

The Potential of Asynchronous Video in Online Education

Michael E. Griffiths and Charles R. Graham

INTRODUCTION

There are differences in the benefits that are afforded by the two extremes of face-to-face and distance education. University campus courses are based on the assumption that the student community and interaction between learners and an expert teacher in the same physical location is essential to the learning process. In comparison, distance education provides a learner with flexibility, individualized learning, lower costs, and self-determination in the learn-

ing process. Much research has been invested into modern approaches that may be able to harness key benefits from both face-to-face and distance education. One recent breakthrough has come in the use of asynchronous video in online classes at Brigham Young University (BYU). Early results have been promising in finding a way to bridge the gap between the two extremes of education. Using the frameworks of instructor immediacy and social presence, this article presents developments and findings from the study of two



Michael E. Griffiths,
Center for Teaching and Learning,
Brigham Young University,
3800 HBLL, Provo, UT 84602.
Telephone: (801) 422-1268.
E-mail: mike_griffiths@byu.edu



Charles R. Graham,
Assistant Professor, Department of Instructional
Psychology and Technology,
Brigham Young University,
150-F MCKB, Provo, UT 84602.
Telephone: (801) 422-4110.
E-mail: charles_graham@byu.edu

online classes in the School of Education at BYU, where asynchronous video has been developed as a central method for communication, assignments, and feedback.

IMMEDIACY

Some of the advantages of a face-to-face setting can be described in terms of the benefits of the close social interaction that exists in a classroom. Close social interaction between teacher and student, which is one important facet of the overall domain of social interaction, is often discussed in terms of instructor immediacy. Immediacy is defined as: "those communication behaviors, some visual others vocal that enhance closeness to and non-verbal interaction with another" (Mebrabrian, 1969, p. 213). Rovai (2000) elaborates that instructor immediacy is the immediate verbal and non-verbal communications such as smiles, head nods, use of inclusive language, and eye contact that promote increased learning. Cutler (1995) describes immediacy in terms of a reciprocal process in which individuals are more likely to establish trust, seek support, and find satisfaction the more they know more about each other.

STUDENT MOTIVATION

Studies including Christophel (1990), and Christensen and Menzel (1998) suggest that improved instructor immediacy affects student motivation, which in turn improves student learning. These studies suggest that immediacy has an indirect rather than a direct impact on student learning, as it is in reality student motivation that directly impacts student learning. It is reasonable to assume that a high level of instructor immediacy would most likely have the lowest level of impact on students with naturally high levels of motivation. Frymier (1993) investigated the interaction of students' motivation to study and instructor immediacy in a traditional face-

to-face learning environment. Her research concluded that students who began a course with low to moderate motivation to study had increased motivation to study after interacting with a highly immediate instructor, while students with a high level of motivation were unaffected by the high level of immediacy.

With the evidence suggesting that close social interaction, or immediacy, between an instructor and a student is correlated to some degree with student motivation, especially for students who have a low to moderate natural level of motivation, there is a need to investigate the instructor immediacy limitations that exist in online learning. Online learning environments do not have the advantages of the close proximity and all of the sensory perspectives and perceptions that are available in that setting. Due to this dynamic, it could be argued that instructor immediacy, and hence increased motivation for non-highly-motivated students, is an unlikely product of a traditional online class.

LIVE VIDEO

To emulate some of the advantages of face-to-face settings, many attempts have been made to use synchronous (live) video conferencing in online distance education. The rapid propagation of the Internet over the last decade has led to new opportunities for leveraging the potential of live video in online distance education settings. In North America, it is estimated that by 2007, 73.6% of the population had access to the Internet, which equates to a growth of 130% between 2000 and 2007 (<http://www.internetworldstats.com/stats2.htm>).

Home computers and webcams are now relatively inexpensive products and it seems that the time is right to capitalize on the potential benefits of video conferencing. However, there are still several problems in the implementation of live video that need to be addressed. First, being required to join a live video conference

removes the time flexibility benefit which is one of biggest attractions of distance education. Second, many different technical issues exist that make it difficult to guarantee a good quality experience for all participants. In any group of online distance learners there can be diverse Internet connection, personal computer hardware, software, and other setup problems that, added together, cause different learners at different times to have a poor quality experience or to miss the experience altogether.

A POTENTIAL SOLUTION

Another audiovisual technology that may be a part of the solution is asynchronous (prerecorded) video communication. Asynchronous video takes advantage of the same Internet infrastructure and personal computer availability as live video streaming, but does not suffer from the same problems. Video messages, or video clips of instruction, are recorded and then sent over the Internet, which means that if the Internet connection is slow, then it will simply take longer to send, or can be re-sent later. As these video messages are recorded, the time flexibility benefit of online learning is retained, as an instructor or a student can record a video message at any time, and the receiver of the message can view it at any time according to his or her own schedule and availability. While these asynchronous video messages do not allow for spontaneous two-way discussion, they do convey many of the verbal and nonverbal elements associated with human face-to-face conversation.

INITIAL PILOT USING ASYNCHRONOUS VIDEO

For the Winter 2008 semester, a request was made to develop an online version of a class in the School of Education at BYU. In this class, which is required for secondary teaching majors, preservice teachers learn how to implement technology in second-

ary education classrooms. It was decided to try piloting the use of asynchronous video as a central communications method in the online class. The idea for using asynchronous video originally came from the designer/instructor's experience networking with family members in other countries using asynchronous video, or video-mail, as it is sometimes referred to.

In this first pilot class in winter 2008, each student was required to have a webcam and access to a computer and the Internet. On the first day of class, students met with the instructor in a lecture theatre to discuss the structure of the class and for the students to view and discuss a video presentation. This was the only time the class met together. The students were then required to go to the class Web site using the Internet and to follow the instructions on the site. The first thing that students were required to do was to watch a video clip in which the instructor introduced himself and then explained the goals and objectives of the class.

As part of the first set of assignments the students were required to use webcams to record a clip to send to the instructor. In this clip, students were required to introduce themselves, describe something unique about themselves, and respond to a discussion question related to the assignments. Video clips were sent by each student to the instructor as attachments in an e-mail. On reception of each video clip sent by students, the instructor recorded a video clip of himself in which he responded to the personal introduction given by the student, expressed encouragement, and stressed that he would do his best to help when needed, and finally gave some feedback on the student's response to the discussion question.

At certain points in the semester, students watched video clips in which the instructor was shown presenting certain topics that were reinforced with diagrams and pictures mixed into the video clips. The class Web site included textual instruc-

tions on the requirements of assignments and, in most cases, screen capture video clips showing how to use the software applications that were used in the assignments. Several assignments required the students to record video clips of themselves explaining the rationale for their projects or responding to a discussion question.

From time to time the instructor sent e-mails with encouragement and reminders, and several times the instructor sent these messages in the form of recorded video clips instead of textual messages. The students also sent e-mails to the instructor when they needed help with assignments or if they had any other questions. The instructor attempted to answer all e-mail questions by the end of the day in which they were received. The final class assignment required each student to send a video clip to the instructor answering several final exam questions and also giving general feedback on the class including saying what they would do differently if they were the instructor.

INITIAL PILOT RESULTS

Following the pilot, student perceptions and class artifacts were studied to see whether immediacy was established and to what degree and the results were very positive. From student comments and the scores from the student ratings system, it was obvious that the students were able to perceive the instructor and his personality very well through the use of asynchronous video. The class was rated higher in every element of the BYU student ratings system than any of the face-to-face sections of the same class, and the students submitted comments such as:

It was much more personal this way, even more so than a face-to-face class usually is.

The instructor was personable with the students even though this was an online section.

The instructor really showed that he cared about us as students.

Instructor was very good at communication between teacher and students—especially for an online class.

Apart from the high level of immediacy as perceived by students, there were two other main benefits that surfaced during the study of the pilot. First, students were reporting that they had a closer connection to the instructor than in a face-to-face class and that they felt that they had received more individual attention and feedback than in a face-to-face class. Second, the instructor reported that there was a marked difference in the kind of responses students would give to assignments when they were required to present their response on a video clip in comparison to the responses to the same assignments that are normally in written format.

INSTRUCTOR PERCEPTIONS

The instructor reported that although there was a fair amount of extra work involved in the initial design and set up of the online class, the actual running of the class was no more difficult or burdensome than the face-to-face version. In terms of overall time commitment, the instructor stated that the online version of the class actually took less of his time, and that it changed the way he worked. He would read e-mails, watch video clips, and respond to individual students at various times of the day, including evenings and weekends, whenever he happened to be online. This is in comparison to the face-to-face class where he would store up assignments to grade at regular intervals. The instructor declared that this actually reduced stress as a large pile of work rarely accumulated. However, the instructor recognized that this pattern of flexibility

suited him personally, but might not suit other instructors.

The instructor stated that the video clip presentations by students were a better representation of their actual level of knowledge than the written assignments that are required in the face-to-face class. The instructor also reported that the responses contained more information, and that he was able to more accurately discern the knowledge and skills of the students due to the audio-visual cues inherent in a video clip presentation. The instructor also stated that they knew more about each individual student than he felt was possible in the face-to-face class setting, which meant that he was consequently more able to respond to the individual needs of each student. The instructor stated that he did not think that there were many benefits of the face-to-face class that were lacking in the online class, with the exception of the dynamic nature of class brainstorming that he stated was a helpful part of the learning process for the face-to-face students.

FURTHER DEVELOPMENTS

Following the pilot, the method of using of asynchronous video was further developed, and another online class was implemented in fall 2008 in the School of Education. One major development since the initial pilot was a better and simpler use of technology. In the pilot, students recorded video clips on their computers, and then e-mailed the clips as attachments to the instructor. There were numerous issues to resolve using this method, as some students did not understand how to create smaller video files that could be e-mailed, or did not know where to find the video files to attach to e-mails. It was recognized that to be successful, technological barriers needed to be removed.

Over the summer period, online tools were evaluated, including Web sites such as freegabmail.com, tokbox.com, and social

networking tools such as Facebook. These Web sites allow users to create and upload video clips, and in most cases require no prior technical expertise. The Web sites control the webcam and upload clips automatically to their servers, thus removing most of the technical barriers that had been faced in the pilot. Tokbox.com was selected as an interim solution while a new Web site for class video blogs was developed by the BYU Center for Teaching and Learning, which became available a few weeks into the semester. There was a transition period when both tokbox.com and the class video blog Web site were used; for the second half of the semester, only the class video blog Web site was used. The class video blog Web site was as simple to use as tokbox.com and it linked to the BYU student database, which made it easier to create class groups. Additionally, the class video blog Web site allowed for group discussion blog pages for which the other Web sites such as tokbox.com do not have the functionality.

In the fall 2008 online class, which was also taught by the designer-instructor of the original pilot, the pattern was similar to the winter 2008 class, except that there were more student assignments in the form of video clips. There was also more feedback from the instructor in the form of video clips. Following the experience of the pilot, the model for using asynchronous video was more fully developed and organized, and included two experimental video-based group assignments.

IMMEDIACY AND MOTIVATION IN THE FALL 2008 ONLINE CLASS

With the implementation of Web sites that facilitate asynchronous video communication, the class was in general a smoother experience for students and instructors. The perceptions of students in the online class followed the same pattern as for the pilot, except in this case, the students had never met the instructor. Student com-

ments related to immediacy include the following:

Although I've never met the man, I feel like I know him really well and that he knows me. I loved this course!

The instructor is so involved and committed to my learning and success.

I received quick and valuable feedback from him.

I felt like the instructor made concerted efforts to encourage his students and connect with them despite the fact the class was online.

The instructor was one of the most caring and friendly teachers I've ever had.

It's great to have a teacher that cares as much as he does.

In addition to reviewing student comments, four students from the online section were interviewed after the class had ended. The students met the instructor in person only when they came for interviews, at which point the instructor introduced them to the interviewer. Comments from the interviews confirm the high levels of immediacy achieved through the use of asynchronous video. When asked about how connected they felt to the instructor, students gave the following statements:

When I gained the best connection was when he would look at my video or my project and then make some kind of personal assessment or give me some response. And I was really impressed that he was able to do that as frequently as he did, so I think that's really what helped us understand each other.

He sent us a webcam every week, and so just walking in I recognized him right away even though it was the first time I'd seen him in real life. I felt that he was really approachable. I didn't have too many problems in the class, everything was pretty straight forward, but I feel that if I did, he was really approachable and I could ask him and he'd be willing to help.

I think the consistency of him sending webcam messages of himself; just that he was that consistent and always on top of it. I feel like whenever I did e-mail him something I got instant feedback. That's really different than a teacher would be in a real classroom.

The comments relating to connectedness reveal perceptions of instructor immediacy and the capacity of asynchronous video to form close relationships in which participants know each other without any physical contact. As previously noted, high levels of immediacy have been shown to be correlated with increased levels of student motivation. When students were asked to comment on how the relationship with the instructor through asynchronous video had affected their motivation to perform well in the class, students made the following statements:

I think it can only contribute to it. He was really good at making me comfortable, I would put work into it just as any student would and he really built it up. He was always enthusiastic about the job I did and that really helped me have a desire to do well in future projects.

I knew he was concerned and he was interested and he was very helpful. And just knowing I had the resources of everything he taught us plus any help that I may need from him, just knowing that I had all these resources, I might as well use them.

Well, yeah. He always had a response. We would post a clip and he would post a response. That would be kind of like grading a term paper that we would have to write and the teacher would write "good job." But he actually took the time for each one of us.

Results from the pilot and the fall 2008 online class consistently show the same patterns of high levels of immediacy and closeness between students and instructors, which, according to the available data from student ratings and student inter-

views, has had a positive effect on student motivation.

STUDENT COLLABORATION AND SOCIAL PRESENCE

Close connection and interaction between students is another aspect of face-to-face classrooms that has not been so easy to implement in distance education. These interactions and connections in online student communities have been described in research as social presence. Social presence is one element of the well established community of inquiry framework (Garrison, 2003), which was designed as a way of viewing the overall educational experience with the original objective of observing the strengths and weaknesses of text-based online education. The framework incorporates three main overlapping sectors that were perceived as being necessary elements of an educational experience. The three main sectors are cognitive presence, teacher presence, and social presence. Social presence is defined by three main constructs: affective expression, open communication, and group cohesion. These three constructs are mostly used to represent the quality of experiences between students in a learning environment.

Social presence is further described as, "The ability of participants to identify with the community (e.g., course of study), communicate purposefully in a trusting environment, and develop inter-personal relationships by way of projecting their individual personalities" (Arbaugh et al., 2007, p. 4). This is also described in the following terms: "Within our model, we define Social Presence as the ability of learners to project themselves (i.e., their personal characteristics) socially and emotionally, thereby representing themselves as "real" people in a community of inquiry" (Arbaugh et al., 2007, p. 21). In addition, the expression of emotion, feelings, and mood is a defining characteristic of social presence as described by Garrison,

Anderson, and Archer (1999), and research by Eggins and Slade (1997) suggests that humor is also a strong indicator of social presence. According to these descriptions of social presence within the community of inquiry framework, the establishing of social presence in a traditional online setting is not easy to achieve to the degree that can exist in a face-to-face setting due to the lack of verbal and nonverbal cues and the sensory perspectives and perceptions that exist in a close proximal setting.

COLLABORATION USING ASYNCHRONOUS VIDEO

In the online class in fall 2008, two group assignments were introduced. The introduction of these assignments was a first attempt to test the ability of asynchronous video to achieve group collaboration. For this research, the first group assignment is termed as a stepped approach and the second is termed as a round-robin approach.

For the stepped group project, students were divided into groups of three or four students. Each group had its own blog page on the class Web site. Each student submitted two video clips to their group blog as part of the assignment. The subject of the discussion was Google Earth. First, students watched video clips showing how to use Google Earth and specifically how to create a virtual tour. Students then posted a video clip in which they described their first ideas on how they might have secondary aged students use Google Earth to enhance learning. Once each student had posted a video clip to the group blog page, the instructor posted a clip giving some additional insights. Next, each student was required to watch the clips posted by all students and the instructor on their group page. Then, each student recorded another video clip in which they discussed the ideas of every other student in their group, and at the end of the clip they stated how their own ideas had developed. They finally each

created a virtual tour based on their selected learning objective.

For the round-robin group assignment, the group consisted of all students in the class. The topic of discussion was how online blogs can be used to enhance student learning. The first student posted a video clip brainstorming an idea of how they might use a blog to help students learn. The second student watched the first clip, and in their clip they commented on the ideas in the first clip and then added something new. Each subsequent student watched the two most recently posted clips and commented on them both before adding their own ideas. Each student was required to submit two comments, and students were not allowed to submit their second comment until at least three had been posted since their first post. Thus, for most students, they were required to watch clips posted by four different students.

RESULTS OF STUDENT COLLABORATION

Students completed a Likert-scale survey based on the social presence section of the

community of inquiry measurement instrument (Arbaugh et al., 2007, p. 46). According to results from the survey, from student ratings comments, and from student interview comments, a clear pattern emerged. Students reported that they had learned from each other, but that they did not form distinct impressions or form relationships with other. In terms of the social presence constructs in the survey for the 17 students who completed the survey, affective expression rated low, while open communication and group cohesion were more highly rated, as shown in Table 1.

Student comments from interviews confirm this general pattern. Statements related to how students learned from collaboration include the following:

The video sharing was really good because we were able to receive other ideas from other students in our same program. And so some of the ideas they came up with were really good so I liked the sharing through the students.

I went through, not everybody's but I went through several of them each time. It also helped me figure out exactly what everyone else thought the assignment

Table 1. Social Presence Survey Responses from 17 Online Students

Construct	Likert Rating (1-5)
Affective expression	
Getting to know other course participants gave me a sense of belonging in the course.	3.38
I was able to form distinct impressions of some course participants.	3.56
Online or Web-based communication is an excellent medium for social interaction.	3.38
Open communication	
I felt comfortable conversing through the online medium.	4.38
I felt comfortable participating in the course discussions.	4.50
I felt comfortable interacting with other course participants.	4.38
Group cohesion	
I felt comfortable disagreeing with other course participants while still maintaining a sense of trust.	4.06
I felt that my point of view was acknowledged by other course participants.	4.25
Online discussions help me to develop a sense of collaboration.	4.38

was so it helped me figure out the assignments.

Being able to see their ideas and remember what they used in their teaching, their lessons that they had already planned out in other classes we had been in, it was fun to see how they went off that and formed new ideas.

And there were a few, I guess that I would watch more than others, and so there were a few that I would say that I felt like I gained from or that I shared with.

Student statements from interviews that relate to the lack of forming connections or relationships, a general lack of interest in other students, or problems with getting to know the other students in the groups include the following:

I don't think so, not as much, as group projects I've been a part of before in other classes. I didn't feel that I was that important to any group project that I was working on. I didn't feel that cohesiveness or something with the group, it was lacking.

So yeah, unless it was an assignment, I didn't really watch anyone else's blog or videos.

So that's a challenge I think with working in groups, especially if you don't have e-mail addresses and contact information. You only rely on that Web site which people probably don't check as frequently as those other things, so it's harder to work together as a group.

In hindsight, it is not surprising that this pattern emerged. Both group assignments were designed to allow students to see each other and to listen to ideas, but neither assignment was designed to allow for direct student-to-student dialog and expression. This was a major learning point from the fall 2008 online class. This experience raised questions, such as how can asynchronous video be used in a way that allows for effective student-to-student dialog in collaborative assignments and

that also facilitates the forming of strong and close relationships that are motivational to their educational experience? Currently, two online classes are being taught and studied during winter 2009, and group assignments have been adjusted to allow for increased student-to-student dialog. Results of these developments will be published as soon as possible.

INSTRUCTOR PERCEPTIONS OF COLLABORATION

The instructor reported that the two group assignments were not structured to allow for a group construction of knowledge or any kind of collaborative product. However, the instructor acknowledged that students did gather ideas from each other, and that there were some interesting benefits to the asynchronous group discussions that were noticed. It is difficult to guarantee that each student in a face-to-face class can have a fair and equal voice in any group assignment as some students are naturally more dominant than others, but in the asynchronous discussion, no student could dominate, and each was required to participate, which also added individual accountability. The fact that every student was able and required to share ideas was considered by the instructor to be a positive side to the asynchronous group assignments.

STUDY LIMITATIONS

The study of the use of asynchronous video so far has been limited to online and blended classes that are offered to students on the Provo campus of BYU. It is hypothesized by the researchers and designers involved in these studies that the method of using asynchronous video as a core component of an online educational strategy will be favorably received and motivational to learners who are truly at a distance and who chose distance educa-

tion as their preferred learning experience. Further research and development is necessary in a true distance learning environment to scrutinize these claims.

SUMMARY AND CONCLUSION

Asynchronous video, or video-mail, is not a new state-of-the-art technology, but it is a new technique that is being introduced to the educational world. Recent developments in social networking technologies have produced online tools that facilitate the use of asynchronous video via webcam for educational purposes. Initial studies in the School of Education at BYU suggest that asynchronous video has the capacity to deliver the verbal and non-verbal signals necessary in developing positive levels of immediacy and social presence that can be motivational to students in regular face-to-face learning environments, and at the same time maintain the time and location flexibility benefits of distance education.

Initial studies have also shown that certain aspects of student collaboration are possible, but that more development and research is required to find out to what extent elements of face-to-face collaboration can be reproduced using asynchronous video. In addition, research is required to study the potential of asynchronous video to create a different style of collaboration that is effective in ways that may only be achievable in asynchronous settings. To find answer to these questions, an asynchronous video learning model is currently being developed at BYU, and collaboration on the development of this model is welcomed.

Although development is still in its early stages, results from the study of online classes in the School of Education at BYU show that there is a high degree of promise

in using asynchronous video to bridge the gap and enjoy the benefits of both face-to-face and distance learning environments.

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