Here or There Instruction: Lessons Learned in Implementing Innovative Approaches to Blended Synchronous Learning

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Abstract

Here or There (HOT) instruction is a blended synchronous approach that enables students from on-campus (“here”) or a remote location (“there”) to participate together in class activities in real time. The purpose of this article is to share three different cases at two universities that illustrate different implementations of HOT instruction, explain the affordances of these varied approaches, provide best practices that are common to each, and share lessons learned along the way. Readers will gain a better understanding of how to implement a range of innovative HOT approaches, and in what context(s) they might choose one approach over another. The authors’ experience indicates that sound pedagogical principles along with pragmatic considerations, such as class size, available technology, and instructor’s skills, should guide decisions regarding use of these blended synchronous approaches. Future research should look towards what impact blended synchronous environments have on student outcomes.

Keywords: blended synchronous learning, synchromodal learning, synchronous hybrid learning, video conferencing, web conferencing, here or there instruction, HOT instruction

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"The public discussion has become stuck in a false dichotomy of traditional vs. online—a dichotomy that treats all online models as similar and that ignores blended or hybrid approaches" (Hill, 2012, p. 86). As access to synchronous communication tools improves and students desire for flexibility increases, the lines between these modes have become blurred, making way for new blended and hybrid approaches (Roseth, Akcaoglu, & Zellner, 2013). One such approach is Here or There (HOT) instruction, a blended synchronous approach that enables students from on-campus ("here") or a remote location ("there") to participate together in class activities in real time (McKimmy & Schmidt, 2014; 2015).

These blended synchronous approaches offer many advantages to students. In addition to providing greater flexibility for how students choose to attend classes (Bower, Dalgarno, Kennedy, Lee, & Kenney, 2014), blended synchronous approaches increase access to learning from remote locations, which enhances the variety of student perspectives brought to the classroom (Bower et al., 2014; Cunningham, 2014; Rogers, Graham, Rasmussen, Campbell, & Ure, 2003). This approach can also help students from remote locations feel a greater sense of community and the perception of being part of "real" classroom (Bower et al., 2014; Szeto, 2015), thus reducing their feelings of isolation (Park & Bonk, 2007). At the same time, this approach gives students who live close to campus the flexibility to attend class in-person, fulfilling their desire for more interaction and social connections with their peers and instructors (Bower, Dalgarno, Kennedy, Lee, & Kenney, 2015). Moreover, this approach gives instructors the opportunity to transform their teaching into a role of instructional leader (Szeto, 2015) and to incorporate more active learning opportunities for students (Bower et al., 2014).

Although there are clearly many benefits to blended synchronous learning, this approach is by no means a panacea (White, Ramirez, Smith, & Plonowski, 2014). There are a number of challenges in carrying out this approach successfully, as learned through the authors' implementations. The purpose of this article is to provide best practices and lessons learned from implementing a range of approaches to blended synchronous learning.

Process

To better understand the different approaches to blended synchronous learning, the authors used a formative and collaborative process of exploration. To begin this endeavor, the first author reached out to others who were doing similar work. During initial discussions, the authors shared their experiences collectively and then selected specific cases that would illustrate both the commonalities and distinctions among various approaches. After writing up case summaries, the authors then identified common themes across their different experiences. Following this, the authors agreed that it would be important to include a student perspective. To do this, they examined their end-of-semester, anonymous course evaluations to see if any comments specifically mentioned the HOT approach. To gain a more in-depth perspective, they invited a student who had participated in two of the different approaches to join the team as the third author on this paper and provide her perspective on what it was like to take part in these sessions. All authors then met regularly to discuss and describe the themes that emerged across the varying approaches.

The remainder of this article will discuss the results of this exploration on different approaches to blended synchronous learning. First, specific cases that showcase three different approaches to HOT instruction are presented, followed by an explanation of the factors to use to select the most suitable approach. Then, the article provides perspectives from instructors and students on their experiences with this type of instruction and lessons learned from those experiences. Finally, the article ends with discussion of the key findings, limitations, and open research questions.

Specific Case Examples

Three different cases of the HOT approach were implemented at two different universities: (1) the Virtual Flipped Classroom approach, (2) the Student-Facilitated approach, and (3) a Hybrid approach. For an overview of the three approaches, see Table 1.

Virtual Flipped Classroom Approach

General description and purpose. "Flipped classroom is a pedagogical model in which the typical lecture and homework elements of a course are reversed" ("7 Things You Should Know About Flipped Classrooms," 2012, p. 1). Content is typically delivered through online video lectures, which are distributed for out-of-class viewing. Class time is repurposed for student inquiries about lecture content, interactive activities, or discussion. Research supports that this approach improves student achievement and satisfaction (Dove 2013; Enfield 2013; Pierce & Fox 2012). The Virtual Flipped Classroom approach is similar to a traditional flipped classroom in that a course is designed so that students review content asynchronously, and some form of synchronous interaction comprises in-class activities. It differs, however, in that synchronous interaction includes both "here" students and "there" students simultaneously.

Classroom configuration. A virtual flipped course is held in a small room, seating eight or fewer in a circle or U-shape around the instructor. The web conference is projected so that "here" students see the active video, chat, and/or slides. "There" students view these on their own computers. Students attending on-campus do not log in to a web conference but interact with "there" students through an omnidirectional speakerphone, connected to the instructor's audio input and output. When "here" students speak, the instructor swivels a webcam toward them, feeding the web conference video. "There" students use their own headsets and webcams when speaking. See Figure 1 for a schematic of the classroom configurations used with this approach and others discussed in this article.

Preparation. The instructor sets up a laptop, USB webcam, USB speakerphone, and a projector prior to class. To provide prompts and summarize information, slides may be shared in the web conference, which is projected in the physical classroom.

Specific course implementation. Free and Open-Source Software in Education, a graduate course at University of Hawaii has been taught with this approach. The course was designed for fully asynchronous delivery; students followed a guided sequence of readings, videos, and online assignments. It was augmented with optional, bi-weekly, HOT sessions allowing for "here" or "there" participation. Students who were unable to participate synchronously were able to review the recorded web conference afterward. The instructor facilitated the web conference and classroom discussion simultaneously–a task that required appropriate hardware and comfort using web conference software.

HOT sessions were used for content summary and review, discussion on current topics and cases, assignments clarification, and student questions. The learning objectives of these HOT sessions were for students to be able to: (a) test their understanding of lesson content in discussions about current events; (b) engage with guest presenters about real-world examples and implementations; (c) present final projects to peers for discussion and feedback. Advanced-organizer questions were provided to frame each lesson. An example question that met first lesson objective tying the content to current events was: “What determines if software is free, open-source, or both?” Synthesis of content sources (e.g., readings, videos) and performance on exercises (e.g., blogging, discussion, presentation) were required to effectively answer this question. The HOT environment supported synchronous discussion that built upon these asynchronous activities.

Student-Facilitated Approach

General description and purpose. A second HOT method is a Student-Facilitated approach where breakout sessions are run by students. The purpose of these sessions is to create a student-centered learning environment that distributes the responsibilities of running the HOT session, creating more student ownership of the learning environment.

Classroom configuration. The sessions take place in a large collaborative classroom space that includes six “pods”; each comprised of a table for six to eight students, a computer/ TV monitor at one end to facilitate collaborative work, and a speakerphone interconnected to three other speakerphones to pick up on everyone’s voices in the room. There is one wide-angle webcam for displaying the entire classroom for the “there” students. There are two projector screens – one displaying the video conference session with presentation slides and the other displaying text chats from the web conference.

“Here” students sit together at half the pods in their small discussion groups. The other pods are set up for the “there” teams to “sit at.” Large, high definition monitors at those pods display the student-hosted web conferencing sessions and are connected to a headset for the instructor to “sit in” on the virtual discussions. WebEx is used as the web-conferencing platform for the “there” students. For the whole class discussion, the instructor hosts a main training session. For breakout sessions, “there” student facilitators host the sessions in personal meeting rooms, and on-campus students meet face-to-face.

Preparation. Prior to class, the instructor queries students to identify interest in facilitating and students’ experience facilitating discussions and hosting web conferences. Two types of student facilitators are assigned. Technology facilitators set up, record, and share recordings of online breakout sessions, troubleshoot technology problems, and monitor text chats. Discussion facilitators keep the content of discussions focused and monitor time. Discussion facilitators receive slides to guide discussion, including facilitation notes (for example, “Find someone to take notes during the discussion”). Technology facilitators receive directions on hosting a web conference. Technology facilitators schedule their sessions and send invitations to discussion group members and the instructor. Links to the student-facilitated sessions are then included in student directions for the HOT session.

Specific course implementation. The Student-Facilitated approach has been implemented in an online graduate course at the University of Cincinnati called Universal Design for Learning Online. This course began with group instruction where “here” and “there” students came together, facilitated by the instructor. Breakout sessions followed, with students forming groups of four to five, each comprised of all “here” or all “there” students. The instructor walked the room, sitting with each group to clarify assignments and coach students. With “there” groups, the instructor joined their session using the headset located at their pod. Since all groups used the same slides to guide discussions, the instructor could quickly scan the room's monitors and visually see each group's progress. The HOT session wrapped up with a whole group debriefing, sharing takeaways from each group's discussion. Finally, the instructor highlighted big ideas that tied into the learning goals of the session and provided a jumping off point for subsequent asynchronous work.

The learning objectives of these HOT sessions were for students to be able to: (a) understand how online tools can support multiple means of expression; (b) apply their understanding of learner variability to the design of instruction; (c) analyze assessments to determine whether they are universally accessible. Each session provided activities to meet the learning goals of the session. For example, to meet the objective of understanding how learning tools can be used to support multiple means of expression, students discussed their experiences from the previous week's asynchronous discussion in VoiceThread, a tool which allows students to post in a variety of mediums (e.g., text, voice, video). During the VoiceThread discussion, students first posted in a medium that was comfortable to them and then another medium that was uncomfortable to them. Then, when everyone came together during the HOT session, they discussed what it was like to complete an activity in a means that is in and out of their comfort zone. By sharing these experiences, they could see the importance of allowing their own students freedom of expression by leveraging online tools that support this.

Hybrid Approach

General description and purpose. The Hybrid approach incorporates aspects of both Virtual Flipped Classroom and Student-Facilitated approaches. This approach is similar to the Virtual Flipped Classroom in that sessions begin with whole group instruction facilitated by the instructor. The Hybrid approach distinguishes itself from Virtual Flipped Classroom in that it incorporates breakout sessions. Similar to the Student-Facilitated approach, students are broken into groups of four to five. However, the Hybrid approach is different in the composition of groups and the facilitation of group discussions. In the Student-Facilitated approach, group composition is homogenous (either all "here" or all "there") and groups are facilitated in the physical classroom. In the Hybrid approach, groups are heterogeneous (a mix of both "here" and "there" students) and are facilitated in the web conferencing space.

Preparation. The instructor sets up hardware components before class, including a laptop, Swivl automatic pan-and-tilt platform, power strip, USB web camera), projection, and noise-canceling USB speakerphone. "Here" students bring a microphone-equipped headset. The instructor uploads presentation slides to the web conference, which is projected for "here" students.

Classroom configuration. "Here" students meet in a small room seating up to eight. The instructor and all students use individual logins to the web conference. The instructor's computer is projected so that "here" students can observe lesson content and discussion; however, they can also view the video, slides, or other media on their own laptops, as can "there" students. "Here" students mute their microphones during full group discussion and the omnidirectional speakerphone provides classroom audio. The instructor's webcam is attached to the Swivl. When "here" students speak, the instructor passes the Swivl's electronic marker, which causes the Swivl and webcam to pan towards the speaker. "There" students communicate using headsets and optionally webcams.

Specific course implementation. The Hybrid approach was piloted at the University of Cincinnati in Assessment in Online Learning, a course traditionally taught fully online. Designed for asynchronous delivery, it was augmented with bi-weekly synchronous web conferences delivered in WebEx. Seven web conferences were offered over a semester, of which four were in HOT format and three in a fully online format. Learners were required to attend at least four sessions, of which two were required to be HOT. Learners were given the option of attending the HOT classes "here" or "there."

The learning objectives of these HOT sessions were for students to be able to: (a) develop assessments for blended and online learning; (b) consider the role of technology on the design of blended and online assessments; and (c) engage in synchronous discussions related to these assessments. The first hour of class was typically instructor-centered, focused on content review, assignments clarification, and questions. After a short break, students joined breakout sessions. Breakouts were comprised of both "here" and "there" students. Students were given a discussion topic and instructions on using a collaborative whiteboard to create an artifact to share. Similar to the Virtual Flipped Classroom approach, the Hybrid approach also used advanced-organizer questions to frame each lesson and augmented these with explicit instructions for online groups. An example of an activity that met the learning objective to consider the role of technology on the design of blended and online assessments is displayed in Figure 2.

The instructor moved between virtual breakout rooms, listening, reviewing the group's progress on their whiteboard, and providing feedback. Breakout discussions varied between 30 and 45 minutes. Afterward, all students rejoined the whole class to share their whiteboards and discussion outcomes. A final discussion tied their conversations to the main lesson points and upcoming assignments.

Factors in Selecting an Approach

Approaches to HOT vary depending on a variety of factors, including group size and technology considerations.

Group Size

Groups of eight or fewer "here" students can be handled comfortably in Virtual Flipped Classroom or Hybrid instructional approaches. In both approaches, experienced instructors can facilitate both audiences without the aid of technical support staff. A single omnidirectional speakerphone can adequately cover the area required to gather a class of this size around it. A conference-table arrangement also allows the instructor to rotate a single webcam to display "here" participants as they speak or to use a Swivl device.

A class size over eight "here" students requires a larger physical space, which requires multiple microphones and possibly room-based audio; both of which require advanced sound planning for coverage and avoidance of audio feedback. Larger class size also necessitates different approaches to facilitation. The Student-Facilitated approach leverages the affordances of a collaboration-centric classroom, where pods are arranged to facilitate small groups. The pods enable group-based projection, modular audio equipment, and multiple simultaneous discussions which the instructor can monitor individually. This classroom setup enables a larger physical audience distributed between pods. However, it may require the aid of trained support staff and student volunteers to assume technical and facilitation roles.

Technology Considerations

Hardware and software can have a dramatic effect on instructional effort and overall success of HOT instruction. Key considerations include providing user-friendly tools, interruption-free connections, high-quality audio, and a dedicated presenter computer.

Web conferencing. Selection of a web conferencing platform impacts everyone's ease of participation. Some instructors have personal preferences for web conference platforms, of which dozens exist. However, it is not always feasible for instructors to choose their platform, as technical know-how and institutional policies factor in. The selected platform's features also determine whether breakout discussions are possible, and which features (e.g., recordings, whiteboards, self-selected rooms, etc.) are available in breakouts. Accessibility (e.g., closed captioning, text transcripts) features vary, as do the range of operating systems supported (e.g., Linux, Android, iOS, etc.). Ease-of-use and interruption-free connections are key to user satisfaction and instructional success.

Audio-visual hardware. Microphones, speakers, and cameras are essential components for successfully blending physical and online classrooms. USB-connected omnidirectional speakerphones are available from many manufacturers. Higher quality speakerphones sell at a premium, but are worth the expense, particularly if they provide noise-cancellation. Successful HOT instruction depends on clear audio above all else. In spaces dedicated to online instruction, setup may require experts and advanced equipment (e.g., mixers, multiple microphones, installation) to avoid audio feedback between microphones and speakers.

Video of physical classrooms can be generated from fixed or movable webcams. Fixed cameras reduce complexity by removing pan/tilt/zoom from the instructional variables, but may provide limited field-of-view. A camera can be manually manipulated to focus on individual speakers, but requires attention during an already complex instructional process. Automated pan/tilt/zoom platforms such as Swivl exist, but introduce complicating variables, such as panning speed, targeting methods, and new points of technical failure. An elevated, wide-angle camera can capture the physical classroom, albeit from a fairly impersonal perspective – it may be difficult for online students to see who is speaking from a bird's eye view.

Presentation Computer. Space supporting HOT instruction may allow instructors to bring their own device (BYOD) or require use of a classroom-based computer. While BYOD has the advantage of allowing instructors to work on a personalized system, this advantage is eclipsed by the pre-configuration advantages of a classroom-based computer system where the audio, video, and projection functionality can be verified in advance.

Student and Instructor Perspectives

Based on these cases, varying perspectives are provided on the participant experience in a range of HOT approaches.

Student Perspectives

Course evaluations were examined for all three courses to assess the experience of students in the HOT sessions. In the Virtual Flipped classroom, students were asked for specifics ways the instructor was helpful in achieving their objectives. One respondent (of eleven) stated "Synchronous HOT discussions." Another cited "synchronous sessions," and two others cited "guest speakers" who participated in HOT sessions. Other comments included requests for earlier HOT sessions and more variety in HOT format. 100% of respondents agreed that "students were encouraged to share relevant ideas, knowledge, feedback and experiences" and that "course activities were effective in helping me achieve the goals for the class".

In the Student Facilitated class, 40% of the comments in response to "What did you like most about this course? specifically mentioned the HOT format. These positive comments included gaining an appreciation for technology in the classroom, the opportunity to interact with students and the professor in person, the diversity of students who could attend because of the format, and the ability to obtain immediate feedback. About a third of the comments in response to “what suggestions do you have to improve this course?” specifically mentioned something regarding the HOT format. Most of the critical comments surrounded the challenges of technology itself. One person felt that the technology was “way more complicated than it needed to be.” Other comments mentioned that the HOT sessions were too long, seemed unnecessary to meet the learning objectives, and were repetitive to the asynchronous sessions. In addition, one student class felt the class was "segregated Here and There” and another student commented that additional synchronous meetings would be needed to create a sense of community.

In the Hybrid classroom, no students specifically commented on the HOT sessions in the course evaluations, which was notable. However, one student (the third author) who enrolled in this course along with another HOT course reflected on the benefits. She particularly appreciated the opportunity it gave to co-construct the class:

> I felt more in control of my learning, like I could decide how and where to participate and comment on issues with technology. The two courses were structured differently, but my opinions on format and technology were welcome in both and the teachers were willing to adjust their instruction [for their students], which shows just how flexible the HOT format is.

Instructor Perspectives

Instructors have numerous tasks when teaching a HOT class. In addition to delivering content and facilitating discussion, they need to monitor students in multiple locations, using multiple communication modes (e.g., voice, video, chat, and polling). Facilitating a web conference while leading a face-to-face group is daunting for many, causing a significant learning curve. HOT instruction can cause cognitive overload because of multiple, simultaneous demands. The first author wrote to her co-instructor in an email after teaching a HOT session:

> I actually just woke up from a 2-hour nap – that's how much that session took out of me. We need to continue thinking about how to make this type of thing easier as I really do think it serves an important need for our students.

Support needs vary with instructors' technical abilities and the complexity of technology and classroom requirements. In Virtual Flipped or Hybrid approaches, instructors may be able to handle these tasks independently because class sizes are small and equipment can be minimized (i.e., a single computer, projector, webcam, and speakerphone). Instructors with strong troubleshooting and multitasking skills may have more success in this environment. Student-Facilitated approaches with more students, larger classrooms, and additional equipment are more likely to require assistance. Consequently, some instructors want a third party to control the web conference on their behalf. It can also be reassuring to instructors to have someone else present to handle any technical troubleshooting while carrying on with instruction. The support role can vary from equipment setup to taking charge of web conference facilitation.

Despite the challenges, the authors of this article express cautious optimism. HOT instruction seems to create a more flexible, engaging learning environment for students as compared to fully online or on-site instruction.

Lessons Learned

Over several years, the authors learned several lessons as to what contributes to successful HOT instruction. These lessons include: (1) simplifying the technology, (2) distributing the workload, (3) making participation flexible, (4) integrating the use of HOT into course design, and (5) planning for support.

Simplify the Technology

Keeping the technology as simple as possible helps avoid snafus and maintain a focus on teaching. In Student-Facilitated HOT sessions, “here” students controlling their microphones was problematic. Initially, everyone in the room connected to the web conference. However, students simply did not remember to turn off their microphones between speaking, resulting in audio interference. Eventually “here” students were asked to leave their devices at home and use a speakerphone and a single camera in the room to capture their interactions. In Hybrid classes, using a Swivl to aim the webcam introduced unnecessary complexity. Configuration was required to verify Swivl functionality before class. During class, a “marker” was passed to each student, guiding the Swivl’s pan/tilt functionality. This interrupted conversational flow. Eventually, the Swivl was replaced with a high-definition, wide-angle web camera. “There” students observed a less specific view of “here” participants, but there was also no longer an artificial constraint on discussion.

Classroom-based, pre-installed computers, audio, video, and projection greatly reduces technological complexity. A pilot project at the University of Hawaii underscores this point, which found the introduction of BYOD laptops to be a severe complicating factor in supporting HOT instruction (McKimmy & Schmidt, 2014). Some computers refused to recognize USB-connected devices, while others were trouble-free. Even connections to projection equipment became complicated, as a range of connections were tested on various computers (e.g., HDMI, VGA, mini-displayport, etc.). Some laptops easily identified video connections, while others required adapters, or failed to project altogether. The inconsistency across BYOD devices led to complications, ultimately causing instructors to lose faith in the reliability of the entire setup.

Distribute the Workload

Another important lesson learned when teaching in a HOT session is to distribute the workload. There are many more tasks that need to be taken care of in this type of learning environment and it can become overwhelming for one person to handle. At first with the larger class size, the instructor tried to manage all these tasks (e.g., facilitate an oral discussion while continually trying to keep track of the chats and troubleshoot technology problems) and this became untenable for the instructor to manage. So, in later sessions, students began to take on more roles, such as “chat tracker” and “technology troubleshooter.” This created a more student-centered learning environment, enabling more student ownership of the learning environment, and took some of the pressure off the instructor to try to manage everything.

Make HOT Participation Flexible

The success of a HOT session is related to the level of commitment of participating students. When first starting the Student-Facilitated approach, sessions were required. Dates and times were enumerated at registration. However, there was resistance from some “there” students who assumed they could participate on their own schedule. As a result, they would often attend late or leave early, disrupting lessons. In later sessions, students were queried about their interest and availability for HOT and assigned alternative, asynchronous tasks to those opting out. This seemed to not only improve attendance, but also engagement and commitment of those attending. For example, “there” students used video more often when communicating if they had chosen to participate.

Integrate into Course Design

As previously stated, some students felt the HOT approach may not be necessary for learning the content. Although the instructors had learning objectives tied to each session, these objectives may not have always been apparent to students. By more explicitly tying the content and perspectives offered in the HOT session back into the course learning objectives, students and instructors may be reassured of the need for HOT sessions to support learning. This may help improve attendance and engagement during the session, while also encouraging students who are unable to attend to review the HOT session recording. Whether instructors use HOT to deliver content or for group discussions, the session should provide content and perspectives that are not otherwise offered in regular course activities. By ensuring that HOT lessons are well integrated into course structure, students and instructors have a further sense of purpose to the HOT sessions.

Plan for Support

Provision of instructional and technology support for HOT environments is a challenge. Many instructors are reluctant to attempt HOT instruction without continuous technical support presence. However, staffing every HOT classroom with support personnel is impractical at scale due to associated time and cost implications. The most scalable approach at the University of Hawaii has been for a technical support staff member to provide training prior to HOT instruction, then “sit in” (virtually or physically) on the first HOT session to provide moral and technical support. Thereafter, the instructor is expected to facilitate HOT sessions independently. This approach has received mixed reception by faculty. While some are content, and build their confidence early on; others are vocal about needing a more continuous support presence. Even with this limited support approach, the support team was forced to expand service hours into the late evening. The expansion of service hours has a direct impact on cost of services, staffing, and oversight responsibilities.

Discussion

Over the years, the authors learned that they are not alone in experiencing challenges with the technology, process, and pedagogy of blended synchronous learning. Each of the sections that follows highlights key findings in relation to what others exploring similar approaches have found and ends with open questions that could be addressed with future research.

Technology

One of the biggest hurdles to overcome with blended synchronous learning is that the technology can be unpredictable, which interferes with the learning experience. It is somewhat comforting to know that technology issues and a high need for technology support are commonly noted by others attempting blended synchronous teaching (Bower et al., 2014; Butz & Stupnisky, 2016; Cunningham, 2014; White et al., 2014). Without a solid plan for inevitable technology problems, the authors experienced firsthand that teachers can become overwhelmed in these situations, as noted by others (Bower et al., 2014, Szeto, 2015). Since technology issues are inevitable, it is important for teachers to be prepared for the unexpected. Similarly, Bower et al. (2014) found "the teacher attributes of flexibility, adaptability, and composure were crucial in blended synchronous learning environments" (p. 170). Effective practices included: (1) simplifying the technology set up, (2) providing upfront technology training for teachers, and (3) involving students in troubleshooting and facilitating the technology. Other ideas include using co-instructors (Bell, Sawaya, & Cain, 2014) or teaching assistants (Cunningham, 2017; White et al., 2014). It proved crucial to properly train students and set expectations that technology issues may occur and how to remedy them. Bower et al. (2014) recommend providing a technology introduction at the start of the course, practicing tasks before the session, and providing just-in-time training. Using these practices, an unexpected benefit is that learners gain knowledge of and fluency with associated hardware and software tools.

Although a number of solutions to technology problems have been proposed, there still remain some open questions, such as how to best support HOT instruction at scale? And, what are the most effective video technologies for maximizing the social presence of the "there" students?

Process

The process of teaching in blended synchronous environments involves more multitasking than teaching in a purely online or face-to-face modality (Szeto, 2015). As the number of students increase, the tasks involved to manage this environment multiply. A result is that this type of teaching requires more effort than purely online or on-campus classes entail (Bower et al., 2014; Rogers et al, 2003). Proposed solutions to these issues include: (a) keeping numbers of students low (White et al., 2010), (b) employing teachers aids (Cunningham, 2014; Rogers et al., 2003), and (c) having institutional support (Bower et al., 2014). One solution was to expand on the "tech navigator" approach used by Bell et al. (2014), which used a doctoral student to oversee the technology of the session. The Student-Facilitated approach involves more students and broadens the scope of students' responsibilities to better distribute the workload and engage more students in the process. Although the use of student facilitators helps manage the workload during class, it does not reduce the high need for advanced planning and organization required for this type of teaching (Bower et al., 2014). Thus, how to make the workload in planning and organizing these environments more manageable for teachers who wish to offer this flexible opportunity for their students remains an open question.

Pedagogy

Since blended synchronous approaches are relatively new, research is just beginning to examine what pedagogies work best in these environments. An important pedagogical practice was to be explicit to students about how the HOT sessions supported the overall course learning objectives. This finding aligns with Bower et al. (2014) who note that clearly defining learning outcomes is more critical for blended synchronous sessions than other teaching modes because activities may take longer and thus need to be highly focused.

Another pedagogical principle that emerged is to actively involve students in the course design of HOT sessions, which in turn may help them feel a greater sense of ownership of their learning. Effective methods included are iteratively eliciting and incorporating students' feedback into the design and giving them greater responsibilities during the session. These findings are reflected by others who found that blended synchronous sessions can prompt instructors to create more active-learning opportunities for their students (Bower et al., 2014; White et al., 2014).

A final pedagogical principle that works well for small classes is to combine "here" and "there" students to create a sense of co-presence among the students attending in different modes. Bower et al. (2014) reported that co-presence increases when the two cohorts of students can be mixed during small group work; however, they note this design may not always be desirable for practical reasons. Creating mixed groupings was not possible for larger classes because of technology limitations. Thus, determining ways to create co-presence for larger classes remains an open question.

Although the authors gained some understanding of pedagogical designs that may work well within blended synchronous environments, there is much more to learn about the impact blended synchronous learning, such as HOT approaches, have on student outcomes. Researchers are just beginning to answer these questions. For example, some researchers have done empirical studies to assess the differences between the outcomes of students who attend online versus in-person, and they have found similarities between the groups on outcomes, such as test scores (White et al., 2010), motivation, needs satisfaction, and perceived success (Butz & Stupnisky, 2016). Although these studies show promise for this type of learning environment, much more work remains to study the impact of blended synchronous learning on student outcomes; thus, this is an important area that should continue to be explored by researchers working in this area.

Conclusion

As institutions move beyond the false dichotomy of purely on-campus and online approaches to learning, sound pedagogical principles and other pragmatic factors should guide decisions regarding the use of this blended synchronous approach. Examples of pedagogical principles include explicitly tying HOT sessions to the learning objectives, involving students in the course design and implementation, and combining "here" and "there" students in groupings when possible. Examples of pragmatic factors include physical classroom size, available technology, and the instructor's comfort level and skills with the associated technology.

The cases described in this article contribute to the literature related to this emerging instructional modality, but are not without limitations. For example, this work was performed solely within the context of educational technology and instructional design programs. Hence, the faculty and student perspectives discussed are limited in their applicability outside of these contexts. Additional research on the HOT approach in disciplines outside of educational technology and instructional design is needed. Further, the evaluation methods were preliminary and for the most part formative in nature. Future research should incorporate more rigorous methodology focused on investigating empirically the impact of the approach on student learning. This is the critical next step in evaluating blended synchronous learning once educators move beyond the pragmatic and technology issues involved.

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This article does not contain any studies with animals performed by any of the authors.

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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Figures

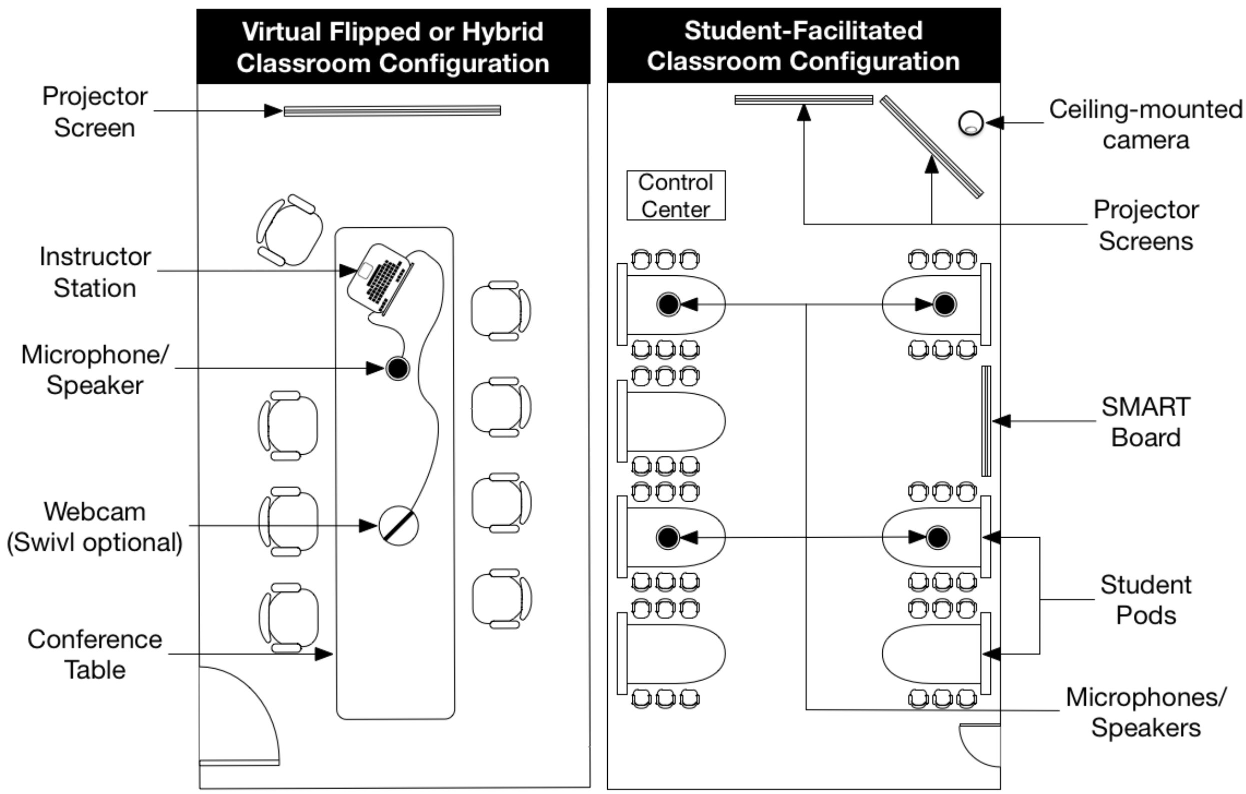

Figure 1. Floorplan schematic of classroom configurations used with Virtual Flipped or Hybrid

Consider as a group that all activity in an online course is mediated by technology.
Respond to the following questions:

- How does technology impact assessment?
- When should technology be considered?

As a group, develop 3 bullet points that capture your main idea on your shared WebEx whiteboard. Be sure to create a screenshot of your whiteboard so that you can share out with the whole group.

Figure 2. Example instructions for online breakout groups in the Hybrid approach

Tables

Table 1

Comparison of HOT Approaches

		Roles of Participants			Setup Requirements		
HOT Approach	Number of "here" students	Instructor	Student	Support Personnel	Hardware	Resources	Configuration
Virtual Flipped	Up to 8	Presenter, Discussion Facilitator, and Technology Support	Learners	As needed	Instructor computer; Projection; USB webcam; USB omnidirectional speakerphone	Web conferencing software; Slides supporting planned instruction; discussions; other activities	Conference table for "here" students; Projection of instructor's web conference; speakerphone positioned to cover all "here" students; elevated USB webcam repositioned as "here" students speak
Student Facilitated	Up to 15	Instructional leader	Technology facilitators, Chat monitors, Discussion facilitators, and	Varies from in-room support to on call, depending on the technology	Widescreen camera; 4 spider speakerphones; 2 projectors; 2 laptops to manage video conference and	Web conferencing software; Slides for discussion facilitators; and Manuals	Small group tables; Turning on TV Monitors at pods and loading discussion slides; Logging into web conference for student meeting and connecting headsets at

			Learners	skills of teacher and newness of technology set up	chat separately; headphones for each virtual breakout session	for technology facilitators; Student directions for how to attend virtual sessions	pods; Getting projectors set up; Logging into main training session on multiple laptops to show different views (e.g. chat and presentation)
Hybrid	Up to 8	Presenter, Discussion facilitator, and Technology support	Learners and discussants	As needed	Instructor computer; Swivl automatic pan-and-tilt platform; USB wide-angle high definition web camera; Noise-canceling USB microphone/ speaker	Web conferencing resources; Slides supporting planned instruction; Discussions; Other activities; Web conference whiteboards	Reservation of conference room; Setup and configuration of Swivl, webcam, and USB microphone/ speaker; Setup and configuration of web conferencing space (login, adding slides, creating breakout rooms and shared whiteboards); Projection of instructor web conference; Management of web conference software; Management of Swivl