Is Online Life a Breeze? A Case Study for Promoting Synchronous Learning in a Blended Graduate Course

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Abstract

This case study examines a synchronous online teaching practice in a blended course in which distance and residential students jointly perform multi-media presentation and verbal critique to improve individual students' projects in media design. The research focused on the pedagogical strategies, tools, and issues associated with synchronous teaching. The researchers looked at how learning was promoted, and how interaction was mediated using a combination of communication tools - Breeze (now called Adobe Connect Professional) shared screen and Breeze voice, telephone, or text-based discussion. Online instructors' perceptions of the benefits as well as disadvantages of the synchronous mode were identified and discussed. Based on the findings, suggestions are offered to instructors and institutions interested in the integration of synchronous technology into their courses and programs.

Key words: synchronous online teaching, online pedagogy, online teaching guidelines, synchronous technology (tool), blended learning

Introduction

As broadband Internet access becomes more affordable and the advanced communication technology provides more varied features ensuring multi-interactive learning experiences, synchronous instruction– which previously had not been adopted as often as asynchronous – is fast becoming an important communication mode in online learning fields (Shi, Mishra, Bonk, Tan, & Zhao, 2006) (Synchronous instruction, or synchronous learning, in this paper, refers to real-time instruction or learning occurring entirely online.). However, because of its newness, research on synchronous learning has not received significant research attention (Shi et al., 2006). As a result, the efficacy of synchronous learning has not been explored satisfactorily to know how this mode impacts online learning experiences, what pedagogical strategies are best suited for different learners and learning contexts, and what tools provide better support for those strategies. Synchronous instructional modes and techniques offer fresh and interesting opportunities for enhancing learning across age groups and disciplines that should attract a plethora of research attention during the coming decade. What is exciting for educational researchers is that, at present, we are only at the entry point for such research.

For successful online instruction, it is vital to use synchronous and asynchronous modes appropriately and to acquire skills and practical strategies for such communication systems. In this study, the researchers look closely at the instructors' practices in a synchronous context and address how individual strategies have influenced group interaction and processes. In addition, we examine how the tools were used to support the instructors and the students as well as the types of support that seem necessary for better use of synchronous technology. Also explored are the instructors' perceived benefits and disadvantages of the synchronous mode and tools. Based on the findings, the researchers suggest several instructional guidelines for effective synchronous instructional design and delivery. Given the newness of this field, however, such guidelines are not intended to be comprehensive or prescriptive. Clearly, much work remains.

Issues and Solutions on Synchronous Communication

There is mounting evidence that synchronous instruction has a positive impact on online students' learning by supporting the types of elements often found in face-to-face contexts (Lobel, Neubauer, & Swedburg, 2002; Murphy, 2005; Oren, Mioduser, & Nachmias, 2002; Orvis, Wisher, Bonk, & Olson, 2002; Rogers, Graham, Rasmussen, Campbell & Ure (2003); Shi & Morrow, 2006; Veerman, Andriessen, & Kanselaar, 2000; Wang & Chen, 2007). Orvis et al. (2002) examine synchronous text chat interactions in military training sessions. They indicate that online interactions focusing on problem-solving show a similar pattern of interaction as found in a corresponding face-to-face course within the military: on-task (55%), social (30%), or technology-related (15%). In that study, the observed synchronous interaction patterns changed over time. Mechanical interactions steadily reduced as students acquired skills and knowledge about technology. On-task related interactions reached their peak near the middle of the training time, whereas students tended to be more involved in social interactions at the beginning and end of the six-month training time period. The researchers argued that clear patterns of collaborative interaction occurred in a synchronous problem solving context. They also contended that social interactions had a positive impact on the group problem-solving behaviors.

In another study, Lobel et al. (2002) found that online synchronous interactions in an inquiry based learning context were parallel in nature, whereas face-to-face interactions were typically viewed as serial events. Parallel communication is observed when online discussion participants post their individual messages simultaneously with a given time and date stamp. These researchers indicate that, "[Parallel communication] enhanced the perceived worth of the group to be many times the sum of the worth of its individuals and it is this synergy that made collaborative learning attractive and effective to the participants" (Lobel et al., 2002, ¶11). In addition, they noted that seventy percent of the discussion participants in the synchronous learning situation were actively participating in the discussion within five-minutes of the one-hour discussion period. The researchers felt that the high percentage of participation as a form of parallel communication was perhaps due to the fact that the online context observed (in this case, mediated by the "eClassroom") was more dynamic in terms of trust formation and data flow than that seen in a face-to-face section of the same course.

Of the advantages of synchronous interaction, teacher immediacy and dynamic interaction are highlighted by researchers as elements benefiting students who work in different times and locations. These two advantages are often discussed in conjunction with issues involved in the synchronous delivery mode. As Nipper (1989) points out, "The primary aim of implementing computer conferencing in adult learning is to overcome the problem of social distance between learners and teachers, not just geographical distance" (p. 71).

In an education context, "distance" can be explained using the concept of "immediacy." Immediacy refers to verbal and non-verbal behaviors used by instructors to reduce psychological distance between students and instructors (Gorham, 1988). In a traditional classroom, nonverbal immediacy is perceived as physical cues such as body position, facial expressions, smiling, eye contact, and gestures (Anderson, 1979), whereas verbal immediacy includes encouraging students to participate, using personal examples and humor, providing as well as inviting feedback, and addressing students by name (Gorham, 1988). It is known that both nonverbal and verbal immediacy influences student motivation and cognitive and affective learning in a positive fashion (Christopher, 1990). Particularly, for low involvement students,

instructor immediacy enhances student attitude change toward the subject matter because those students consider the instructors' high immediacy (e.g., friendly and warm communication style) as a key aspect of high quality instruction (Booth-Butterfield, Mosher, & Mollish, 1992).

Some efforts have been made by researchers to see how immediacy works for Web-based contexts in which nonverbal immediacy behavior is significantly limited (Arbaugh, 2001; Freitas, Myers, & Avtgis, 1998; Melrose & Bergeron, 2006; Mullen & Tallent-Runnels, 2006). For instance, when the online dialogue is mediated by written language, both synchronous and asynchronous interactions are likely to lack verbal and physical cues. Arbaugh (2001) finds that the online immediacy behavior of instructors is an important factor in Web-based MBA courses impacting on online students' satisfaction and learning experiences. In other studies, instructor immediacy and student immediacy positively influence and enhance participant mutual understanding, while, at the same time, creating an overall social climate which increases interactivity among participants in online discussions (Melrose & Bergeron, 2006).

On the other hand, some researchers have expressed concerns or are openly hesitant about available synchronous tools and choice options. For instance, Marjanonic (1999, p. 131) stated that "…the majority of synchronous collaborative tools enable communication (such as text-based chat systems or video teleconferencing) rather than computer-mediated collaboration." Perhaps it is partly for this reason, communication over collaboration, that educators have been somewhat reticent to adopt synchronous instruction within online courses in higher education where collaboration is playing an increasing role. Pfister and Mühlpfordt (2002, pp. 4), citing the work of Hesse, Garsoffky, and Hron (1997), delineate several possible limitations in using a synchronous text-based mode for collaborative discourse: (1) Lack of social awareness, (2) Insufficient group coordination, and (3) Deficient coherence of contributions.

Several solutions are suggested to decrease the potential problems related to distance discourse and processes. Bonk and Reynolds (1997) delineate online strategies to support critical thinking, creative thinking, and collaborative learning. Focusing on effective discussion methods, they suggest different roles assigned to each discussion participant such as a starter who reads ahead commences discussion, a wrapper who summarizes the discussion that transpired and remaining open issues, or a debater who argues the pros and cons about the given topic. There are literally dozens of additional roles that learners can be assigned (e.g., questioner, coach, optimist, pessimist, sage, encourager, idea squelcher, etc.) to facilitate their synchronous interactions and resulting learning outcomes.

Even with such innovative pedagogies, it is difficult to equalize participate contributions in a synchronous forum. Pfister and Mühlpfordt (2002), in fact, point out the problems in equalizing contributions and creating coherent communication within synchronous discourse since there can be deficiencies in its structure. These researchers advocate the use of learning protocols to facilitate a synchronous text-based discussion performed by a small group (e.g., three to five students). That is, the programmed software provides the necessary structures of discussions to elicit balanced contributions and maintain coherence within the discourse presented by team members. However, the researchers noted that the learning protocols introduced in their study may not apply to all learning contents and contexts. Rather, they recommended the application for "a kind of short time exercise with clearly defined objectives and time restrictions" (Pfister & Mühlpfordt, 2002, ppg. 34). The point the researchers call attention to is the provision of the proper learning structure for different learners, contexts, and contents to maintain the quality of the synchronous discourse.

Research Context

This study has been conducted as a part of a larger research project on synchronous technology integration into a graduate distance program in educational technology at a large state university. The researchers examined a key course in this program for master's and doctoral level students. The students in this course learned the principles of message and media design and expanded their learning by developing their own instructional media products. During the spring of 2006, this course merged students in the distance and the residential sections. This merger was most apparent when using a synchronous conferencing tool called Breeze (now called Adobe Connect Professional) for various course activities and meetings. Twenty-two of the distance students and eleven of the residential students enrolled in this blended course. One full-time faculty member and five graduate teaching assistants jointly

facilitated the course.

During the semester, the students were required to complete three main projects individually. At the same time, they were supposed to participate in four synchronous critique sessions in which students and instructors met as a small group and conducted peer evaluations of the students' ongoing media design products. The critique sessions held in this particular course aimed: (1) to help students apply the newly learned design principles in order to formatively evaluate media design products, and (2) to exchange constructive feedback on each other's projects in progress.

Each critique session consisted of three to four students and one instructor as a facilitator. The session was mediated by combined synchronous communication technologies, such as the Breeze web-based collaboration tool, including a text-based chat or voice conference feature, or a standard telephone conferencing tool depending on the instructional conditions and instructor preferences. Breeze is a recently emerging Web-based collaboration system that can connect instructors and a group of students virtually as well as support environments for multi-media presentations and collaborations (Figure 1)

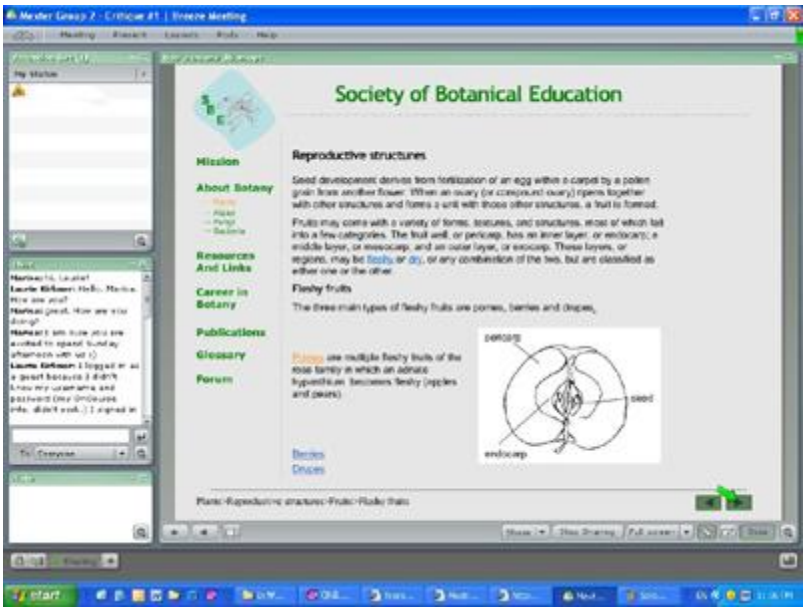

Figure 1. A synchronous critique session in Breeze context

For each session, the individual instructor contacted the students (3-4 students per session) to schedule a meeting. Once the meeting time was set, the instructor created the virtual meeting space in the Breeze web server supported by the university and sent the students the URL of the website that the students would log into later. On the scheduled date and time, the instructor coordinated the Breeze environment in which the student (i.e., the presenter) uploaded a presentation file to the Breeze screen to share it with the team members during the presentation. The instructor also arranged a Breeze Voice conference or a telephone conference to communicate with the participants.

Throughout the semester, a total of 49 synchronous critique sessions were conducted in this course (see Table 1).

Table 1.*Numbers of Synchronous Critique Sessions and Tools Used*

Number of synchronous Critique sessions held	Tools used for synchronous critique sessions
49 (including 3 practice sessions)	Breeze* & telephone (38)** Breeze & Breeze voice chat (4) Breeze & Breeze text chat (5) Breeze & Breeze voice chat & telephone (2)

* Breeze used as a visual display for uploading student's projects and helping to share the same screen during the presentation.
** Numbers in parentheses denote the number of critique sessions via the various communication tools.

Research Methods

Data were collected from January to May, 2006. The primary data collection methods included individual interviews with the instructors as well as the experiences of one of the researchers who participated in team-teaching this course. During the semester, this individual facilitated eight critique sessions as well as observed two text-based chats and four recorded critique meetings in the Breeze server. The researcher's experiences in this course influenced the initial list of questions for the interviews as well as analyses of the data collected. In terms of the data, the students' experiences in this study (Park & Bonk, in press), a course evaluation survey, the course instructors' critique assessment reports, and asynchronous discussions that occurred in the course website were utilized to interpret the data collected and uncover any differences between the instructors' comments and other data sources.

The interviews aimed to know how instructors experienced the synchronous critique including their perceptions about synchronous teaching, the strategies employed, and the challenges facing participants within a synchronous context. The subjects participating in the interviews consisted of one primary faculty instructor and four assistant instructors who were involved in teaching this blended course and facilitating the synchronous critique sessions.

The interviews were conducted in a semi-structured way through face-to-face meetings or *via* telephone. Before each interview, the researcher sent the instructors the list of the questions (see Appendix) and information about the study. During the interview meeting, the researcher used the same questions in the list as well as follow-up questions about emerging issues. The meeting time for each subject took from forty to seventy minutes. All interviews were tape-recorded, transcribed, and analyzed by one of the researchers. After each interview, a summary of the interview was emailed to each subject to correct the researcher's misinterpretations about their intentions and to ask additional questions to clarify the responses that they had already made.

Findings and Discussions

In terms of learning effectiveness and satisfaction measured by the students' and instructors' feedback, the synchronous mode of instruction in this course was successfully implemented. A course evaluation was conducted online at the end of the semester. Seven out of eleven residential students and nineteen out of twenty-two distance students participated in the survey. The results revealed that 85 percent of the residential respondents and 84 percent of the distance respondents agreed that the online critiques were helpful for their project completion.

Follow-up interviews with four distance students and four residential students were then conducted (Park & Bonk, in press). The findings of the interviews with the students indicated that they were satisfied with the synchronous activities in terms of the prompt feedback, meaningful interactions, and instructor's appropriate supports. On the other hand, time constraints, a lack of reflection time, tool-related problems, and peers' insufficient preparation in the necessary equipment and technology were identified as the main challenges.

In this study, the collected data from the interviews with instructors were analyzed to find the common themes as the unit of analysis. The themes helped the researchers identify the instructional strategies used for the synchronous critiques and understand the positive and negative aspects of the synchronous instruction. The following section describes the findings in this study in terms of the: (1) instructors' perceived benefits and issues of the synchronous critique; (2) instructional supports the instructors provided; and (3) prevailing issues related to the synchronous tools used.

Benefits and Issues of Synchronous Instructional Mode

Compared to the time delayed interaction (e.g., discussion forum, Q&A forum), the synchronous critique discussion used in this course offered vastly different benefits for the instructors and the students. The instructors interviewed indicated that real-time communication helped to promote more interactive and meaningful engagement during the discussions. For example, early in the semester prior to the start of the synchronous critique meetings, the distance students communicated with the residential students and the instructors in the asynchronous forums within the course website. As the quote below indicates, one of the distance students felt more connected to other students during their online collaborations within the asynchronous conferencing.

> The group work was challenging [in the other course]…but it also helped me to feel connected, and like I was on the same page as at least a few other people =). I'm looking forward to some chats so I can feel connected again. [Emoticon in original]

Her posting was echoed by several replies from peer students who essentially expressed the same concerns and expectations. It is important to note that, even early in the semester, the students were actually involved in certain types of interactions in the asynchronous forum through Q&A sessions and informal discussions and socializing. Interestingly, the types of interactions the students appreciated here were actually more geared to real-time based engagements, such as synchronous task-oriented discussions or collaborative team tasks. In fact, the instructors noted that the student complaints about feelings of isolation completely disappeared when they started participating in the synchronous meetings. However, the opportunity for live interaction was not the only factor that lowered or eliminated any deemed isolation barriers. Instead, several elements might interact to create a sense of community among the students and stimulate meaningful interactions. These elements include the availability of fast feedback, social supports, rich verbal elements, and instructional strategies.

One of the disadvantages online students commonly experience is delayed feedback, especially when interactions mainly occur asynchronously (Doherty, 2006; Song et al., 2004). Students are often frustrated when their questions are left unanswered for several days and feedback on assignments lags. The instructors in this study reported that the synchronous interaction made it possible to instantly address students' questions related to the course content, project requirements, and technology (e.g., the use of different design software). In addition, the instructors commented that synchronous interaction within this class encouraged the critique participants to exchange constructive feedback, offer voluntary help to team members, and seek other forms of help from instructors. For instance, one instructor stated:

> It is consistently happening to students [in an asynchronous forum]. Many of them don't know what they have to [say] and they are insecure in being able to discuss the topic. They are very cautious; conservative in the amount of what they say or what they try to address. [However] synchronously, especially with voice, they go faster and they try things out little more.

The instructor pointed out that some of the students in this course who were already involved professionally in media design fields had a good chance to contribute to the learning of others. As an

example of the value of incorporating real world experiences into the class, the instructor commented, "In this blended course, the residential students probably benefit from seeing the work of the distance students because many of them are employed professionally now and just gave them [the residential students] a wider group to interact with." Other instructors also indicated that the multiple critique sessions allocated across the semester helped students significantly improve their own products.

Unlike face-to-face conversations, the lack of audio elements in online conversation influences communications. For example, a text-based chat is known to be more difficult for effectively delivering a speaker's meaning and intentions than a voice or video chat. According to Dennen (2005), "Communicating online requires that the writer chooses words carefully and the reader be prepared to engage in a process of meaning negotiation rather than jumping to conclusions or offense" (ppg. 19).

The audio-based communication during the critique discussion in this study supplied rich verbal elements that a text-based communication could not offer. The participants were able to communicate by listening to each others' voices as well as their conversational tones and emotional expressions. The instructors agreed that such verbal cues enhanced their mutual understanding and increased the general connectivity among the participants.

While many students found the verbal communication for online discussions useful, one of the students interviewed expressed highly positive experiences, as follows: "When you actually hear the voice speaking those same words there is helpfulness and kindness in the tone. There is little room for error in the meaning of the words or critique when you are speaking in real time and can immediately correct any misconceptions of your intent." (Park & Bonk, in press)

In conjunction with verbal communication support that the instructors pointed out, the words of encouragement and compliments exchanged during the critique worked positively for the students who were worried about their knowledge and skills in media design. The positive and helpful comments offered by peers appeared to motivate the students and enhance their confidence. Consequently, the instructors argued that this experience could prepare the students for later criticisms and concerns. In addition, one of the instructors reported how humor and verbal immediacy worked for critique climate in a positive way:

> The critique participants joked around and linked back to times they have met in other critique sessions. They talked about the process they had been going through while working on this project and compared experiences. They appeared to enjoy and value the meeting together.

The previous research on immediacy also shed some light on the influence of the psychological elements (or immediacy) on online students' learning and motivation (Melrose & Bergeron 2006; Mullen & Tallent-Runnels, 2006). Instructors' social supports as well as peer students' social presence are influencing elements not only for enhancing the cognitive learning, but also for creating a social climate which increases interactivity among participants in online discussions (Melrose & Bergeron, 2006). From such perspectives, establishing a learning community and facilitating social supports is important in helping students to be more active online learners.

Given these findings, the synchronous interaction opportunities in this study were more likely to play a positive role in the promotion of interpersonal and social relationships among participants. Furthermore, the small-group-based live interaction could encourage an active role on the part of learners and promote meaningful collaboration as a group. Particularly, collaboration mediated by the audio conferencing tools (e.g., Breeze shared screen and telephone) could provide a novel social dimension that was conducive to positive learning experiences and learning satisfaction. Table 2 presents a summary of the benefits of the synchronous critique activities.

Table 2. Benefits of Synchronous Peer Critique Discussion

Providing immediate feedback
Encouraging to exchange multiple perspectives
Enhancing dynamic interactions among participants
Strengthening social presence
Fostering the exchange of emotional supports and supplying verbal elements

Instructional Supports

Student positive experiences and satisfaction in this synchronous discussion could not be achieved without planned instructional supports and the appropriate use of communication tools employed by the course instructors. It has been emphasized by many other researchers that online instructors' skills and knowledge in online pedagogy and tools are critical elements for successful distance learning (Berge, 1997; Bonk & Dennen, 2003; Oliver, 2000).

Given such recommendations, the following section discusses how the course instructors attempted to take advantage of the benefits of the synchronous instruction mode and lessen the challenges of the real-time interaction through various instructional supports and the available synchronous tools (see also Table 3). The instructional approaches presented here are organized based on the strategies the students viewed useful for their learning. The two key areas discussed are: (1) Prepare students before the synchronous activity, and (2) Promote active student involvement through preplanned interaction structures, scaffolded learning, and small group activities.

Prepare Students

Since few of the students in this course had ever used the Breeze synchronous systems for learning-related purposes before, there was a pressing need for the instructors to train the students with the Breeze system as well as explain the purpose of the synchronous interaction in this course. In preparation for the actual critique discussion sessions, the instructors used ground rules, practice sessions, and materials to be analyzed and critiqued.

The ground rules (guidelines) included in the course syllabus explained the objectives of the critique, the critique requirements, and the rules and examples. The guidelines made clear what the students should do and should not do as a critique receiver and a critique provider. For example, it advised that "the person whose work is being considered will present the work, including a brief statement of the audience and goals for the work [and] a brief (2-3 minute) walk-through of the work that shows as many of its unique characteristics as possible…" The kinds of statements the critique givers should include in their verbal critique were also addressed in terms of discrepancies, concerns, and successful features.

The rules and guidelines are particularly useful when they clearly communicate the instructors' expectations, the purposes of the critique activity, and requirements. The student interviewees responded that they read the guidelines before the activity and viewed the information useful not only for the preparation, but also for understanding of their role in the activity (Park & Bonk, in press).

Prior to the synchronous critique sessions, practice sessions were held by the primary instructor via one face-to-face format and three online synchronous modes. The practice meetings aimed to demonstrate the procedures and requirements of the critique and to accustom students to the functions and features of Breeze. While the instructor held multiple practice sessions in varied modes in order to focus on a different emphasis of the critique activity, some of the students participating in the interviews responded that the most helpful session was the first actual critique meeting because they could perform it with an authentic topic in the Breeze environment talking through the audio conferencing tools. That is, although each practice session was designed to focus on one or two elements of the critique activity, it lacked some of the conditions (i.e., the face-to-face critique meeting focused on the critique procedures but it could not provide an opportunity to use the Breeze system). However, both the instructors' as well as the

students' points are worthwhile to include in a plan of practice sessions. To make practice more useful, it is necessary that such sessions address individual key elements of the critique activity under authentic conditions.

The students preferred that any materials intended to be used for the synchronous critique meeting be made available beforehand. For instance, when the students worked on the development of a Web-based lesson, some of the instructors collected the relevant student URLs and distributed the list to the students in a team ahead of each session. Such a coordinated approach appeared to work particularly well because, according to the students, it could provide them with time to look at each other's projects before the critique session began and assess them against the design principles and project requirements. Because the synchronous critique was performed in a time-pressed condition, the students were often required to perform the multiple high level and intense cognitive processing for evaluating other team members' projects and then nearly simultaneously discussing them in the context of course topics. Providing additional review and reflection time would decrease cognitive overload as well as increase a chance to bring more quality feedback to the meeting.

Table 3. Instructional Strategies Employed by the Instructors

Instructional Strategies
Prepare Students Provide ground rules and guidelines. Hold practice sessions. Provide materials to be critiqued prior to the activity.
Promote an Active Involvement Structure the synchronous critique activity Scaffold students' discussion Use a small-group and be flexible about synchronous activity management Require students to keep a critique log and write a reflection paper after each session.

Promote Active Involvements

The synchronous critique meeting in this course was designed from a learner-centered pedagogical perspective. That is, the instructors encouraged the learners play a more active role in their learning by taking the initiative in seeking information and collaborating with other team members to tackle issues closely relevant to their professional interests or course projects.

While the instructors had the freedom to tailor their own sessions according to the learning context and the learners assigned to them, the findings of the study showed that the overall critique sessions were commonly structured in this manner: (1) presenters' presentation, (2) question and answer between the presenter and team members, (3) team members' critique, and (4) summary. Given that synchronous interactions were held under one-hour fixed time conditions, the discussion structure was more likely to help instructors to manage the time pressed discussion in an organized way and also help the instructors to elicit quality discourse from the students.

On the other hand, the instructors stated that they acted as facilitators to give students more power to freely exchange opinions instead of dominating the discussion. One instructor, in fact, stated:

> While the students were giving their feedback, I listened to them and considered their opinions to determine if their feedback is valid or important or makes sense. When it's my turn to say, I would usually say whether I agreed with them and why. I'd also provide any additional feedback that I think is important but had been left out by my students.

It was observed that the cognitive supports were provided during the discussion in varied forms. For

instance, the instructors provided information, clarified meanings, and summarized key points (e.g., "So, to summarize, overall the group liked the layout and images Jane used on the two pages....Jane may want to think about whether how many font treatments she needs, and if there are other ways to emphasize different types of information."). The instructors also brought up questions and issues whenever the discussion was inactive or the students focused on one point rather than dealing with different aspects or perspectives (e.g., "Did you have a functional reason for choosing these particular colors?"). Directing questions to quiet students was a commonly used strategy in order to draw out balanced contributions by team members (e.g., "Peter, Kim, what do you think about the way Jane combined the detailed information about fruit with the information about vegetables on this page?"). As noted in the quote below, one of the instructors attempted to validate or acknowledge the critique providers' points when they were not confident or not welcomed by the critique receivers:

> When some students have made a very legitimized criticism but they say, "I am not really sure but it seems to me…" or "This might be just to me…", I am trying to give not only the formal principle, but also kind of support to their comments.

The students' responses revealed in the course evaluations and the interviews indicated that such instructional supports were particularly valuable to help them focus and make sure they were successful in performing their synchronous tasks:

> Student A: He [the instructor] effectively controlled the pace and led us to focus on important points of our projects. He also came up with meaningful questions or suggestions about our projects, which gave me a lot of help.
>
> Students B: A summary at the end by either the instructor or the participant was helpful. Even though I had the same remarks noted it was good to hear the instructor repeat them.
>
> Students C: Her comments were made clearly; they were constructive with a positive tone, but they were critical…which you need…I felt like her insights actually taught me to see slightly differently.

The instructors agreed that a small group (i.e., 3 students) worked effectively for a one-hour audio conference. More than three students in a team created problems in coordinating the sessions and increasing students' workload for reviewing the projects to be critiqued. In contrast, the sessions tended to be inactive when fewer than three students were involved in a critique team because of relatively less diverse experiences and fewer perspectives. The critique meetings were scheduled to be one hour sessions. Student attendance at these sessions was typically not problematic which is not too surprising given that this was a graduate class. The same results may not have occurred had this been an undergraduate class. Flexible synchronous decision making and guidelines seem to be vital for deciding the size of the team, the interval between the critiques, the duration time, and the scheduling for the given conditions.

In sum, despite the unique advantages of synchronous mode of interaction, it has often played a supplementary role within asynchronous online instruction (e.g., online chats with guest experts or online office hours). Some researchers (e.g., Murphy, 2005) have attributed the low adoption to its relatively low reliability, high price, and bandwidth constraints, whereas other researchers (e.g., Hesse, Garsoffky, & Hron, 1997) have pointed to pedagogical limitations such as insufficient structure and supports of synchronous discussion. Several solutions are suggested to decrease the potential problems related to real time discourse and processes. Some researchers such as Pfister and Mühlpfordt (2002) recommended the use of the necessary structures of discussions to generate balanced contributions and maintain coherence within the discourse presented by team members. It appeared that the instructors in this study nicely addressed these concerns through structure and multiple scaffolding strategies to help students' thinking and to guide knowledge application during the critique activity.

Issues on Synchronous Tools Used

Overall, the instructors showed high satisfaction with the Breeze shared screen feature. The advantages of Breeze identified by the instructors included: (1) Not difficult to share varied file types visually, (2) Functions to organize critique participants' roles and screen control, (3) Compatibility with the existing course, (4) Ease of use, and (5) Capability for recording and archiving

Depending on the conditions, the instructors used the Breeze voice chat or telephone to talk with their students during the critique. Telephone conferences were preferred by the instructors over the Breeze Voice chat because the telephone was an already familiar tool for the instructors and the students and it provided a stable condition that was much less vulnerable to the participants' technological conditions.

The most frequently encountered problem involved the resonating voices the Breeze voice tool created. In addition, some students' connection problems (when it forced them to drop out repeatedly during the critique) seriously impacted group communication and the team's ultimate performance in a negative direction.

In sum, a useful approach for not depending on any single software is likely to facilitate more sophisticated forms of synchronous interaction. Instructors need to be aware of different synchronous tools available for their courses and have knowledge and skills about such tools before using them in a course. Equally important, the preparation of necessary equipment, the speed of synchronous conferencing connections, and the selection of the appropriate tools must be considered before holding the synchronous meeting. Table 4 summarizes the issues discussed.

Table 4. Issues Identified on Synchronous Tools

	Advantages	Disadvantages
Breeze shared screen	Shared view and content during presentation Features to organize participants' roles and screen control Compatibility with the existing course Ease of use Recording and archiving function	Small screen viewer when other pods are used at the same time. Delay or difficulty in playing large-sized files.
Breeze voice conference	No additional cost needed Ease of use	Vulnerability to user's technical conditions
Telephone conference	Stable condition Ease of use	Relatively high cost
Breeze text-based chat	No additional cost required	Difficulty in moderating discussions with a large group of students

Conclusions

This study examined how the synchronous communication mode was incorporated in a blended graduate course to facilitate real-time critique sessions carried out by the residential and distance students enrolled in the graduate course. The findings showed that the combined power of synchronous communication tools with the effective instructional approaches used for the synchronous discussion created a novel instructional condition that could not be easily achieved by an asynchronous mode of communication. That is, the real time interaction effectively supported two of the key instructional goals—effective learner multimedia presentations and intense learner critique discussions. The synchronous environment also fostered a vast array of social interactions. In addition, live meetings in small groups encouraged learners to maintain an active role in the discussions and facilitated meaningful collaboration. Equally important, the multiple critique sessions conducted across the semester provided a recurring chance for the

instructors to instantly address students' questions related to the course. In turn, the non-delayed interaction benefited the students by having a chance to exchange useful information among the students, direct their questions to the instructors, and improve their projects.

The course evaluation survey and the findings from student interviews provided evidence that the real time critique sessions contributed to students' satisfaction and overall learning. Coupled with fast-paced live characteristics of synchronous mode, several elements such as well designed and effective instructional approaches, social presence, rich verbal cues, and proper technology use seemed to synergistically interact to promote a sense of community and enhance task-related learning. As previous studies of asynchronous interaction and communication have reported (Doherty, 2006; Song et al., 2004), there were similar complaints about the lack of interactions and delayed feedback expressed by some of the distance students early in the semester before they were involved in the synchronous meetings. Given that students' complaints about feelings of isolation disappeared when the synchronous meetings commenced, the synchronous critique activity in this course seemed to address the students' needs that were not easily satisfied in the time delayed learning environments.

The team teaching capability in this course appeared to be one of the critical factors of the synchronous instruction success witnessed in this study. For instance, team teaching made it possible to implement 49 small-group based meetings during the semester. One primary instructor and five teaching assistants provided planned supports and practical guidance for their students to achieve the key course goals before, during, and after the synchronous meetings. It is plausible that recruiting qualified team teaching members and developing effective synchronous communication and collaboration aids is the key to successful learning synchronous learning experiences; at least in higher education.

It may also be that appropriate use of several different synchronous tools and approaches played an important role in fostering quality learning experiences during this course. The advantages of real-time communication were multiplied by the use of combined synchronous tools. The lack of dependence on a single software tool or approach was meant to facilitate more sophisticated forms of synchronous interaction.

Another factor impacting the results found here was that the students were experienced in educational technology use. In addition, they were majoring in educational technology; hence they likely had internal motivation to succeed here. Both of these factors might be deemed limitations of this particular study.

We also observed a potential limitation that the instructors did not appear to utilize the recorded audio files. Some of the Breeze meetings were recorded and archived to allow the students to access the recorded sound and visual presentation files, while most of the telephone mediated meetings were tape-recorded not for the students' use, but for research purposes. Unfortunately, the researchers did not have a chance to explore whether or when the students actually used the Breeze recorded sessions and how the recorded files actually facilitated students' learning in this course. Future studies might address this issue further.

There were also tool related problems observed in this study. For instance, we noted severe echoes generated by audio conference tools, students sometimes lacking necessary equipments (e.g., headsets for talking), and slow network connections, among other problems and challenges to the synchronous processes and performances. To cope with such problems, online instructors might make different synchronous tools available for their courses and try to obtain sufficient knowledge and skills about each of these tools before using them. Of course, having an instructional team may also help in this regard, since each team member could become an expert at a different synchronous tool or feature.

Implications

Based on the key findings of this study, several suggestions are offered below related to instructional guidelines for synchronous teaching. These guidelines include strategies on how to prepare students for synchronous audio conference meetings and how to promote active and meaningful interactions. Our guidelines and suggestions should help institutions plan for the incorporation of the synchronous mode of instruction in their various programs.

Prepare Students for Synchronous Learning

Naturally, the learners are central to the effectiveness of synchronous online instruction. Learners may not have experience with technology-mediated synchronous instruction; at least not with the particular tools employed within a particular organization. As a result, it vital to train them with basic technology skills as well as to explain the purposes and benefits (as well as the problems) associated with synchronous communication. Some recommendations are listed below.

1. Clarify Technology Requirements. Before commencing with any synchronous activities or instruction, require student to be equipped with the necessary software and equipment (e.g., a headset for voice chat) as well as a stable Internet connection. Extensive preparation fosters a more rich and engaging learning process, including quality group interactions and performances.
2. Explain Task Purpose. Express explicitly what learning outcomes and behaviors are expected from the synchronous activity. Course resources and materials, synchronous interaction guidelines and ground rules, and team meeting planning aids and worksheets should be provided to help students' understanding and preparation of the synchronous task.
3. Schedule Practice Sessions. Hold practice sessions under the same conditions (e.g., tools, activities, events, and procedures) as those implemented during the actual synchronous meetings. Such practice sessions help students become aware of the procedures and tasks required in synchronous activity and to become familiar with the functions and features of the communication tools.
4. Be Flexible. The instructional plan should be flexible enough to adjust according to students' emerging needs and instructional conditions. Decisions made for communication tools to be used, the duration and number of synchronous sessions, the number of participants per session, and the meeting times need to fit various situations.

Promote Active and Meaningful Interactions

Not only must students be prepared for synchronous instruction, but instructors need to reconsider their pedagogical techniques when utilizing synchronous learning tools. More emphasis should be placed on active and engaging learning approaches where students are placed in charge of their own learning. More than fifteen or twenty minutes of direct instruction without engaging the learners can prove to be quite deadly. Utilizing synchronous tools such as online polling, web browsing, drawing, and chat can involve students more in the learning process and focus their attention. Some of the points offered below also should increase learner motivation and engagement.

1. Scaffold Students' Discussion. Instructors should not dominate or lecture but facilitate more interactive and coherent contributions during the meeting. Instructors, as subject matter experts, information givers, and technology advisors, should use various support strategies such as clarifying meanings, authenticating students' points, providing rationale, and posing questions to keep discussion active and constructive.
2. Create a Social Climate. A positive and friendly environment helps students to be open and reduces problems that might hinder students' participation. Engaging students in task-based collaboration is also important to increase satisfaction and connectivity among participants. A flexible structure, role assignment, supportive interaction, immediate feedback, encouragement, and personal messages seem to foster a sense of community as well as accountability among students.
3. Provide Materials to be Discussed. Topics or materials to be reviewed during synchronous

meetings should be provided before the meeting. Unlike asynchronous discussion, a synchronous meeting requires immediate responses from students often without sufficient time to reflect upon the topics. Materials given to students assist them not only to think deeply about the given topics, but also to bring constructive feedback to the meeting.

4. Facilitate a Small-Group-Based Discussion. An audio conference is not suitable for a large number of participants. Three to four students in a small group is perhaps the ideal number for quality synchronous discussions and interactions.

Provide Faculty with Planned Supports.

Many instructors in higher education remain reluctant, resistant, and reticent to use any form of technology in their classrooms. Such hesitancy is not surprising given that new educational technologies seem to emerge each week with a host of unique expectations for instructors to consider and potentially find a way to embed in their classes. Synchronous instructional tools may pose an even greater challenge and risk for many instructors. The reason for the sense of risk is that synchronous instruction--unlike various supplemental forms of asynchronous instruction such as online discussion forums, student online blogs and reflection tasks, and online testing--may directly replace face-to-face lectures in which they have invested extensive time and effort and, thus, are highly passionate about. Professional development and support in the area of synchronous teaching and learning, therefore, is crucial.

Without a doubt, adapting synchronous approaches to existing courses requires new knowledge and skills. Administrators should understand the different roles and responsibilities of online instructors and develop new support systems better suited for their contexts. To meet these needs, institutional infrastructure and supports must address issues related to instructional supports (e.g., pedagogy), technology supports (e.g., software, hardware, resources, and skills), and institutional support (e.g., an incentive program). Several general ideas are noted below.

1. Provide Technology Options. Introduce all the technology tools available to instructors. They should be given several options for software to experiment with rather than be assigned a single software option and forced to fit it to their instructional approaches and course tasks. And if the goal is one tool or system, instructors' evaluations of various tools should be considered before selection. Higher education institutions should not simply mandate a tool or system since it is free or open source. Should such instructor input be discounted, unnecessary problems and faculty resistance to the use of the system or tool will likely arise.
2. Offer Faculty Professional Development. Provide faculty members a development program in which they (1) obtain information about the available technology tools, (2) share experiences on their use, and (3) acquire the necessary skills and knowledge to use a tool or system. The program should focus on technological skills as well as pedagogical ones, thereby equipping them with appropriate approaches for online teaching. The supports for design, technology, and pedagogy must be sustained continuously until instructors gradually become accustomed to effective ways of teaching with synchronous tools and systems.
3. Provide New Incentive Programs. Changing current teaching approaches and philosophies or adopting wholly new ones always requires extensive time and effort. To make matters more difficult, concerns about increasing workload, preexisting time constraints, and a lack of institutional support negatively influence the ability to recruit qualified instructors to online teaching (Betts, 1998; Dillon & Walsh, 1992; Olcott & Wright, 1995). Funding, a new reward system combined with a solid technical and instructional infrastructure must be reconsidered and established before planning any online program; especially a synchronous one.

We hope that these suggestions will help online instructors and administrators better plan their synchronous courses and programs as well as allow future users to consider the instructional conditions that synchronous tools and systems offer whenever using the guidelines. When such events and conditions occur, perhaps online life will be a bit of a Breeze!

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Appendix

Interview Questions for Online Instructors

1. How many years have you taught online or/and face-to-face courses?
2. Did you ever use any synchronous tools for instructional purposes before this course?
3. How many synchronous sessions did you hold in this course? What tools did you use - Breeze voice, telephone, or text chat?
4. What instructional value did you see in the synchronous critique? Did you have any difficulties in the use of this method?
5. Before each meeting, did you remind students to read the critique guidelines included in the syllabus?
6. Did you provide critique materials to the students before the discussion?
7. What strategies did you use to facilitate meaningful critique?
8. How did the Breeze system work for this synchronous activity?
9. How often did you use telephone, online voice chat, or text chat? Tell us about advantages and disadvantages of each tool. How is Breeze different from other communication tools you ever used?
10. What suggestions would you make to improve the synchronous use?

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