Social Presence in Technology-Enabled Team Learning Environments

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Abstract Social presence has been identified as one of the key factors in influencing motivation in learning. Social presence helps in increasing interactivity which fosters genuine learning and development of a community of inquiry, development of higher levels of critical thinking, reflection, and problem-solving. An analysis of social presence and lack of social presence emphasizes the need for educators to evaluate the degree of social presence in the online learning environment. Technology affords ways for teams to build interaction within the team and with the instructor. Suggestions for best and promising practices in evaluating social presence in online technology-mediated team learning and methods for increasing social presence are discussed.

Introduction

Social presence can be viewed as student-to-student and student-to-instructor interaction that builds trust and personal connections. In this chapter, social presence is explored from various perspectives with the encouragement of instructors and students to build social presence as a means of fostering optimal team collaborations. Social presence was originally defined in 1976, by social psychologists Short, Williams, and Christie, as the degree of prominence in a conversation by one person during an interpersonal relationship (Biocca et al., 2003). The concept included the quality of the medium of communication, the level of intimacy displayed through expression and emotion, and the technology used to mediate the communication. Since then, definitions and interpretations of the definition of social presence have been continuously revisited by researchers and practitioners. Gunawardena and Zittle (1997) defined social presence as the degree to which a person is perceived as "real" in computer-mediated communication (Kear et al., 2014) and hypothesized that people seek to maintain equilibrium in their interactions (Swan and Shih, 2005). Rourke et al. (1999) expanded on the definition by identifying three elements that

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help define social presence: cohesiveness, affect, and interaction. Tu (2002) further classified social presence into online communication, interactivity, and social context dimensions, and Biocca et al. (2003) defined social presence as the "sense of being with another." Effective social presence has been characterized when one is aware of the ability to access the interactions, interpersonal aspects, and intelligence of others, and has a feeling of connectedness and psychological presence between the communicators (Oh et al., 2018).

Swan and Shih (2005) defined social presence as "the degree to which participants in computer-mediated communication feel effectively connected to one another" (p. 115). Other definitions include "an individual's ability to demonstrate his/her state of being in a virtual environment and so signaling his/her availability for interpersonal transactions" and "the ability of participants to identify with the community, communicate purposefully in a trusting environment and develop interpersonal relationships by way of projecting their individual personalities" (Whiteside et al., 2017, p. 12). Quality interaction is evident when: (a) there is a significant contribution to discussions in a team or collaborative activity, (b) students clearly respond to both peer and instructor prompts and requests, and (c) students appreciate other students' ideas and healthy criticism, and displays of critical thinking. Positive student interactions in technology-enabled team learning environments can further increase student interaction, leading students to take ownership of their learning (Fahy, 2003). Social presence can be with both instructor and peers. The instructor does not always have to be the primary source of student learning support, as peer-to-peer support influences student accountability overall to team performance.

Social interaction may increase student satisfaction in the quality of the course content. However, there are a number of factors that may affect effective use of social presence and student satisfaction, such as: (a) group size in both team and online group discussions (Akcaoglu and Lee, 2016), (b) the level of knowledge in the use of assigned social and online educational platforms, (c) online privacy concerns (Tu, 2002), (d) netiquette, and (e) self-efficacy (Zhan and Mei, 2013). For groups and team interactions to be effective, there is a need for simplicity in the exchanges of information in digital and computer-mediated communication, and the group members must be able to communicate effectively and clearly for increased collaboration (Lowry et al., 2006).

Community of Inquiry Framework

The *Community of Inquiry* (CoI) framework, developed by Garrison et al. (2001), described a dynamic model of social presence for the pursuit of meaningful inquiry in learning. The CoI framework views cognitive presence, teaching presence, and social presence having integral relationships (see Table 1). Cognitive presence is defined as the ability to devise meaning through construction, exploration, resolution, and confirmation of understanding through communication (Garrison, 2007).

Table 1 Examples of social, cognitive, and teaching presence

Elements	Categories	Indicators

Social presence	Effective expression
	  Open communication
	  Group cohesion
		Emoticons
		  Risk-free expression
		  Encourage collaboration

Cognitive presence	Triggering event
	  Exploration
	  Integration
	  Resolution
		Sense of puzzlement
		  Information exchange
		  Connecting ideas
		  Apply new ideas

Teaching presence	Design and organization
	  Facilitating discourse
	  Direct instruction
		Setting curriculum and methods
		  Sharing personal meaning
		  Focusing discussion

Teaching presence is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001, p. 5). Garrison et al. (2001) further explained that teaching presence should involve precipitation and facilitation of learning through sustained and authentic communication. The social development theory helps further increase the significance of social presence in online learning as it states that "social interaction is vital to cognitive development" (Valenzuela et al., 2013, p. 95).

Teams

Early use of the word '*team*' denoted horses pulling together a plough or a stagecoach together. As horses pulled together in the same direction, they moved forward, and if they pulled in different directions, they would not get to the final destination. Hill (2001) defined a team as a group of people who are mutually accountable and have set performance goals and a strategy to achieve those goals. Likewise, Green (2003) defined a team as "a group of people pulling together for a common purpose, which they value" (p. 6). Kozlowski and Ilgen (2006) summarized definitions of teams as "(a) two or more individuals who (b) socially interact (face-to-face or, increasingly, virtually); (c) possess one or more common goals; (d) are brought together to perform organizationally relevant tasks; (e) exhibit interdependencies with respect to workflow, goals, and outcomes; (f) have different roles and responsibilities; and (g) are together embedded in an encompassing organizational system, with boundaries and linkages to the broader system context and task environment" (p. 79). Teams are often composed of individuals with unique knowledge, experience, and expertise which is not a guarantee of success. However, how these individuals work together providing an integrated team response can be a marker toward success (Gabelica et al., 2016). Lumsden et al. (2010) defined a team as a "diverse group of people" (p. 13) and gave some characteristics of a group; "all members help the group to interact and make progress on the task at hand."

Team Learning

Early research of team learning aimed to determine how to teach a large number of students while still maintaining the core values of teaching, which included deep discussions, decision-making, engagement, and feedback. Sibley et al. (2014) found that for a team-based learning to be effective to solve complex real-world problems, the team needs to be balanced, have team members with a wide range of skills, backgrounds, and personal experiences, include a large number of students (5–7), and the members must work together consistently. Team learning success as defined by Hill (2001) identifies four benchmarks to be deemed successful: improvement of skills at the individual level, less confusion or duplication of effort among team members, openness in sharing information and tasks, open communication about success and failures. Michaelson's foundational research in team learning was the impetus for a framework and methodology that promotes team-based learning (TBL).

Technology-Enabled Learning Environments

Technology-enabled learning environments are commonplace in online learning environments. Technology-enhanced learning is a learning process that is supported by technology applications, such as communicative software applications, learning management systems, or production tools. Land and Jonassen (2012) posited that designing a learning environment begins with identifying the goal of learning and creating learning activities and experiences that reciprocate real-world situations.

Social Presence in Online Learning

Social presence in teaching and learning environments can be a challenge to attain. When instructors and online learning environments are designed to allow learners to personalize and customize their social identities, social presence can increase (Shen et al., 2010). Group or team social presence can be affected by the size of the group or team, of which the optimal size is related to the complexity of social interactions that will be occurring. Bertucci et al. (2010) explained the complexity of group size and social interactions with these examples: (a) when individuals work in pairs, there are "two social interactions," and (b) when working in groups of four team members, there are "12 social interactions" to manage. Large groups may be problematic as all members may not be actively engaged in learning. Social loafing, defined by Aggarwal and O'Brien (2008), refers to the behavior that some engage in

when they do not contribute to the group or complete desired outcomes. Social loafing tends to be more prevalent in large teams and can result in reduced effectiveness of team-based learning environments.

Akcaoglu and Lee (2016) further argued that a large team may contribute to attention overload of the team members due to the compounded influence of increased team interactions. Reduced attention affects the development of team cohesion, team morale, and quality of communication. Conversely, smaller teams can result in decreased repetitiveness, increased sense of community, higher-order thinking, and increased learner outcomes. Lowry et al. (2006) espoused other benefits of small teams, such as increased quality of student-to-student communication and an increased willingness of individual students to interact with other team members.

AbuSeileek (2012) reported that groups of two to five students have higher performance than those of six to seven students. Team size influences the members' level of shared social and personal identity, social interactions, and participation for effective team-based learning. Smaller teams are preferable for the increased outcome of quality work and communication (Alnuaimi et al., 2010).

Evaluating Social Presence in Online Team Learning

Evaluation of social presence in online team learning should include user interface, social cues, learning interaction, learning performance, and the constructs of social presence, inclusive of co-presence, intimacy, and immediacy. Zhao (2003) defined co-presence in a technology-based environment as the human-to-human interactions that give "the sense of being together with other people in a technology-generated environment" (p. 445). Positive feelings regarding co-presence contributes to increasing team members' participation and interaction. Social cues and user interface were viewed by Wei et al. (2012) to be significant environmental factors that influence social presence. The user interface evaluates the team members' perception of a learning system and qualities of social cues mediated by the online learning system. Wei et al. (2012) reported that among 552 students, user interface and social cues have a direct effect on social presence ($\beta = .324$, $\beta = .506$), social presence had a direct effect on learning interactions ($\beta = .776$), and learning interactions had a direct effect on learning performance ($\beta = .632$). Implications from this finding highlight the need for online learners to familiarize themselves with the online learning environments and the requirements for successful team learning at the beginning of the learning process. When learners are familiar with the learning environment, this familiarity can increase their transmission of social cues, which in turn increases social presence.

Technology Supports to Increase Social Presence

Technology affords effective ways to increase social presence for digitally mediated team learning. Through video, audio, and whiteboard applications, instructors can purposely design ways to support social presence.

Synchronous Videos

Synchronous video is live video communication. Live video captures what is taking place as it is taking place. Synchronous video is typically viewed through various online platforms such as Zoom, Adobe Connect, the live video function of Blackboard Collaborate, YouTube Live, BigBlueButton in Canvas, Webex, and Teams. The live video platforms can be more expedient and help establish others as being "real" and "there" enabling people to virtually see each other in real-time. Live video contributes to improved engagement and increased instructor presence and supports the development of a community of learning as a result of the inclusion of verbal and nonverbal communication. Typically these live platforms can support the transfer of files and other data that may further foster shared communication.

Due to facial, physical, and other nonverbal clues, the face-to-face discussions are deemed more authentic by students. Clark et al. (2015) further stated that these clues mirror what happens when meeting in the same physical environment. There are immediate social interaction, increased engagement, and participation in team-based learning. For effective team learning when using synchronous video, Clark et al. (2015) indicated that there should be a creation of social space that builds a strong sense of community that includes: (a) establishment of rules and (b) identification of group members ideals and beliefs, and sociability. The environment should build respect and trust between all team members.

Synchronous video interactions can include instruction that explains content or describes learning tasks. Further it can be used for prompt instructor feedback and better student–teacher interaction and communication (Karal et al., 2011; Rehn et al., 2016). In synchronous interactions, the teacher can influence behavioral, affective, and cognitive learning outcomes. The instructor's presence in synchronous video can support an environment where the cognitive and social presence can thrive.

Asynchronous Videos

Asynchronous videos can be described as video-recorded learning content outside of the classroom, prepared by an instructor, adopted from or created by a third party, and administered to learners as pre-class, in-class, or post-class learning content

(Ishak et al., 2020). There are different types of asynchronous videos such as demonstration, learning glass, pen tablet, interview, talking head, classic classroom, digital drawing board (Khan-style), computer coding sessions, whiteboard, and slides (Choe et al., 2019; Chorianopoulos, 2018) (Fig. 1).

Different platforms utilized to share asynchronous videos include: YouTubeEdu and iTunesU or learning management systems (LMSs) such as Canvas and Blackboard. LMSs often offer options to upload or record videos and offer tutorials to guide the instructor in making or uploading recordings. Asynchronous videos can be pre-recorded by the instructor or students and shared with team members to watch at their convenience. Video embedded in asynchronous discussion, known as a voice thread, can foster multimodal discussions and communication to make the online discussion experience more authentic. Pre-recorded lectures were found to increase social presence cues. Video feedback from the instructor affords expression of nonverbal cues, which increases a sense of closeness and effective teaching and learning experiences.

Choe et al. (2019) viewed that effective pedagogy in teaching online is different from face to face interactions, thereby requiring instructors to develop new online teaching skills. These skills may include: (a) developing presentations for an online environment; (b) using cameras and virtual backgrounds, and (c) how to effective use of multimedia resources. Understanding and applying multimedia learning principles (Mayer, 2009) can improve asynchronous video instruction, such as video lectures, which may increase team learning, improve learning outcomes, and students manage cognitive load (Choe et al., 2019). When included in team learning, asynchronous videos help create a balance between the affective, psychomotor, and cognitive domains (Moridani, 2007). Balancing of these domains in teaching helps in increased learner performance. The benefits of asynchronous videos can provide learners with a means to review content.
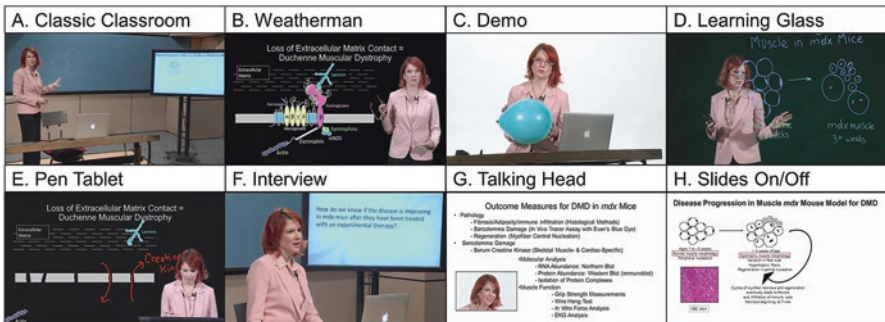

Fig. 1 Types of asynchronous videos (Choe et al., 2019). (**a**) Classic classroom, (**b**) weatherman, (**c**) demo, (**d**) learning glass, (**e**) pen tablet, (**f**) interview, (**g**) talking head, (**h**) sides on/off

Digital Storytelling

Digital storytelling is an instructional approach to build social presence in teams. Shelby-Caffey et al. (2014) identified that digital storytelling told a person's point of view, drew the viewer's attention, and stirred an emotional connection, which increased social presence. It combines images, voice, music (Smeda et al., 2014), video, animation, graphics, and web publishing (Mellon, 1999) to tell a story. It helps to establish a team member or learner as a "real" person. Other educational benefits of digital storytelling with teams include: (a) increased innovative learning and teaching practices, (b) increased learning outcomes, (c) increased learners' motivation, (d) building of constructive learning environments by instructors, (e) facilitate an integrated approach to curriculum development, (f) engage learners in deep learning, and (g) development of problem-solving skills through collaboration and student–student interaction.

Tools to design digital storytelling include (a) Moviemaker (Smeda et al., 2014), (b) WeVideo (Karakoyun and Yapici, 2016), (c) Adobe Slate, and (d) ShowMe Interactive Whiteboard (Leshchenko et al., 2017). When digital storytelling is incorporated in team learning, the team members take active roles and analytical roles integral in the learning cycle. Mendez et al. (2015) report that "when students tell their own stories, they develop a stronger relational integration of theories and contextualize the concepts they learn" (p. 32).

Feedback

Providing feedback is an integral part of teaching and learning (Hennessy and Forrester, 2014). Video feedback has enabled instructors to be more effective in increasing social presence in online learning because they created a sense of closeness with students. Video recordings of evaluation of assignments can contribute to increased understanding of the feedback provided. Video feedback should help the learner view the feedback as part of an ongoing conversation about their learning process (Thompson and Lee, 2012) in synchronous and asynchronous learning. Likewise, audio feedback affords the same opportunity for reflection and may facilitate students reviewing their work at the same time they are listening to the feedback (Olesova et al., 2011).

Social Media Platforms

Social networks increase social learning, communication, and collaborative learning (Rasiah, 2014; Balakrishnan and Gan, 2016). Twitter, Myspace, and Facebook provide just-in-time interactions and are further viewed as useful tools to facilitate communication with learners, effectively manage educational projects, and provide communication platforms for learning (Kim et al. 2018). Wang et al. (2014), in their

research on the use of Facebook to create a social presence in online learning, investigated how students used Facebook for academic purposes. They found that it helped in group formation and facilitation and increase in student–student and student–instructor interactions. For the effective use of social media platforms, the instructors need to understand the learners' social and academic backgrounds to design quality lesson plans and learning assessments (Rasiah, 2014) and incorporate learning theories effectively.

Facebook, the most commonly used site by people of different age groups, has been used as an online team-based learning platform, and it has (a) cultivated positive learning experience, (b) enhanced instructor–student interactions, (c) contributed to facilitating learner relationships, and (d) increased social presence through virtual interactions (Everson, et al., 2013; Rasiah, 2014). Other benefits of social learning platforms include learners' developing team working skills as they create their learning spaces to resolve learning challenges.

Wikis are another online tool for facilitating collaborative knowledge building. Wikis' online recording capabilities trace written interactions, changes, and progress in collaborative work. The adaptation of the different social media platforms influences the education sector's approach toward online learning and teaching. Rasiah (2014) viewed that higher education has provided transformational learning and teaching opportunities through social media platforms. Social learning processes occur as the team members collaborate, connect, and interact with knowledge construction processes.

Conclusion

Social presence is essential for teams working online. There are many ways for instructors to both initiate and increase social presence in the teaching and learning environment, including sending a welcome letter at the beginning of a course of instruction, creating a personalized introduction, providing prompt feedback (Wang, 2010), and scaffolding and engaging with learner comments and interactions (Fahy, 2003). Use of social media applications such as Twitter and Instagram can aid in the sharing of ideas, files, tasks, and screen sharing. Through these tools, students are also able to discuss, negotiate, and clarify ideas promptly to arrive at a final solution (Huang, 2017). Further, synchronous tools such as interactive whiteboards, screen sharing, and video and audio chats can be integral tools for use with pedagogical strategies that maximize the strengths of team-based learning, while minimizing the drawbacks (Gautreau et al., 2012). It is evident that social presence is essential in team-based learning and many factors affect and influence the application of technological applications mentioned to increase social presence, thus affecting the creation and management of meaningful online learning experiences in technology-enabled learning environments.

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