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ORIGINAL ARTICLE

Developing social presence: Teachers' experiences of asynchronous discussion strategies in an online graduate class

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All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

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ABSTRACT

Distance education is increasingly common in higher education, though the quality of online programs varies significantly. Students in online learning often feel isolated from their classmates, which can hinder their success in achieving learning outcomes. One of the most common ways learners socially interact in online education is through asynchronous discussions. This qualitative research study utilized six different asynchronous discussion strategies (problem-based solution, audio recording, teacher facilitation, peer facilitation, debate, personal experiences) in an online graduate class, based on a literature review and course design. The researchers explored their implementations for the importance of social presence from the students' perceptions. All the participants were in-service teachers, focusing on learning the foundations of educational technology. A phenomenological research design was employed to analyse the participants' multiple perspectives of their experience with different discussion strategies. Results reveal insights on how different discussion types can be used to improve the social presence and provide practical implications for teachers of online courses. The findings suggest that all the discussion strategies allowed some level of collaboration; however, the problem-based solution activity emerged as a helpful strategy to improve graduate students' social presence in online graduate courses. Overall, the researchers argue that course designers and instructors must use different strategies at different points in their courses and think carefully about their discussion prompts and protocols in online asynchronous discussions (e.g., topic, timeline).

Keywords: distance education, community of inquiry, social presence, asynchronous discussion, higher education

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INTRODUCTION

Distance education (DE) is the practice of teaching students using digital tools and includes the physical separation between instructor and learners. DE requires planning and support, the use of technological media, and both instructors' and learners' ability to communicate synchronously and asynchronously (Swan, 2010). It is rapidly growing and becoming a preference for most post-secondary institutions (Allen & Seaman, 2017). During the COVID pandemic, DE became not just a preference but a requirement in all the countries (e.g., Kim, 2020; Koçoglu & Tekdal, 2020; Zawacki-Richter, 2021). After the pandemic, this growing trend is expected to continue. As a result, more and more universities are transitioning from traditional campuses, where students attend lessons in person, to dual-mode universities, which offer a mix of distance and face-to-face courses (Wotto, 2020). As more universities outfit themselves for DE, competition between institutions increases, and this pressure frequently leads to online programs of lesser quality that sometimes fail outright (Arora & Srinivasan, 2020; Blankenberger & Williams, 2020).

Many studies have examined DE programs to try to identify what it is that makes some successful and others fail. For instance, Rovai and Downey (2010) identified several primary areas that determined success in DE programs and highlighted online course design and pedagogy, among others, and emphasized the importance of student interaction and engagement in online courses. Yuan and Kim (2014) developed a set of guidelines for facilitating the development of successful online learning programs. The guidelines included continuously building social community, assigning collaborative tasks, and using various means of stimulating discussions and interaction between the students (Yuan & Kim). The findings of previous studies emphasized these as the required conditions of successful DE courses (Choi & Park, 2018; de Oliveira et al., 2019).

On the other hand, student isolation and disconnection from their course, peers, and teachers have been found as one of the primary reasons for student failure in DE courses (e.g., Kara et al., 2019; Raza et al., 2021). The unique set of circumstances found in distance education has led to much higher quality issues than face-to-face courses, with isolation, a sense of disconnection, and technological limitations playing key roles (Palvia et al., 2018). Lower levels of student performance in DE are directly traced to lower measures of social connection and community (Ragusa & Crampton, 2018). Developing students' strong social presence can overcome these feelings of isolation and lead to both better learning outcomes and experiences for students (Ma & Lee, 2021). Social presence is the sense of community that a person feels that they are part of a group and are accepted by others in that group, recognized as being a real person who belongs and has social value (McMillan & Chavis, 1986).

Garrison et al. (1999) stated that "social presence is a direct contributor to the success of the educational experience" (p. 89) and plays an integral part in successful learning outcomes. It is not only through supporting the students' knowledge creation and learning process but also addressing those common problems in DE of isolation (Collins et al., 2019). It has been demonstrated that a strong social presence in DE can improve students' engagement and learning outcomes (Buelow et al., 2018; Geng et al., 2019; Shen & Chen, 2018). DE students who report lower levels of social connection and interaction often report that they are not learning as much as when their sense of community is stronger (Moore, 2014). Unfortunately, the social connections that often develop between learners in normal classes, where students and teachers are face to face with one another, are frequently absent for DE (Keskitalo, 2021).

One way to improve the success of DE programs is to develop the social presence factors and opportunities for interaction, discussion, and collaboration. Social presence can be cultivated if activities or discussions are designed in

which learners have the opportunity to get to know each other and share commonalities (Bolliger & Martin, 2018). It can be facilitated by the instructor in various ways, such as building and modelling positive rapport in the classroom through friendly interactions and creating an open environment where students are encouraged to communicate openly. Social presence is crucial in DE due to the prevalence of a sense of isolation often felt by both students and educators alike (McElrath & McDowell, 2008; Yuan & Kim, 2014). The current research sought to address this problem through asynchronous discussion strategies designed to maximize social presence and overcome these issues of lack of social connection and isolation. Asynchronous discussions in DE allows learners to access information at their own pace and convenience with no finite time frame. They allow students to interact, socialize, feel connected, learn from their instructors and classmates, and gain different perspectives from a diverse group of peers (Dzubinski, 2014).

Theoretical Framework

Vygotsky's (1978) sociocultural theory of human learning emphasized the significance of social interaction for constructing knowledge in a learning environment. According to sociocultural theory, meaning is created through people's interactions with one another. The theory focuses on knowledge being created by the learner through their interaction with other people in their community as they try to make sense of the environment around them (Harasim, 2017). The sociocultural theory has been studied extensively and applied to the modern distance learning environments (Garrison & Cleveland-Innes, 2005). Many researchers have sought to analyze DE through this lens. One such example, often cited as supporting the design and implementation of DE programs, is the Community of Inquiry (CoI) model (Choo et al., 2019; Harrel & Wendt, 2019; Junus et al., 2021; Smadi et al., 2019).

The CoI model is based on the social constructivist learning theory, specifically for the online learning environments (Garrison et al., 1999). It serves as a framework for the design and execution of DE programs through the perspective of constructionist collaboration (Rockinson-Szapkiw et al., 2016). The CoI model is based on the concept that in order for effective outcomes for learners in an online environment, social presence must be present. Kaufmann & Vallade (2020) highlighted that social presence is essential and strongly correlated with students' sense of social belonging to their group of online peers. It is primarily the idea that a person perceives other people in an online environment as actual, real people rather than just some kind of unknown entity, while at the same time a person projects themselves as a real person and feels that they are recognized as such (Garrison & Arbaugh, 2007). Social presence is demonstrated by emotional expression, including humour and sharing personal details, and open communication where others are respected and recognized (Garrison et al., 1999). One way to achieve this is by recognizing and projecting personality, which can be achieved in various ways. For instance, a person might share personal details or viewpoints, express something humorous, express an emotional response, recognize the ideas or contribution of another person or engage in reciprocal exchanges (Garrison et al., 1999). Furthermore, social presence can also be described as the sense of community and connection that learners feel in the online environment. This is the cohesiveness of a group, indicated by a sense of belonging of the members and commitment to one another (Picciano, 2019).

Considering the important of social presence for student success in DE, the present study aims to identify different asynchronous discussion strategies from the literature and explore ways on how they can used individually or together to improve social presence experienced by learners.

Discussion in Online Education

Two primary types of discussions in distance education are asynchronous and synchronous discussions. Synchronous discussions are live discussions where each person comments and replies to others in real-time through web conferencing programs like Zoom and Adobe Connect. Asynchronous discussions are not live and take place over time, such as forum discussions on message boards. In these discussions, students post and reply at their own pace. These discussions are a common part of course design for online learning to increase learning engagement (Truhlar et al., 2018; Wollerton, 2018). DE students need a positive and flexible environment to comfortably interact (Shim & Lee, 2020), and asynchronous discussion forums are this type of place where a learning community can develop (Peterson et al., 2018). These discussions allow learners to interact with one another at their own pace, access each other's ideas and provide a space for quieter or more shy students to participate (Dzubinski, 2014). Many studies have found stronger measures of social presence in classes where students had more ability to communicate through asynchronous discussion boards (Kumi-Yeboah et al., 2017; Phirangee, 2016; Yen et al., 2019). Furthermore, posing the correct discussion prompt is crucial for social knowledge construction (Bollinger & Martin, 2018).

New tools and technology that allow novel communication methods do not automatically create quality and meaningful online learning experiences. Instructional designers must think carefully about how to best create and structure their course content to ensure positive learning outcomes and nurture social presence. This is a growing need emphasized in peer-reviewed studies regarding detailed approaches that teachers might follow to foster and promote a sense of social connection in online classes (Sun & Chen, 2016). Phirangee et al. (2016) expressed the need to identify and use different discussion strategies effectively to develop a social presence for online classes. Others have emphasized the importance of peer and instructor contribution in online discussions to improve social presence (Baran & Correia, 2009; Clarke & Bartholomew, 2014). Several studies have highlighted the need for which types of learner interactions distance learners prefer and should engage in (Phirangee, 2016).

Regarding the initial prompt in online discussions, only a few studies have investigated the role the prompts play (Richardson et al., 2013). A literature review of the different strategies for discussions resulted in identifying six different asynchronous discussion types. Studies in the literature supported each as being successful and contributory to sense of community and connection, fitting the sociocultural theory and supported by the CoI model. The aim of the present study is to help and inform instructors and instructional designers on how different discussion strategies can be used to design effective asynchronous discussions and improve students' sense of social presence.

Asynchronous discussion strategies in online education

Problem-based solutions. Students in online courses develop a greater connection to one another if they are assigned group work, especially if they have to work together toward solving a common problem. These prompts resulted in students working collaboratively and had a positive impact on open communication between the participants and group cohesion (Saqr et al., 2020). Previous research stressed that students show higher levels of interaction and knowledge construction when working together to solve a problem (Lan et al., 2012; Zydney et al., 2012).

Audio recording. For this type of strategy, students or teachers can respond to discussion posts with audio rather than a text message. This strategy has been found to increase the presence of whoever recorded the message as the listener hears the tone of the recording ((Hoffman-Longtin, 2019). Filius et al. (2019) reported an positive response to the use of

audio feedback in their study, and stated that students felt audio feedback was constructive and engaging and more personal than written feedback. Ching and Hsu (2013) on a study of the use of VoiceThread for asynchronous discussions reported that students were better able to communicate emotion and personality and thus were more connected to their peers

Teacher facilitation. In this type of strategy, the instructor is involved in the discussions by asking questions and prompting students and keeping learners on task. In one study, students reported that it could become frustrating and demotivating when their peers didn't stay on topic in their notes and went off on tangents. In this case, having a teacher keep the discussions on topic was regarded as beneficial to ensure meaningful discussion (Phirangee, 2016). Song and McNary (2011) identified that a class learning community really developed in the online discussion forums as the learners were able to interact with each other and the course content, but also with their teacher, to construct knowledge.

Peer facilitation. Like teacher facilitation, with peer facilitation, one set of students is chosen for the role of facilitator, and their task is to elicit responses from their peers through questions and challenging their opinions. Chan et al. (2009) found that learners may be more comfortable in an online discussion when it is an equal peer rather than the instructor facilitating the discussion. Previous studies have found peer facilitation to lead to higher participation and activity in discussions and generally enhances social presence (e.g., DeNoyelles et al., 2014). In addition, peer interactions not only impact peer interaction and individual performance, but also broaden the interaction in the class (Swain et al., 2022)

Debate. In a debate discussion, students assume positions either for or against something or assume different perspectives and argue from their perspective. Darabi et al. (2011) found that students exhibited a high level of social integration when they had to debate each other. Previous research stressed that students engaging in debates allow extended reflection times, enhances learning confidence and promote interaction between students (Zhu, 2021). Even though there are previous research studies on debate as an instructional strategy, there is a need for more research in online settings (Mitchell, 2019).

Personal experiences. In this discussion, students are encouraged to share personal experiences that relate to the topic and connect them with each other and with the course content. Sharing personal experiences have been identified as a way to encourage interpersonal exchange between learners, help them get to know each other, encourage participation and successfully promote social presence in online learning (Bassani, 2011; Molseed, 2012). Sharing personal experiences can allow learners to have additional time to reflect on other students' ideas, integrate their own experiences, connect others' ideas and promote more in-depth discussions between students (Carrillo & Flores, 2020).

Study Purpose

The number of DE programs and courses are growing. Graduate students and professionals especially prefer asynchronous distance courses due to time and cost efficiency. DE courses offer flexibility in terms of schedule, location, and instructional strategies (Martin et al., 2020). However, these flexibilities come with some limitations in terms of interaction and sense of belonging. With growing interest in DE, there is a growing interest in how to improve opportunities for interaction and social presence in DE. Therefore, the current study was designed to investigate different asynchronous discussion strategies in the literature and apply them to an online post-graduate class to explore the students' experience with different asynchronous discussion strategies. With clearly researched and established discussion strategies, a step forward can be taken in addressing the issues of lower levels of student interaction and performance, which are remarkably common in distance education. This study seeks to address the following research

question: What are students' experiences of six different types of asynchronous discussion strategies in terms of social presence in an online graduate class?

Significance of the Study

As distance education continues to become more prevalent, the need for clearly established strategies and techniques that educators and administrators can use to achieve positive experiences and learning outcomes also is becoming greater. This study seeks to contribute to literature regarding distance education by exploring the social presence that results from different asynchronous discussion strategies. As asynchronous discussions are a very common component of online courses, especially in higher education, the findings of this may provide practical implications for educators (DeNoyelles et al., 2014). It is the hope of the researcher that educators may use the findings of this study to better design their asynchronous discussions to be more engaging for students, to help them connect with each other more and build a stronger sense of community, overcome isolation as well as reduce dropout, and to better engage their critical thinking faculties. Moreover, this study was carried out so to inform further areas of research as there is a need for studies that have explored different types of asynchronous discussions and their effects on the students' social presence (Phirangee et al., 2016; Sun & Chen, 2016).

METHOD

The present research aims to understand graduate students' phenomenological experiences of different asynchronous discussion strategies in an online graduate class. Valle et al. (1989) described the phenomenological design as the one where the experience of the person exists non-separately and as an interaction of multiple people. Phenomenological studies describe a phenomenon (e.g., the experience) from the perspective of people involved (Welman & Kruger, 1999). This design is subjective in nature and aims to understand lived experiences of the graduate students in online asynchronous discussions.

Participants and Setting

The study was conducted at a private university in Turkey. Data was collected from graduate students in an online class in the field of educational technology. There were fifteen students in the class, and twelve participated in the study. Eight of the participating students were master's degree students, and four were doctoral students. All students were teachers by profession. Ten of the participants were Turkish, whilst one was Moroccan, and one was Iranian. Of the twelve participants, half had no experience with courses that incorporated online elements before this course. Two of the participants were male, and the remaining ten were female. The age range of the participants was between 25 to 41 years old. All the participants were advanced-level second language English speakers.

The researchers were the primary instructor and the teaching assistant for the course. All course materials were posted on a learning management system (LMS). The assignments were submitted through LMS, and the online discussions took place on this platform. The course lasted fourteen weeks in total, and the class was delivered in English.

Implementation of the Strategies

Each week following the online class, the students were assigned readings in advance for the following week's class posted on the LMS. After the students read their assigned course material, they were required to take part in asynchronous online discussions in some weeks as part of their course work to reflect on the material and exchange ideas

and viewpoints. The instructions for each discussion were posted on the LMS, including the due dates for the different phases of each discussion. These discussions constituted a total of 12% of their final grade for the course.

Description of activities

For the six discussion types, six different instructions were written on the corresponding week's discussion forum on the LMS. The researchers explained each discussion to the students in the space of two to three minutes at the end of class in the week before each discussion was due to take place.

Problem-based solution. In week 4, the problem-based solution strategy was employed. Along with the regular weekly reading materials, another resource was added to the LMS for the students to cover. This was a document giving a scenario and a problem for the week related to the weekly topic. Students were instructed to work in a group to find a solution for the problem outlined in the scenario. The students were asked to work in groups of three students, and these three members posted in a single thread for the group. Group members were not pre-assigned. Anyone could start a new post; then the following two new members should join the existing discussion until they were in a group of three. Following this, the next student who wanted to do their discussion should start a new group. They had no set number of posts but rather were to post as many times as necessary to reach a consensus on how to deal with the problem posed in the scenario.

Audio recording. In week six, the audio recording discussion strategy was employed. For this week's discussions, students were asked to post the recordings of their voices rather than being typed out. Furthermore, the instructions stated that any further responses for the author of the primary post to response posts should also be voice recordings.

Teacher facilitation. In week seven, the teacher facilitation discussion strategy was used. For this discussion, the students were asked to write primary posts. However, they were told that primary posts need not be as long or detailed, as the focus of the week's discussions was to have a more interactive discussion. With that in mind, students were asked to write at least four response posts and to try to continue discussions. They were also informed that their instructor would be taking part in the discussions for the week. In that week, the instructor and the teaching assistant went through all the discussions and participated in at least one post in each discussion, attempting to ask questions to further stimulate discussion or get students to consider different perspectives.

Peer facilitation. In week eight, the discussion followed the peer facilitation strategy. Three phases were included in the instructions for the discussion. First, students were expected to write a primary post as normal, summarizing the week's materials writing their related thoughts and questions. Second, the students were to write a single response post. To ensure that every student's post received a response, they were asked to respond to primary posts that other students had not yet written a reply. In this response post, students were asked to assume one of two positions. They could choose to take a challenging stance, where they would question the position of the writer of the primary post and try to have them consider a different viewpoint. Alternatively, they could assume the role of questioner, trying to elicit further in-depth thinking about some aspect of the primary post by asking insightful questions. For the final phase of the discussion, the authors of the primary posts were asked to write a further response to the challenging stance or insightful questions asked by other students. This was the minimum requirement, and students were free to continue discussions with further posts if they chose to.

Debate. In week nine, the students engaged in a debate. Students had weekly reading material as usual and were asked

to respond to a debate prompt included in the discussion instructions on the LMS relating to the week's topic and materials. Furthermore, the debate instructions included set positions that students were to assume based on different theoretical perspectives. They were asked to argue for their views and against the other perspectives. Similar to week four's problem-based solution discussion, students were instructed to work in groups of three. They were not in pre-assigned groups. They were encouraged to join an existing debate thread if one did not have three students yet, or to start a new debate thread.

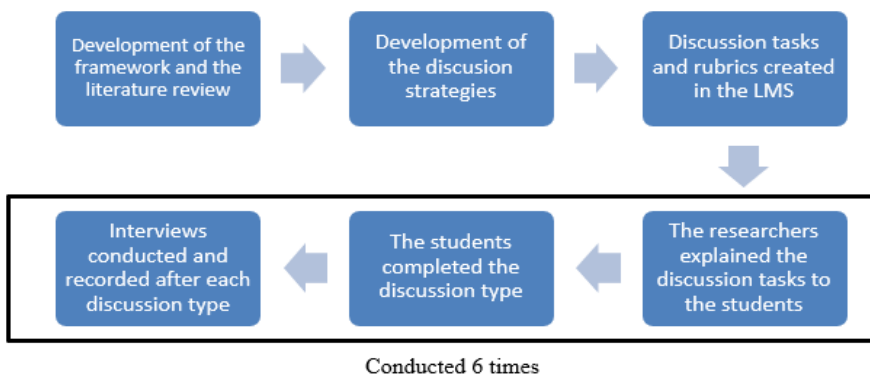
Personal experiences. In week eleven, the discussion's focus was on sharing personal experiences. The students had a single primary post they were to make in a new thread and a minimum of two response posts they had to make on their classmates' posts. However, the difference was that students were asked to share a personal experience they had had in their primary posts, which related to the week's assigned materials. Furthermore, they were asked to do the same on the secondary posts, writing about similar experiences that they had had to those written by their classmates in their primary posts.

Data Collection

At the beginning of the semester, the instructor explained to the students that they would need to cover the assigned material and take part in asynchronous discussions. He gave the students instructions on what he expected from the discussions and pointed them towards the instructions on the LMS for the discussions.

At the end of the first class, the researchers asked the students' consent to participate in the study. They were informed that the researchers intended to conduct audio-recorded interviews with them after each asynchronous discussion. A series of open-ended interview questions were developed for the purpose of the study, based on the theoretical framework and markers of social presence already established in the literature. For example, the researchers asked the participants about their experience in the latest discussion and how they felt expressing themselves. After each specific discussion strategy, the researchers started the semi-structured interviews with the same questions but with some changes in the follow-up questions. Each interview was recorded. Figure 1 represents all the stages of the study.

Fig. 1 Study Phases



Data Analysis

In order to draw out information that was relevant to the research question, all the interviews were first transcribed verbatim and then uploaded to NVivo qualitative data analysis software. Verbatim transcription was used to ensure the trustworthiness of the analysis of the research data when converting the audio recordings of each participant's interview into text form. In order to accomplish this as effectively as possible, the researchers checked each other's transcriptions, listened to the recordings of the interviews that were unclear several times over to best determine the words spoken. Data were analyzed using thematic analysis using the following states: (a) familiarization with the data, (b) initial coding, (c) searching for themes, (d) reviewing themes, (e) defining and naming themes, and (f) reporting (Braun & Clarke, 2006).

Trustworthiness and Limitations

Member checking was employed to ensure trustworthiness (Creswell & Miller, 2000). In order to accomplish this, the verbatim transcripts of each interview and the results were sent to the participants in order to check that they accurately represented the viewpoints of the participants. Furthermore, the researchers sought to increase trustworthiness by using an audit trail throughout the study procedures (Creswell & Miller, 2000). In this process, detailed notes were kept at each stage, especially in the analysis process. This allowed a greater degree of clarity and reflection in the coding process and a constant comparison of data with previously coded concepts. Moreover, two researchers checked the inter-rater validity of the codes that emerged from the data.

Regarding the limitations, none of the participants were native English speakers. While all had a strong enough grasp of the English language necessary to read and write academic articles, none were perfectly fluent to the equivalent level of a native. Another limitation of the study was the number of participants. The class only had fifteen students enrolled, and twelve of these took part in the discussions and agreed to be included in the study. Furthermore, even though the study aims to understand the participants' experience in asynchronous discussions with regards to social presence, the students also had chance to meet in synchronous meeting via an online conferencing tool and this may influence their experience in the discussions.

FINDINGS

The purpose of the research was to explore the implementation of different types of asynchronous discussion strategies in an online graduate class. In addition to commenting directly on weekly discussion strategies, the participants also made remarks on the overall asynchronous side of the course, such as comparing the different types of discussion strategies and giving their opinions on what worked well and what did not. They also shared how factors like scheduling and time limitations were important for the quality of the discussions.

Problem-based Solution

In this strategy, the students had to work together to reach a consensus regarding a given scenario with a stated problem. The findings revealed that this strategy encouraged the students to interact with their peers. For instance, Participant-10 shared: "It makes you talk to each other more and really check the other's comments to see what they were thinking before writing a reply." Participant-1 also expressed: "It really forces you to make comments." Having to come to a common solution meant that a certain amount of back-and-forth discussion was necessary. Due to the nature of the task, the students encouraged each other to work together rather than just sharing their own thoughts. This is demonstrated

in Participant-6's comment: "I was writing to (Participant-5) – ok let's check, and you write your comments. I asked (Participant-7) what are you thinking, why don't you add something. I was encouraging them to write." As well as being highly interactive, this discussion type also led the students to develop solutions to given problems in a collaborative problem-solving experience: "We needed to share our ideas to make a solution together" (Participant 4), and "we couldn't just think of it by ourselves" (Participant-10). As expressed by Participant-2, the students had to "communicate to work towards a goal." This resulted in feelings of group cohesion by the end of the discussion. "We felt we were really a group. We worked as a team" (Participant-6).

While there were strong positive indicators of social presence from the comments, not all of the experiences could be described with collaborative interaction. A second theme was a failure to connect between groups. As previously discussed, the problem-based solution discussion strategy did encourage team building and collaboration. Unfortunately, this sense of connection did not seem to extend outside the direct groups of three. As Participant-12 explained: "We didn't really connect with other groups since we didn't need to do anything in their discussions." Due to the setup of the discussion activity, there was nothing motivating the learners to look at what was going on in the other group's discussions. Some expressed regret in not being more connected with other groups, as Participant-3 commented: "We didn't get a chance to respond to the ideas we liked from other students." This statement meant that the discussion did not have a positive effect on the overall sense of community in the class. This was exemplified by a statement from Participant-2: "We were in our own bubbles for this one" when referring to this discussion type.

Audio Recording

For the audio recording strategy where students posted using recordings of their voices, the main theme was recognition through open communication. Participant-11 explained her experience: "when you hear someone speaking, it's more personalized." Participant-8 stated that "people write in an academic way, and it all feels similar, but when they are speaking, they are different." The students articulated how recognition of differences in individual voices helped them to know between people more clearly than their writing styles. Although mentioned less frequently, some students found audio increased both humour, ("they made a few funny jokes," Participant-3) and gave more feeling ("voices give more feeling," Participant-7) to the posts.

As well as having a positive influence on personal projection, the discussion also allowed for effective communication between the students, and they understood each other's ideas clearly. For example, Participant-1 stated, "When I listen to my classmates, I can understand their emphasis better from their voices." They also found audio communication more comfortable and enjoyable. Participant-3 said, "it's easier to listen to each person. It's more convenient," and Participant-5 expressed, "I love hearing some voices." The audio discussion was clearly an enjoyable way to communicate for the students.

Teacher Facilitation

In this strategy, the course lecturer and the teaching assistant took part in the discussions, mostly through asking questions to facilitate them. When the students were asked about their experiences, they shared that they had to put more effort into their communications. Participant-7 said: "Since the teacher put a comment on the post, it was more motivating to write more." Many stated that they feel the responsibility to continue the conversation. For example, Participant-1 shared: "The questions were directly asked the student rather than just being general questions that anyone could answer, so I felt that I should answer." This shows how the instructor facilitating the discussions caused students

to feel that they were directly being recognized and responsible to respond. This motivation continued just beyond directly responding to the instructor's prompts. As Participant-11 explained: "The questions were thought-provoking, and they led to more responses and discussion." The students felt that overall participation was higher for the week than usual: "People were posting more because they felt connected and involved rather than just doing a passive task" (Participant-2).

As well as a general increase in the quantity of discussion, some felt that the instructor's involvement increased the quality of the discussions. Several students mentioned higher motivation to respond to the comments. Participant-1 said: "the questions gave me the courage to answer them, or even if I didn't know answer to the questions, I researched about it." The findings revealed that the students were encouraged to collaborate and learn more with the instructors' involvement by asking questions in the discussions. Participant-5's statement explicitly supported this finding: "the questions were interesting, and we could also read a lot of interesting answers and learn something extra."

Peer Facilitation

Peer facilitation was the strategy where students adopted the role of a questioner or took a challenging stance in order to facilitate the discussions. During the interviews, the students expressed how this particular strategy facilitated discussions. This was similar to teacher facilitation. Asking direct questions to particular people was employed, and this created an inclusive feeling for the students, rather than general questions being asked in other discussions for anyone to respond to. For instance, Participant-9 stated that "everyone was included in the discussion because our friends asked us questions directly." Participant-10 supported the same idea: "the questions definitely gave you more of a chance to reply more and take part." One way the discussion was different from the previous weeks was in the openness of the communication. Participant-2 shared: "We feel a bit more relaxed and friendly," referring to the fact that they were being asked questions by a peer rather than an authority figure. Participant-4 stated that the discussion was "friendly conversations like debating the issue with your friends." This type of communication meant that students felt relatively relaxed, and they were able to share their opinion and reflections more freely.

Again, similar to teacher facilitation, the students also expressed that they shared a lot of ideas and learned from each other, though this was expressed to a greater degree for peer facilitation. Participant-4 shared how looking at the posts of their peers helped them to learn different perspectives: "I learned the perspectives that I didn't think of before that." Participant-7 said, "We helped each other to see the topics more in-depth," indicating a co-exploration of the issues and that social knowledge construction was taking place during the discussions. This was further supported by several students stating that they read the opinions and thoughts of their peers before writing their own posts in the discussions. For instance, Participant-10 stated: "Before I wrote my own post, I looked at some other questions and tried to include some of the ideas they used."

The second theme was the recognition of individual thinking. The students expressed how this type of discussion gave insight into others. Participant-6 shared: "When we ask questions, especially it shows what someone thinks, through the question." Participant-8 expressed how the discussion "showed differences in the way some people were thinking." These excerpts demonstrate that the students were able to understand more about their peers and their way of thinking through this discussion. Furthermore, the students were able to give their "personal opinions and concerns about different subjects" (Participant-2). This indicates that not only were students comfortable sharing their own private opinions about topics, but they were also doing the discussion in a way that revealed something about themselves.

Debate

Discussions for this week began with a scenario in which each student took a different theoretical position and debated each other based on their experience. For this week's discussion, the students expressed that the debate strategy allowed them to share their personal experiences. Participant-5 stated: "We had to defend theory with our personal teaching experience." Participant-6 stated a similar opinion: "We had to think about the different ways we do it in our classroom." These excerpts demonstrated how the students were able to share some of their own knowledge and experience regarding teaching and use them to defend their opinions in the discussions.

The students also defined this as a collaborative experience. For example, Participant-11 articulated: "We were supposed to reach an agreement, so we had to work together towards that." As in the problem-based solution week, having a required end goal for the discussions fostered a certain degree of teamwork. Participant-3 stated how this made the discussions more interactive, as "we couldn't just post and leave it, we had to read and respond." This refers to how the nature of the debate ensured that students had to engage with the others in the discussion in a reciprocal exchange.

Differences in opinions and perspectives were also reported as an important feature of this discussion type. Participant-1 explained how this discussion type encouraged the students to share diverse opinions: "This discussion gives us a format to say something different from each other." This was also echoed by Participant-4: "Of course, we have to talk from different angles because that's a debate!" The adoption of different theoretical perspectives allowed some students to gain some perspectives on the personalities of their peers. For instance, Participant-12 explained: "We could see how their personality is and what kind of teacher they might be."

Personal Experiences

During the discussions for this week, the students were encouraged to share any real-life incidents that they connected to the week's materials. The students shared that this discussion strategy helped them to understand each other's experiences and opinions. For instance, Participant-9 shared that "the experiences other teachers had let [them] get some insights into them." Participant-12 also stated how it gave them a "deeper understanding" of their classmates and their personalities. This concept also made itself evident in the interviews when the participants discussed how they related to the personal stories told. Participant-8 shared his peer's common experience in a personal story: "One of my friends had a similar experience to me from what I read in her post, so we shared the same issue together." Others made similar comments about recognizing certain elements of the personal stories of other classmates, which prompted them to engage more with those students. Participant-1 expressed the engagement: "I ended up responding to ones that I am connected with." This shows how the personal experiences fostered an emotional connection during the discussions and also a mutual awareness of others.

The interviews also revealed a high level of participation in the personal experience discussions. For instance, Participant-10 clearly expressed the theme: "I think you feel like responding more when you connect more with each other." Moreover, the students mentioned that the personal experience discussion type helped them to feel a greater level of community in the course. One example of this was: "you felt that you were not alone in your situation; other teachers were also going through the same experiences and having the same problems" (Participant-5). The comments seemed to indicate that this discussion type was leading to feelings of less isolation and more connection between students.

DISCUSSION

In this section, the findings of the current research are discussed in depth. The aim of this study is to provide a better understanding of how different asynchronous strategies affect the sense of community and social presence.

Opportunity for Collaboration

Having opportunities for collaboration have an important impact on students' social presence and sense of community in online education (Wendt & Rockinson-Szapkiw, 2015). The findings suggest that all the discussion strategies allowed some level of collaboration; however, the findings suggest that the problem-based solution allowed more collaboration opportunities for the participants. Aligned with the present study findings, high levels of collaboration and social construction of knowledge were reported in the literature using problem-based discussions. The problem-based discussion strategy successfully promotes collaborative working and group cohesion (Kristianto & Gandajaya, 2022). Having a common goal motivates the students and helps them to work together collaboratively to solve it. This demonstrates how this discussion type goes beyond individual ideas and encourages social knowledge construction (Kassymova et al., 2020). In particular, problem-based learning activities significantly promote sharing ideas while working together towards a solution (Simamora & Manurung, 2021). This recognition of the contribution of others and shared creation are strong indicators of social presence (Garrison et al., 2000). The emphasis on teamwork was another important finding in this strategy; however, this may not provide a much greater sense of community as students do not need to interact outside their groups. Cobb (2009) defined social presence as a sense of cohesiveness as well as a commitment to one another. The findings suggest group-only interaction as a lack of cohesiveness and students in online education need opportunities to interact with the class as a whole.

Personalized Experience

While different researchers have described many different aspects of social presence, perhaps the core in the CoI model is the recognition of others and projection of self as real people (Garrison & Arbaugh, 2007). This theme reflects how the aspect of social presence has clearly been developed through the audio recording (Ice et al., 2007; Hew & Chung, 2013). This experience was unique in the audio recording strategy as it allowed the students to hear each other and project their personalities (Hoffmann-Longtin, 2019). Both humor and feeling are especially important to accomplish this (Kim, 2005). Students find it easier to express themselves through the medium of audio as compared to writing (Ching & Hsu, 2013). As the text discussion was a less rich medium of communication, the extra cues in verbal communication helped students understand each other more clearly (Kim, 2005).

Even though it was expected to be a personal experience, the findings suggest that the debate strategy does not create such a context and support social presence in online courses (Liu & Yang, 2014). The findings on social presence are somewhat inconclusive, and this may be due to the topic of the discussion and the lack of participant roles in the debate discussions. The instructor's guidance and the students' workload (an issue unforeseen by the researchers) at that period of the semester seem to influence the quality of the debate discussion (Hoskins, 2012). The key lesson from this week's discussion was that course designers must think carefully about their discussion prompts and protocols, and the design of the discussions (e.g. topic, timeline) (Zydney et al., 2012), and use different strategies at different points in their courses (Darabi et al., 2011).

Feeling of Responsibility

Teacher and peer presences in the teacher and peer facilitation activities motivated students to continue the discussions, research more and examine ideas to a greater depth. Teacher facilitation (Darabi et al., 2011; Phirangee, 2016) and peer facilitation (Chan et al., 2009; Cobb, 2009) created a greater level of participation than other strategies. Song and McNary (2011) argued that teacher facilitation is necessary for social knowledge construction in online discussions. However, the findings suggest that the social construction of knowledge is possible without a teacher's presence. Peer facilitation strategy helps learners to be more comfortable with sharing ideas and viewpoints and increases participation (Hew & Cheung, 2010; Oh & Huang, 2018). On the other hand, having the instructor facilitate the discussions help to create stronger social presence. However, this may be time intensive for the teacher and might not always be feasible. Therefore, the researchers recommend that instructors act to facilitate discussions as often as possible by prioritizing the first few online discussions to help develop a sense of community early in the course. Implications for course design could therefore be to use peer facilitation as often as possible where feasible, like teacher facilitation. Instructors could try to model good moderator behavior nearer the start of the course and then have students take over the role once they understood the role. More research is needed on how much and in what contexts moderation is necessary from instructors and what roles peers should play in peer facilitation activities (Baran & Correia, 2009; Clark & Bartholomew, 2014).

Open Communication

Open communication, the recognition of the contribution of others, learning from others, and shared discovery were significant indicators of social presence (Garrison et al., 2000). The findings suggest that peer facilitation and personal experiences were the two primary strategies that allow and encourage open communication between the students. When the participants were interviewed regarding their perceptions of the personal experience strategy, they expressed how this discussion helped them get to know more about each other. Peer facilitation also allowed some students a greater sense of freedom in their communications (Oh et al., 2018). In addition, the students described experiences of exploring different ideas from their peers, seeing things from different perspectives, and learning together. They were recognizing different perspectives in each other through the discussion, which resulted in an increase in the social presence (DeNoyelles et al., 2014).

The findings suggest open and easy communication and high levels of participation in these two strategies. Peer facilitation and personal experiences are connected, and communal activities positively affect social presence (Bassani, 2011; Molseed, 2012). It is especially important to allow and encourage students to share personal experiences during any appropriate type or topic of a discussion activity (Gallagher-Lepak et al., 2009).

CONCLUSION

These findings take a step forward in addressing the problems of isolation, poor student experiences and unsuccessful learning outcomes in distance education. They indicate the potential strengths and weaknesses of the six different discussion types in terms of their effects on social presence. Overall, students were very positive about their experiences with the varied discussion strategies in terms of general enjoyment, social connection and cognitive engagement.

The findings indicated that small group task discussions with set goals are good for developing teamwork within the group but are limited in that they do not create a sense of community for the class as a whole. Furthermore, the expectations and roles in such discussions must be clearly defined for a beneficial discussion to occur, and the topic must be chosen

carefully. Moreover, the current study supports previous literature findings that the use of audio in discussions is an effective way to develop social presence. Furthermore, teacher facilitation encouraged more quality communication while peer facilitation more open and relaxed communication.

A limitation of the findings for social presence is that students got to know each other better and became more familiar with using online discussion forums as the course progressed. It has been shown in previous literature that student posts gradually increase in the amount of cognitively higher-order content as courses progress (Eccarius, 2012). It is also likely that social presence is similarly affected. Therefore, while the final discussion strategy of personal experience produced a strong sense of social presence, this could also have been partially due to its position as the final discussion.

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Ethics Approval: All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

REFERENCES

Allen, I. E., & Seaman, J. (2017). *Digital compass learning: Distance education enrolment report 2017*. https://files.eric.ed.gov/fulltext/ED580868.pdf

Arora, A. K., & Srinivasan, R. (2020). Impact of pandemic COVID-19 on the teaching–learning process: A study of higher education teachers. *Prabandhan: Indian Journal of Management*, *13*(4), 43-56. http://dx.doi.org/10.17010/pijom%2F2020%2Fv13i4%2F151825

Baran, E., & Correia, A. (2009). Student-led facilitation strategies in online discussions. *Distance Education*, *30*(3), 339-361. https://doi.org/10.1080/01587910903236510

Bassani, P. B. S. (2011). Interpersonal exchanges in discussion forums: A study of learning communities in distance learning settings. *Computers & Education*, *56*(4), 931-938. https://doi.org/10.1016/j.compedu.2010.11.009

Blankenberger, B., & Williams, A. M. (2020). COVID and the impact on higher education: The essential role of integrity and accountability. *Administrative Theory & Praxis*, *42*(3), 404-423. https://doi.org/10.1080/10841806.2020.1771907

Bolliger, D. U., & Martin, F. (2018). Instructor and student perceptions of online student engagement strategies. *Distance Education*, *39*(4), 568–583. https://doi.org/10.1080/01587919.2018.1520041

Braun, V., & Clark, V. (2006). Using thematic analysis in psychology. Qualitative Research in Psychology, 3(2), 77-101. https://doi.org/10.1191/1478088706qp063oa

Buelow, J. R., Barry, T. A., & Rich, L. E. (2018). Supporting Learning Engagement with Online Students. *Online Learning*, *22*(4). https://doi.org/10.24059/olj.v22i4.1384

Carrillo, C., & Flores, M. A. (2020). COVID-19 and teacher education: a literature review of online teaching and learning practices. European Journal of Teacher Education, 43(4), 466-487. https://doi.org/10.1080/02619768.2020.1821184

Chan, J., Hew, K., & Cheung, W. (2009). Asynchronous online discussion thread development: Examining growth patterns and peer-facilitation techniques. *Journal of Computer Assisted Learning*, *25*(5), 438-452. https://doi.org/10.1111/j.1365-2729.2009.00321.x

Ching, Y. & Hsu, Y. (2013). Collaborative learning using VoiceThread in an online graduate course. *Knowledge Management & E-Learning: An International Journal*, *5*(3), 298-314. https://doi.org/10.34105/j.kmel.2013.05.021

Choi, H. J., & Park, J. H. (2018). Testing a path-analytic model of adult dropout in online degree programs. *Computers & Education*, *116*, 130-138. https://doi.org/10.1016/j.compedu.2017.09.005

Choo, J., Bakir, N., Scagnoli, N. I., Ju, B., & Tong, X. (2019). Using the community of inquiry framework to understand students' learning experience in online undergraduate business courses. *TechTrends*, *64*(1), 172–181. https://doi.org/10.1007/s11528-019-00444-9

Clarke, L. W., & Bartholomew, A. (2014). Digging beneath the surface: Analyzing the complexity of instructors' participation in asynchronous discussion. *Online Learning*, *18*(3). https://doi.org/10.24059/olj.v18i3.414

Cobb, S. C. (2009). Social presence in online learning: A current view from a research perspective. *Journal of Interactive Online Learning*, *8*(3), 241-254. http://www.ncolr.org/jiol/issues/pdf/8.3.4.pdf

Collins, K., Groff, S., Mathena, C., & Kupczynski, L. (2019). Asynchronous video and the development of instructor social presence and student engagement. *Turkish Online Journal of Distance Education*, *20*(1), 53-70. https://doi.org/10.17718/tojde.522378

Creswell, J. W., & Miller, D. L. (2000). Determining validity in qualitative inquiry. *Theory Into Practice*, *39*(3), 124-130.

Darabi, A., Arrastia, M., Nelson, D., Cornille, T., & Liang, X. (2011). Cognitive presence in asynchronous online learning: A

comparison of four discussion strategies. *Journal of Computer Assisted Learning*, *27*(3), 216-227. https://doi.org/10.1111/j.1365-2729.2010.00392.x

de Oliveira, M. M. S., Penedo, A. S. T., & Pereira, V. S. (2018). Distance education: advantages and disadvantages of the point of view of education and society. *Dialogia*, *29*, 139-152. http://doi.org/10.5585/Dialogia.n29.7661

DeNoyelles, A., Zydney, J. M., & Chen, B. (2014). Strategies for creating a community of inquiry through online asynchronous discussions. *MERLOT Journal of Online Learning and Teaching*, *10*(1), 153-165.

Dzubinski, L. (2014). Teaching presence: Co-creating a multi-national online learning community in an asynchronous classroom. *Online Learning*, *18*(2), 1-16. https://www.learntechlib.org/p/183749

Eccarius, M. (2012). Rubric development to assess student learning through asynchronous discussion board. *The Quarterly Review of Distance Education*, *12*(4), 265–268.

Gallagher-Lepak, S., Reilly, J., & M Killion, C. (2009). Nursing student perceptions of community in online learning. *Contemporary Nurse*, *32*(1-2), 133-146. https://doi.org/10.5172/conu.32.1-2.133

Garrison, R., Anderson, T., & Archer, W. (1999). Critical inquiry in a text-based environment: computer conferencing in higher education. *The Internet and Higher Education*, *2*(2-3), 87-105. https://doi.org/10.1016/s1096-7516(00)00016-6

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *Internet and Higher Education*, *10*, 157–172. https://doi.org/10.1016/j.iheduc.2007.04.001

Garrison, D. R., & Cleveland-Innes, M. (2005). Facilitating cognitive presence in online learning: Interaction is not enough. *American Journal of Distance Education*, *19*(3), 133-148. https://doi.org/10.1207/s15389286ajde1903_2

Garrison, R., Anderson, T., & Archer, W. (2000). Critical inquiry in a text-based environment: computer conferencing in higher education. *The Internet and Higher Education*, *2*(2-3), 87-105. https://doi.org/10.1016/S1096-7516(00)00016-6

Geng, S., Law, K. M. Y., & Niu, B. (2019). Investigating self-directed learning and technology readiness in blending learning environment. *International Journal of Educational Technology in Higher Education*, *16*(1). https://doi.org/10.1186/s41239-019-0147-0

Harasim, L. (2017). *Learning Theory and Online Technologies* (2nd ed.). Routledge. https://doi.org/10.4324/9781315716831

Harrell, K. B., & Wendt, J. L. (2019). The impact of blended learning on community of inquiry and perceived learning among high school learners enrolled in a public charter school. *Journal of Research on Technology in Education*, *51*(3), 259–272. https://doi.org/10.1080/15391523.2019.1590167

Hew, K. F., & Cheung, W. S. (2013). Audio-based versus text-based asynchronous online discussion: Two case studies. *Instructional Science*, *41*(2), 365-380. https://doi.org/10.1007/s11251-012-9232-7

Hew, K. F., & Cheung, W. S. (2010). Higher-level knowledge construction in asynchronous online discussions: an analysis of group size, duration of online discussion, and student facilitation techniques. *Instructional Science*, *39*(3), 303-319. https://doi.org/10.1007/s11251-010-9129-2

Hoffmann-Longtin, K. (2019). Hearing is believing: Using audio feedback in the online interpersonal communication course. *Journal of Communication Pedagogy*, *2*, 96–102. https://doi.org/10.31446/jcp.2019.18

Hoskins, B. J. (2012). Connections, engagement, and presence. *The Journal of Continuing Higher Education*, *60*(1), 51-53. https://doi.org/10.1080/07377363.2012.650573

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and students' sense of community. *Journal of Asynchronous Learning Networks*, *11*(2), 3-25. https://files.eric.ed.gov/fulltext/EJ842694.pdf

Junus, K., Santoso, H. B., & Ahmad, M. (2021). Experiencing the community of inquiry framework using asynchronous online role-playing in computer-aided instruction class. *Education and Information Technologies*. *27*(2), 2283-2309.

https://doi.org/10.1007/s10639-021-10670-5

Kara, M., Erdogdu, F., Kokoç, M., & Cagiltay, K. (2019). Challenges faced by adult learners in online distance education: A literature review. *Open Praxis*, *11*(1), 5-22. https://search.informit.org/doi/10.3316/informit.234110355704611

Kassymova, G., Akhmetova, A., Baibekova, M., Kalniyazova, A., Mazhinov, B., & Mussina, S. (2020). E-Learning environments and problem-based learning. *International Journal of Advanced Science and Technology*, *29*(7), 346-356.

Kaufmann, R., & Vallade, J. I. (2020). Exploring connections in the online learning environment: student perceptions of rapport, climate, and loneliness. *Interactive Learning Environments*, 1-15. https://doi.org/10.1080/10494820.2020.1749670

Keskitalo, T. (2021). Enhancing the sense of community through interaction in a global online course. *Journal of Education and Training Studies*, *9*(2), 32-44.

Kim, J. (2020). Learning and teaching online during Covid-19: Experiences of student teachers in an early childhood education practicum. *International Journal of Early Childhood*, *52*(2), 145-158. https://doi.org/10.1007/s13158-020-00272-6

Kim E (2005). The effects of digital audio on social presence, motivation and perceived learning in asynchronous learning networks. (Doctoral dissertation). ProQuest Dissertations & Theses database.

Koçoglu, E., & Tekdal, D. (2020). Analysis of distance education activities conducted during COVID-19 pandemic. *Educational Research and Reviews*, *15*(9), 536-543. https://doi.org/10.5897/ERR2020.4033

Kristianto, H., & Gandajaya, L. (2022). Offline vs online problem-based learning: a case study of student engagement and learning outcomes. *Interactive Technology and Smart Education*. https://doi.org/10.1108/ITSE-09-2021-0166

Lan, Y., Tsai, P., Yang, S., & Hung, C. (2012). Comparing the social knowledge construction behavioral patterns of problem-based online asynchronous discussion in E/M-learning environments. *Computers & Education*, *59*(4), 1122-1135. https://doi.org/10.1016/j.compedu.2012.05.004

Li, C., & Lalani, F. (2020). The COVID-19 pandemic has changed education forever. This is how. https://www.weforum.org/agenda/2020/04/coronavirus-education-global-covid19-online-digital-learning

Liu, C. J., & Yang, S. C. (2014). Using the community of inquiry model to investigate students' knowledge construction in asynchronous online discussions. *Journal of Educational Computing Research*, *51*(3), 327-354.

Ma, L., & Lee, C. S. (2021). Evaluating the effectiveness of blended learning using the ARCS model. *Journal of Computer Assisted Learning*, *37*(5), 1397–1408. https://doi.org/10.1111/jcal.12579

Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education*, *159*, 104009. https://doi.org/10.1016/j.compedu.2020.104009

McElrath, E., & McDowell, K. (2008). Pedagogical strategies for building community in graduate level distance education courses. *MERLOT Journal of Online Learning and Teaching*, *4*(1), 117-127. https://jolt.merlot.org/vol4no1/mcelrath0308.pdf

McMillan, D. W., & Chavis, D. M. (1986). Sense of community: A definition and theory. *Journal of Community Psychology*, *14*(1), 6-23. https://doi.org/10.1002/1520-6629(198601)14:1%3C6::AID-JCOP2290140103%3E3.0.CO;2-I

Mitchell, E. T. (2019). Using debate in an online asynchronous social policy course. *Online Learning*, *23*(3), 21-33. https://doi.org/10.24059/olj.v23i3.2050

Molseed, T. (2012). An analysis of peer review response types in threaded discussions of an online graduate class. *Computers & Education*, *49*(2), 254-267.

Moore, R. L. (2014). Importance of developing community in distance education courses. *TechTrends*, *58*(2), 20-24. https://doi.org/10.1007/s11528-014-0733-x

Oh, E. G., Huang, W. H. D., Hedayati Mehdiabadi, A., & Ju, B. (2018). Facilitating critical thinking in asynchronous online discussion: Comparison between peer-and instructor-redirection. *Journal of Computing in Higher Education*, *30*(3), 489-509.

https://doi.org/10.1007/s12528-018-9180-6

Palvia, S., Aeron, P., Gupta, P., Mahapatra, D., Parida, R., Rosner, R., & Sindhi, S. (2018). Online education: Worldwide status, challenges, trends, and implications. *Journal of Global Information Technology Management*, *21*(4), 233-241. https://doi.org/10.1080/1097198X.2018.1542262

Peterson, A. T., Beymer, P. N., & Putnam, R. T. (2018). Synchronous and asynchronous discussions: Effects on cooperation, belonging, and affect. *Online Learning*, *22*(4). https://doi.org/10.24059/olj.v22i4.1517

Phirangee, K. (2016). Students' perceptions of learner-learner interactions that weaken a sense of community in an online learning environment. *Online Learning*, *20*(4). https://doi.org/10.24059/olj.v20i4.1053

Phirangee, K., Demmans Epp, C., & Hewitt, J. (2016). Exploring the relationships between facilitation methods, students' sense of community and their online behaviours. *Online Learning*, *20*(2). https://doi.org/10.24059/olj.v20i2.775

Picciano, A. G. (2019). Beyond student perceptions: Issues of interaction, presence, and performance in an online course. *Online Learning*, *6*(1). https://doi.org/10.24059/olj.v6i1.1870

Raza, S. A., Qazi, W., Khan, K. A., & Salam, J. (2021). Social isolation and acceptance of the learning management system (LMS) in the time of COVID-19 pandemic: an expansion of the UTAUT model. *Journal of Educational Computing Research*, *59*(2), 183-208. https://doi.org/10.1177/0735633120960421

Ragusa, A. T., & Crampton, A. (2018). Sense of connection, identity and academic success in distance education: sociologically exploring online learning environments. *Rural Society*, *27*(2), 125–142. https://doi.org/10.1080/10371656.2018.1472914

Richardson, J., Ertmer, P., & Sadaf, A. (2013). Relationship between types of question prompts and critical thinking in online discussions. In Educational Communities of Inquiry: Theoretical Framework, Research and Practice (pp. 197-222). IGI Global. https://doi.org/10.4018/978-1-4666-2110-7.ch011

Rockinson-Szapkiw, A., Wendt, J., Whighting, M., & Nisbet, D. (2016). The predictive relationship among the community of inquiry framework, perceived learning and online, and graduate students' course grades in online synchronous and asynchronous courses. *The International Review of Research in Open and Distributed Learning*, *17*(3), 18-35. https://doi.org/10.19173/irrodl.v17i3.2203

Rovai, A. P., & Downey, J. R. (2010). Why some distance education programs fail while others succeed in a global environment. *The Internet and Higher Education*, *13*(3), 141-147. http://dx.doi.org/10.1016/j.iheduc.2009.07.001

Saqr, M., Nouri, J., Vartiainen, H., & Malmberg, J. (2020). What makes an online problem-based group successful? A learning analytics study using social network analysis. *BMC Medical Education*, *20*(1). https://doi.org/10.1186/s12909-020-01997-7

Shen, L., & Chen, I. L. (2018). Social presence in online dissertation classes. In I. Management Association (Ed.), *Online Course Management: Concepts, Methodologies, Tools, and Applications* (pp. 1484-1500). IGI Global. https://doi.org/10.4018/978-1-5225-5472-1.ch078

Shim, T. E., & Lee, S. Y. (2020). College students' experience of emergency remote teaching due to COVID-19. *Children and Youth Services Review*, *119*, 105578. https://doi.org/10.1016/j.childyouth.2020.105578

Simamora, D. F., & Manurung, H. M. (2021). The effect of problem-based learning model during pandemic on the thematic learning outcomes of students in elementary school. *Jurnal Basicedu*, *5*(5), 3073-3088. https://doi.org/10.31004/basicedu.v5i5.1242

Smadi, O., Parker, S., Gillham, D., & Müller, A. (2019). The applicability of community of inquiry framework to online nursing education: A cross-sectional study. *Nurse Education in Practice*, *34*, 17–24. https://doi.org/10.1016/j.nepr.2018.10.003

Song, L., & McNary, S. W. (2011). Understanding students' online interaction: Analysis of discussion board postings. *Journal of Interactive Online Learning*, *19*(1), 1-14. http://www.ncolr.org/jiol/issues/pdf/10.1.1.pdf

Sun, A., & Chen, X. (2016). Online education and its effective practice: A research review. *Journal of Information Technology Education: Research*, *15*, 157–190. https://doi.org/10.28945/3502

Swan, K. (2010). Teaching and learning in post-industrial distance education. In M.F. Cleveland-Innes & D.R. Garrison (Eds.), *An Introduction to Distance Education* (1st ed., pp. 67-89). Routledge. https://doi.org/10.4324/9780203860915

Swain, A., Shofner, M., Fagan, W. F., & Marbach-Ad, G. (2022). The relationships between peer-to-peer interactions, group formation, choice of research, and course performance in an online environment. *Journal of Science Education and Technology*, *31*(6), 707-717. https://doi.org/10.1007/s10956-022-10000-5

Truhlar, A. M., Williams, K. M., & Walter, M. T. (2018). Student engagement with course content and peers in synchronous online courses discussions. *Online Learning*, *22*(4). https://doi.org/10.24059/olj.v22i4.1389

Yen, C. J., Bozkurt, A., Tu, C. H., Sujo-Montes, L., Rodas, C., Harati, H., & Lockwood, A. B. (2019). A predictive study of students' self-regulated learning skills and their roles in the social network interaction of online discussion board. *Journal of Educational Technology Development and Exchange*, *11*(1). https://doi.org/10.18785/jetde.1101.02

Yuan, J., & Kim, C. (2014). Guidelines for facilitating the development of learning communities in online courses. *Journal of Computer Assisted Learning*, *30*(3), 220-232. https://doi.org/10.1111/jcal.12042

Wotto, M. (2020). The future high education distance learning in Canada, the United States, and France: Insights from before COVID-19 secondary data analysis. *Journal of Educational Technology Systems*, *49*(2), 262-281. https://doi.org/10.1177/0047239520940624

Zawacki-Richter, O. (2021). The current state and impact of Covid-19 on digital higher education in Germany. *Human Behavior and Emerging Technologies*, *3*(1), 218-226. https://doi.org/10.1002/hbe2.238

Zhu, M., Berri, S., & Zhang, K. (2021). Effective instructional strategies and technology use in blended learning: A case study. Education and Information Technologies, 26(5), 6143-6161. https://doi.org/10.1007/s10639-021-10544-w

Zydney, J. M., DeNoyelles, A., & Kyeong-Ju Seo, K. (2012). Creating a community of inquiry in online environments: An exploratory study on the effect of a protocol on interactions within asynchronous discussions. *Computers & Education*, *58*(1), 77-87. https://doi.org/10.1016/j.compedu.2011.07.009

Valle, R. S., King, M., & Halling, S. (1989). An introduction to existential-phenomenological thought in psychology. In *Existential-phenomenological perspectives in psychology* (pp. 3-16). Springer, Boston, MA. https://doi.org/10.1007/978-1-4615-6989-3_1

Vygotsky, L. S. (1978). *Mind in Society*. Cambridge, MA: Harvard University Press. https://doi.org/10.2307/j.ctvjf9vz4

Welman, J. C., & Kruger, S. J. (1999). *Research methodology for the business and administrative sciences*. International Thompson.

Wendt, J. L., & Rockinson-Szapkiw, A. J. (2015). The effect of online collaboration on adolescent sense of community in eighth-grade physical science. *Journal of Science Education and Technology*, *24*(5), 671-683. https://doi.org/10.1007/s10956-015-9556-6