ASCILITE 2024

Navigating the Terrain:

Emerging Frontiers in Learning Spaces, Pedagogies, and Technologies

Applying community of inquiry in a collaborative experiential learning course

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A collaborative experiential learning course involves two or more learning institutions. Operational constraints in designing such a course, especially when the institutions are in different locations, motivated the application of Community of Inquiry (COI) with online components, which typically finds application in blended learning. This article describes a new application of COI in a collaborative experiential learning course with a case study that involved two universities at different countries. The course included students from a university learning about Sustainable Development Goals (SDG) in communities at the locality of another university. The application of COI was measured using factor pattern matrix (FPM). Students' perceived learning was measured using reflection and course feedback. COI was rated well by students from both universities with indication of strong social and cognitive presences. The cognitive presence of visiting students appeared dominant through activities, while of host students through reflection. The study describes a new application of COI in areas other than blended learning.

Keywords: collaborative, experiential learning, blended learning, community of inquiry, factor pattern matrix, case study

Introduction

Experiential learning is a method, a technique, or a process of constructing knowledge that involves grasping and transforming experience to meet certain instructional objectives (Roberts, 2012; Kolb & Kolb, 2009). Experiential learning involves continuous reconstruction of experience to prepare for future living or to reach definitive objectives (Roberts, 2008). Experiential learning is demonstrated to have long-term effect (Ramírez & Allison, 2023), distinguishes students from their peers (Selingo, 2016), and improves students' ownership of lessons (Dobbins et al., 2021). The principles and practices of experiential learning are adopted in many courses and learning institutions incorporate experiential learning in their curriculum (Faulconer & Kam, 2023; Kercheval et al., 2022; Ebbini, 2022; Otaki et al., 2022; Naor & Mayseless, 2021; Dobbins et al., 2021).

With such motivation, a university in Singapore set up a course whose aim was to provide awareness to students about the United Nation's Sustainable Development Goals (SDG) (https://sdgs.un.org/goals) in curated communities in Indonesia, one of its neighbouring countries. The course was designed with another university in the destination country. The course included a study trip in addition to classroom teaching. The study trip was designed based on experiential learning theory (ELT) (Kolb, 1984) where students from both universities co-learned about communities to maximize immersion and to enrich each other's perspectives (Jones, 2018). Such arrangement brought about collaboration into experiential learning, which the author refers to as collaborative experiential learning.

While ELT provides a general guideline for designing experiential learning, it does not provide an explicit operationalisation of collaborative experiential learning. Furthermore, many aspects of learning have evolved since ELT was first proposed with the proliferation of technologies that support learning and emphasis on learning in communities (Wenger et al., 2010). The community of inquiry (COI) guides learning as a collaborative endeavour. Studies have shown the effectiveness of COI to create a meaningful learning experience in blended learning settings (Liu et al., 2021; Siah et al., 2021; Zhang, 2020). Therefore, COI may be

used to designed collaborative learning experience. In the following subsections, the theoretical aspects of ELT and COI is unpacked.

Experiential learning theory (ELT)

The experiential learning cycle comprises of the following stages: (1) concrete experience (CE), (2) reflective observation (RO), abstract conceptualization (AC), and (4) active experimentation (AE). Seaman (2008) argued that viewing learning as happening in stages inadequately explains the holistic learning processes that are central to learning from experience. Bergsteiner et al. (2010) argued that the concrete-abstract polar implies that learning happens in either concrete or abstract state, while studies suggest that learning happens in a spectrum (Svinicki & Dixon, 1987). Instead of viewing CE, RO, AC, and AE as learning stages, the author views them as learning states, which means they do not need to occur in sequence. Viewing them as learning states agrees with Kolb & Kolb (2017), which views learning as student-directed and the role of the instructors is to manage the learning process.

The experiential learning space include: (1) physical, (2) cultural, (3) institutional, (4) social, and (5) psychological aspects. The creation of a comprehensive learning environment expands on each of the space.

Community of inquiry (COI)

COI was proposed to provide a perspective to understand the dynamic of online learning experience (Garrison et al., 2000). Inquiry-based learning in COI is contrasted with content-based learning, where students are at the centre of learning and are supported to achieve competence in higher-order thinking skills (Garrison, 2016). Presence takes a centre stage, which is defined as a state of alert awareness, receptivity, and connectedness to the mental, emotional, and physical workings of both the individual and the group in the context of their learning environments and the ability to respond with a considered and compassionate best next step (Rodgers & Raider-Roth, 2006). Garrison et al. (2001) identified that effective learning experiences occur at the intersection of the following three presences:

(1) Teaching presence, defined as the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educational worthwhile learning outcomes (Anderson et al., 2001),
(2) Social presence, defined as the ability of participants to identify with the community, communicate purposefully in a trusting environment, and develop interpersonal relationships by way of projecting their individual personalities (Garrison, 2009), and
(3) Cognitive presence, defined as the extent to which learners can construct and confirm meaning through sustained reflection and discourse in a critical community of inquiry (Garrison et al., 2001).

The concept of COI is rooted in constructivism (Mascolo & Fischer, 2005). The author argues for the compatibility of experiential learning with COI due to the parallel of COI's constructivism with that of experiential learning. A study by Akyol & Garrison (2011) indicated that students were able to reach high levels of cognitive presence and learning outcomes in blended courses, which suggested that cognitive presence is associated with perceived and actual learning outcomes. A study by Richardson & Swan (2003) found that students with high overall perceptions of social presence scored high in terms of perceived learning and perceived satisfaction with the instructor.

Despite its context-specificity (Cleveland-Innes, 2018), COI is measured regardless its application context using transcript analysis qualitatively and using factor pattern matrix (FPM) quantitatively (Arbaugh et al., 2008).

Research questions

This paper is aimed to demonstrating a new application of COI in a collaborative experiential learning course with online and in-person learning activities through a case study. The research questions are as follows:

(1) How do students perceive the experiential-learning-based course in relation to the teaching, social, and cognitive presences?
(2) How do students perceive the learning activities of the course?

The course

The course consisted of two components as follows:
(1) A 5-day classwork, operationalized in a typical classroom setting to provide students with general knowledge (history, population, government, politics, society, economy, and heritage) of the curated communities in Indonesia, and
(2) A 7-day fieldwork, operationalized on-site to provide students with direct experience with the curated communities.

The structure of the course is illustrated in Figure 1. Students from the visiting university learned about the general knowledge of the curated communities as a classwork. Students from the visiting university then travelled to Indonesia and was hosted by a host university situated near the curated communities. Students from both visiting and host universities conducted fieldwork together.

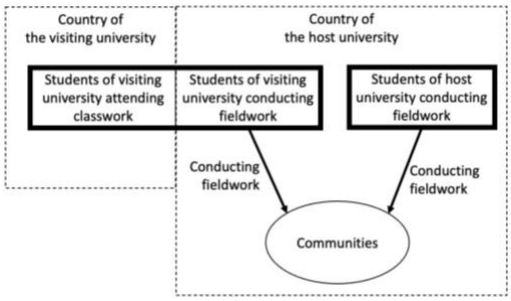

Figure 1. The structure of the course

The curation of the communities and the learning design of the fieldwork involved co-development between the teaching teams from the visiting and host universities. Backward design was used to design the learning outcomes, learning activities, and assessment tasks of the fieldwork (Wiggins and McTighe, 1998). The intended learning outcomes of the fieldwork were targeted at the higher order learning of analysis and evaluation (Bloom, 1956) as follows:
(1) Students can analyze and present the potential and challenges of the assigned regional communities using the business model canvas (BMC) framework (Osterwalder & Pigneur, 2010), and
(2) Students can evaluate their understanding about local communities in the context of SDG.

The assessment tasks of the fieldwork were as follows:
(1) A presentation of the potential and challenges of communities using BMC framework, and
(2) A reflection about student's experience interacting with the communities.

The course was designed as a general education that was not tied to fulfillment of major's requirements. The students came from various majors. The course did not have prerequisites, nor was it a prerequisite of another course.

The learning activities included community visits, while factoring in curricular requirements, budgetary constraints, and teaching timetables. The community visits were arranged to communities who adapted to their conditions, resources, and limitations to meet one or more SDG. An online platform was utilized before, during, and after the community visits. COI was used in designing the experiential-learning-based course. Table

1 illustrates the various platforms to create COI, with adjustments to enable students to participate effectively (Cleveland-Innes, 2018; Cleveland-Innes et al., 2007).

Table 1
The platforms to create COI

Presences	Online	In-person
Teaching presence	Lectures	Community visits, cultural visits, visit to national park, briefing, panel discussions, facilitation (during group discussions)
Social presence	Introduction page, chat groups	Community visits, cultural visits, visit to national park, group discussions, team bonding activity
Cognitive presence	Exploration, abstraction	Exploration, abstraction, experiencing

Creating the teaching presence

In the online space, teaching presence was manifested through lectures (on Zoom) and chat groups (on Telegram and MS Teams). Lectures were conducted by instructors to deliver contents in a formal setting. Instructors' presence in chat groups was informal to provide clarification, address students' queries, and provide assurance to students.

Panel discussions were conducted in-person to deliver SDG-related contents by community practitioners. In-person briefings provided contextual descriptions of learning activities to students. Instructors were present during fieldwork and group discussions to facilitate students' learning and to provide assurances to students.

Creating the social presence

An online platform (Padlet, Figure 2) was used by students and instructors to introduce themselves to one another. It helped create a sense of belonging within the learning community. Students and instructors interacted in chat groups. The conversations covered social sharing and content-related sharing.

Figure 2. An online page for introduction (blurred for publication)

In-person social presence was manifested through various visits (to communities, cultural sites, and a national park), discussions, and a team bonding activity. Like in the online conversations, in-person conversations also covered social sharing and content-related sharing.

Creating the cognitive presence

Students conducted exploration and abstraction through online readings and online sharing. Online readings pertained to the SDG and the communities that the students were assigned to. The readings were shared using a learning management system (LMS), MS Teams, and Telegram chat. Online sharing contained videos from the communities to engage students' various senses, e.g., students could see and hear the communities.

Students conducted exploration and abstraction during the community visits (in-person). Students gained direct experience interacting with the communities and gained contextual exploration and abstraction.

Creating the learning experience

Kolb's learning cycle and learning space were used (Kolb & Kolb, 2017), as described in Introduction. CE was achieved by direct experience during the visits of the students to various communities. Students were equipped with prompt questions, based on the BMC framework (Osterwalder & Pigneur, 2010), through which they conducted RO. Through group discussions, class presentation, and engagement with instructors, students formed learning concept (AC). Students applied what they had learned in subsequent visits (AE).

The learning space was created as follows:

(1) The physical learning space, consisted of the space of the communities (e.g., farms), the discussion space (e.g., discussion rooms), and the online space (e.g., Zoom, Padlet, MS Teams, and Telegram),
(2) The cultural learning space consisted of a common language and analytical framework (i.e., the BMC),
(3) The institutional learning space consisted of the ecosystem of learning from the two universities that provided resources to support the course,
(4) The social learning space consisted of peers and facilitators from both universities, and
(5) The psychological learning space, where facilitators provided psychologically safe space for students to clarify and learn.

Method

The students were invited to fill out an anonymous, voluntary, and nongraded online survey at the end of the course. Institutional Review Board (IRB) exemption has been obtained. The end-of-course feedback was aimed at finding out how students rated each learning activity as follows: (1) team bonding activity, (2) lectures, (3) cultural visit, (4) community visits related to SDG, (5) visit to national park, and (6) overall course, using a five-points-scale of 1 (strongly disagree), 2 (disagree), 3 (neutral), 4 (agree), and 5 (strongly agree). Qualitative feedback was also collected.

COI development was quantified using FPM (Arbaugh et al., 2008). The matrix is a 34-item survey, which measures teaching presence (13 items), social presence (9 items), and cognitive presence (12 items). Ordinal responses were scored using the same five-point scale in data collection. The means and standard deviations of each presence were computed and analyzed. The factor loadings of each item of FPM were computed.

Results

The response rates are presented in Table 2. The responses of the visiting and the host universities were analyzed separately. The study met the recommendation of at least 10 participants per item (Nunnally, 1978).

Table 2
Response rate

Measures	Visiting university	Host university
Factor pattern matrix	14/16	19/19
End-of-course feedback	14/16	18/19

Response to COI

The results for the three presences are presented in Table 3. The responses ranged from 3.87 (cognitive presence of the visiting university) to 4.10 (social presence of the visiting university).

Table 3
Responses as classified using COI's presence

Presence	Visiting University	Host University
Teaching presence	mean = 3.92, σ = 0.97	mean = 4.06, σ = 0.96
Social presence	mean = 4.10, σ = 0.95	mean = 3.95, σ = 1.05
Cognitive presence	mean = 3.87, σ = 1.02	mean = 4.10, σ = 0.96

Factor loadings of the significant COI items, defined as having a component of 0.30 or higher, are presented in Table 4 (Arbaugh et al., 2008); showing only the items with significant results. Item 16 (online or web-based communication is an excellent medium for social interaction) and Item 17 (I felt comfortable conversing through the online medium) load heavily on social presence for both the visiting and the host universities. Item 28 (online discussions were valuable in helping me appreciate different perspectives), Item 29 (combining new information helped me answer questions raised in course activities), and Item 30 (learning activities helped me construct explanations/solutions) load heavily on cognitive presence for the visiting university, while Item 31 (reflection on course content and discussions helped me understand fundamental concepts in this class) loads heavily on cognitive presence for the host university. No items load heavily on teaching presence.

Table 4
*Factor loadings of significant COI items of the visiting (V) and the host (H) universities (heavy loading **bolded**)*

Item	Component		
	1	2	3
16. Online or web-based communication is an excellent medium for social interaction.	V = 0.09 H = -0.09	**V = 0.34** **H = -0.44**	V = -0.15 H = 0.16
17. I felt comfortable conversing through the online medium.	V = 0.03 H = -0.12	**V = 0.39** **H = 0.38**	V = 0.14 H = 0.15
28. Online discussions were valuable in helping me appreciate different perspectives.	V = -.0.04 H = -0.19	V = 0.14 H = -0.10	**V = 0.33** H = 0.13
29. Combining new information helped me answer questions raised in course activities.	V = -0.16 H = -0.19	V = -0.03 H = 0.10	**V = 0.40** H = -0.17
30. Learning activities helped me construct explanations/solutions.	V = -0.15 H = -0.19	V = -0.10 H = 0.07	**V = 0.32** H = -0.08
31. Reflection on course content and discussions helped me understand fundamental concepts in this class.	V = -0.22 H = -0.10	V = -0.06 **H = 0.40**	V = -0.16 H = 0.39

End-of-course feedback

The rated feedback is presented in Table 5. The course received positive feedback that ranged from 3.62 to 4.95. Students from the visiting university rated lectures as the lowest and community visits related to SDG as the highest. Students from the host university rated lectures as the lowest and visit to national park as the highest. Students from the host university rated the overall course higher than each course component.

Table 5
Students' feedback about the learning activities

Measures	Visiting University	Host University
Team bonding activity	mean = 4.50, σ = 0.82	mean = 4.67, σ = 0.47
Lectures	mean = 3.62, σ = 1.29	mean = 4.07, σ = 0.72
Cultural visit	mean = 4.36, σ = 0.72	mean = 4.61, σ = 0.59
Visit to communities related to SDG	mean = 4.68, σ = 0.54	mean = 4.58, σ = 0.55
Visit to national park	mean = 4.64, σ = 0.54	mean = 4.83, σ = 0.37
Overall	mean = 4.64, σ = 0.48	mean = 4.95, σ = 0.23

Qualitative feedback was analyzed from the feedback comments provided by the students. The comments of the students of the visiting and the host universities were analyzed separately. The themes of fun, camaraderie/bonding, and language barriers came up most frequently.

Fun was shown by comments such as: '... this program was amazingly fun and I have no regrets signing up for it ...', '... the experiential learning trip is a 5/5, and I am glad I chose to partake in the trip ...', and '... the journey itself was extremely enjoyable ...'.

Camaraderie/bonding was shown with comments such as: '... the collaboration between both schools was still held together by the camaraderie shared between the student bodies ...' and '... my ... friends have done their best to make sure we enjoyed ourselves, and I want to repay the favour ...'.

Students of the visiting university brought up the theme of language barrier with comments such as: '... the language barriers that existed all throughout the trip, ... , made it difficult to learn anything tangible ...', '... though I understand that they are trying their best to speak …, sometimes the accent ... makes it hard to understand the points they are trying to get across clearly ...', and '... a notable challenge emerged in the form of a language barrier ...'. Language barrier did not appear in the comments of the students of the host university.

Discussions

The notion of appreciating an unfamiliar community within 7 days is daunting. This is especially so considering the cultural difference between the students of the visiting university and the communities. Collaboration that includes another group of students who speak the same language as the communities diminished the learning obstacle. Applying COI appears to broaden the learning space beyond the visit duration and to maximize learning, despite learning constraints.

The creation of COI appears to be viewed favourably by the students, whose means ranged from 3.87 (the lowest: cognitive presence by the visiting university) to 4.10 (the highest: social presence by the visiting university). There is no evidence that the universities viewed the creation of COI differently.

The study was able to uncover the similarities in social presence and differences in cognitive presence of the visiting and host universities in detailed items of COI in accordance with a study by Arbaugh et al. (2008).

With respect to social presence, students from both universities viewed online and web-based communication as excellent media for social interaction. The students were comfortable conversing through the online media. There was no evidence of creating a sense of belonging, formation of distinct impressions of other participants, feeling comfortable in participating, disagreeing, or discussing with other participants. Being a short trip of 7 days, there were no elements or activities specifically focusing on enhancing the sense of belonging, creating distinct impressions of others, and going through brainstorming practices.

The findings suggest that while the social presence was formed to the point that students used the online media and felt comfortable conversing, it did not go beyond conversation to in-depth discussions, which could have enhanced cognitive presence.

With respect to cognitive presence, students from the visiting university appeared to favour the activities while the students from the host university appeared to favour the reflections. It appears congruent that the students from the visiting university were less familiar with the communities than the students from the host university. The cognitive presence from the activities was dominant in the visiting students. The host students, being familiar with the communities, appraised the cognitive presence more from the reflections. The teaching presence did not appear strongly based on the loadings of the FPM. The finding may be inconclusive due to the

problems related to measuring the items of teaching presence as suggested in a study by Arbaugh et al. (2008). The finding seems to agree with literature that seems to have discussed extensively on cognitive and social presences, but not on teaching presence.

Student feedback corroborates the quantification of COI attainment. Students cited the camaraderie and bonding, which point to the successful creation of social presence as enabled by COI. Student comment that the course was fun appears to support the observation, too.

Students from both the visiting and host universities rated the lectures the lowest. This is not surprising given the emphasis of the course on experiential learning. The higher overall rating than each component by the students from the host university may point to other item(s) of the course that are not captured by the feedback survey.

There are points to discuss about the learning experience that took place among students from the visiting and host universities. The background knowledge of students from the visiting and host universities seems to have influenced how the students' learning experience. The understanding of cultural nuances in the curated communities, for example, was different between students of the visiting and host universities. Such differences seem to influence the content and the preferred approach of learning, among other things. However, this study did not examine the background knowledge of the students, which is a limitation. Future studies that include different learning institutions in the same course may benefit from examining the similarities and differences of background knowledge of students.

Although the number of responses is sufficient according to a study by Nunnally (1978), the studies would benefit more from a larger data. This is another limitation of the study. While a comparison to other similar studies would have strengthened the findings of this study, context similarities are important considerations. In the context of the host and visiting universities, the program was the first of its kind. With future programs being planned, it would be interested to make a comparison when data is available.

The applicability of COI in designing the course expands the use of COI beyond blended learning. It seems that COI demonstrate effectiveness, too, on courses with a blending of online and in-person components without the courses being necessarily blended. The blending characteristics may be interesting areas to explore.

Conclusions

An experiential-education-based course involving two universities was developed by applying COI to expand the learning space amidst constraints. The presence of COI was measured and appeared to be viewed favourably by the students, which ranged from 3.87/5.00 to 4.10/5.00. Student feedback about the course was 4.64/5.00 from the visiting students and 4.95/5.00 from the host students.

Two items of social presence were viewed similarly, while four items of cognitive presence were viewed differently by students of the visiting and host universities, where the former seemed to favour activities and the latter seemed to favour reflections. The findings suggest that, while social presence was formed, conversation might not have gone into in-depth discussions, which could have enhanced cognitive presence.

The teaching presence did not appear strongly, which may be inconclusive due to the problems related to measuring the items of the teaching presence. The learning activities appeared to be viewed positively by the students. Visit to communities appeared to be perceived most favourably, while lectures appeared to be perceived least favourably.

The study describes a new application of COI in areas outside of blended learning. The applicability of COI has been demonstrated on experiential education-based courses that involve multiple institutions with constraints

that require blending of online and in-person learning activities, without the learning necessarily being blended.

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ASCILITE 2024

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