The Value and Challenges of Using Web Conferencing Technology to Integrate Online Students Into Campus Activities

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Abstract: Free and low-cost web conferencing technology is now ubiquitous enough to allow for the development of interactive live streamed programming of campus activities for online students. This *blended experience* approach breaks down the walls between online and traditional education by providing opportunities for online students to engage in synchronous interactions with students and faculty members on campus. WTCC used Adobe Connect meeting software to live stream six campus-based club events during the fall 2016 semester. These live streams were very popular, with 50% of the 674 club participants attending the club meetings online. Survey data showed that online attendees found the meetings to be as valuable, if not as engaging, as did live attendees. Furthermore, many online attendees reported that the live stream provided the only opportunity for them to attend these club meetings. However, reported audio problems associated with larger meetings demonstrated the limitations of using just one type of live streaming tool for all meetings, and suggested the need for flexibility in application of online meeting technology. This paper discusses plans for expanding live stream programming at Wake Tech, as well as a rubric for choosing online meeting products.

What if…

…Susan could attend the Social Sciences club meeting on campus, even though she lived 6 hours away?
…Dr. Smith could take time out from his conference in Denver to live stream a lecture to his English class in Raleigh, North Carolina?
…teachers could hold office hours anywhere and students could come to office hours anywhere?
…distance didn't affect how closely we could work together?

Introduction

In less than 20 years, online education has transformed the world of higher education. A recent survey of 2,800 U.S. colleges and universities showed that 32% of all college students have taken an online class, and 70% of college executives now believe that online education is critical to their school's long-term strategy (Allen & Seaman; 2013). One reason for this growth is the flexibility and convenience of online education that allow students to balance coursework with other responsibilities. However, this flexibility comes at a cost, as students in online courses frequently report feelings of isolation and loneliness in their online classes. The isolation that students feel in online classes is potent and has implications for student perceptions and performance (Curry, 2000; Haythornthwaite et al, 2000; Rovai, 2007).

One solution to this problem is to integrate online students into the campus by providing access to non-instructional activities. Participation in campus-based non-instructional activities such as the library, tutoring centers, and club activities plays an important role in student academic success by allowing students to integrate into the campus (Karp, 2011). For online students, participation in these activities may even be more important as research has shown that online students' feelings of isolation and alienation associated with this physical separateness can be reduced by activities that increase feelings of social presence (Rovai, 2007). Unfortunately, the reasons that lead students into online education are often the reasons that prevent them from taking advantage of resources that might help alleviate feelings of isolation, provide academic support, and promote integration with the school. Campus-based non-instructional resources such as clubs and tutoring centers are often not available to online students that have difficulty making it to campus.

Building Online Capacity: Replication Versus Blending

In developing non-instructional resources for online students, the typical approach begins and ends with the school's website, where campus-based information is provided in limited digital analogs, and administrative transactions that can be completed by the student. However, this *replication* model does not allow for meaningful social interaction among users, the importance of which has been noted by many researchers (Anderson, 2003; Bernard et al, 2009; Jaggers & Xu, 2016, Moore, 2013; Shearer, 2013).

With the advent of web conferencing tools such as FaceTime, Skype, Adobe Connect, and YouTube, it is now time to consider an alternative to this sterile replication model in favor of a model that integrates online students into campus. Rather than building separate educational resources for online students, it might be time to use meeting technology to allow online students to blend into campus-based events and resources. The first iteration of this *blended experience* model used web conferencing technology (Adobe Connect) to create interactive live streams of campus club meetings. Web conferencing is different than prerecorded videos on demand (VODs) because it allows what Holden and Westfall (2008) call *interactional symmetry*. As opposed to the VOD, which allows one way communication (the stream out), web conferencing allows for all meeting attendees to stream their image and communicate in a live, shared discussion. This symmetry of interaction allows for the give and take that is necessary in collaborative events. As well as interactional symmetry, most web conferencing technology platforms allow for the sharing of educational objects such as PowerPoint presentations, YouTube videos, websites, and files that meeting attendees can work on collaboratively. Despite these powerful advantages, web conferencing requires no special equipment or programs for the end user.

Theories of online education suggest two main reasons why providing this opportunity for online students to blend into campus events might be helpful (Moore, 2013). The first is that social interaction helps to build a learning community that encourages critical thinking and problem solving. Furthermore, interpersonal interaction decreases the transactional distance among learners and strengthens the psychological connection the student has to their online class. It seems reasonable to suggest that opportunities for interaction that occur within the context of extracurricular activities would contribute to increased feelings of connection to the school in much the same way that they do within the online class.

Wake Tech Virtual Club Community

Initial efforts were based on successes from a 2015/16 pilot program to live stream club events for the social sciences department at Wake Tech. Remote participation was robust during the school year, and student evaluations suggested that online students found these events valuable and necessary (Roddenberry & Kallimanis, 2016). Based on this success, Wake Tech created the Virtual Club Community (VCC) to develop a program of live streamed, interdisciplinary club events during the 2016/17 school year. Committee members included faculty members from several disciplines within the Arts and Humanities division, as well as staff from multiple campus support units. By pooling the efforts of this interdisciplinary committee, Wake Tech hoped to provide a more diverse program of events that were better promoted, better attended, more interactive, and of higher technical quality than previous interactive live streams. The committee also hoped to gather data comparing the experiences of online and campus-based attendees. Six different club events were live streamed during the fall semester. These events varied in location type and audience size from the relatively intimate crowd of 27 students in a classroom to an ambitious, campus-wide *triple cast,* incorporating 304 attendees in three different audiences; a live audience, a simulcast audience on another campus, and an audience of remote viewers attending via computers and mobile devices. To test the limits of simplicity, all live streaming activity was done on a Dell laptop using only the internal microphone and camera and available campus Wi-Fi. The idea behind this choice was that, in order to be commonplace, live streaming should be able to be done with commonplace tools. Results would eventually suggest this approach to be lacking in certain situations, which will be discussed later.

Quantifying the Value of the VCC

Respondents and Survey

334 of the 674 of the meeting attendees at the six club events (49.5%) attended via computer, mobile device, and, in the case of the simulcast, remotely from an off-campus location. Initial analyses showed no differences among these three remote attendance groups with regard to the survey responses, so they were combined together for the analyses presented here. Emails were collected during the club events and survey links were sent to all students supplying an email address. 173 attendees completed the surveys (26% response rate), with the average age of the respondents being 23.8 years. Four items assessed the attendees' experience at the club event (how interactive?, how engaging?, how informative?, and how valuable?**)**. Two items assessed participants' perceptions of how likely they would be to attend future events. Finally, three items were completed by remote attendees only, and assessed their perception of the technical quality of the event (sound quality, video quality, overall technical quality). Each item was scored on a four-point-scale, and multiple paired sample *t*-tests were used to analyze the data. A copy of the survey is included in the Appendix.

Results

Attendees' Experience

There was no difference between online and seated attendees' ratings of the two items related to interest. Online student ratings of how informative and valuable the events were did not differ significantly from seated attendees. However, the two items designed to measure interactivity and engagement did show a difference based on method of attendance. Seated attendees found the events to be more interactive and engaging than did the online attendees. Means and significance test results are presented in the table below.

Item	Online attendees		Seated attendees		Significance	
	Mean	**SD**	**Mean**	**SD**	***t***	***p***
How informative did you find today's event?	3.64	.55	3.78	.46	1.65	.10
How valuable did you find today's event?	3.57	.68	3.71	.55	1.32	<.001*
How interactive was today's event?	3.2	.72	3.58	.57	3.48	.001*
How engaging was today's event?	3.62	.59	3.91	.29	3.52	.15

(= statistically significant difference)*

Table: Comparing Attendees Perceptions of Club Events by Method of Attendance

Likelihood of attending future events

Two items assessed how likely attendees would be to attend future events, either via live stream (question one) or on campus (question two). Seated and online meeting attendees did not differ in how likely they said they would be to attend a future live streamed club meeting, $t(1,170) = 1.24$, $p = .22$ ($M = 3.15$, $SD = .78$ for seated attendees; $M = 3.31$, $SD = .79$ for online attendees). However, online attendees were significantly less likely to say they would come to future events on campus ($M = 2.77$, $SD = .92$) than were seated attendees ($M = 3.65$, $SD = .53$), $t(1,171) = 5.79$, $p < .001$.

Technical Quality

Remote attendees completed three questions related to the live stream quality. Overall, remote attendees found the overall technical quality to be quite good ($M = 3.3$, $SD = .64$). However, a *t*-test comparison showed a significant difference in the perceived quality of the audio and video streams. Remote attendees found the audio quality of the live stream to be significantly poorer ($M = 2.84$, $SD = .64$) than the video quality ($M = 3.26$, $SD = .81$), $t(1,115) = 6.59$, $p < .001$.

Evaluating Blended Club Meetings: Summary, Challenges and the Future

Summary

Overall, student interest in blended experience events was strong, with half of all fall club attendees choosing to attend the club meetings remotely. Survey data from attendees suggested that remote attendees found these events to be as informative and valuable as the seated attendees. More importantly, the results demonstrated that the live stream presented the only opportunity for many of these students to attend club meetings. However, remote attendees felt the events were less engaging and interactive than did the seated attendees. Finally, the results showed that there are still technical issues to be resolved, especially with regard to audio quality.

Challenges

One main concern was that students attending remotely found the events to be less interactive and engaging than campus-based attendees. This makes intuitive sense, as these attendees were more removed from the event than the campus-based attendees. However, there is enough functionality in most web conferencing tools that this should not be accepted as inevitable. The key to making the most of the blended experience model is understanding the different capabilities of live and remote audiences, then creating events that incorporate engaging activities for each. The typical Q & A session at a large presentation provides a perfect example of this dualistic approach to creating blended experience content. Because of the audio limitations, it was very difficult to recreate a quality Q & A session for the remote attendees. Often, the question was impossible to hear, and many speakers forgot to repeat the question before answering. However, breakout discussion groups, which would be difficult to do in a large club meeting of 100 seated attendees, can be done with the click of a button in a web conference. What is now necessary is for early adopters to create and test new blended experience models that incorporate the strengths and limitations of these blended audience members.

The two most common technical challenges to maintaining a high quality, interactive live stream were *dropping* (meeting attendees being kicked out of the meeting) and poor audio quality. Using Wi-Fi, especially with larger groups sometimes resulted in *drops*, with meeting hosts getting kicked out of the meeting room. Meeting drops involving the host led to all meeting participants losing contact with the live speaker, an especially problematic occurrence. Switching to the use of a cabled instead of WiFi has led to fewer instances of host dropping during live events. Meeting attendees also suffered the same fate occasionally; however these drops were related to end user connectivity. Although not in the host's control, this limiting factor of attendee connectivity must be taken into account when creating live stream programming.

The other common challenge was poor audio quality for attendees. The choice to live stream activities using the internal microphone and camera of the Dell laptop led to difficulty in maintaining a high quality audio and video experience for remote users, especially when streaming large events with large numbers of remote attendees. Although video quality was generally good, audio quality was more problematic. Less than optimal video and audio quality were related to two factors; the use of the laptop camera and microphone, and the size of the room. The purchase of Blue Yeti external microphone ($129) and a Logitech HD Pro C920 ($99) have greatly increased the audio and video quality of livestreams. However, high audio quality was still problematic in larger rooms with bigger audiences. Live events using public address (PA) equipment (microphones, speakers in the room) were sometimes plagued by echo problems. Although some of meetings were streamed quite successfully using Adobe Connect, continued difficulties with improving sound in larger areas has led us to question whether one live streaming tool would be sufficiently flexible and robust enough to live stream in a wide variety of settings.

A framework for selecting meeting technology

The persistent technical difficulties encountered during the fall semester led to the insight that creating successful live streaming will involve a host of products to be used selectively depending upon the needs and constraints of the live event. Early live stream successes using Adobe Connect led to functional fixedness, the inability to see the need to adapt to the situational constraints of the meeting. Metaphorically speaking, we had received a hammer and suddenly believed that everything was a nail! Effective live stream programming in the future will require the mapping of different live stream products, with their individual strengths and limitations, to the demands of the live stream event.

What is needed is a framework that allows the educator to map the correct meeting technology to the constraints of the online environment. One of the observations we made during the semester was that the smaller group activities tended to have more interaction and collaboration than larger group activities, which tended to be more speaker-focused. This relationship between audience size and interactivity maps well onto the qualities of available live streaming tools. The collaborative power of web conferencing apps are better suited for smaller collaborative groups, while the robustness of social media-based streaming tools like Facebook and YouTube streaming are better for events with larger audiences. The figure below includes a sampling of popular live streaming technologies arranged along this dimension of variance.

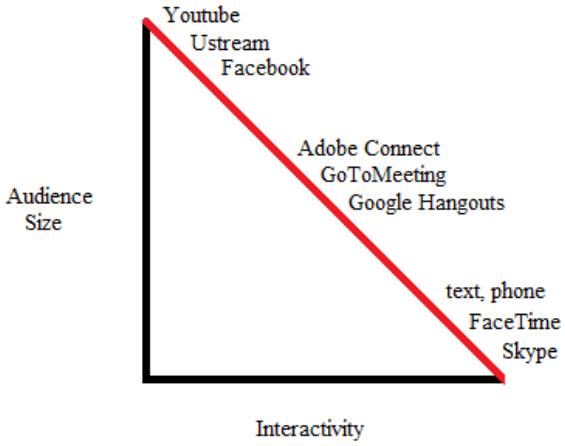

Figure: Mapping Meeting Tool to the Characteristics of Blended Experience Events

Along with web conferencing and social media streaming tools, the evolved live streamer may also need to incorporate FaceTime, Skype, and other synchronous interaction tools designed for one-on-one interactions. Although it is impossible to anticipate the type and need of every blended experience event possible, this framework will provide the reader with a general guide for making an initial selection.

The Future: Expanding the blended experience to other resources

Beginning in the spring 2017 semester, Wake Tech will expand their blended experience model to include two other non-instructional resources; the Individualized Learning Center (ILC), and the Social Science Resource Center (SSRC). The ILC is the main campus academic support center, providing students with assistance in study skills, writing, math, science, and computing. Two blended experience opportunities will be available to students in the spring. These two opportunities include the ability for students to attend live streams of campus workshops, and the ability for students to schedule live streamed individual consultations with staff members from the writing ILC. The SSRC is an open lab for Social Science students, staffed by anthropology, sociology, and psychology instructors. This lounge is often the center of where instructors hold impromptu study sessions or give short lectures to their students. Several instructors have expressed a willingness to live stream some of these extracurricular events for a wider online audience during the spring semester. Also, in conjunction with a First in the World Grant to improve minority performance in online courses, Wake Technical Community College is using the blended experience model to create interactive live stream versions of non-instructional resources for minority students. Research on minority male experiences in higher education suggest that social activities such as mentoring, developing relationships with instructors, and the gathering of social capital are important to the success for historically disadvantaged minorities (Harper, 2012). These social networking opportunities, important to minority student success, are exactly the kinds of qualities that cannot be conveyed in the replication model of providing non-instructional resources.

Long term plans at Wake Tech include creating an entire network of live streamed, fully-interactive, non-instructional resources and activities for students in all areas of the college. Though it is hard to quantify the impact of these activities, it would be interesting to assess the impact of blended

experiences on feelings of attachment, engagement, and student academic success. It seems logical that opportunities to blend in with campus events and people would allow online students be more engaged and integrated with the school, and that this positive orientation would lead to more academic success. Finally, as experimentation with live streaming in academic settings continues, certain activities will prove to be conducive to live streaming. Like any innovation, development will proceed by a steady progression of trial and error with mistakes and insights informing the process. But no matter what tools are used, the time has come for educators to leverage live streaming into the educational process.

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Appendix – Survey Instrument

1. How informative did you find today's event?

1	2	3	4
Not informative at all	somewhat uninformative	somewhat informative	very informative

2. How interactive did you find today's event

1	2	3	4
Not valuable at all	not that valuable	somewhat valuable	very valuable

3. How engaging was today's event?

1	2	3	4
Not interactive at all	not that interactive	somewhat interactive	very interactive

4. How valuable was today's event?

1	2	3	4
Not valuable at all	not that valuable	somewhat valuable	very valuable

5. How likely would you be to attend a future club event via live stream?

1	2	3	4
Not likely at all	somewhat unlikely	somewhat likely	very likely

6. How likely would you be to come to campus to attend a future club event?

1	2	3	4
Not likely at all	somewhat unlikely	somewhat likely	very likely

7. How would you rate the audio quality of this presentation?

1	2	3	4
Very Poor	somewhat poor	somewhat good	very good

8. How would you rate the video clarity of this presentation?

1	2	3	4
Very Poor	somewhat poor	somewhat good	very good

9. How would you rate the overall technical quality of this presentation?

1	2	3	4
Very Poor	somewhat poor	somewhat good	very good