also imposes challenges to the learners, including time constraints, lack of reflection, language barriers, tool-related problems, and network connection problems. Wuensch et al. (2008) found that students regarded online learning superior to conventional face-to-face learning in terms of convenience and self-pacing, but inferior in terms of communication with peers, communication with the instructor, assistance in learning complex material, amount of the required effort, understanding of course material, and pleasantness of learning.

Although the technology of creating an online synchronous learning environment is becoming more and more feasible (Chen & Ko, 2010; Chen, Ko and Kinshuk & Lin, 2005; Hastie, Hung, Chen, & Kinshuk, 2010; Wang & Chen, 2009; Wang et al., 2010a), most educators are not familiar with how to hold an online synchronous class. It is important, therefore, to understand what an online synchronous environment is, how a class held in such environment can be organized and managed in a way that not only facilitates students' learning process for deep understanding, but also lessens the instructor's cognitive and affective loads in online teaching (Leo et al., 2009).

Garrison et al. (2000) surveyed students' responses to learning in computer-mediated asynchronous environments based on the conception of presence and came up with the model of community of inquiry to account for students' learning. Because no instrument has yet been developed specifically for measuring students' learning experience in online synchronous learning environments, Garrison and colleague's insights (Garrison, 2007; Garrison et al., 2000; Garrison, Anderson, & Archer, 2001) about learning inquiry in computer-mediated learning environments were adopted in the present study to understand students' perception about learning in the SCC. Through understanding what and how students perceived their own learning experience in the SCC, instructional strategies may be come up with for educators who are interested in employing SCC-like computer-mediated synchronous learning environments in distance teaching. In the following sections, the conception of presence will be discussed first, followed by the model of community of inquiry.

2.2. Presence

The perception of presence is one's subjective sense towards interacting with an environment, where the interaction convinces the user of his/her actual existence in the computer-mediated environment (Draper, Kaber, & Usher, 1999). Ijsselsteijn and Riva (2003) proposed that this experience of "being there" is a function of the interactions between the characteristics of the user (i.e., perceptive, cognitive, and affective processes) and those of the medium (i.e., the form and content). In their model, the user interacts with the medium through the continuous perceptual-motor cycle. The user's perception of presence may change over time as s/he moves through and interacts with the mediated environment. Zahorik and Jenison (1998) suggested that presence is tied to one's successfully-supported actions in the environment, either being real or virtual. In other words, this coupling of the user's intention and the effectiveness of the environment in response to the user's purposeful actions is what determines the extent of the user's perceived presence in the environment.

Heeter (1992) differentiated the subject experience of presence in terms of self, other beings, and the surrounding environment, and defined three corresponding dimensions – personal presence, social presence and environmental presence respectively. Personal presence refers to the extent to which and the reasons why we could feel like we ourselves are in a computer-mediated world. The perceived affordances of the virtual environment play a key role in this dimension. Social presence refers to the extent to which other beings (living or synthetic) also exist in the world and appear to react to us. Our conversation or interaction with those who recognize our existence in the virtual environment gives rise to this sense of "being together" (Short et al., 1976). Environmental presence refers to the extent to which the environment per se appears to know that we are there and to react to us. Both social presence and environmental presence contribute to one's perception of presence in the virtual environment.

Heeter, Gregg, Climo, Biocca, and Dekker (2003) in a later study came up with a different but complementary perspective on the formation of presence. They investigated the experience of social presence existed in the connection of a homebound senior and a group of physically present seniors in a senior day care center through a "telewindow" – a set of audio, video, and network facilities. In this one-to-

many (also many-to-one) asymmetric interactions, the social presence of the group of seniors was vivid to the homebound senior (and vice versa), given that senior people at both sites had already known each other and established interpersonal relationship. Heeter et al. (2003) explained that people at both sites had accumulated a common ground on "mutual knowledge, mutual beliefs, and mutual assumptions" (Clark & Brennan, 1993) and shared a common understanding through ongoing social encounters, physically or virtually.

Concluding what has been discussed earlier, the formation of the sense of presence in an online learning environment result from the user's interaction with the virtual environment mediated by the medium employed. The sense of presence could be derived from a bottom-up process driven by salient sensory inputs mediated by technology (Davide & Walker, 2003), a top-down process driven by the existing schema or experience about the beings (physical or synthetic) involved in the virtual environment (as illustrated in Heeter et al.'s study), or even more likely, a synthetic process of both.

2.3. Social presence, cognitive presence, and teaching presence

Garrison et al. (2000) concluded their extensive investigations on students' learning in computer-mediated asynchronous communication environment and proposed the model of Community of Inquiry for online learning, as depicted in Fig. 1. The core of the model, the meaningful learning experience, consists of two inseparable processes – reflection and discourse, which are mediated by the interplay of cognitive presence, social presence, and teaching presence in the design, facilitation, direct instruction, and assessment of an online course (Garrison, 2006). Cognitive presence, social presence, and teaching presence were three major components used to identify the learning experience in the computer-mediated communication.

Cognitive presence concerns the process of critical thinking in the online learning environment. It involves the steps of perceiving triggering events, exploration, integration, and resolution in the learning activity. These steps are crucial for establishing reflection and discourse in systemic inquiry.

Social presence refers to participants' ability in the online environment to project their personal characteristics into the community, and to present themselves as real persons to the other online participants. It is an important factor to make one feel connected with others, not isolated, in the online learning environment (McInnerney & Roberts, 2004; Wilhelm, Rodehorst, Young, Jensen, & Stepans, 2003). The goal of establishing social presence is to create a climate of mutual trust and belongingness which supports upcoming/ongoing interactions. The factors that may influence one's social presence include affective perception and interaction, the sense of open community, and the sense of group cohesion. Garrison (2006) noted that, as social presence is formed, "it moves to the background as students engage and collaborate with their peers on matters associated with the curriculum" (p. 29).

Teaching presence concerns online learners' perception about the instructor in his/her roles in the learning process as both a designer of educational experience and facilitator of learning activities, who is in charge of cognitive, affective, and managerial activities in the online courses (Hiltz & Turoff, 2002). Components relevant to describing teaching presence include the design and organization, facilitation, and direct instruction of the course. Students' perceptions of social presence and cognitive presence are largely shaped by the design and facilitation of learning activities (Garrison, 2006).

From the perspective of interactions, Swan (2003) related a learner's perception of social presence, cognitive presence, and teaching presence to Moore's (1989) classification of interaction with peer learners, with the course content, and with instructors, respectively. Heckman and Annabi (2005) regarded these interactions as dynamic and mutually interdependent processes for knowledge construction and distribution (Aviv, 2000; Salomon, 1993).

Summarizing what has been discussed about the formation of presence and Garrison et al.'s (2000) classification of cognitive presence, social presence, and teaching presence, a learner's perception of presence can be regarded as the synthesis of the bottom-up process, i.e., the learner's active and purposeful interactions with learning peers, instructors in the online environment, and the top-down process, i.e., the cumulative familiarity and understanding of the learning environment (including learning peers, instructors, and subject matter as a whole), which were both mediated by the computer technology, i.e., the SCC in this study.

Though Garrison et al.'s (2000) model of Community of Inquiry was developed on the basis of online asynchronous learning, it comprises comprehensive analyses of learners' perception of online learning activities which served the purpose of the present study well. We

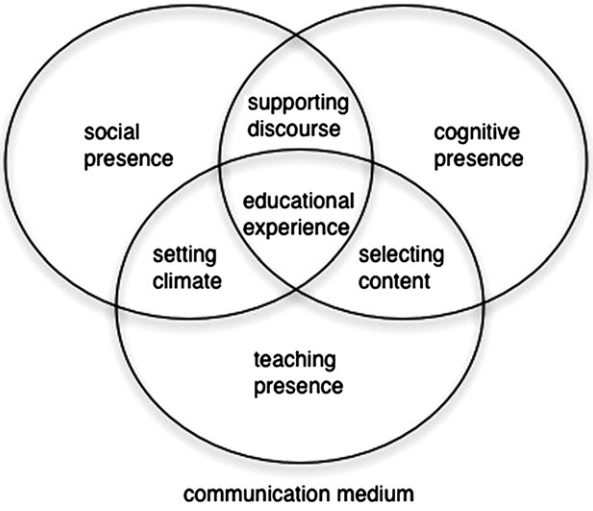

Fig. 1. The framework of Community of Inquiry (Garrison et al., 2000).

examined the same dimensions of student learning through the lenses of learners' interactions in the SCC to gain insights from students' experiences.

3. Methodology

3.1. The context and participants

Starting from March 2010 through June 2010, a 16-weeks online research seminar entitled "Online Research Seminar on E-learning" was offered for doctoral students across Canada, New Zealand, Italy, and Taiwan. Three professors, one from Canada, one from Italy, and one from Taiwan chaired this seminar. Seventeen doctoral students (s2, s3, s4 from Canada; s5, s6, s7, s8, s9, s10 from Italy; s11 from New Zealand; and s1, s12, s13, s14, s15, s16, s17 from Taiwan), who were the advisees of these three professors, attended the seminar regularly. Sixteen researchers in the field of e-learning from Canada, Chile, Finland, Italy, Japan, and Taiwan were invited as guest speakers. The seminar took place once a week in SCC, with each meeting lasting roughly two hours – one and half hour for presentation and an half hour for Q&A.

To manage the complexity of holding this online seminar, the three professors who chaired the seminar shared the administrative work, including coordinating the speakers' talks, moderating, and administering the meetings. They shared the responsibility of being the coordinator, the moderator, and the session manager to run this seminar efficiently. The coordinator contacted all speakers and scheduled their talks. The moderator chaired a session and oversaw the professional aspects of the session, including announcing the start and the end of a session, introducing the guest speaker, and quite often serving as a discussant in a talk. Three professors took turns in being the moderator for different guest speakers. The session manager took care of all aspects of an online meeting, including reminding course participants to open/mute their microphones to prevent interruptive echoes, and reminding the speaker about the questions posed in the text message and helping amplify the posed questions in the electronic whiteboard, and facilitating the speaker and participants to better utilize the functionalities supported by the SCC for better learning and instruction experiences.

In addition to the administration tasks, a group of technical staff took charge of testing the system with the guest speakers at the distance before each meeting and helping them upload the slides to the electronic whiteboard. Technical staff were also standing by (online) to provide timely assistance to seminar participants, in case unexpected technical problems emerged.

Students joined the seminars by logging into the system at a designated time from different places and time zones. During the talk, students were encouraged to post questions and comments to the guest speaker in audial form using the microphone or textual form using text messaging in the chat room. They received homework assignments from the guest speakers at the end of each talk. They were asked to finish the assignments and submit them to their individual thesis advisor (or supervisor).

Fig. 2 is a snapshot of the online research seminar captured from a video clip of class recording. The screen comprises five parts. The central part of the screen is the electronic whiteboard, which is used to present the slides. All course participants are allowed to scribble on it to discuss questions and ideas. Below the electronic whiteboard are the real-time images of online participants. All participants' live images are shown here. The speaker was shown in the upper left panel. A list of participants were presented in the center left panel, with icons indicating if their microphone or webcam is on. The text chat room is placed at the bottom left panel for instant text messaging. Students type messages to the instructors and learning peers and receive text messages from other participants here.

3.2. Data collection and manipulation

3.2.1. Content analysis of text messages

Text messaging is a form of interaction taken place among online participants in the SCC. Online participants were encouraged to do so in the meeting to avoid interrupting the speaker. Analyzing the content of text messages, therefore, may provide evidence accounting for the interactions taken place in the seminar, which underpin students' subjective sense of social presence, teaching presence, and cognitive presence. Text messages were collected from 13 out of the 15 class recordings and analyzed. Due to system failures, the class recording of the 8th and 13th meetings were unavailable.

To document the text messages, this study first identified each text message by its sender, potential receiver(s), and the content type of the message. All participants of a meeting were distinguished into four categories, including (1) students, who officially registered for the class, either for credit or not; (2) teachers, who chaired the seminar, including the coordinator, moderator, and session manager; (3) staff,

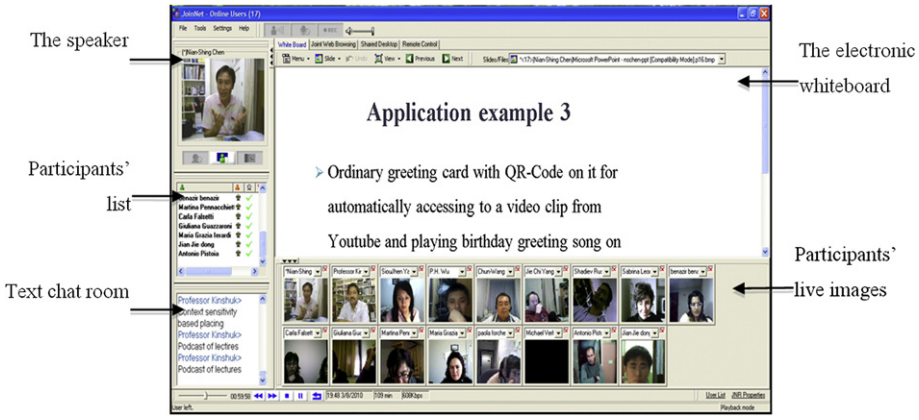

Fig. 2. A snapshot of the online research seminar in the SCC.

including the researcher and technical crew; and (4) others, who did not belong to any of the above identities. Because this study attempted to understand students' learning experience in the online research seminar, only the text messages sent by students and teachers will be focused and analyzed.

The content of text messages were analyzed based on the coding scheme presented in Table 1. This coding scheme was developed largely based on Garrison et al. (2000) model of Community of Inquiry and Zhu's (2006) framework for analyzing students' cognitive engagement in asynchronous online discussions. Text messages sent by the teacher(s) were distinguished into seven types according to their purposes, including (1) facilitation, (2) course management and organization, (3) direct instruction, (4) affectional expression, (5) responsive expression, (6) technical issues, and (7) other purposes.

Text messages sent out by students were categorized in two types, question and statement. Two types of questions were distinguished: the ones for (1) in-depth clarification and understanding, and for (2) broader conceptual connections. The statements sent by learners were categorized into two big categories: cognitive and social. The cognitive category consists of five different levels of knowledge (Bloom & Krathwohl, 1956) provided in the message, including (1) informative, (2) explanatory, (3) analytical, (4) synthetical, and (5) evaluative. The social category consists of two types of messages, including (1) affectional and (2) responsive. In addition, a certain amount of messages were found to be related to issues of the SCC system and such were categorized into the type of technical. The messages that cannot be

Table 1
The coding scheme of text message analysis.

Sender	Type	Characteristics	Explanation and example
Instructor	F	Facilitation	The statement for facilitation of the meeting, e.g., "You can ask any question here in the textroom at any point."
	M	Management and organization	The statement for course management, e.g., "Homework due in two weeks."
	I	Direct instruction	The statement/question for instructional purposes, e.g., "Technology as a support tool, and not driving the pedagogy…"; "Is there effect of learning style and/or cognitive style? Some learners are natural in constructivist environments, whereas others are not."
	A	Affectional expression	The statement for affective expression, e.g., "Good afternoon", "Got you, hope you could be on time the next time.;-)".
	R	Responsive	The statement made in response to an earlier message, request, or feedback, e.g., "Yes, I agree with your point that it is one possible scenario."
	T	Technical issues	The statement relevant to technical issues of SCC system, e.g., "Please MUTE your MIC."
	O	Others	Other kinds of statement, e.g., "It seems this is the highest number of participants throughout this semester."
Learner	Question		
	D	In-depth	The question for a deeper clarification of a topic under discussion, e.g., "Since informal learning content could be provided by any body on internet, how and when the teacher evaluate the student's competence which derived from informal learning?"
	B	Broad	The question for a broader connection of concepts, e.g., "Is the networking [of the device] via Wifi or 3G?"
	Statement		
	C	Informative	The statement that provides factual information complementary to the topic under discussion, e.g., "e-Portfolio helps students to learn and record their learning experiences."
	E	Explanatory	The statement that provides factual information with personal opinion to explain the issue under discussion, e.g., "as i understood there is no ubiquitous device exists yet, only combination of device that provides high embeddedness with device that provides high mobility."
	L	Analytical	The statement that provides analytical opinion in relation with the issue under discussion, e.g., "in my opinion if a learner is following a formal learning path and so specific learning objectives have been fixed, probably his/her informal learning adds value and is evaluated within the formal path."
	S	Synthetical	The statement that attempts to synthesize or provide a summary to the issue under discussion, e.g., "I believe, within informal learning activities, the design process of the students at a cognitive and metacognitive level attributes to the development of self-direction and self-reflection habits as part of the design process, not only in term of outcome/product."
	V	Evaluative	The statement that provides evaluative or judgmental opinions of the issue under discussion.
	A	Affectional	The statement for affectional/emotional expression, e.g., "hello everybody", "OK thank you".
	R	Responsive	The statement made in response to an earlier message, request, or feedback, e.g., "Yes, it's exactly what I was thinking about".
	T	Technical	The statement relevant to technical issues of SCC system, e.g., "We have some problems with connection from the university", "There's a strong echo."
	O	Others	Other kinds of statement, which is irrelevant to the topic under discussion, e.g., "I want to ask for leave temporarily because one computer become a mail relay station for it is infected".

grouped into any of the above categories were labeled the type of others. This coding scheme was applied in all the text messages collected from 13 class recordings.

3.2.2. Survey of learning experience

A questionnaire (see Appendix) was developed on the basis of the model of community of inquiry (Arbaugh et al., 2008; Swan et al., 2008). The original 34 items were modified to fit the setting of the online seminar. Students were asked to rate the perceived teaching presence, social presence, and cognitive presence using a 5-point scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Nine more questions (including three open questions) were added to better understand how and what students perceived about learning in the online research seminar. For example, because most guest speakers as well as course participants were not native English speakers, it was important to know whether students felt comfortable with the way speakers gave their presentations in English. Also, these additional questions asked about the overall impression about speaker's speaking speed and the pace of speakers' presentation, and about the time management of the seminar.

Three open questions were added to find out students' relevant learning experiences and their concerns about learning in the online seminar. One question asked students whether anything they thought important but was missing in this seminar, in comparison with any of their favorite experiences in physical face-to-face learning. Another similar question was asked but contrasted with their favorite experience in other online synchronous learning classes. The third question asked students if there was any improvement could be made to improve the seminar.

The questionnaire was created and distributed online using Google Docs. Students were directed to the questionnaire at the end of the last meeting. Seventeen responses were collected and analyzed.

4. Results

This section reports the findings of content analysis of text messages and those of the survey.

4.1. Text messages

4.1.1. An overview

There were 946 text messages collected in 13 class recordings. The number of text messages in each of the 13 meetings is listed in Table 2. The messages sent by students, who formally enrolled in the online research seminar, and the ones sent by teachers, i.e., the three professors who chaired the seminar, were focused. As shown in Table 2, there were 511 messages sent by students, 202 messages by teachers, and 233 by others (including guest speaker, researchers, technical crew, and guests).

4.1.2. Student-sent text messages

Among others, the messages sent by students provide useful information about students' participation and engagement in the online seminar. A glimpse into Table 2 shows that 511 out of the total of 946 (54.02%) recorded text messages were sent by students, which constituted the major body of the recorded text messages.

In 11 out of 13 meetings, student-sent messages outnumbered the ones sent by teachers or other participants. Interestingly, however, in meeting 6 and 14, student text messages were fewer than those sent by others. It was found in these two meetings, that the guest speaker's research assistant frequently provided information relevant to the presentation in the text chat room to help all participants better perceive the content, which may have resulted in the relatively lower frequency of student messages in the meeting.

Though student-sent messages seemed to have taken place constantly in the online seminar, the content of these text messages need to be further investigated to understand students' participation and engagement in the online research seminar. Two aspects of student messages were explored in terms of students' cognitive and social activities captured in the text messages: (1) to whom did students send messages, and (2) what students' messages were about.

4.1.2.1. To whom did students send messages?. Student text messages were first identified by their potential receiver. Three categories of receivers were distinguished: a student, all participants, and teachers. The messages sent to each of these three categories of receiver signify the interaction between a student and another student (SS), a student and all participants (SA), and a student and teachers (ST), respectively. The frequencies of SS, SA, and ST messages are presented Table 3. The first column of Table 3 lists the message type, the first row the weeks, and the cells the frequency in a week.

It can be seen that 308 out of the total 511 (60.27%) student messages were sent to all participants (SA) and 201 out of 511 (39.33%) were to teachers (ST), but only two (.39%) to students (SS). It is very likely that students chose to send private messages to another learning peer which cannot be seen by others in public, nor be recorded by the SCC system. The high frequency of SA and ST messages suggested, at least, students were involved and engaged in the online research seminar.

Table 2
A summary of text messages.

Msg. type	Meeting													Total	Mean (S.D.)
	1	2	3	4	5	6	7	9	10	11	12	14	15		
Student-sent	57	50	66	34	41	19	30	39	31	44	31	38	31	511	39.31 (12.59)
Teacher-sent	12	15	12	15	23	5	6	21	20	5	11	43	14	202	15.54 (10.09)
Others	11	19	6	4	9	40	9	15	11	6	1	79	23	233	17.92 (20.96)
Total	80	84	84	53	73	64	45	75	62	55	43	160	68	946	72.77 (29.58)

Table 3
Summary of student-sent text messages in terms of the potential receiver.

Msg. type	Meeting													Total	Mean (S.D.)
	1	2	3	4	5	6	7	9	10	11	12	14	15		
SS	1	0	0	0	0	0	0	0	0	0	0	1	0	2	.15 (.38)
SA	32	39	51	19	29	12	16	22	15	18	18	17	20	308	23.69 (11.17)
ST	24	11	15	15	12	7	14	17	16	26	13	20	11	201	15.46 (5.32)
Total	57	50	66	34	41	19	30	39	31	44	31	38	31	511	39.31 (12.59)

4.1.2.2. What were students' messages all about?. Student text messages were further analyzed by the content to better understand how students were engaged in the seminar, cognitively and socially. All students' text messages were analyzed according to the coding scheme presented earlier in Table 1. The results of the analysis is shown in Table 4. The first column of Table 4 lists the type of messages according to their categories, the first row the meeting, and the cells the frequency.

It was observed in Table 4 that 354 out of the total 511 (69.28%) student messages were of the social category, in which the affective expressions (A) were much more frequent than those for responding to a previous message (R). Examining the text conversation, it was found that most affective expressions (A) were greetings and farewells, and responsive messages (R) were for simple feedbacks or comments on teachers' questions, request, or comments. Both kinds of messages were constantly taking place in the seminar through the whole semester.

For the 107 messages recorded in the cognitive category, the type of in-depth questions (D), informative statement (C), and analytic statement (L) were frequently captured. An average of 2.31 (28.04%) in-depth questions (D) were recorded in the meetings, whereas only an average of .62 (7.48%) broad questions (B) were captured. In other words, the questions for in-depth clarification were constantly asked in the seminar, but the ones for broader concept connections were not.

Among five different types of cognitive statements (C, E, L, S, and V), an average of 2.54 (30.84%) informative messages (C) and 2.15 (26.17%) analytical (L) ones were captured, which outnumbered other types. Only a handful of explanatory (E) and synthetic (S) statements were recorded, and no evaluative (V) statement was found in the 13 meetings. There are two possible reasons to explain this finding. First, the online research seminars were lecture-based. During the rapid pace of the presentation, students could only participate in the meeting by providing shallow (i.e., factual, complementary) information based on their prior knowledge and experience, and shared some personal (i.e., analytical) opinions in response to the issues under discussion in that moment as they usually did in physical face-to-face seminars. Second, just as the seminars held in physical face-to-face meeting rooms, participants were not having adequate time for reflection and deeper thinking, it is possible that students were not able to engage in higher-order thinking and reasoning and come up with synthetic or evaluative messages.

The messages relevant to technical issues (T) were mostly found in the first few meetings. It was very likely that students had not yet been familiar with the SCC system and the settings of their own computer to participate in the online seminar. However, it was observed that the number of technical messages decreased along the weeks, which implies that students were getting familiar with the operation of the online learning system.

The messages which cannot be identified as any of the above categories (O) were the ones irrelevant to the seminar. Such kind of messages were not important to this study and were ignored.

Among 13 meetings, 66 student messages were recorded in meeting 3, which is the largest number of messages in the course. In these total 66 messages, a high proportion of cognitive messages (30 out of 66) was found. In these 30 cognitive messages, 1 was in-depth question, 7 informative statements, 17 analytic statements, and 5 synthetic statements. In other words, students seemed to be very interested in the topic and were highly engaged in the talk brought by the speaker.

4.1.3. Content analysis of teacher-sent text messages

In addition to student-sent messages, the messages sent by the three professors in the meetings were also analyzed. According to the coding scheme listed in Table 1, five types of messages were identified: facilitation (F), course management (M), direct instruction (I), affective expression (A), responsive (R), technical issues (T), and other messages (O). There were 202 messages sent by the three professors in 13 meetings. A summary of these messages is presented in Table 5. The first column of Table 5 lists the types of messages, the first row the meetings, and the cells the frequency of each type of message.

Table 4
Summary of student-sent messages in terms of content types.

Msg. type		Meeting													Total	Mean (S.D.)
		1	2	3	4	5	6	7	9	10	11	12	14	15		
Cognitive	D	0	3	1	4	0	3	4	5	1	2	1	4	2	30	2.31 (1.65)
	B	0	0	0	1	3	0	0	2	0	2	0	0	0	8	.62 (1.04)
	C	1	5	7	1	1	4	0	4	0	1	0	4	0	28	2.15 (2.34)
	E	0	1	0	1	1	0	0	0	0	0	0	0	0	3	.23 (.44)
	L	0	2	17	2	1	1	3	0	1	0	0	0	6	33	2.54 (4.67)
	S	0	0	5	0	0	0	0	0	0	0	0	0	0	5	.38 (1.39)
	V	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0 (0)
Subtotal		1	11	30	9	6	8	7	11	2	5	1	8	8	107	8.23 (7.36)
Social	A	44	20	29	21	22	9	22	19	26	30	22	23	22	309	23.77 (7.94)
	R	1	7	5	1	3	2	0	6	3	7	4	5	1	45	3.46 (2.04)
Subtotal		45	27	34	22	25	11	22	25	29	37	26	28	23	354	27.23 (8.21)
T		7	10	1	1	3	0	1	2	0	0	0	1	0	26	2.00 (3.08)
O		4	2	1	2	7	0	0	1	0	2	4	1	0	24	1.85 (2.08)
Total		57	50	66	34	41	19	30	39	31	44	31	38	31	511	39.31 (12.59)

Table 5
Summary of teacher-sent messages in terms of content types.

Msg. type	Meeting													Total	Mean (S.D.)
	1	2	3	4	5	6	7	9	10	11	12	14	15		
F	5	0	1	0	3	0	0	3	0	0	0	1	1	14	1.08 (1.61)
M	1	0	0	0	1	0	0	0	0	0	0	0	1	3	.23 (.44)
I	2	11	8	7	6	3	3	10	13	4	9	22	9	107	8.23 (5.34)
A	2	1	1	1	7	0	3	4	3	1	2	3	3	31	2.38 (1.80)
R	0	0	0	0	2	0	0	0	2	0	0	2	0	6	.46 (.88)
T	2	2	0	7	2	2	0	4	1	0	0	12	0	32	2.46 (3.50)
O	0	1	2	0	2	0	0	0	1	0	0	3	0	9	.69 (1.03)
Total	12	15	12	15	23	5	6	21	20	5	11	43	14	202	15.54 (10.09)

As can be seen in Table 5, there was an average of 15.54 messages sent by the professors in each meeting. And among other types of messages, an average of 8.23 (52.97%) messages were for direct instruction (I). The text conversation showed that these instructional messages were mostly sent by the professor who moderated the discussion. Messages for facilitation (F) were mostly appeared in the first meeting, but not constantly recorded in the text chat room. Messages for course management (M) were found occasionally in a few meetings. As revealed in the text messages, they were for setting up the assignment due dates.

An average of 2.38 (15.35%) teachers' messages were for affectional expressions (A), and a handful of .46 (2.97%) for responding or giving feedback to students' requests (R). Noticeably, there is an average of 2.46 (15.84%) messages were sent for assisting students dealing with technical problems (T). The majority of this type of messages were sent by the professor who took charge of all aspects of the seminar, i.e., the session manager. Messages relevant to technical issues were constantly found in the meetings, which suggested that to some extent, technical problems could still trouble people in attending the online research seminar.

4.2. Survey of learning experience

The questionnaire surveyed students' overall impression about the online research seminar in different aspects. This section reports the result of the survey on teaching presence, social presence, and cognitive presence. The mean ratings for the subcategories of these three type of presence are reported in Table 6. The average rating for each questionnaire item can be seen in Appendix.

4.2.1. Teaching presence

As shown in Table 6, the overall rating for the perception of teaching presence was calculated as 4.02. The average ratings for the categories of design and organization, facilitation, and direct instruction were 4.32, 4.01, and 3.74, respectively. These ratings suggested that most students agreed that they were able to perceive teaching presence in the online seminar.

Among three subcategories of teaching presence, the average rating for direct instruction was slightly lower than those for course design and organization and facilitation. A closer look at the question items in the category of direct instruction (items #11–#14) in Appendix found that students' ratings were relatively low on items #12, #13, #14. Item #12 concerned the overall impression about the speakers' speaking speed, item #13 the pace of speakers' presentation, and item #14 the timely feedback provided by speakers. These question items, in a sense, were relevant to individual guest speaker's teaching style and their experience of teaching in the online synchronous environment.

Because the seminar consists of different invited talks and the talks were mostly lecture-oriented, it is very likely that some speakers' teaching style or their experience of teaching in the SCC may influence a student's overall perception of teaching presence. Also, because this was an international seminar, the speakers' as well as students' ability to understand English, particularly expressed in different accents of English, can be a concern. However, this result suggested the necessity for engaging students in the interactions with speakers to help them accustom to the guest speaker's style of presentation.

Table 6
Average ratings on the perception of presence.

Presence	Categories	Average rating (S.D.)	Overall rating (S.D.)
Teaching presence	Design and organization	4.32 (.32)	4.02 (.31)
	Facilitation	4.01 (.24)	
	Direct instruction	3.74 (.28)	
Social presence	Affective expression	3.63 (.26)	3.74 (.21)
	Open communication	3.90 (.14)	
	Group cohesion	3.69 (.12)	
Cognitive presence	Triggering event	4.10 (.17)	4.09 (.20)
	Exploration	4.12 (.15)	
	Integration	3.96 (.12)	
	Resolution	4.18 (.33)	
Overall evaluation	Seminar as a whole	4.41 (.62)	4.13 (.43)
	Course content	4.47 (.62)	
	Effectiveness	4.12 (.70)	
	Time management	3.53 (1.01)	

4.2.2. Social presence

Students' average rating for the perceived social presence was 3.74. The mean ratings for the category of affective expression, open communication, and group cohesion were 3.63, 3.90, and 3.69, respectively. These average ratings, in comparison with those of other types of presence, were all below 4.00, which suggested that students were less agreed that they were able to perceive social presence in the online research seminar.

The ratings for the subcategories of social presence were investigated. Looking into the category of affective expression, it was found that students' ratings for item #15 and #16 were diverse. Item #15 concerned about students' feeling of belongingness to the course via knowing other participants, and item #16 about forming distinct impressions of other course participants. Four students disagreed or strongly disagree on item #15, and five disagreed on item #16. Noticeably, however, 11 out of 17 students agreed or strongly agreed on item #17 that the SCC provided adequate tools for social interaction. This interesting result suggested that students' perception of affective expressions may not totally depend on the tools provided in the online learning environment, but may also rely on the acquaintance of other course participants. Lacking the opportunity to get familiar with other participants may have been an obstacle for them to perceive affective expressions in the online research seminar.

For the category of open communication, students' opinions toward items #19 and #20 were diverse. Item #19 was about students' feeling in participating in the course discussion and item #20 in interacting with other peers. Though the majority of students agreed that they felt comfortable in participating in the class discussion or interacting with other peers, there were still a few students felt uneasy to have open communication in the seminar.

As far as the category of group cohesion is concerned, it was found that students were conservative in rating item #23, which asked them if online discussions with other course participants help them to develop a sense of collaboration. Whereas eight students agreed on this item, there were seven students hold it neutral, and two others disagreed.

The above results suggested two issues that needed to be considered in helping students learn in such online synchronous learning environments, given that the participants of the seminar were physically separated from each other: individual difference in adapting to the learning context of SCC and the opportunity for student–student interactions. First, students came to participate in the online seminar with different backgrounds and experiences in technology, especially the online synchronous learning environment. It is thus necessary to pay attention to those students who were quiet in class discussions and help them resolve possible technical or personal issues in class participation. Second, as observed in the subcategory of affective expression, students need the opportunity to gain acquaintance with other course participants. It was suggested that some group work should be designed intentionally for students to work with each other, in class or after class meetings, to help them know each other. Such activities may contribute to students' future collaboration.

4.2.3. Cognitive presence

The overall rating for cognitive presence was calculated as 4.09. The mean ratings for the categories of triggering event, exploration, integration, and resolution were 4.10, 4.12, 3.96, and 4.18, respectively. The ratings suggested that most students agreed that they were able to perceive cognitive presence in the seminar.

Although earlier findings in teaching presence and social presence revealed some potential problems in this lecture-oriented online seminar, the overall rating of cognitive presence was high, in comparison with those of teaching presence and social presence. This could be because that all course participants were doctoral students, who were capable of grasping pieces of information in the talks and relating them to their existing knowledge, whether these information were relevant to their own research work or not.

4.2.4. Overall evaluation

As shown in Table 6, most students agreed on the way the seminar was organized, designed, and implemented. However, the question regarding time management of the seminar did not receive many positive responses. Three students disagreed with the efficiency of time management, whereas five held it neutral and nine others agreed. This could result from the fact that some speakers did not keep to the time and went over the scheduled duration of one and half hours.

Open questions asked students to compare their most favorite experiences of physical face-to-face learning and online synchronous learning with the current online seminar. Students' responses were categorized by the content into one of the following three big categories: learner–instructor interactions, learner–learner interactions, and learner–content interactions.

Students' responses relevant to learner–instructor interactions focused on the issues of course designed and facilitation. They expected more conversations with guest speakers and an easy way this learner–instructor interaction to be carried out. For example, student s10 commented that "the presentations ended up being an online 'sage on the stage' lecture, with little/no interaction." Student s6 wrote, "the course should have provided more occasions for interaction with teachers and with other students." Student s7 provided a more concrete idea, that "in order to promote the interaction and discussion, each lecture could be split in two sessions: the first session dedicated to contents presentation, the second session… could be dedicated to the discussion of relevant topics." Student s11 commented that "the ease of discussion did not seem to appear. It was sometimes difficult to voice an opinion." Student s2 suggested to "improve text chat, organizing it for questions and answers online" and s12 suggested that "[we need] a traffic light to let the token holder know that someone wants to talk".

Students' responses relevant to learner–learner interactions showed that they were expecting not only the opportunities to interact with other learning peers, but also the chances to collaboration and establishing a virtual learning community. However, before having the chance to work together, students need the chance to introduce themselves to other peers, as s10 stated, "in F2F [face-to-face] I will always allow time for students to introduce themselves". Students regarded collaboration the best way to learn online. For example, s10 recommended to "encourage group interaction. Encourage group activities. I think both of these would allow students to get to know one another." Student s17 suggested that "[we can] make talks shorter and have more interaction and collaborative work" and "[promote] students' collaborative work during and after class." Student s10 proposed a practical idea that, "with social media tools such as MSN Messenger/Twitter/Facebook/Google talk some way to keep the students connected out of class would establish a sense of known students' interests".

Student s7 noticed that "the collaboration among students was missing." Student s6 stated that "[the] collaboration among students was very poor. Work was mainly individual but maybe the quality of contributions on the part of the learners can be enhanced with collaboration

(group works, interaction in the discussion forum)." Student s5 stated that the online research seminar can be improved towards the "creation of a virtual community or a group to continue sharing ideas".

As far as the responses related to learner–content interactions, students suggested the time for reflection in the online seminar. Student s7 commented that, "in my point of view the principal weakness of this experience was the lecture management." Student s6 wrote, "maybe it would be better to identify 3/4/5 research issues… this would give enough time for students' reflection and creativity."

To a certain extent, these issues emerged in students' responses about learner–instructor interactions, learner–learner interactions, and learner–content interactions are interrelated. Discussions and suggestions arise from above findings are addressed in the following section.

5. Discussions and suggestions

The recorded text messages signified students' participation in the online research seminar, whereas the responses in the survey revealed their overall impression about the learning experience. The results may inform the improvement and future planning of such courses holding online synchronously. Three interrelated aspects of a successful online synchronous course were brought up in the above analyses: (1) planning for effective interactions; (2) the complementary use of synchronous and asynchronous resources/tools; and, (3) instructional design and facilitation.

5.1. Effective interactions

The content analysis on text messages showed that more than half of the recorded messages (511 out of the total 946; 54.02%) were sent from students, and most student-sent messages were mainly for affective expressions (309 out of 511; 60.47%). The most frequent affective expressions found in the text messages were greetings and farewells at the beginning and the end of the class, which is a phenomenon found in similar online synchronous learning environments (e.g., Chen, Chen, & Tsai, 2009). This kind of unilateral interactions was not effective for establishing intimacy and trust among students and instructors, as well as students and students.

Effective interactions refers to the interactions taken place among learners and instructors, as well as learners and learners, which result in a better understanding of each other and accumulating mutual trust. The sense of trust is the foundation of effective learner–learner interactions, which give rise to social presence, and learner–instructor interactions, which bring about teaching presence. In the SCC, though one can see and hear other participants through the video/audio facilities, merely seeing or hearing each other does not afford the sense of being "present", not to mention the sense of being a member of the learning community. Given that the students involved in the online research seminar may not have known each other, the establishment of the sense of intimacy and trust should be accumulated through continuous interactions (i.e., a bottom-up process) and gradually becomes a part of the top-down process for forming the sense of presence. Mutual trust is the basis of social presence (Meyerson, Weick, & Kramer, 1996), and also the basis of the sense of community (Varnhagen, Wilson, Krupa, Kasprzak, & Hunting, 2005). Schwier (2001) suggested that the sense of trust can be established using activities as "catalysts" that require students to work together at the beginning of the course. This sense of trust will bring familiarity and intimacy among peers (Hiltz & Shea, 2005; Hiltz & Turoff, 2002), based on which course participants are able to perceive the online seminar as a learning community.

However, because in the lecture-oriented online research seminar, those learning activities which could allow students to collaborate with each other are not the primary focus, there is very little opportunity for students to establish trust with peers and instructors. The ineffective interactions could possibly impede students' collaboration and adaptation to the instructors' different teaching styles. Based on what we have learned about effective interactions, creating the opportunities for encouraging and promoting students' group work and collaboration in or out of class may benefit in building a sense of learning community.

5.2. The complementary use of synchronous and asynchronous tools/resources

The content analysis on students' text messages showed that students mostly posted questions for in-depth clarification, and statements for informative and analytic opinions in the seminar. Rare synthetic or evaluative statements were captured, which required a deeper thinking and reflection. Because the online research seminar was lecture-based, a better solution for enhancing students' inquiry and reasoning about a topic is the complementary use of synchronous and asynchronous resources in the SCC.

Synchronous and asynchronous resources/tools complement each other in time (Johnson, 2006). In the online research seminar, direct instructions make demands on media synchronicity to convey the content materials. However, students need time to be engaged in metacognitive processes such as reflection, integration, and exploration for deep understanding. Synchronous and asynchronous approaches are suitable for different types of learning activities. Synchronous resources/tools, for example, are good for communicating the content, whereas asynchronous ones for deep understanding (Schwier & Balbar, 2002). In asynchronous discussions, reflective thinking can add richness and quality to discussions (Tallent-Runnels et al., 2006; Varnhagen et al., 2005). Hawkes and Romiszowski (2001) found that asynchronous dialogues were less interactive than synchronous face-to-face communications but had a significantly deeper explanations. Therefore, a better course design should consider both synchronous (possibly in class) and asynchronous (possibly after class) discussions for peer collaboration and deeper understanding. Once part of the discussion activity has been set up, some materials can be left for group discussion, or be posted as a learning task for peer collaboration. The speakers/teachers do not have to present everything in the class, and a certain amount of time can be reserved for learner–instructor interactions.

5.3. Instructional design and facilitation

The text messages students sent in the seminar showed that those messages were triggered by the topic or issue the guest speaker presented in the talk at a specific moment of time. However, the format of the lecture-based seminar may have limited students' exploration on some topics they found interesting, and due to the time constraint, some discussions could not have extended during the class hour.

With flexible and fertile resources in the SCC, the effective learner–instructor and learner–learner interactions, as well as the complementary use of synchronous and asynchronous resources in the online synchronous learning environment, should be facilitated by certain pedagogical strategies (Garrison, 2006) and organized in designed learning activities (Winn, 2003). That is, learning activities in the online

research seminar (as well as other online classes) should be designed and organized in a way that students' learning and all different resources can both be regarded as integral parts of the learning environment (Schwier, 2001; Winn, 2002) to maximize the potential uses of resources and tools in reifying students' perception of teaching presence, social presence, and cognitive presence, and to the perception of being in a learning community.

6. Conclusion

This article presents a novel experience of holding international online research seminar as an official graduate course across different countries. Researchers, educators, and students from all over the globe participated in the seminar. The model of community of inquiry was re-interpreted from the perspective of learner–instructor, learner–learner, and learner–content interactions. From the perspective of interaction, student learning experience in the online research seminar was explored. Three important insights emerged from the findings of this study, including (1) effective interactions among learners, instructors, and course content; (2) complementary use of synchronous/asynchronous resources and tools; and (3) instructional design and facilitation in synchronous cyber classroom settings. Only through proper instructional design and facilitation, can the interactions among learners, instructors, and the content be promoted, the strengths of different online resources and tools be maximized, and the learning community be built. This study hopes to stimulate more follow-up research on improving teaching presence, social presence, and cognitive presence in synchronous cyber classroom settings for promoting international collaborations among educational institutions around the world.

Appendix

The result of survey on the online research seminar.

Construct	Categories	Items	Responses					Average rating (S.D.)	Overall rating (S.D.)
			SD	D	N	A	SA		
			1	2	3	4	5		
Teaching presence	Design and organization	1. The moderator/session manager clearly communicated important course goals.	0	0	3	7	7	4.24 (.75)	4.32 (.69)
		2. The moderator/session manager provided clear instructions on how to participate in course learning activities.	0	0	3	6	8	4.29 (.77)	
		3. The moderator/session manager clearly communicated important due dates/time frames for learning activities.	0	0	2	6	9	4.41 (.71)	
	Facilitation	4. The speaker and moderator clearly communicated important course topics.	0	0	3	5	9	4.35 (.79)	4.01 (.62)
		5. The speaker and moderator were helpful in identifying areas of agreement and disagreement on course topics that helped me to learn.	0	0	4	8	5	4.06 (.75)	
		6. The speaker was helpful in guiding the class towards understanding the topic in a way that helped me clarify my thinking.	0	0	2	10	5	4.18 (.64)	
		7. The speaker helped to keep course participants engaged and participating in productive dialogue.	0	3	4	4	5	3.71 (1.10)	
		8. The speaker encouraged course participants to explore new concepts in this course.	0	1	2	6	8	4.24 (.90)	
		9. Speaker and moderator actions reinforced the development of a sense of community among course participants.	0	1	7	5	4	3.71 (.92)	
		10. The session manager's intervention helped facilitated the flow of the course.	0	0	3	8	6	4.18 (.73)	
	Direct instruction	11. The speaker, moderator, and session manager helped to focus discussion on relevant issues in a way that helped me to learn.	0	1	1	10	5	4.12 (.78)	3.70 (.60)
		12. I felt comfortable with the speaker's speaking speed.	1	1	5	8	2	3.53 (1.01)	
		13. The pace of speaker's presentation was right for me to understand the key points of the talk.	1	0	4	9	3	3.76 (.97)	
		14. The speaker provided feedback in a timely fashion.	0	1	7	8	1	3.53 (.72)	
Social presence	Affective expression	15. Getting to know other course participants gave me a sense of belonging in the course.	1	3	4	5	4	3.47 (1.23)	3.63 (.96)
		16. I was able to form distinct impressions of some course participants.	0	5	2	7	3	3.47 (1.12)	
		17. Synchronous Cyber Classroom provided adequate tools for social interaction.	0	1	5	5	6	3.94 (.97)	

(**Appendix** *continued*)

Construct	Categories	Items	Responses					Average rating (S.D.)	Overall rating (S.D.)
			SD	D	N	A	SA		
			1	2	3	4	5		
	Open communication	18. I felt comfortable conversing through the tools provided in Synchronous Cyber Classroom.	0	0	6	4	7	4.06 (.90)	3.90 (.93)
		19. I felt comfortable participating in the course discussions.	0	2	4	5	6	3.88 (1.05)	
		20. I felt comfortable interacting with other course participants.	0	2	4	7	4	3.76 (.97)	
	Group cohesion	21. I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	0	0	8	4	5	3.82 (.88)	3.69 (.74)
		22. I felt that my point of view was acknowledged by other course participants.	0	2	5	7	3	3.65 (.93)	
		23. Online discussions with other course participants help me to develop a sense of collaboration.	0	2	7	4	4	3.59 (1.00)	
Cognitive presence	Triggering event	24. Problems posed by other course participants increased my interest in course issues.	0	1	3	8	5	4.00 (.87)	4.10 (.66)
		25. Invited talks are thought-provoking.	0	1	2	10	4	4.00 (.79)	
		26. I felt motivated to explore content-related questions.	0	0	3	6	8	4.29 (.77)	
	Exploration	27. I utilized a variety of information sources to explore problems or assignments posed in this course.	0	0	4	4	9	4.29 (.85)	4.12 (.75)
		28. Brainstorming and finding relevant information helped me resolve content-related questions.	0	1	3	7	6	4.06 (.90)	
		29. Online discussions were valuable in helping me appreciate different perspectives.	0	0	5	7	5	4.00 (.79)	
	Integration	30. I was able to combine information learned from different talks to answer questions raised in course activities.	0	0	4	8	5	4.06 (.75)	3.96 (.58)
		31. Learning activities helped me construct explanations/solutions for the problem I had.	0	0	5	10	2	3.82 (.64)	
		32. I was able to reflect on course content and discussions to understand fundamental concepts in this class.	0	0	3	11	3	4.00 (.61)	
	Resolution	33. I can describe ways to apply the knowledge created in this course in some e-learning practices.	0	0	4	8	5	4.24 (.83)	4.18 (.69)
		34. I have developed solutions to course problems or assignments that can be applied in practice for future research.	1	1	4	5	6	3.82 (1.19)	
		35. I can apply the knowledge created in this course to my research work or other non-class related activities.	0	0	1	7	9	4.47 (.62)	
			VP	P	N	G	VG		
			1	2	3	4	5		
Overall impression		36. This online seminar as a whole was	0	0	1	8	8	4.41 (.62)	4.13 (.62)
		37. The course content was	0	0	1	7	9	4.47 (.62)	
		38. The effectiveness of this online course format was	0	0	3	9	5	4.12 (.70)	
		39. The distribution of time among presentation, Q & A, and time to lighten the cognitive load (using music, video) was	0	3	5	6	3	3.53 (1.00)	

SD = Strongly Disagree, D = Disagree, N = Neutral, A = Agree, SA = Strongly Agree, VP = Very Poor, P = Poor, G = Good, VG = Very Good.

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