

## Using Asynchronous Audio Communication (AAC) in the Online Classroom: A Comparative Study

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### Abstract

Facilitating learning online requires an evolving set of teaching skills that embrace Web 2.0 technologies. Asynchronous Audio Communication (AAC) may bridge the virtual "communication divide" between instructors and students. The purpose of this study was multi-faceted: first, to assess students' and instructors' satisfaction with asynchronous audio instructor feedback as a teaching strategy in the online courseroom; second, to determine the perceived effect of AAC on student satisfaction, learning outcomes, student engagement, and perceived instructor presence; and third, to examine whether there was a significant difference in the way AAC was perceived by undergraduate and graduate students attending two southern state universities. Asynchronous Audio Communication in the form of instructor feedback was utilized in graduate and undergraduate online courses in the areas of reading, health education, and family studies across a 9-month period. The total sample included 156 participants. Instructors sent out both group and individual audio communication throughout the course. At the end of the semester, students completed an online survey that collected quantitative and qualitative data. Descriptive, inferential, and qualitative data analyses demonstrated that the majority of students and instructors reported that AAC can improve online students' perceptions of instructor presence, student engagement, knowledge of course content, and the instructor-student interaction.

**Keywords:** E-learning; social presence; instructor feedback; audio communication, Web 2.0

### Introduction

Even with all of its convenience and portability, the online classroom is still seen by many as lacking the human "connectivity" of face to face courses. In fact, many empirical studies note that a major reason why many faculty who teach online still prefer to teach face to face is because they perceive they are more capable of "connecting" with their students and assessing their understanding in a traditional setting (Allen & Seaman, 2006; Bower, 2001; McKenzie, Mims, Bennett, & Waugh, 2000; Oomen-Early

& Murphy, 2008). However, one must question whether this “virtual divide” of human emotion will shrink with the onset of Web 2.0 technology. The term “Web 2.0” has been defined in a number of ways. Some descriptions include:

- “empowering,” user-friendly online tools that create a “richer online experience” for the user (Frost, 2005)
- the second generation of services available on the World Wide Web that lets people collaborate and share information online.” (Wikipedia, 2007)
- the “Live Web” that puts the “We” in “Web” technology (Frost, 2006)

The “new generation” of the web is revolutionary in its ability to reach the “everyday” user. As Andrew Keen of the Weekly Standard writes:

Even the most poorly educated and inarticulate among us -- can and should use digital media to express and realize themselves. Web 2.0 'empowers' our creativity, it 'democratizes' media, it 'levels the playing field' between experts and amateurs. The enemy of Web 2.0 is 'elitist' traditional media. (Keen, n.d., ¶ 1).

### *Creating more “Interpersonal” Web 2.0 Online Classrooms*

The learning domains of cognitive, affective, and psychomotor made famous by Benjamin Bloom in 1954 have been expanded in recent years to include the “social” or “interpersonal” learning domain. Education researchers such as Anderson and Krathwohl (2001) suggest that developing skills of interaction and collaboration have never been more important than in today’s volatile world. The interpersonal domain is not best handled with just text on a screen. Web 2.0 technology includes a number of communication tools which connect people more effectively and allow them to share information, ideas, and opinions online almost instantaneously. Some of these tools include wikis, blogs, videoblogs, digital video such as Youtube, digital photo hosting and sharing services such as Flickr or Photobucket; webcasts, podcasts, instant messaging, social bookmarking, satellite mapping such as Googlemaps, and asynchronous audio communication (just to name a few!). Could use of this technology contribute to more “interpersonal” online classrooms and enhance connectivity and collaboration between students and instructors? How might integration of these tools impact students’ motivation and improve upon retention? These questions largely remain unexplored in the current E-learning empirical knowledge base.

### *Providing “Affective” Instructor Feedback*

There is no doubt that instructor feedback is important to enhance student learning. However, much of what has been researched about instructor feedback has been exclusive to the traditional classroom (Flaherty & Pearce, 1998; Gorham, 1988; Walther & Burgoon, 1992). Only recently have researchers begun to investigate the complex role instructor feedback plays in online education (Gallien & Oomen-Early, 2008; Ice, Curtis, Wells, & Phillip, 2007; Offerman, Pearce & Tassava, 2006). Indeed, understanding how feedback facilitates or hinders online learning is key to creating effective instruction and enhancing “interpersonal” communication.

Recent findings have shown that online learners’ levels of satisfaction, performance, and sense of community are related to the interactions they have with their instructors, including the type and frequency of feedback they receive on assignments and course material (Gallien & Oomen-Early, 2008). Until recently, studies have examined text-based feedback only, either delivered through email or via the course management system (e.g., Blackboard or WebCT). The nature of this type of feedback (i.e., lack of verbal and nonverbal information) challenges two important factors related to successful online learning: social presence and instructor immediacy behaviors.

Social presence refers to the degree to which individuals perceive others to be real in the learning environment, a model long-established in the literature (Short, Williams & Christie, 1976). According to Richardson and Swan (2003), this perception of human presence is essential for students and faculty to develop personal relationships and communities online, which in turn appears to have a positive influence on learner satisfaction and performance (Newberry, 2001; Richardson & Swan, 2003). Hackman and Walker (1990) said, “social presence is influenced by the delivery modes utilized for specific communication functions,” including the way in which feedback is delivered (p. 198).

Teacher immediacy behaviors enhance closeness (relationships) as well by reducing the psychological distance (i.e., perceived distance) between individuals (Hackman & Walker, 1990). Some of the behaviors used by teachers to produce immediacy and build a sense of psychological closeness include verbal encouragement, praising, asking questions, using humor, and self-disclosure (Hackman & Walker, 1990; Woods & Baker, 2004). Studies have shown that instructors can project teacher immediacy behaviors through text-based interactions (Arbaugh, 2001).

Although there are critics who believe learning is hindered in an environment without physical presence, several studies have shown this not to be true (Gallien & Oomen-Early, 2008.; Gunawardena and Zittle, 1997; Ice, Phillips, and Wells, 2007; Richard and Swan, 2003; Rourke, Anderson, Garrison & Archer, 2001; Swan, 2002). Gunawardena and Zittle (1997), for example, found that a sense of presence was established through the use of emoticons. The researchers found that 60% of the variance in student satisfaction was related to students' perceptions of presence, which was enhanced by the use of emoticons as a replacement for nonverbal cues. Gallien and Oomen-Early (2008) examined student satisfaction and performance through the use of two different forms of feedback – personalized and group-oriented– and determined that students were more satisfied and performed better when they received personalized feedback on their assignments. This study also demonstrated that online instructors now have the capability through Web 2.0 technologies to enhance social presence and student engagement without having a “real time” physical presence.

Recently, Ice, Phillips, and Wells (2007) examined the use of audio feedback and found that online learners preferred audio to text-based feedback. The researchers found that audio was far better than text-based only in conveying nuance and helping students retain and apply course content. They also found that audio feedback positively influenced students' perceptions of the instructor as a caring individual.

These studies suggest that human relationships can be mediated by technology, and that physical presence is not necessary to provide presence, awareness, and “interpersonalization.” The use of audio feedback to enhance a sense of community and togetherness, and ultimately learning, is the focus of this research.

### **Purpose of the Study**

The purpose of this study was multifaceted: 1) to assess students' and instructors' perceptions of asynchronous audio instructor feedback as a teaching and learning tool in the online classroom; 2) to determine the perceived effect of AAC on student satisfaction, learning outcomes, engagement, and perceived instructor presence; 3) to determine if there was a significant difference in perceptions of asynchronous audio instructor feedback between undergraduate and graduate students attending two southern public universities, 4) to build upon previous research relating to online instructor feedback and AAC (Arbaugh, 2001; Gallien & Oomen-Early, 2008; Ice, Curtis, Wells, & Phillip, 2007; Richardson & Swan, 2002).

The purpose was addressed through survey data collection to answer three research questions. Alignment of survey items to these questions was as follows, with student response as strongly disagree, disagree, agree, or strongly agree:

#### Research question 1: Do students acknowledge benefits of AAC?

Survey item 1: Statement of “helpful”

Survey item 3: Statement of “saves me time”

Survey item 4: Statement of “helps me understand the content better”

#### Research question 2: Do students acknowledge impact of AAC on engagement?

Survey item 5: Statement of “better instructor-student relationship”

Survey item 6: Statement of “more engaged in the course content”

#### Research question 3: Do students indicate a preference for AAC?

Survey item 2: Statement of preference for AAC rather than written feedback

Survey item 7: Statement of preference for blended audio and text feedback

(Additionally, the survey included an item about ease of use and a comment area for qualitative responses.)

### Methodology

One-hundred and fifty-six graduate and undergraduate students attending two mid-size public universities and enrolled in online courses participated in the research. The instructors of these online courses were full-time faculty trained to provide asynchronous audio feedback by recording Mp3 audio files and/or "embedded" audio feedback with Adobe 8.0 Professional. These Mp3 messages or Adobe PDF documents containing audio feedback were posted for the students in the online Blackboard classrooms. Students received at least five collective (i.e., for the entire class) audio messages from their instructor and at least two individual audio feedback messages by the end of the semester. A written summary was also provided with the collective audio messages. All classes utilized Blackboard as the online platform. At the end of the course, students were invited to complete an online survey, which asked them to reflect on the utility and effectiveness of the feedback strategy.

The 9-item electronic survey was developed by the researchers to collect the data. The survey was based upon a previous study by Ice, Curtis, Phillips, and Wells (2007). Survey items were comprised of statements that would be answered in Likert-style format, with a scale from 1-4, with 1 being "strongly disagree" to 4 being "strongly agree." One final open-ended question allowed students to leave their qualitative comments.

Prior to the launch of the study, the survey was sent to three experts who had vast experience teaching online and conducting research related to E-learning in order to establish face validity. The survey was also piloted prior to data collection with 12 undergraduate and graduate students for wording and clarity. The survey was hosted by an online survey service and an online link to the survey was posted in the Blackboard courseroom at the end of the semester. Students were invited to complete the survey along with their end-of-course evaluations. Students were not required to include any identifying information on the survey nor were email addresses connected to the responses.

### Results

Seventy-five percent of the total sample of 210 chose to complete the electronic survey ( $n = 156$ ). Seventy-six (49%) were undergraduate students and 80 (51%) were graduate students. The mean number of online courses taken for students participating in the study was 2.5, and the mode was 4.

#### *Quantitative Analyses*

Frequencies for each survey question item are listed in Table 1. Overall, students and instructors reported they were satisfied with AAC as a teaching and learning tool for feedback delivery ( $\bar{X} = 3.05$ ).

As depicted in Table 1, over 88.5% of the students ( $n = 138$ ) believed the instructor's audio feedback to be helpful and 88.1% ( $n = 133$ ) found it easy to use. Students were split in terms of whether they preferred the audio to the written feedback, with 52.6% indicating that they disagreed or strongly disagreed with using only audio and 47.4% indicating that they preferred the audio to the written. Over half of the students (59%;  $n = 92$ ) found AAC to be timesaving, 71.8% (112) found that the audio feedback helped them understand the content better, and 80.2% (125) felt that the audio feedback kept them engaged in the course content. The use of AAC was also perceived to improve the relationship between instructor-student: Over 82.4% (129) of the students agreed that the audio communication helped enhance the instructor-student relationship. The majority (84.6%;  $n = 132$ ) of the students preferred for the instructor to use a blending of audio and text-based feedback.

Independent Sample T-tests revealed that there were no significant differences in the mean survey scores between undergraduate and graduate students, indicating that both groups appeared to favor asynchronous audio instructor feedback equally ( $t = -.150$ ;  $t = 1.74$ ;  $t = 1.45$ ;  $t = .062$ ;  $t = .584$ ;  $t = -1.06$ ;  $t = -.819$ ;  $t = -1.06$ ;  $t = -1.88$ ;  $p \geq .05$ ).

Table 1. Frequencies, Percentages and Means of Survey Response Items (n = 156)

Question Item	Response Item	Frequencies	%	Mean
Q1. I find the audio communication that the instructor leaves in the courseroom helpful.	Strongly Disagree	8	5.1	3.37
	Disagree	10	6.4	
	Disagree	55	35.3	
	Agree	83	53.2	
	Strongly Agree			
Q2. If given the choice, I prefer to receive audio communication rather than written communication from the instructor	Strongly Disagree	29	18.6	2.52
	Disagree	45	28.8	
	Disagree	33	34.0	
	Agree	29	18.6	
	Strongly Agree			
Q3. I believe that audio communication in the courseroom saves me time	Strongly Disagree	18	11.5	2.68
	Disagree	46	29.5	
	Disagree	60	38.5	
	Agree	32	20.5	
	Strongly Agree			
Q4. I feel that the audio communication helps me understand the content better than without having it in the courseroom.	Strongly Disagree	14	9.0	2.89
	Disagree	30	19.2	
	Disagree	71	45.5	
	Agree	41	26.3	
	Strongly Agree			
Q5. I believe that the instructor's use of audio communication can help create a better instructor-student relationship in the courseroom	Strongly Disagree	12	8.1	3.24
	Disagree	15	9.5	
	Disagree	51	32.4	
	Agree	78	50.0	
	Strongly Agree			
Q6. I believe that the audio communication created by the instructor led me to be more engaged in the course content.	Strongly Disagree	7	4.9	3.14
	Disagree	23	14.8	
	Disagree	66	42.0	
	Agree	60	38.3	
	Strongly Agree			
Q7. I would prefer for the instructor to use a blending of audio and text based communication in the courseroom	Strongly Disagree	11	7.1	3.29
	Disagree	13	8.3	
	Disagree	51	32.7	
	Agree	81	51.9	
	Strongly Agree			
Q8. I think it's easy to listen to the instructor's audio feedback.	Strongly Disagree	11	7.1	3.35
	Disagree	12	7.7	
	Disagree	27	30.1	
	Agree	86	55.1	
	Strongly Agree			

#### Qualitative Data

Question 9 on the survey asked the students to “please share any additional comments on your perceptions AAC as a teaching and learning tool.” Interpretation of the open-ended item was based on a five-step method for analyzing qualitative data by Taylor-Powell and Renner (2003) which involves:1)

becoming familiar with the data; 2) finding a focus for the analysis; 3) categorizing the material; 4) finding patterns; and 5) bringing the data all together. This type of analysis is based on themes that emerge as the data becomes more familiar (Taylor-Powell & Renner, 2003).

Ninety-one (58%) participants left qualitative comments. Of these 91 responses (Table 2), 82 (91%) reflected positive themes relating to the use of audio feedback, while 9 (9%) indicated students either did not like using asynchronous audio messages or they simply preferred receiving only text-based feedback. Two participants indicated that they could not use the audio feedback because one was hearing impaired (and only used the text-based feedback), and the other one did not have a working computer soundcard. Positive emerging themes were that the audio feedback was easy to use, it felt more personal, it “humanized” the instructor, it appealed to their learning style, and it seemed “promising.” Negative themes were that the strategy did not appeal to their learning style, it took too long to download the audio files, or students found text-based feedback more helpful.

Table 2. Emergent Themes from Students’ Qualitative Comments on AAC (Question #9)\*

Emergent Themes	Example Quotes
Easy to use (+)	“I liked that I could just download it and listen to it on my Mp3 player or at work.”
Personalizes feedback (+)	“I felt the feedback was more personal and ‘tailor-made’ for the individual.” “Even if the comments were constructive, the audio softened it.”
Humanizes the instructor (+)	“I enjoyed hearing my professor’s voice and tone attached to the comments.” “The feedback in audio format just doesn’t sound as critical as when you only read it.” “Hearing the instructor’s voice really helped give the online more of a traditional class feel.” “At times I felt the instructor was right in front of me.”
Appeals to auditory learners (+)	“This really appealed to my learning style. I do so much better when something is auditory rather than just visual.”
Has potential to improve online learning (+)	“I think this strategy has a lot of promise.” “I’m a new online student, and I thought the audio messages really helped me stay engaged.” “I would like to see it used in other online courses.”
Improves the instructor-student relationship (+)	“I think it creates a ‘bridge’ from the instructor to the student.”
Does not appeal to student’s learning style (-)	“I learn better by reading.”
Takes too much time to download (-)	“It takes too long for me to download large files.” “It’s not that convenient.”
Blended feedback is best	“The instructor should use a mix of audio and text-based.” “I think both are necessary.” “Using both audio and written is good because we have all kinds of learners in this class.”

\*n = 91

## DISCUSSION

This study used survey methodology to assess both student and instructor satisfaction with AAC as well as perceived impact on learning outcomes, engagement, and instructor presence. Due to the sample, the study was also able to address these impacts at both undergraduate and graduate levels.

The results of this study revealed that asynchronous audio communication is an effective teaching tool that enhances instructor presence, student engagement, content knowledge, and overall course satisfaction. The findings of this research support the work of Ice, Curtis, Phillips & Wells (2007) who found that not only was there an “overwhelming student preference for asynchronous audio feedback as compared to traditional text based feedback,” (Section IV, ¶ 1), but the students applied the feedback contained in the audio more effectively than feedback received in text-based only instructor commentary. However, unlike Ice, Curtis, Phillips, and Wells (2007), students in this study indicated they preferred to receive a blending of both audio and text-based feedback rather than just audio by itself. Reasons for this divergent finding may stem from the composition of the sample: The sample in this study included both graduate and undergraduate students and students from multiple disciplines who were enrolled in upper-division major coursework (which can be writing intensive). Qualitative comments revealed that students like referring back to the written feedback, but used the audio to augment and expand on the text-based commentary. Also, including the text based feedback along with the audio aligned with ADA (American Disabilities Act) guidelines.

It was interesting to find that just over a slight majority of the students 59% (n = 92) believed audio feedback actually saved them time. Instructors felt that it only slightly reduced the time it took to provide commentary, most likely because both audio and text were used rather than just one or the other. Students also revealed that it took time to download the audio file rather than just read text-based feedback. Regardless, the majority of students found AAC to be worth their time, with 88.5% (n = 138) moderately or strongly agreeing that audio feedback was helpful. Even more compelling was that 91% (n = 142) of the students found AAC to improve their understanding of course content and 82.4% (n = 106) believed it improved the instructor-student relationship. Therefore, AAC was shown to increase students' feelings of instructor presence, improve their perceived understanding of course and help sustain their level of course engagement. Those reasons alone should be compelling enough for online instructors to give audio feedback a try.

In addition, the simplicity and portability of audio-based feedback enhances its utility as a teaching strategy. There is a very small learning curve required to use of this type of technology. Audio messages can be created and downloaded in seconds from various file formats and generated by way of computer, phone or Mp3 player. Students can then listen to feedback in the car, walking across campus, exercising, or flying across the country. While Second Life, podcasting, and videoblogs are all popular, “cutting edge” strategies for enhancing one's online learning experience, many student populations today are still working with dial-up or older, unsophisticated technology. This may deter their exploration of Web 2.0 innovations and increase their apprehension for online learning if this technology is “forced” on them. For example, at the university where this study was conducted, only 5% of the 5,108 students surveyed about their use of technology reported an interest in podcasting and 3% of the students did not even know what was meant by the term “podcast.” The ease and simplicity of downloading and listening to audio messages was a key benefit mentioned in the qualitative comments from students in this study on AAC.

Another key benefit for using asynchronous audio is the “affective” impact it appears to have on students' cognition and engagement. Though instructors can express themselves and their emotions through text based communication, 88.5% (n = 132) students in this study mentioned that they like the way they were able to catch the nuances provided in the instructor's audio messages. As also noted by Ice, Curtis, Phillips, and Wells (2007), this finding is important because it extends upon previous research relating to online social presence (Richardson & Swan, 2002). Richardson & Swan (2002) found that student satisfaction with an online course significantly increased when he/she felt the instructor was “there” and appeared to be attentive. Furthermore, when one considers Social Presence Theory (Short, Williams, and Christie, 1976), the human voice can dissolve barriers to computer-mediated instruction, and the online instructor may then appear more “life like.” Through the instructors' inflection, humor, and nuance, students may begin to feel more trusting, and more willing to express and ponder ideas, resulting in more critical thought and analysis within the online classroom.

This study did not find any statistically significant differences in responses according to level of education. Undergraduate students and graduate students were similar in their reaction to AAC. However, a future investigation could examine this more closely, intentionally sampling courses that reflect "first-time online" enrollments and thereby establishing whether overall experience may be a factor. In addition, large enrollment lower division courses were not sampled in the current study, only upper division or graduate courses; therefore, future studies could explore the use of AAC in hybrid or large enrollment courses at the undergraduate and graduate level.

The sampling frame for this study was cross-disciplinary, with participants enrolled in reading, health education, and family studies online courses. With a final sample of 156 students, reasonable conclusions could be drawn from the survey data. This study confirms much of what is considered conventional wisdom about the online classroom: that students and instructors alike continue to seek connection in their course work and that Web 2.0 technologies support such connectivity. The current study provides some insight into whether connectivity must be "real time," either physically or virtually. Indeed, the temporal consideration appears to be less important than the "personalization" conveyed by audio feedback from the instructor. The preference for audio feedback paired with text feedback offers strong support for use of AAC.

While the current study did not seek to identify additional methods for using AAC, the researchers did expand their own use of the technology as a natural outgrowth of this study. Some of their uses have included:

1. audio-based exams for vocabulary and language-building courses such as medical terminology,
2. detailed individualized feedback on students' course papers and projects,
3. feedback on graduate students' theses and dissertations, both in specific parts of the manuscript and in overall comments (for an entire chapter, for example),
4. narration for training materials, especially as audio clips embedded alongside screenshots of a computer application,
5. narration for assignment guides, including audio clips embedded alongside screenshots of the student's Blackboard course interface,
6. narration in electronic portfolios,
7. narration of course syllabus.

## **CONCLUSION**

The researchers conclude that the field has adequate evidence and rationale to support the use of AAC broadly and routinely in online classrooms. As this study and others have demonstrated, students and instructors like the connection that AAC provides them. As an additional mode for instructor feedback, AAC serves multiple learning styles with a minimum learning curve for instructors.

More quasi-experimental research is needed to compare learning outcomes, student retention, and student satisfaction when audio versus text based feedback is used. While initial response from students indicates preference for both, this choice may be a response based more on familiarity (keeping the familiar text feedback while adding AAC) than true comparison between the two modes. Additionally, as in all examinations of new technologies, a novelty effect may be identified.

Online classroom experiences will continue to integrate Web 2.0 technologies, making AAC only one of many choices to enhance instructor-student relationships and also to improve instructor feedback. One side effect of such integration may be the adoption of multiple strategies that allow the student to focus on the feedback most helpful and the best match with the individual learning style. Thus, researchers may find it difficult to establish any one superior method for online feedback.



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