

Employing the Community of Inquiry Framework in an Asynchronous Graduate Course for Teachers

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Community of inquiry (CoI) has been recognized as a design framework for online learning. As its use has been gradually increasing in online graduate programs for teachers, it is important to know how it affects teachers' professional knowledge. This study examined course design elements/activities together with the CoI presences. The findings from the teacher interviews and the survey data showed: (1) all presences were evident in the course, and (2) activities aligned with social and cognitive presences (i.e., hands-on assignments, peer feedback, collaborative group work, and discussions) enhanced teachers' professional knowledge. Practical recommendations for course design are presented. The findings suggest CoI can be a model for online teachers' professional development.

During the Covid-19 pandemic, higher education institutions faced instruction-related challenges. For example, the delivery mode of face-to-face (FtF) courses suddenly shifted to emergency remote teaching (Hodges et al., 2020). This shift occurred without instructional planning due to unforeseen crisis conditions in several countries (Iglesias-Pradas et al., 2021). As a result of the unplanned transition to emergency remote teaching, there appeared to be problems for learners and instructors. Learners were forced to rapidly adapt to these new course delivery approaches, leading to stressed, dissatisfied, and disengaged academic work. Meanwhile, instructors needing more online teaching and management skills had to make quick decisions about designing courses for online distance education (Gillis & Krull, 2020). Instructors extensively employed teaching methods and activities specific to FtF instruction without considering and evaluating emergency remote teaching (Bozkurt & Sharma, 2020; Hodges et al., 2020). Although studies have consistently highlighted the importance of course design in distance education, course design principles or elements have been ignored, such as specific considerations for delivery modes (Iglesias-Pradas et al., 2021), facilitating learning and establishing familiarity with the instructor of a course (Fuller et al., 2014), and systematic, planned learner engagement (Bozkurt & Sharma, 2020).

During the pandemic, instructors relied on the intensive use of synchronous methods of online course delivery, which has not always provided productivity, efficiency, and improved student learning (Celik et al., 2022; Iglesias-Pradas et al., 2021; Turnbull et al., 2021). Synchronous methods come with multiple constraints. For example, extended periods on screen may lead to decreased cognitive engagement and motivation in synchronous contexts (Raes et al., 2020). Further, issues such as slowness and unexpected loss of internet connection might be inconvenient for students and instructors (Dindar et al., 2022; Olt & Teman, 2018). These disadvantages made synchronous learning more challenging and encouraged instructors and course designers to look for other modalities.

Asynchronous learning provides flexible alternatives and more options for self-paced learning contingent upon being designed effectively (Gillis & Krull, 2020). Asynchronous learning activities offer several advantages. For example, in asynchronous discussions, students can express their arguments in detail (Brierton et al., 2016). Students feel more comfortable without pressure to respond to questions on time (Lowenthal et al., 2017). It is also possible in asynchronous learning platforms to create a powerful communal feeling through various course elements for interaction and collaborative work (Adams & Wilson, 2020). On the other hand, promoting meaningful interaction that leads to desired student outcomes has been a challenge in asynchronous online course design efforts (Adams & Wilson, 2020; Ding et al., 2020). Course designers must capitalize on the social nature of learning to promote design and online learning aspects (Shea et al., 2005). Moreover, current design approaches (e.g., assigned readings, quizzes with multiple choice items, discussion posts) for online courses fail to elicit satisfaction for students because courses include a heavy reading load (Calderon & Sood, 2020) and less peer interaction (Northey et al., 2015). However, higher purposeful interpersonal interaction in online courses might result in better perceived satisfaction and learning (Mehall, 2021). This kind of interaction differs from social interaction by which learners exchange information (Garrison & Cleveland-Innes, 2005). To overcome the challenges faced in learning online, several design models have been used, one of which is the community of inquiry (CoI) framework, regarded as a high-impact pedagogy and technology design approach that enhances learning in asynchronous courses (Akyol & Garrison, 2008; Castellanos-Reyes, 2020; Choo et al., 2020; Rockinson-Szapkiw et al., 2016).

Community of Inquiry Framework

The original definition of CoI is "a group of individuals who collaboratively engage in purposeful critical discourse and reflection to construct personal meaning and confirm mutual understanding" (Garrison, 2017, p. 2). The framework describes interaction through three dimensions: cognitive, teaching, and social presences. Each presence is a "critical prerequisite for successful higher education experience" (Garrison et al., 2000, p. 87). Cognitive presence is "the extent to which the participants in any particular configuration of a community of inquiry can construct meaning through sustained communication" (Garrison et al., 2001, p. 89). It "provides a description of the progressive phases of practical inquiry leading to resolution of a problem or dilemma" (Akyol & Garrison, 2011, p. 235). Teaching presence is "the design, facilitation, and direction of cognitive and social processes to realize personally meaningful and educationally worthwhile outcomes" (Anderson et al., 2001, p. 8). In the context of K-12 settings, it is also "the ability of a teacher or teachers to support and enhance social

and cognitive presence through instructional management, building understanding and direct instruction” (Dunlap & Lowenthal, 2009, p.133). Social presence is “the ability of participants in a community of inquiry to project themselves socially and emotionally, as ‘real’ people (i.e., their full personality), through the medium of communication being used” (Garrison et al., 2000, p. 94). The three dimensions work interdependently and overlap (Garrison, 2017).

In most asynchronous courses, poor course design (i.e., only using e-mail exchanges and text-based discussion boards) in distance learning limits students’ interactions leading to feelings of isolation (Chang et al., 2015) and attrition (Liu et al., 2009). To provide a more satisfying experience, it is important to take an inquiry and community stance toward course design. Therefore, we used the Col framework in this study because it is a process framework managing learning and teaching models in online mediums (Akyol et al., 2009). Further, it is a design model that addresses critical aspects of online learning affecting teachers’ professional development in asynchronous environments (Spires et al., 2018). A deep inquiry into a teacher’s professional development through critical reflective practices in a group is essential (Krzyszowski & Mavrommati, 2020). Col helps teachers prioritize flexible, collaborative learning over submission of independent work, which in turn promotes sustainable improvements in teachers’ classroom practices (Butler & Schnellert, 2012). Our main argument of using Col in this context is that the more teachers have opportunities to interact with each other, instructors, and course content, the more they are satisfied with the asynchronous online experience that improves their knowledge. The interaction aspect of asynchronous context might be highly crucial, especially when learners feel socially isolated during crisis times such as pandemics.

Purpose of the Study

In the current study, we first re-designed an online course because it needed more engagement and instructor facilitation according to student feedback in previous years. The online course was designed based on the Col framework and was delivered entirely asynchronously. Then, we explored the teachers’ experiences in this graduate-level course related to their engagement and their perceived professional knowledge. Two research questions guided this study:

1. Which elements/activities of Col were evident in the course based on teachers’ experiences during the asynchronous online course?
2. What course design elements/activities aligned with the Col framework support/foster teachers’ perceived knowledge of the course content?

In this study, we embraced Bacon’s (2016) definition of perceived knowledge: teachers’ “self-report of knowledge gain, generally based on some reflection and introspection (p. 3).” It is more like an adequate measure of learning than a cognitive measure of actual learning (Richardson et al., 2010; Sitzmann et al., 2010). Our primary focus was not to reveal to what extent teacher knowledge changed. Instead, we asked our participating teachers to reflect on what course elements/activities helped them gain professional knowledge in this online course.

As higher education institutions add more asynchronous courses to their programs, the quality and the design of these courses are often called into question (Rueter et al., 2019). This study aims to highlight the importance of a unifying model for better, engaging, and interactive course design (Richardson et al., 2022). Our findings contribute to the knowledge base of understanding the Col as a course design model to be followed. Our study also addresses an important gap in the literature. To the best of our knowledge, there is a scarcity of evidence using the Col framework within a graduate-level, asynchronous, online teacher education program (e.g., Fuller et al., 2014). It is also equally important that the Col framework can shed light on designing an effective professional development course in which practicing teachers have several opportunities for their professional learning.

Study Context

An asynchronous course is described as a course that does not need in-person classes and does not require students to be on campus (Online Learning Consortium (OLC), 2015). The course we redesigned was part of a fully online graduate program in a public university in the Southeast U.S. providing advanced professional and pedagogical studies to develop expertise in the knowledge and skills of accomplished teachers. The course in this program is delivered using a learning management system (LMS), Brightspace D2L. The previous versions of the course included readings, discussions, and quizzes that were not tied to a conceptual design model and lacked consistency across the activities. Based on the feedback from teachers (students in the course) and faculty (instructors), a need has been identified to improve and redesign the course regarding learning philosophy and engagement.

Asynchronous Course Design Using Community of Inquiry

We employed the Col framework as a general structure to create meaningful learning experiences and elements through social (engagement with learners), cognitive (engagement with content), and teaching (engagement with goals and direction) presences (Garrison, 2007; Garrison et al., 2000; Richardson et al., 2012; Swan et al., 2014). In addition, we utilized design ideas and modified activities from the relevant studies (i.e., Akyol & Garrison, 2008; Fiock, 2020; Garrison & Cleveland-Innes, 2005; Richardson et al., 2010) to reflect the working practices in our course.

We encouraged social presence by developing a seven-week-long group project in which groups of five completed a collaborative project by meeting asynchronously and an option to meet synchronously. To promote deep and meaningful learning, we added this group project that potentially promotes critical discourse in a sustained manner (Garrison & Cleveland-Innes, 2005; Richardson et al., 2010). Additionally, we designed one pair-work activity in which dyads worked together to identify problems and solve an ethical dilemma faced in professionals’ daily lives and four targeted discussion forums that promoted interactions encouraged by prompts and questions. These activities included problem-solving such as open-ended tasks that teachers worked together to unpack (Richardson et al., 2010). Based on the suggestions from Mehall (2021), students shared anecdotes from their professional life to offer differing perspectives on current social issues and one showcase for presenting final project materials and for receiving and giving feedback. In addition, using Slack as a messaging platform and regular announcements and follow-ups in an LMS (i.e., technology use), students interacted with each other and the instructor. This way of communication aimed to increase the magnitude of social interaction rather than its density (Garrison & Cleveland-Innes, 2005). Announcements were used to recap the learning content and to preview the course content for the following week. Random survey questions were posted in Slack to regularly check-in with students about their needs, experiences, and feedback. Then, based on feedback, the course content and activities were updated, revised, or renewed as an ongoing effort to improve the course for students.

We intentionally introduced frequent and continuous opportunities for practice, self-assessment, and feedback to support cognitive presence. Students read from e-books, commented on text, and completed comprehension quizzes to test their knowledge. In two real-life connected assignments, students met, observed, and/or interviewed a professional to better understand the skills they will gain after completing the course. These exploration events enable teachers to engage in an inquiry process and discover issues and problems in professional practice (Fiock, 2020; Garrison et al., 2000). We encouraged them to engage

in a dialogue focused only on the subject matter to provide quality, interactive learning experiences beyond solely socially present instructors (Garrison & Cleveland-Innes, 2005). Hands-on assignments were provided for students to practice what they have learned independently. Then, they were engaged in a peer review and feedback cycle in which they gave and received feedback on their materials, assignments, and papers. These activities encouraged students to consider diverse points of view and various experiences. Students could choose their topic from their unique context to represent their work in various ways.

We encouraged teaching presence by providing timely and supportive instructor feedback for real-life connected assignments (the hands-on work completed), group work, and projects. From Richardson et al.'s (2015) suggestion on this kind of presence, the course instructor provided explicit and clear instructions for all course activities and reiterated all guidelines in the Slack communication channel by interacting with students. A welcome module which included an introductory video, meet & greet forum, instructions for course navigation, expectations, and requirements with a 12-item orientation quiz was prepared for orientation. Slack was also used to promote the link between teaching and social presence because without sufficient support and facilitation, social interaction would not go beyond sharing experiences (Garrison & Cleveland-Innes, 2005). In addition, the course instructor provided scaffolding (Flock, 2020) on the navigation of the course through a page in the orientation module and chatting in Slack. This possibly helps teachers to stay in the course as the instructor answers their questions.

All activities and design elements were flexible by design; we allowed all three Col presences to mix systematically. Our design elements were used to build an intentional and collaborative community of learners. Our design elements aimed to support learner engagement as the course was framed around an online community (Robinson et al., 2017). This course was taught during the pandemic with two sections in Summer 2020 for 10 weeks.

Method

We used a case study methodology (Yin, 2017) to collect and analyze qualitative data from the teachers (as students) who enrolled in the online program at a university in the southeast U.S. As suggested by Yin (2017), we relied on multiple sources of evidence and used quantitative data to investigate teachers' experiences in the course. By taking the course as a case, we tried to reveal the actual experiences and perceptions of teachers in the course.

Participants

In this study, the words "learners," "students," or "teachers" all refer to the same participating body of people. Teachers are students/learners in the online course. The instructors are not participants; they are the researchers and authors of this study. In the Summer of 2020, two sections of the course taught by the researchers were available to collect data. There were 35 teachers in total: 20 males and 15 females, and 18 teachers responded to the survey. For the interviews, a call to volunteer to participate in this study was sent to the students before the course began. Two students from each section were recruited, and four in total participated in the study (one male and three females). After the data was collected, students who agreed to participate in the interviews were sent incentives (i.e., \$50 gift cards).

Procedure

As outlined before, the course was designed based on the Col framework, focusing on three presence dimensions. In the Fall of 2019, the course blueprint was prepared, including details about the activities. One instructional designer and two instructors with experience in the previous version of the course provided comments regarding aligning the activities with the program standards. After developing the course, we piloted the initial version with more than 120 teachers in all separate sections taught by the two researchers of this study. A formative evaluation of the course was conducted using formal and informal feedback from the teachers through Slack reflection and the instructors through a mid-course form and an end-of-the-course form (15 five-Likert type items). In general, teachers asked for more clarity in instructions, more engagement in Slack, and faster and more detailed responses to their messages/emails. Improvements and revisions were made to better reflect the presence dimensions of the Col framework. Piloting and formative evaluation were not parts of this current study. The final iteration of the course was completed in two sections taught by the first author of this study.

Instruments, Data, and Analysis

The complex nature of online learning requires us to collect multiple data sources to understand the courses (general tendency) and individual learning (Gunawardena et al., 2001). For course-level data, we used instructor-oriented questions/items from the university's official course evaluation survey. We asked a panel of experts who are teaching online and know Col to identify these questions and align them to the Col framework for validity purposes. There were three items related to the social and teaching presences of Col: The instructor was (1) available to students; (2) helpful to students; and (3) encouraged class participation, discussion, or questions. The response scale ranged from strongly disagree (1) to strongly agree (5). The items measured separate observable behaviors of the instructor, so no underlying latent construct was investigated. A panel of researchers provided content validity for these questions, as well. We provided the average scores of all three items to determine a general picture of teachers' perceptions.

For the qualitative data collection, two approaches were used:

1. We used open-ended questions from the university's course evaluation survey. The open-ended questions asked the aspects of the course that contributed most to learning and suggested improvements to enhance student learning.
2. We created an interview protocol to explore teachers' in-depth experiences. The interview protocol was validated by a panel of experts who had taught in the program before. There were questions about teachers' experiences, learning activities, the relationship between their engagement and perceived knowledge, and course design. All interviews were completed and recorded in the Zoom environment.

The questions and the interviews were analyzed through content analysis by generating codes from sentences (Patton, 2015). This was in-vivo coding with no prior coding scheme. During this process, the researchers discussed and negotiated the emerging codes and categorized them under each research question to establish trustworthiness. The field notes of the interviewers were also used to verify codes and categories (Patton, 2015).

Findings

Quantitative Results: General Picture of Social and Teaching Presence

A total of 18 teachers completed the survey items. Out of 5.0, the average scores of all three items were as follows: The instructor was available to students (Mean = 4.9, S.D. = .32); helpful to students (Mean = 4.6, S.D. = .78); and encouraged class participation in discussion, or questions (Mean = 4.7, S.D. = .57). Collectively, the quantitative data showed the respondents agreed the instructor was present in the course, which might correspond to social and teaching presences in the course.

Qualitative Findings: Teachers' Experiences and Perceptions

The survey results of data from 18 teachers showed five categories of emergent codes corresponding to the design elements of the course. Readings, hands-on assignments, discussions, collaborative group work, and peer review were revealed and detailed below under each presence dimension. The teachers' general experiences from the course were positive, and there was evidence of categories for each dimension of the Col.

Four individual interviews were conducted for a more in-depth understanding of teachers' actual experiences. Our findings from the interviews were parallel with the survey findings regarding design elements aligned with the Col framework. We merged the synthesis into the three dimensions of the Col framework (see Table 1).

Table 1

Course design elements/activities and the Col presences aligned with the research questions

	Social presence	Cognitive presence	Teaching presence
Communication with the instructor	x		
Using technology (Slack) to interact	x		
Scaffolding for revisions	x		
Group work	x +		
Peer reviews and feedback	x +		
Collaboration with peers	x		
Discussion forums with real-life problems/connections	x +	x +	
Discussions aligned with the textbook/readings		x +	
Reviewing samples and templates of the assignments		x +	
Reflecting on content knowledge		x	
Feedback from the instructor			x
Instructor's encouragement for engagement			x
Quick and on-time feedback and email/message responses			x
Instructor's guidance and directions			x

Note. x is for the alignment between the course design elements/activities and the Col presences (research question 1). + is for the course design elements/activities that supported/fostered teachers' perceived knowledge (research question 2).

Under the social presence dimension, communication was consistently mentioned. One teacher commented:

Being able to communicate with the professor [is the thing that most contributed to my learning]. Using Slack was interesting and helped build class camaraderie. I liked that the professor allowed revisions throughout the units as the lessons were scaffolded into the final project.

In addition to the innate messaging feature of the LMS used, the teachers “[...] enjoyed Slack, with the constant open communication.”

Based on our interview, one teacher also liked the content and the scope of the group work. Ellie (pseudonym), a teacher, stated:

The professional development project was neat because this is my first semester in the program, so that was my first experience creating a professional development. I liked that because we could be artistic and creative and have the freedom to do what we wanted to do for that project, so I liked that as well.

Peer reviews/feedback and group work were the most striking evidence of the social presence dimension of the course. One teacher noted “the unit plan with peer feedback was the most beneficial.” Scott (pseudonym) from the interviews detailed how she used feedback from her peers in this course:

I really like the feedback part. I like to know that other people have—people can kinda see what I’m doin’ and then think, “Why don’t you do it this way?” ‘cause I’m a firm believer two minds are better than one.

Collaboration in asynchronous environments was achieved through a project in this course. One teacher said that “collaboration with peers helped me a lot. Sometimes it isn’t easy being in all online courses. It makes it easier when you can collaborate with peers on [an] assignment.” Similarly, one teacher found working with a group asynchronously helpful for “developing a professional development activity.”

The targeted discussion forums also helped teachers become present socially in the course as Caroline (pseudonym) said:

I really enjoyed the first one where the art of instructional coaching. I liked seeing how the practices for teachers were also the same practices we use in the classroom, which of course makes sense ‘cause you’re teaching your teaching. Looking at those patterns between what does the instructional coach do versus what does the teacher do?.

For cognitive presence, there were assignments in the course tied to real-life and practical experiences of teachers. These assignments required teachers to think deeply and take a critical stance on their and others’ instructional and professional practices. Two teachers said, “the most beneficial assignments to me were the interview with an instructional coach,” and “I actually really enjoyed the interview with the instructional coach.”

Readings and other hands-on assignments were beneficial for promoting cognitive presence. The teachers expressed that “the articles and books [chapters] provided me with the knowledge that enhanced my learning,” and “I think the examples within the Modules were helpful.” In hands-on assignments, teachers went beyond readings and taking quizzes. One teacher shared, “these assignments were very in-depth, and I feel that provided me with more hands-on experience than any other course that required creating lesson plans.” From the interviews, Caroline commented:

I had not had experience before with writing unit plans or lesson plans. They were much more vague. I liked using the unit plan and the lesson plans to be more deliberate with my decision making and to use more research about effective instructional strategies to actually implement and be deliberate about those.”

Some teachers also mentioned hands-on assignments “allowed me to demonstrate my knowledge.” One teacher explained “designing and completing an entire unit plan with assessments provided a clear method for mapping out, planning learning, and objectives for future lessons.” This assignment allowed teachers to reflect on their content knowledge and develop a well-organized and effective plan.

As for the teaching presence dimension, we found feedback was a common category that emerged from the responses for almost all teacher respondents. They thought the feedback was “useful,” “constructive,” “well-rounded,” and “individualized and did not contain generalized comments.” One teacher found the instructors “responsive” and believed the instructor “encouraged students to ask questions. I would sign up for another class where he was the instructor again if I was able to.” Some teachers also appreciated the instructor’s way of giving feedback:

The instructor is always quick to respond to any questions that you have. He clarifies any misunderstandings and doesn’t mind providing immediate feedback to ensure you are on the right path.

Our analysis of the interviews also added new insight to the teaching presence dimension, which can be revealed or seen in different ways. Laila (pseudonym) said:

If there was any assignment I was unfamiliar with, the instructor gave lots of details or information about how to understand it, where I could look to familiarize myself a little better. I felt like, if I didn’t understand it right away, I was given everything I needed to try and understand it, and we were always encouraged to ask questions if we had further questions. It was all relevant, but, to me, this class was extremely relevant to what I do, to what I needed to know, and how to improve myself.

In summary, three presence dimensions appear in the course through corresponding design elements. Communication, collaborative group work, feedback, and hands-on assignments were the major elements merged to be important. The responses to the open-ended questions and the interviews overlapped in some points, demonstrating consistency across the two data collection tools.

Qualitative Findings: Improvements through the CoI Design Elements

Our second research question investigated what course design elements/activities aligned with the CoI framework support/foster teachers’ perceived knowledge of the course content. We were able to extract the social and cognitive presence dimensions. However, no evidence of the elements related to teaching presence as influencing teachers’ knowledge emerged. Peer reviews/feedback, pair and group work, discussions, readings, and hands-on assignments appeared to help the teachers learn new pedagogical strategies.

Under the social presence dimension, the teachers perceived peer reviews as useful in improving their assignments and knowledge of lesson plans. Ellie detailed her experience with peer reviews:

I think givin’ feedback; ultimately, it makes the lesson plan better for other people to read it. Yes, I think they improved. Also, I think it will improve in the future because I have more experience writing detailed lesson plans. Usually, during the week, I feel like there’s a rush and not putting as much

detail that this is nice to have this practice for the future (Ellie).

One positive finding regarding peer feedback was teachers had a chance to practice empathy which helped them approach lesson planning from different perspectives. Laila explained:

I thought the feedback portion as really relevant. When I was the person giving the feedback, I found myself really tryin' to think and walk through as if I were a student having that type of lesson given to me. What are some things that I would think of? How would I feel about it? How would I feel if I were the instructor? Then what the requirements were of the actual of the actual task that we were given feedback on.

In addition, the pair work assignments helped some teachers in the course self-evaluate themselves as Scott said:

The ethics was good, because there's just things we take for granted. There's just things that we know we should and shouldn't be doing. It's common sense to some of us, but some of us forget or just don't think about it. Sometimes it's nice to be reminded to stop and check yourself, make sure that you're doing what you're supposed to be doing.

As far as cognitive presence is concerned, Ellie discussed how she began constructing meaning through the discussion activities that promote real-life connection in the course:

I really enjoyed interviewing her [an instructional coach] and seeing that perspective and that whole other role inside the school. I'm in my little bubble. I teach and there's students and there's administrators, but there's so many more people who have so many roles that I opened my eyes to a new role and just different opportunities in the education world besides just teaching. There's a lot more possibilities.

Another teacher, Scott, thought that these activities allowed him to meet someone in the position that he was interested in attaining in the future. Talking with an instructional coach gave him an opportunity to see what the job would entail and how he can be successful.

Readings from the e-book were also seen as a valuable resource for practicing cognitive presence in the course. Ellie reflected:

I've learned a lot of other theories by reading about the different principles of education. As I was reading, I was like, "Okay, I could adapt it in this way," 'cause I was always thinking about it from my first-grade perspective. There were a lot of things that I could try in my instruction in the future (Ellie).

The teachers learned new practices they could plan to implement in their classrooms. Scott shared that he learned "the project-based learning and the student small groups." Similarly, the hands-on experience in the course produced positive results. Scott believed unit planning was the most important part of him. He could put his ideas and learning into a template to write a lesson plan. Laila said, "I was able to write the units fairly well, but then, as I was goin' into the lesson plan, she had the template. It made me dig deeper into the content."

Overall, through social and cognitive presence, the teachers reported improving their knowledge and skills in unit and lesson planning and gave feedback. There was some evidence the teachers felt confident enough to implement some pedagogical strategies in their classrooms after this course. The teachers also shared they gained different perspectives regarding instruction and planning through the activities in the course.

Discussion

With the effect of the pandemic, the popularity of asynchronous and online courses has been gradually increasing. However, courses have been designed with little emphasis on online learning theories and research evidence. Considering this flaw, and to help guide course designers, instructors, and researchers, we developed a course based on the Col framework to improve the efficiency and effectiveness of learner outcomes. Our study adds to the existing literature regarding the positive effect of an asynchronous course designed with the Col framework (Choo et al., 2020; Flener-Lovitt et al., 2020). We can maintain the use of Col as a robust and practical framework and a guideline to provide engaging and hands-on online learning experiences (Akyol & Garrison, 2008).

As Col has been scarcely employed to develop asynchronous courses, the results of this study are expected to contribute to the current efforts of online course design and program delivery at the graduate level. Our findings suggest asynchronous courses can be designed through the Col lens for engagement and interactivity to produce positive changes in learners, more specifically, knowledge gains in practicing teachers taking a graduate-level course. For example, design, facilitation, and direction together are (Garrison & Anderson, 2003) teaching presence elements that might help practitioners design online courses with sustainability in mind (Garrison & Cleveland-Innes, 2005). Regarding facilitation and directions, it would be practical to introduce course expectations in an announcement, on a dedicated page in a module, and in a message in the course's communication channel (i.e., Slack; Garrison & Cleveland-Innes, 2005).

Our study can also offer a multi-faceted perspective into the ways the three presence dimensions work together for quality asynchronous learning experiences (Garrison et al., 2000). Readings from an e-text accompanied with practice quizzes for basic understanding, hands-on assignments, real-life connection discussions, collaborative group work, peer review/feedback, and availability of the instructor have been shown in previous studies (Choo et al., 2020) as effective elements of Col for knowledge gain and satisfaction. These elements can provide a gateway to effective asynchronous learning for online graduate programs since many instructors are less familiar with and are challenged by how to make the best use of their time to be present in asynchronous environments (Rueter et al., 2019; Van de Vord & Pogue, 2012). For practical use, instructors can add a welcome video with some personal insight regarding the course content and a guide to navigating the course (Fiock, 2020). Also, facilitating online group work would be easier if the instructor reviewed learners' comments and encouraged them to move forward with some feedback on their ideas (Richardson et al., 2010).

Collaborative group work opportunities in asynchronous online courses are important for learning (Akyol & Garrison, 2008). Our study yielded parallel findings. One explanation might be the design of the tasks given to the teachers. By design, the nature of the activities triggered the teachers to explain, connect, and analyze what they have been learning instead of merely sharing their knowledge and ideas, which is one of the tenets posed by Garrison and Cleveland-Innes (2005). The teachers were challenged in our course to synthesize relevant literature and create unique products. These opportunities enable students react to their learning in a safe environment as well as be engaged in peer-to-peer interactions, which leads to a sense of belonging to a community (Booth, 2012). This is particularly important when learners felt self-isolated during the pandemic (Adams & Wilson, 2020). In fact, building a sense of community is important since it decreases a sense of isolation while increasing learner satisfaction and academic performance (van Tryon & Bishop, 2009). With structured group work based

on the Col presence dimensions, asynchronous courses might provide desired results. In terms of practical considerations, having a 'welcome page' or 'meet and greet' (i.e., icebreakers) for learners to introduce themselves to their group might help develop trust that supports collaboration throughout group work activities (Flock, 2020; Richardson et al., 2010). Scaffolding can also play an important role in online community building. For example, with "just-in-time" scaffolding, the instructor in the online course can share a video tutorial or announce clarification when learners have difficulties using technology in the course, or there is a misunderstanding or misconception (Richardson et al., 2022).

Similarly, our findings indicated real-life discussions are important elements for learners and their engagement with each other. In the asynchronous environment we designed, the teachers posted regularly about various themes and responded to threads by implicitly addressing the discussed issues. Teachers were expected to analyze the initial suggestions or differing perspectives in their responses. In addition, the instructor used rubrics to give feedback on the quality of the posts and the interactions through responses. These ongoing, weeks-long conversations on targeted topics laid the foundation for a developing online community, which is regarded as a common method (Adams & Wilson, 2020). Establishing a strong sense of community during online learning supports cognitive and social aspects of learning (DeNoyelles et al., 2014). To achieve a better discussion environment in online courses, practitioners can make engaging in discussion activities a significant part of course grades, and require students to incorporate reading materials and personal experiences in discussion posts (Richardson et al., 2010). The nature of the questions in discussion forums is also important. Having provocative and reflective open-ended questions might open other doors to divergent thinking and creativity in learners' posts (Flock, 2020).

Our analysis identified communication, peer review, and discussions as principal design elements. These activities promote community in an online environment, leading to increased participation and interaction in asynchronous learning platforms (Zhao et al., 2014). We intentionally planned these activities to make them intertwined, enabling the teachers to exchange ideas and share experiences in the classroom. As Muñoz-Escalona and McLaren (2018) suggest, well-developed asynchronous discussions promote more profound levels of learning. The teachers were actively engaged in a structured task instead of working on an individual task without group effort. The social environment through several communication channels (posts and threads) enabled learners to interact (Garrison et al., 2000) more organically without assuming learner interactions would occur. To create engaging learning in online courses, a practitioner should allow learners to use peer review comments to shape their discussion posts, and monitor peer responses to assign roles amongst learners so that they think critically about discussion topics (Richardson et al., 2010).

We tried to demonstrate cognitive presence in the course through peer reviews, readings with quizzes, and hands-on activities. The standard design considerations behind these activities required learners to think critically and practice inquiry (Garrison et al., 2001). We allowed the teachers to analyze problems and create tangible solutions for current issues in teaching and learning. They shared their expertise and built on ideas generated collaboratively. They also had opportunities to interact with a professional (working at a school) and other teachers to apply their knowledge and skills. The times dedicated for interaction enable learners solve problems through cooperation and exploration, eventually leading to higher-order learning (Garrison et al., 2000). This result is in line with Zydney et al. (2012) claiming the activities from cognitive presence were more powerful when they included interaction to acquire various perspectives in a group climate. One way to promote cognitive presence in online courses is to provide opportunities for learners to reflect on their interactions with peers and the instructor (Flock, 2020). After completing a hands-on activity, prompts can encourage learners to inquire about their learning and self-assess their progress (Dunlap, 2016). Scaffolding from the instructor may also promote cognitive presence. As Richardson et al. (2022) suggested, promoting self-monitoring and self-regulation through task lists, schedules, templates, worksheets, and checklists is helpful for metacognitive learning. It guides learners to think about their learning during the course.

We observed the teachers were satisfied with teaching presence in the asynchronous course. A closer examination of teachers' reflections showed teaching presence could appear in the instructor's feedback and communication in the messaging app (Slack). For instance, immediate and adaptive feedback might be important aspects of teaching presence; thus, instructors can provide timely clarification to learners avoiding any misunderstandings, which has been shown effective for students' satisfaction in online learning (Caskurlu et al., 2020; Khalid, 2014; Kyei-Blankson et al., 2019). Similar results were produced in studies with in-service teachers (Miller et al., 2014). When it comes to teachers, the instructor of the teachers should also demonstrate instructional practices with the Col's teaching presence. In addition, the role of instructors in meeting students' expectations and learning needs is essential in online courses (Gillis & Krull, 2020). Consistent with this evidence, our study revealed that when instructors quickly responded to questions, students felt a progression on expected course goals. We recommend online course designers consider several opportunities that offer interaction and messaging external to the LMS or course platforms. In addition, there can be planned opportunities for private (i.e., to an assignment) and public feedback (i.e., to personal or group performance; Richardson et al., 2010), on-time grading and feedback to assignments, and as well as prompt responses to emails and chats (Watson et al., 2017). While not necessarily a component in an asynchronous course, live, synchronous communication (i.e., chat, virtual messages, or interactive whiteboards) might be an option to increase teaching presence when needed (Lowenthal & Dunlap, 2018).

In the current study, peer-review opportunities were found to be contributors to learners' knowledge. Accordingly, in-service teachers regarded feedback from their peers on their unit plan as beneficial. Since assessment has been a challenging issue during online learning (Harper et al., 2021), the peer review process could be one alternative for instructors teaching online courses and designers who develop asynchronous courses. For instance, during the pandemic, instructors generally relied on summative assessments through online exams (Kim & Choi, 2020). However, this has conflicted instructors regarding reliability and validity (Abdelrahim, 2021). This is because students sometimes may cheat (Balderas & Caballero-Hernández, 2020). Hence, peer assessment throughout asynchronous online learning can provide a process-oriented assessment that helps instructors avoid unwanted behaviors.

On the other hand, some design elements can belong to more than one dimension of the Col framework. For instance, teachers repeatedly mentioned feedback as an element of both social and teaching presences. This finding may be practically crucial for the design of online courses. Theoretically, it makes good sense to see a design element in different presences. Garrison et al. (2010) emphasized all three presences of Col must meaningfully associate with each other to facilitate successful learning experiences. In this regard, design elements contributing to multiple Col presences could support pedagogical choices and any positive associations for meaningful learning. Then, it is more likely to expect positive learning outcomes from online courses by adding elements that overlap in different presences. Instructional designers of asynchronous courses should consider activities that simultaneously fall into the different presence dimensions.

Although we designed the course using the Col framework, it appears that teachers did not adequately use all design elements. For example, for messaging they did not prefer joining conversations in Slack. We assumed that the teachers' communication preference might be only emailing or messages through the LMS. One plausible explanation could be that learning tasks in the course might not require the teachers to use Slack messaging as a design element. Learners have less intention to use any components of an online course when they are not aligned with learners' needs (Bower, 2008). Another surprising finding from our

study was that no teachers talked about the instructor's guidance in the course process, even though we promoted social and teaching presences. More research is needed to understand whether the underlying reason is the course design itself or the instructor's pedagogical moves that might not facilitate teachers' learning.

Limitations

The lead designer, the instructor, and the first author of the current study are the same person. This can bring advantages (e.g., better engagement) and disadvantages (e.g., potential biases). Since a course designer usually does not teach the course they design in higher education settings (Richardson et al., 2015), planned and enacted course elements and activities might differ. Teaching presence is rarely seen in these types of courses, as well. To our advantage, the same person carried out all the roles for consistency. Oppositely, this person might have brought their biases to actual teaching. Moreover, online graduate programs are designed and implemented at different paces and formats. Our findings may not apply to all online, blended, or hybrid courses and undergraduate or graduate programs.

Sample size can be assessed as another limitation of the current study since we collected quantitative data from relatively few participants. Only three Likert scale items produced our quantitative data. We believe these are insufficient to show that social and teaching presence was found in the course. These were the only items available to us from the university. We were limited to quantitatively measuring both presences. We were careful to claim that the numbers from the items were enough. Since this is a descriptive study, those three items only looked at the bigger picture of teachers' perception. The descriptive findings were limited by sample size and not intended to be generalizable. In addition, we only collected survey and interview data from the course participants who enrolled in a graduate program. Future research could combine video and log data with self-reported data and learning analytics to provide a more robust account of asynchronous course design. Despite these limitations, our empirical results would theoretically and practically contribute to the asynchronous online course design process.

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