

STRATEGIC TOOLING: TECHNOLOGY FOR CONSTRUCTING A COMMUNITY OF INQUIRY

Penny Thompson, Oklahoma State University

Jane S. Vogler, Oklahoma State University

Ying Xiu, Oklahoma State University

ABSTRACT

The Community of Inquiry (CoI) framework describes online learning as a collaborative process supported by social presence, teaching presence, and cognitive presence, which work together to facilitate critical thinking and learning. The technology used in an online class can facilitate a CoI when its features support, rather than constrain, activities that promote these three elements. Affordance theory provides a starting place for matching technology features to teaching and learning goals. Based on affordances and constraints, we analyzed the use of technology in our online and hybrid courses to evaluate how well our chosen tools supported each CoI element, noting ways in which we might better capitalize on a tool's affordances in future iterations of the course. By sharing our reflections, we provide instructors with an example of how they might apply a research-based framework to their own use of technology in the online environment for more effective course design that better supports student learning.

Keywords: teaching presence, social presence, cognitive presence, technology affordances, community of inquiry, instructional design, online learning, higher education

INTRODUCTION

With over seven million students taking at least one online course (Allen & Seaman, 2014), learning in the online environment is becoming increasingly ubiquitous in education. Although online courses can be advantageous for those students who work full time or live too far from the college campus (Wyatt, 2005), some educators question how to continue effectively supporting student learning when moving into the online context (Chiasson, Terras, & Smart, 2015). Providing teachers with a research-based framework for designing effective learning environments and an understanding of

how to use that framework would provide support for effective online course design.

THEORETICAL FRAMEWORK

The Community of Inquiry

The Community of Inquiry (CoI) framework as set out by Garrison, Anderson, & Archer (2000) explains online learning as a collaboratively constructive process supported by three core elements: social presence, teaching presence, and cognitive presence. These elements, which promote critical thinking and learning in an online course, are considered to be interdependent rather

than sequential steps in the learning process. That is, they can—indeed they do—support one another and need not be thought of or planned for in isolation.

Social Presence

Social presence is the idea that students who have a sense of belonging and camaraderie with their fellow classmates, as well as their instructor, feel better supported in their learning (Rovai, 2002; Rovai & Jordan, 2004; Saville, Lawrence, & Jakobsen, 2012). When learning moves into the online context, meeting such affective needs can be challenging, as nonverbal actions and spoken cues (e.g., tone, inflection) are now mediated through technology (Hancock, 2004). In spite of these challenges, research has shown that participants still find ways to present themselves to others as social beings with distinct personalities in an online context via technologies such as discussion forums (Hara, Bonk, & Angeli, 2000), digital storytelling (Lowenthal & Dunlap, 2010), and wikis (Augar, Raitman, & Zhou, 2004). In this way, students in the online classroom not only realize but also trust that the comments they see posted online were written by someone who is real, and who shares a common goal (e.g., learn this content, successfully complete the course) but is simply in a different location.

Teaching Presence

Teaching presence relates to the design and organization of the educational experience, as well as the facilitation of learning activities. Thus, teaching presence recognizes not only the work needed to prepare the online context but also the ongoing instructional engagement that occurs within that context. It is not enough for an instructor to set up the course in the online learning management system (LMS) and create learning modules for students to work through and assignments for them to complete. Nor is it enough for the instructor simply to mimic what is done in the face-to-face classroom by uploading video lectures or posing questions for student discussion (Fish & Wickersham, 2009). Rather, for instructors to effectively support student learning in this online context, they must consider how to share concepts in a way that encourages engagement with the material (Coll, Rochera, & de Gispert, 2014), prompts critical thinking around these concepts

(Costley, 2016), and facilitates the ongoing, collaborative, meaning-making process between students (Savvidou, 2013). Finding a way to balance the roles of “sage on the stage” with “guide on the side” can be complicated in the primarily text-based environment of an LMS (Arend, 2009; Costley, 2016). However, students report higher degrees of satisfaction and better learning when they perceive higher levels of teaching presence in their online class (Shea, Li, & Pickett, 2006). Through teaching presence, an instructor can create a classroom climate that encourages students’ social presence, which allows for further engagement in discourse, thereby facilitating the coconstruction of meaning and, ultimately, the learning process.

Cognitive Presence

Cognitive presence refers to “the extent to which the participants...are able to construct meaning through sustained communication” (Garrison, Anderson, & Archer, 2000, p. 89). In other words, this is where the real work of meaning-making takes place, as participants engage with course content through collaborative reflection, exploration, and inquiry, in order to integrate new understandings for individual learning. In the online context, engaging students in critical thinking and problem solving can be challenging, as discussions are more asynchronous in nature, lacking the immediacy and individualization of feedback (Conaway, Easton, & Schmidt, 2005) that can promote reflection and deeper processing. According to the CoI framework, teaching presence and social presence facilitate cognitive presence (Garrison, Cleveland-Innes, & Fung, 2010; Shea & Bidjerano, 2009), which enables students to think deeply and critically and, therefore, to achieve learning.

Technology’s Perceived Affordances

In an online learning environment, specific features of the technology can facilitate certain behaviors and constrain others. The concept of affordances illustrates the interaction between human behavior and the features of an environment. Gibson (1977), whose work centered on how we perceive physical objects, defined affordance as what an object in the environment inherently “provides or furnishes” (p. 67) for the user. A chair, for example, has a horizontal surface at roughly knee height, and therefore it “affords” sitting. Norman (1999) applied this concept to user

interface design in online environments, and he used perceived affordance to describe the visual feedback that advertises the affordance. The left arrow at the top of a web browser screen is one example, as it presents a visual cue that readily communicates to the user how to navigate back to the previous webpage. Hammond (2010) describes affordances in the context of communications technology as “the perception of a possibility of action (in the broad sense of thought as well as physical activity) provided by properties of, in this case, the computer plus software” (p. 12). Notably, technology can also have constraints that limit user behavior.

Popular technologies currently used for learning and communication, then, can be analyzed based on the behaviors they facilitate or constrain. As an example, Twitter, with its 140-character limit, affords brief, concise communication and constrains longer, more elaborate conversation. For this project we analyzed technologies commonly used in online/hybrid courses for any features that afford or constrain the three types of presence according to the CoI framework.

USING THE COI FRAMEWORK TO ANALYZE TECHNOLOGY USE

To illustrate how technology could potentially facilitate elements of the CoI framework for online learners, consider a learning management system (LMS), the typical venue where these courses are taught. Most LMSs include a way for students and instructors to post personal biographies or profiles, thereby supporting the development of social presence (Barab, MaKinster, & Scheckler, 2003; Kear, 2010). However, these biographies are often hidden within the LMS, which hinders students’ ability to connect these personal disclosures with their classmates’ online activity. In support of teaching presence, an LMS allows instructors to present lessons and activities in a logical sequence via content pages or modules. It also produces threaded discussions that instructors can monitor, and it simplifies sharing rich media (e.g., video) for lecture content (see also Rubin, Fernandes, & Avgerinou, 2013). At the same time, the instructor’s ability to control the physical layout of elements on the page is generally constrained to some degree by the LMS. Another common feature of the LMS is the asynchronous discussion board, which provides

a space for students to come together and discuss content, make inquiries about its meaning, and explore a variety of viewpoints, while affording them time to pause, reflect, and respond to one another in a way that could lead to further clarity, resolution, or consensus. Although not guaranteed by its use, these discussion boards can facilitate cognitive presence when the instructor incorporates certain discussion strategies into their use (Darabi, Arrastia, Nelson, Cornille, & Liang, 2011). These same asynchronous discussion boards, however, pose a constraint, as their asynchronous nature does not allow for spontaneous real-time interaction.

With this theoretical perspective in mind, each of us contributed an example of how we might enhance our own instructional practices by paying more explicit attention to how the technology we use could support each of the elements named in the CoI framework.

Penny’s Example: VoiceThread

Penny has been a frequent user of VoiceThread in her online courses. VoiceThread (voicethread.com) is an online tool that allows users to upload a slide presentation and then record narration for each slide. It also provides a way for viewers to enter text or audio comments on each slide, though the creator of the VoiceThread chooses whether to activate this feature. The site offers a free account as well as a premium account with additional features.

Penny has used VoiceThread to create short lectures to introduce important concepts and prepare students for activities and assignments. For example, students view a brief VoiceThread on research traditions and methods before they critique a scholarly journal article. In this way the use of VoiceThread contributes to teaching presence. Cognitive presence is supported by the ability to use multimedia in a way that supports cognitive processing. The modality principle from the Cognitive Theory of Multimedia Learning (Mayer, 2002) states that a combination of images and audio narration supports learning, and the features of VoiceThread enable this type of presentation. In analyzing her use of VoiceThread, Penny realized that social presence was mostly lacking. This is not automatically a weakness, as there were other features of the course design that supported this type of presence. However, examining the features of VoiceThread revealed that she may have missed

an opportunity to facilitate social presence, and an even deeper level of cognitive presence, by not making use of the option that allows viewers to comment on the presentation. Incorporating this feature would increase student-student and student-instructor interaction, enabling learners to engage with the content together and work out a shared understanding.

Although research on the use of VoiceThread to enhance social presence is just beginning to emerge, some studies have demonstrated its promise. In a small pilot study with 24 graduate students, Cummins and Gouripeddi (2015) found that “student feedback included comments that reflected ... feeling a sense of community, being more engaged and learning a great deal” (p. 2). In another qualitative study of an online graduate class, students reported that using VoiceThread for online discussions made the interaction more personal and similar to a face-to-face class and that they were more likely to go beyond the minimum requirements set forth by the teacher for participating in the online discussion (Kirby & Hulan, 2016). In a qualitative study of undergraduate students using either VoiceThread or YouTube videos in their online discussions, students reported that the audio-visual medium enhanced both instructor and student social presence, though they were less emphatic in their comments related to student social presence compared to instructor social presence (Borup, West, & Graham, 2012). A quantitative study by Taylor and Huang (2011) found that when VoiceThread was used, students’ perceptions of teaching presence increased even though their sense of community (as indicated by asking each other questions, addressing each other by name, etc.) did not. However, as participants in this study chose to use text rather than audio or video for 62% of their VoiceThread comments, it is possible that the rich media features of VoiceThread were not used frequently enough to affect social presence or sense of community. More research is needed to clearly demonstrate how, or if, the use of VoiceThread influences social presence in an online course; however, the early research findings, considered in light of the affordances of the tool, show that it has potential worth exploring.

Jane’s Example: Synchronous Chats

Jane’s tool of choice is the synchronous text chat, which she has chosen to include as part of

her hybrid classes. The chat tool allows for certain aspects of a face-to-face class discussion to transfer into the online context, as the conversation unfolds in real time with an opportunity for more immediate responses from fellow classmates and the instructor. However, unlike a face-to-face conversation, where only one voice can be heard at a time and students must wait their turn to contribute or ask questions, the online chat tool allows all participants to access the floor simultaneously. Students need not wait for the teacher to call on them; they can pose a question, offer a comment, and respond to each other at will.

By participating in this online chat alongside her students, Jane uses the tool to establish a sense of teaching presence as she models how to engage with the content and contribute to the cocreation of meaning through her own postings. This tool also facilitates a sense of social presence—in some ways better than the traditional asynchronous discussion board—as students are pushed to engage in a fast-paced chat that makes informal language, humor, emoticons, and text-speak more acceptable, leading to what one student characterized as more “banter” between participants. As synchronous chats prompt participants to read, reflect, compose, review, and often revise before posting a comment to the public chat space (Vogler et al., 2013), students are primed for cognitive presence.

Although the synchronous chat tool affords real-time interactions between classmates, there are some constraints the teacher might consider when incorporating this technology tool into a course’s design. First, the more informal nature of the fast-paced chat can make it difficult for students to appreciate the degree to which their cognitive presence was required during the discussion. Students in her class have commented as such, “You don’t realize how focused and intense you are in the synchronous discussion until you see [the instructor’s post stating] ‘I guess we better wrap it up for tonight’” and “Looking back over the synchronous discussions, I realize that the conversations were far more rich and collaborative than I realized while they were taking place.” To address such oversight and help students appreciate their cognitive efforts, the instructor might choose to incorporate more activities that prompt students to review the written transcript and reflect on the content discussed during the chat. Second, the

speed with which comments may appear in the public chat space, with multiple participants posting simultaneously, can be overwhelming for students. As one student commented, “it [was] difficult to follow along with all the different directions the discussion went.” Thus, the instructor might choose to set up multiple chat rooms and divide the students into smaller discussion groups as a way to mitigate cognitive overload.

Given such conflicting reactions to the synchronous chats, the instructor often asks students to respond to a brief, informal survey at the end of each semester asking about the different discussion formats. Over the course of several semesters, she has noticed a trend in that students may make comments, such as those above, about the cognitive challenges of engaging in the synchronous chats, and yet they regularly indicate they enjoyed the synchronous chats to a greater degree than the more traditional asynchronous discussion board. Furthermore, when specifically asked about the degree to which they felt cognitively engaged in these two types of discussions, they often indicate that the synchronous chats were more cognitively engaging than the asynchronous ones. Although this student feedback does not provide empirical evidence that students actually learned more from one context over the other, it does provide support for the claim that synchronous chats prime students for cognitive presence, at least as far as student perceptions are concerned.

Ying's Example: Video Discussion Posts

Ying's example comes from a research project centered on student use of video in the asynchronous discussion forum. It is not uncommon for teachers to post video in online courses, and Ying does that as well, creating a weekly update video to review the past week and preview the coming week for the students. Posting such videos is one way to foster a sense of the instructor's social presence in the online class (Borup, West, & Graham, 2012; Rose, 2009). What is unique in this example, however, is that while students in online classes typically contribute using text, Ying sought to increase social presence by requiring students to contribute video discussion posts instead of text at different times during the semester. She anticipated that seeing the faces and hearing the voices of classmates would give students a greater sense of social presence than the lean medium of a text post (Ice, Phillips, &

Wells, 2007). There is also the potential to increase cognitive presence, as students may engage with the material in new ways when deciding how to best present it in video form.

Although formal data collection for this research project is still underway, Ying has noticed anecdotally that even though students are a bit reluctant to complete the video and complain about it being extra work, their exchanges in the discussion forum reveal a greater sense of rapport, with students engaging in community-building behaviors such as addressing each other by name. She has also observed that students reply earlier and more frequently to their classmates' video posts compared to the text posts. In addition, some students have commented that they see the benefit of the video despite their initial reluctance.

With students and teachers seeming to agree that these videos support the basic principles underlying social presence, there are some constraints to their use in the discussion board. As students in an asynchronous discussion are conversing with one another in a back-and-forth manner, it is not uncommon for a student to refer back to a previous comment, skimming through the text to locate a particular word or phrase, when drafting a response. However, digital video does not afford such skimming. While it is usually possible to “scrub” back and forth in a digital video file, the process is cumbersome, and it is more natural for viewers to play a video from beginning to end (Wong, Leahy, Marcus, & Sweller, 2012). The inability to quickly refer back when crafting a response might prompt the teacher to post some time limits on the video length, keeping the videos briefer so that students can quickly review when needed.

CONCLUSION

Through our process of reflecting on our own practice, we have learned the value of applying a rigorous theoretical lens to the use of technology in our online and hybrid courses. It is important to note that our view of technology is not deterministic. We do not believe that technology causes learning but rather that tools can be chosen to facilitate certain activities. By exploring our technology tool use through the CoI framework, we simultaneously found ways to maximize the value of the tool and implement more fully the CoI framework in our instructional design, thereby supporting student

learning in the online context.

In looking at our three examples, we realized that we have three goals for our use of technology tools. First, we seek to provide ample opportunities for students to interact with each other and with us as instructors. This is exemplified by Penny's realization of the need to take better advantage of the interactive features of VoiceThread. Second, we want to use rich media, where appropriate, to make the online interactions engaging. The synchronicity of Jane's text chats and the audio-visual richness of Ying's video discussion posts are examples of techniques we have used to meet this goal. Finally, we have realized the need to be intentional in scaffolding students' reflections on their interactions. While social presence alone may make a class enjoyable, it is the interrelationship of social presence and cognitive presence that leads to deep learning. Jane's intention to add reflective activities based on the chat transcript exemplifies an attempt to address this goal without giving up the affordances the chat tool offers (e.g., increased access to the floor, ability for students to follow one or more topic of their choosing). The reflections on our teaching practice and use of technology tools presented here do not provide an exhaustive list of tools available to support a community of inquiry. Instructors wishing to increase deep learning and engagement in their own classes can use this same reflective process to consider a wide variety of existing and emerging technology tools.

As with any instructional design choice, the decision to use certain technology tools in an online or hybrid course should start with the instructor's learning goals for the students. When searching for tools to meet these goals, it is worth remembering that technology is not "magic" and that new technology tools are not necessarily better than older ones (e.g., Twitter is unlikely to replace the asynchronous discussion board). That is, we do not believe that technology "drives" social, teaching, or cognitive presence in a deterministic way, though we do recognize that some tools may naturally support certain presences better than others. We would suggest that to substitute one type of tool for another (e.g., incorporate web conferences instead of synchronous text chats) is to forgo certain affordances (increased access to the discussion and greater opportunity to pose questions, comment, and respond to each other at will) that can support

valuable learning experiences. Therefore, it is useful—essential even—to consider the features of each technology tool and how its affordances and constraints better support the instructor's specific learning goals for students. Once a decision is made, exploring the tool's features through the CoI lens is time well spent, as the instructor gains insights for how to make the most of each tool.

Online classes are not going away. Even the most reluctant instructor will likely be faced with moving into the online classroom at some point in the future to accommodate demands by administration to increase student enrollment. Effective online teaching requires more than simply posting video lectures from the face-to-face class in the LMS or having students respond to a few questions posted by the instructor in the discussion board. Furthermore, it is easy to be seduced by the latest and greatest technology tools, believing our students will think we are "good" or "cool" because we found a way to incorporate the newest tech craze into our teaching. However, as teachers we must stop and ask ourselves if the students are actually learning (better) with these tools. The CoI framework provides a research-based theoretical framework for systematically selecting tools and effectively incorporating them into our teaching practices. In this way, we can be more confident that the technology tools selected will enrich (rather than detract from) learning in our online classrooms.

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