

# The Effect of Instructor's Use of Audio E-mail Messages on Student Participation in and Perceptions of Online Learning: a preliminary case study

ROBERT WOODS

*Yellowstone Baptist College, Montana, USA and Spring Arbor University, Michigan, USA*

JACK KEELER

*Regent University, Virginia, USA*

**ABSTRACT** *The researchers, in the context of LEAD 713, a graduate-level online course at Regent University, consider whether the systematic use of instructor-initiated audio e-mails (as a supplement to regular textual forms of communication) will increase students' participation in group discussion and result in more favorable student perceptions of student/faculty relationships and quality of group discussion, a greater sense or feeling of online community, and a higher degree of satisfaction with the overall learning experience. The results as a whole appear to challenge the researchers' initial assumptions. Benefits of audio e-mails are discussed and future research designs are suggested.*

## Introduction

Online (Internet) delivery of coursework and other aspects of academic programs is the fastest growing form of distance education in the United States (National Center for Education Statistics, 1999). Nearly 50,000 university-level courses are currently being offered online (Dunn, 2000, p. 34). It has been predicted that as many as half of all post-secondary students will be taking at least some of their coursework online in the near future (Neeley *et al.*, 1998). By 2025, some experts believe that traditional universities will be replaced by a network or consortia of course providers with online delivery systems that completely bypass the traditional classroom (Dunn, 2000, p. 35).

At the institutional and administrative levels, colleges and universities have had to address a variety of recurrent issues as they have increasingly embraced online distance education. Among the issues commonly reported are: financial constraints; inadequate computer support staff; technology and educational software limitations; faculty computer illiteracy; faculty resistance to online education as opposed to more

traditional forms of delivery systems; difficulties in understanding computer and Internet jargon; and insufficient avenues for online faculty development that often fails to move beyond superficial instruction on technological protocols.

At the same time, at the faculty/student level, online instructors have had to deal with students who possess variations in computer skill levels and those burdened by technological uncertainty. Ongoing student issues include complaints about the purpose, nature and quality of online programs or courses, as well as concerns about the quantity and depth of faculty involvement. Students also report feeling isolated in an online educational environment, while others report difficulty in coping with the workload demands of online education. As a result, online educators have sometimes had their courses or programs crippled by student procrastination or lack of timely, meaningful student involvement, which ultimately leads to unacceptable attrition rates. Unfortunately, the response of administrators and educators to these issues has frequently concentrated on maximizing administrative efficiency rather than attending to pedagogical matters or learner needs, fostering student/faculty relationships and online community, or providing multi-faceted modes of delivery.

This naturalistic case study reports how instructors utilized a mixed mode delivery of personal audio e-mail messages as a supplement to textual exchange during an online graduate level course to address the need for more meaningful student/faculty interactions. The researchers explored potential effects of the use of this pedagogical tool—i.e., audio messages as e-mail attachments—on learner's participation in and perceptions of various aspects of online learning.

### **Background and Purpose of the Case Study**

There have been many reasons identified for non-completion of, or less than desired student participation in, distance degree courses and programs. Among them are 'personal/logistical problems such as travel time and work obligations, motivational/psychological problems such as loss of interest and inadequate learning skills, and instructional issues such as poor teaching' (Wilkinson & Sherman, 1991, p. 33). Some online distance graduate students at Regent University, Virginia Beach, Virginia offered the same basic reasons for their lack of participation in group discussion and satisfaction with the overall learning experience. Students also reported feeling isolated from other faculty and students.

Therefore, as instructors teaching a required graduate-level course in organizational leadership we were interested in determining whether the administration of audio messages (via RealAudio) as e-mail attachments sent to the online distance education learners in our course would increase their participation in, and satisfaction with, the online learning experience. The literature reviewed (along with the anecdotal experiences of both instructors in prior online courses) suggested that supplementing standard textual exchanges with additional communication (vocal) cues—in the form of electronically generated audio messages—may help facilitators not only increase student participation in required group discussion, but also help

form more intimate relationships with online students, add to students' perceived sense of online community, and lead to more favorable student perceptions of the overall online learning experience.

Regent University has been involved in online distance education delivery for its graduate programs since 1991. Currently there are eight graduate-level distance degree programs, most paralleling on-campus degree programs. The Center for Leadership Studies offers both MA and PhD programs in Organizational Leadership. A primary distinctive of the organizational leadership programs is that apart from brief on-campus residency requirements each summer, courses are taught almost entirely through the Internet. Exchanges between faculty and students and among students are primarily conducted online. This is generally accomplished through regular e-mail in conjunction with educational software specifically designed to facilitate discussion. The Center for Leadership Studies employs a cohort model of instruction allowing students who pursue the Internet-based degrees to progress through coursework together as a single group (Regent University, 2000a).

A six credit hour doctoral-level course titled *Leadership, Values, Policy and Culture* (LEAD 713) provided the context for the current investigation into the use of online audio messages as an enhancement to communication effectiveness and learning satisfaction. The course was offered in the spring 1999 semester and 40 second-year doctoral students were enrolled. The course was 'team taught' by two instructors and utilized a combination of individual and group learning experiences, including required, online group discussion that was graded on the basis of frequency, quality and timeliness. Dialogue constituted 25% of the overall course grade, while performance on three written assignments determined the rest of the evaluation of student work.

As might be expected for online distance education at the graduate level—and in light of the literature on encouraging group discussion and interaction discussed below—LEAD 713 students were encouraged to interact with other students, the course instructors, or others at Regent University regarding any matter through regular e-mail, telephone or conventional mail. The instructors explained in the syllabus and elsewhere that they viewed their primary role as one of facilitating students' learning experiences rather than one of furnishing lectures on any particular subject. Both instructors were involved in all aspects of the course including providing weekly updates about the course and presenting new material, grading assignments and dialoguing with individuals and groups.

TopClass, an educational software platform that allows threaded, asynchronous discussion, was used to facilitate group discussion. Students were randomly assigned and divided into seven groups for the entire course: five six-member and two five-member groups. They were required to participate in ongoing discussion in response to discussion questions and exercises that were posted by the instructors on a weekly basis. While students were only allowed to post responses within their individual groups, they had access to, and were encouraged to read, what was being discussed within the other groups in response to the same initial discussion questions and exercises. The discussion questions and ensuing exchanges between

students and faculty normally focused on assigned readings or the completed written assignments of fellow students.

### **Audio Messages as a Tool for Improving Online Educational Experiences**

Sparked by the increasing developments and applications of audio for Internet communication generally, scholars and practitioners interested in online education have observed, studied and promoted a corresponding growth in the use of audio within online courses and academic programs. Forsyth (1998) points out that the use of video and audio is the 'most rapidly developing area of the Internet' (pp. 54, 60). He calls for its integration into online courses and delivery. He also notes that many of the problems students may have in receiving audio material are being overcome by technical advances, and stresses that audio aspects of instruction must be 'linked into the text material and the teaching and learning purpose of the material'. Burge and Howard (1990, p. 4) contend that greater familiarity with audio technology leads to greater course satisfaction in distance education generally.

Much of the research and literature related to using audio in online classroom delivery has provided instructions for creating or producing audio messages for the worldwide web (Keating & Hargitai, 1999), or has suggested that new software products may be helpful for online courses (Boettcher, 1998). However, little has been concerned with how these tools can be specifically incorporated within instructional design and delivery, or what effect they might have on learners. Kerka (2000) argues that for distance learning to be effective, facilitators must use a 'mix' of modes—for example, 'combine e-mail discussion with audio/video methods to enhance the social aspect'. The University of Idaho's Distance Learning Guide agrees, suggesting that online facilitators integrate delivery systems such as video and computer conferencing with audio capabilities (University of Idaho, 1995).

Crockett and Petersons (1990) are among those who have focused on audio tutorial packages designed specially for certain distance courses. They warn that although use of such 'technological interfaces' may increase retention rates and overall learning, they 'should be something that aids, something that does not attract attention and energy to itself' (p. 54). Studies such as this one by Crockett and Petersons usually have been concerned with the use of taped rather than streamed audio over the Internet.

Although much has been written regarding the use of audio as the *primary* means of distance education delivery, either by means of audio tapes or synchronous, online audio or teleconferencing (Gunawardena, 1992), no research has concentrated on the use of audio as a supplement to primarily asynchronous, textual forms of online communication, an increasingly popular form of delivery in higher education (Davie & Wells, 1991). More importantly, perhaps, research dealing with the effects of online audio supplements on student/faculty relationships, student participation in online group discussion, student perceptions of online community, and overall student satisfaction with online distance courses or programs, has been missing.

## **Cultivating Relationships in Online Instruction**

Although considerable scholarly research has dealt with how the Internet and other computer technologies can enhance traditional college courses and curricula (Witmer, 1998), studies and literature that focus on the pedagogical needs of online higher education courses and programs has been limited. However, there is a clear indication that fostering interactions and cultivating interpersonal relationships between students and instructors, and establishing a community atmosphere for learning through varied modes of delivery, is essential to facilitate learning and reduce attrition. Thus, facilitators must pay careful attention to their social or 'nurturing' role in the online setting, in addition to the organizational and intellectual roles normally associated with delivery (Mason, 1991).

Clow (1999), Phillips and Peters (1999), Roblyer (1999) and Hacker and Wignall (1997) all concluded that sufficient interaction with instructors and other students was important based on their studies of the student perceptions of particular online college learning experiences. Wilkinson and Sherman (1991) found that lack of personalization, or humanization, and infrequent interaction between students and instructors, were among the reasons given by students for not completing distance education courses. Everhart (1999, p. 12) declares that overcoming a 'feeling of remoteness' may be the greatest obstacle to distance learning and diminishing student attrition. Learning at a distance can thus be both isolating and highly interactive at the same time (Eastmond, 1995, p. 46).

Scholars and educational practitioners have called for and begun to systematically study the challenges and benefits of building community within online courses. Course structure, class size, feedback and previous experience with computer-mediated communication influence online interactions (Vrasidas & McIsaac, 1999). Some attempts have been made to enhance online community through brief on-campus residency requirements (Regent University, 2000b). Wiesenbergh and Hutton (1996) argue that building a learning community is necessary for a successful faculty/study relationship. Dede (1996) concurs and further observes that 'to succeed, distributed learning must balance virtual and direct interaction in sustaining communion among people' (p. 51). Kearsley (2000) states that 'a high degree of interactivity and participation' is the 'most important role of the instructor in online classes' (p. 78). However, Rourke *et al.* (1999) suggested the need to discover an ideal level of social interaction that actually might be detrimental if it is exceeded.

In the process of building community online, faculty concentrate more on leading online discussion and promoting collaborative learning, rather than course design, lectures and assessment (Young, 1997). They play the part of 'provocateur' instead of 'academician' (Parker, 1999, p. 16). Palloff and Pratt (1999) offer instructors guidelines for developing these learning communities online. Kim (1998) describes nine effective principles for facilitators who desire to build online communities, a process described as 'social scaffolding'.

Boettcher (1999, pp. 42–43) encourages the practice of using small groups to facilitate online discussion, manage large class sizes, and encourage students to learn from each other, rather than depending solely on instructors. This may also help

build a sense of community. Rohfeld and Hiemstra (1995) suggest introducing participants to each other, matching them with partners, and assigning group projects to build group rapport and cohesion. However, some students, accustomed to traditional models or paradigms of classroom instruction, have indicated a reluctance to participate in online discussions and learn from fellow students (Cooper, 1999, p. 51). Therefore, 'student satisfaction numbers are generally higher when faculty have time to communicate with them ... interaction with faculty generally creates a sense of personalization and customization of learning' (Boettcher, 1999, p. 43).

The nature of the computer-mediated communication generally appears to both enhance and inhibit meaningful relationships, regardless of whether this occurs in educational or other contexts (Rheingold, 1993, p. 3). Some scholars suggest that the current, predominantly text-based interactions that take place on the Internet encourage 'shallow, impersonal and often hostile relationships' because vocal characteristics, facial expressions and physical appearance factors are 'filtered out' (Parks & Floyd, 1996, pp. 80–81; see also Walther, 1992). Others believe that since computer-mediated communication reduces time and space barriers, and diminishes such inhibitors to communication as status, gender, race and other physical appearance factors, more intimate and sincere relationships can be formed (Parks & Floyd, 1996; Baym, 1995; Sproull & Kiesler, 1991). A number of scholars have reported how those involved in computer-mediated communication create additional communication cues, in the form of icons and textual cues, to lessen the barriers to developing relationships that the medium imposes (Walther, 1996; Walther *et al.*, 1994; Walther & Burgoon, 1992; Reid, 1991).

The nature of online and offline relationships has been compared (Parks & Roberts, 1998) and whether online relationships are real or not has been explored (Moon & Ness, 1996). Chesbro and Bonsall (1989) contend that computer-mediated communication is no more than an 'option for social contacts' among people who would prefer communicating face-to-face (p. 221). Scholars have generally disagreed about the nature and quality of communities that emerge through online interactions. Some contend that they promote greater self and collective growth, and that harmony and inclusiveness are fostered (Cutler, 1996; Featherstone & Burrows, 1995; Jones, 1995). Others argue that they are illusory (Robins, 1995; Meyrowitz, 1985; van Dijk, 1997; Ebersole & Woods, 2001) and fragmenting (Shields, 1996). Harmon (1998a, p. 1) suggests that Internet actually undermines the 'psychological well being' of users, and that even moderate users experience higher levels of depression and loneliness than less frequent ones. This indicates a need to consider 'social factors in terms of how you design applications and services for technology' (Harmon, 1998b, p. A-13).

Although what scholars have learned about computer-mediated communication and the formation of online communities has been limited and open to debate, it does seem to suggest that the nature and quality of interpersonal and group communication must be critical factors in the relative success of online distance courses and programs. There is a need for specific research investigations that concentrate on these concerns. This exploratory case study of LEAD 713 online

learners was designed to address such issues in the context of the research questions stated below.

### **Research Questions**

In light of the literature reviewed, two basic research questions constituted the framework for investigation:

- (1) Will additional communication cues in the form of audio messages (as a supplement to text), administered by an instructor as e-mail attachments at regular intervals throughout a course increase the frequency of student participation and length of utterances in online, asynchronous group discussion?
- (2) Will additional communication cues in the form of audio messages (as a supplement to text), administered by an instructor as e-mail attachments at regular intervals throughout a course result in more favorable student perceptions of student/faculty relationships and quality of discussion in individual groups, a greater sense of online community, and a higher degree of satisfaction with the overall learning experience?

### **Methodology**

A naturalistic case study research design (Yin, 1993) that draws on both quantitative and qualitative methods (Tashakkori & Teddlie, 1998) was selected for this study, because the authors were interested in gaining insight and understanding of the issues related to the use of audio messages in the delivery of online educational services. Researchers were also interested in developing strategies and tactics for improving future delivery of online courses, and for gathering empirical data for additional design and testing, related to using audio in similar settings to increase student participation in group discussion, enhance faculty/student relationships, foster community and increase satisfaction with the overall learning experience.

#### *Study Participants*

Study participants included the 40 students enrolled in LEAD 713. There were 23 males and 17 females. Twenty-nine were Caucasian, seven were African American, three were Hispanic and one was an Asian/Pacific Islander. Two resided outside the United States. They ranged in age from 27 to 62.

#### *Study Procedure*

A randomized control-group post-test only design for educational settings (Isaac & Michael, 1995, p. 75) was used in part to help address the research questions stated above. Students were randomly assigned to one of seven online discussion groups at

the beginning of the course. The groups were then randomly assigned to one of the following four case study treatments.

- (1) *Treatment 1* (12 students: Group A = 6, Group B = 6). Groups A and B received an audio message at the end of each week for a total of 15 messages throughout the semester.
- (2) *Treatment 2* (11 students: Group C = 6, Group D = 5). Groups C and D received an audio message at the end of each month for a total of four (4) messages throughout the semester.
- (3) *Treatment 3* (11 students: Group E = 5, Group F = 6). Groups E and F received an audio-message at the end of every other month for a total of two (2) messages throughout the semester.
- (4) *Treatment 4 (Control Group)* (6 students: Group G = 6). Group G received zero (0) audio messages in addition to regular textual messages throughout the semester.

Note that the control group (Treatment 4) did *not* have access to the audio e-mails sent to Groups A–F (Treatments 1–3) at any time throughout the semester. Furthermore, groups in Treatments 1–3 did *not* have access to the audio e-mails sent to other groups. For example, at no time did the members of Treatment 2 (audio e-mails at the end of each month) or Treatment 3 (audio e-mails at the end of every other month) have access to the weekly audio e-mails sent to the members of Treatment 1, and vice versa.

The audio messages were created using Real Producer (a RealAudio product) and sent by one of the course instructors as part of his regular interaction with each group. The messages were on average 60–90 seconds long and contained two basic components: (1) reiteration of information posted in TopClass folders or disseminated via e-mail; and (2) words of encouragement and support, for example, ‘keep up the good work’, ‘just wanted to check in to see how you were doing’, ‘look forward to seeing you in cyberspace’, or ‘let me know if there is any way I can serve you better as an instructor’. The audio e-mails were sent to each group as a whole according to the treatment schedule listed above. In each case, the content of the audio message paralleled or otherwise reinforced what was already communicated through textual messages. No new content was added.

Frequency of student participation in the group discussion was assessed by recording the total number of initial posts, and replies to others’ posts, within each group in response to 19 discussion questions or exercises presented over a 15-week period. Length of utterance (amount of interaction) for each group was determined by counting the number of words in each student’s total number of posts throughout the time period. The total number of posts per group and the average number of words per group were then calculated.

An e-mail survey was sent to all 40 students following completion of the course. It consisted of five questions. Four of them measured students’ perceptions related to the quality of the faculty/student relationship, quality of group discussion, sense of online community, and satisfaction with the overall learning experience, on a five-point Likert scale (‘5’ being ‘agree strongly’ and ‘1’ being ‘disagree strongly’).



Scores between groups on the frequency and perceptual measures were then compared using the SPSSX statistical software package. One-way Analysis of Variance (ANOVA) was used to examine the differences between groups.

Because the researchers were primarily interested in gaining insight and understanding of the issues presented, qualitative and other unobtrusive data were gathered and analyzed. An optional open-ended question was included in the post-course survey that asked students to comment on the academic and communication relationship they had with the instructor who administered the audio messages. Mid-term and end-of-course evaluations, unsolicited phone calls and e-mails apart from the organized group discussion, and student course grades, were also considered in the analysis of data.

## **Results**

Previous research and literature related to online distance courses and programs would suggest that intentional and systematic use of audio messages by faculty to students, as a supplement to text and other forms of interaction within an online course, would lead to greater and better quality of student participation in course-related group discussion, and more favorable student perceptions and overall satisfaction with the course. The results of this preliminary case study generally did not confirm these assumptions.

### *Frequency of Group Participation*

Contrary to what the researchers expected, it was Treatment 3 which received the fewest number of audio messages from the professor ( $n = 2$ ), that had the highest frequency (i.e., total number of posts/replies throughout the semester) in their discussions ( $n = 1,109$ ). Treatment 1, which received the most audio messages ( $n = 15$ ), had the fewest number of posts/replies ( $n = 657$ ). The Control Group (Treatment 4), which received no audio messages throughout the semester, participated more frequently ( $n = 482$ ) in group discussions than Treatment 1, which received the most audio e-mails. A statistically significant difference between the Treatment Groups with regard to frequency of group participation was identified ( $p < 0.001$ ).

### *Length of Utterance (Word Count)*

Again, contrary to what was expected, it was Treatment 3, which received the fewest number of audio messages, that had the highest average word count for the student groups that were assigned to it ( $n = 100,326$ ). Treatment 1, which received the most audio messages ( $n = 15$ ), had the lowest mean score ( $n = 62,834$ ). Treatment 2 had an average word count of 70,615, and Treatment 4 (control group) had an average word count of 65,957. Treatments 1, 2 and 4 all differed significantly from Treatment 3 at the 0.05 level.

### *Student Perceptions*

Regardless of the number of audio e-mail messages received by the students throughout the course, a statistically significant difference between the groups could not be identified along student perceptions of the following: (1) personal relationship with the instructor; (2) sense of online community; and (3) satisfaction with the overall learning experience. Students across all groups perceived a very positive faculty/student relationship with the instructor (mean = 4.48). They also perceived a strong sense of online community (mean = 3.9), and were very satisfied overall with the learning experience throughout the semester (mean = 4.15).

However, there was a statistically significant difference ( $p = 0.038$ ) between Treatments 1 and 3 concerning their perceptions of the quality of group discussion. Treatment 1 had received audio messages weekly (total = 15), while Treatment 3 had received them every other month (total = 2). However, Treatment 3 reported a higher level of satisfaction with the quality of group discussion, despite the fact they received considerably fewer messages.

### **Discussion**

Scholarly research and literature that has dealt with computer-mediated communication and the formation of Internet communities has provided some indication that strong interpersonal and communal relationships can be achieved online in a largely text-based communication environment. Many observers of Internet communication developments have endorsed the idea that in this medium the use of a mix of delivery modes, including audio messages, will further strengthen these relationships. Moreover, those interested in online distance education also have stressed the need for developing strong student-to-student and faculty-to-student relationships, and building a sense of community among those engaged in particular online courses or academic programs. Some have suggested that online distance educators who build audio elements into their courses and programs can increase student involvement, enhance their overall learning experiences and satisfaction with them, and reduce attrition.

In light of this, it was surprising to discover that systematic, instructor initiated audio e-mail messages to students participating in an Internet-based graduate-level course, as a supplement to text and other forms of communication that took place in the course, did not seem to yield greater levels and quality of online group discussion, a stronger sense of community, more favorable perceptions of the student/instructor relationship, and greater satisfaction with the course as a whole. Most revealing is the fact that Treatment 3, the two groups most highly involved in discussion, actually received fewer audio messages than other groups. This same group was more satisfied with group discussion than the others (mean = 4.3), but did not perceive their personal relationship with the instructor, sense of community, and satisfaction with the overall course, any differently than the other groups involved in the course. In effect, varied use of personal audio messages from the

instructor appeared to have little impact overall when groups were compared in this preliminary investigation.

It would be premature, however, to dismiss the possible benefits of using audio messages in online distance courses either in the way described in this study or in other similar manners. This study focused only on the use of personal online audio messages from the instructor in one course, in one academic program, at one college and at the graduate level of education. It dealt with a relatively small number of predominantly Caucasian students that were divided into relatively small groups. Student participation in any particular online group, and their perceptions of that experience, could have been influenced by a variety of other elements of the specific course or the overall academic program, as well as other types of interactions with the course instructors beyond the audio messages. Future studies that control for such variables may produce different results.

Group dynamics could have played an important role as well. For example, significantly greater involvement and satisfaction with online group discussion on the part of Treatment Group 3 may have been a function of a strong emergent leader, a motivated seeker of group interaction, and/or a highly articulate group member. However, randomization of individual students to groups (as in the current study) will reduce such interference. Greater levels of involvement and satisfaction may also have been the result of a negative group experience in a prior semester by another faculty member. Such variables are significantly more difficult to control for in design. Lastly, variations in the level of instructor involvement or leadership within the various group discussions may contribute to varying levels of involvement and satisfaction. Groups that participate more frequently may simply have more positive feelings towards the instructor.

Nevertheless, despite the limitations mentioned, the lack of significant difference between groups in this exploratory study should not discount the fact that individual students, regardless of particular group membership, were positively effected by audio e-mail messages sent to them by the instructor during the course. The qualitative data more clearly support the researchers' expectations regarding the use of audio e-mail. It appears from the open-ended data collected in the post-course survey and course evaluations that those who could benefit from the inclusion of such audio messages indeed benefited in the ways anticipated. For example, individual students commented that the instructor demonstrated 'genuine concern [through] interaction with Real Audio messages'. Others perceived the audio e-mails as a willingness on the instructor's part 'to go the extra mile with his students, [by showing] personal concern and follow-up ... [via] RealAudio messages'. For this student, content was less important than delivery. Another student commented, 'the weekly audio attachments were a nice touch and appreciated'. Still another remarked that it helped her feel 'closer' with the professor in cyberspace: 'It's nice to know someone is really out there!' A variety of other expressions of gratitude along these lines supported this sense of greater personalization and intimacy.

It thus appears that students who needed additional vocal cues to establish a feeling of 'closeness' with the professor and feel a greater sense of belonging in the online environment were positively effected. Positive comments were

almost evenly spread among the three treatment groups. And students who received as few as two audio e-mails reported the same types of positive effects as those who received 15. Apparently some students simply did not need this 'extra-touch' or additional communication for positive feelings, for reasons that should be investigated in future studies. In any case, based on the positive open-ended responses, the inclusion of audio e-mails did not appear to detract from the quality of student/faculty relationships, perceived sense of online community, and overall satisfaction with the learning experience among LEAD 713 students. It did not appear to attract 'attention and energy to itself' (Crockett & Petersons, 1990, p. 54).

Additionally, unsolicited student e-mails received by the instructor who delivered the audio messages provide an even richer description of the potential positive effects of this tool on building online community and strengthening faculty–student relationships. Overall, while both instructors communicated textually on a regular basis with students in each of the seven groups (A–G), the instructor who sent the audio e-mails received more unsolicited e-mails and phone calls from students in Treatments 1–3 than the professor who did not send the audio e-mails. Two students even composed their own audio e-mails in response to one of the professor's audio e-mails, which supports the idea in the literature noted earlier that some students will create their own cues to overcome barriers to communication in cyberspace.

One of the unsolicited (textual) e-mails indicated that it 'was nice to hear a human voice in cyberspace, it made you feel connected' to the group as a whole, a strong indicator that it helped this person perceive a sense of community. A feeling of co-presence was identified by one student who remarked: 'It was like you were together in class listening to the professor.' Another student, after receiving the audio messages and exchanging several e-mails outside class with the instructor, had this to say about the relationship-building potential of audio messages:

It is great to have someone 'relational' as a professor in this program (and yes there is a lot behind that statement). I have observed in your communication with those in the course that you seem to truly desire a relationship with them—even, as amazing as it sounds, on a personal level—like [having us call you to go] for a cup of coffee. This is truly an encouraging sign to me ... I am thankful that you are modeling a desire for communion rather than just 'task oriented' communication.

The phenomenal growth of online distance courses and programs in higher education clearly calls for additional scholarly research that extends beyond the parameters of this particular study. This case study revealed the potential benefits of using audio e-mail attachments in the academic setting and even suggested potential guidelines for future use. Additional studies might address whether a similar use of audio e-mail messages would lead to similar benefits in other types of course/instructor settings, academic programs, or different levels of education? Also, what would be the optimal objectives, nature, number and length of these messages? The preliminary findings of this study suggest that you can have positive effects with as few as two messages that run about 60–90 seconds in length. Would it have made

a difference if the audio e-mails had mentioned individual students' names within each group? What about the effects of a phone call or video messages? As bandwidth continues to increase, the use of streaming video opens the doors to new forms of experimentation. Moreover, in what other ways can online course instructors satisfy students' individual and collective needs for a sense of community and interaction with instructors and other students? In team or co-instructor settings, might supplemental audio e-mails result in greater interactions with and more favorable perceptions of the instructor who sent them? And, as alluded to earlier, why do certain types of students strongly seek these personal interactions and a community experience, while others are much less concerned about this? Lastly, might the use of audio e-mails increase student performance on course grades? In the current study, students receiving As and Bs were nearly equally divided between Treatment groups. Future studies might explore whether audio e-mails could improve grade performance for marginal students?

More controlled experimental designs may yield overall results more consistent with the researchers' initial expectations related to the consistent administration of audio e-mails as a supplement to regular textual exchange. Differences in perception and experience based on gender, age, ethnicity, technological literacy and primary occupation must be considered. Most of the positive comments about audio e-mail came from women and those under age 35 who worked in positions requiring some moderate to high levels of technological literacy. This gender specific finding appears consistent with some research indicating that women are more likely to seek supportive (communication) environments (c.f. Burnham, 1988; Brunner, 1991; Ryan & Hicks, 1997). Others less technologically literate, possibly in part linked with age, may consider the inclusion of audio e-mails time consuming and distracting. Limitations in bandwidth, and slow downloading as a result, may also have created negative perceptions in some cases. These and other factors discussed above must be properly factored into future designs.

In short, there are endless possibilities for research—both quantitative and qualitative—that would not only contribute to the body of scholarship that has begun to develop in this general area of study, but could address an increasing number of practical administrative and pedagogical/andragogical issues that have emerged as academic institutions have embraced the idea of online distance education.

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*Dr Robert Woods is Associate Professor of Communication at Spring Arbor University, 106 E. Main Str., Spring Arbor, Michigan 49283-9799, USA. E-mail: <rwwoods@arbor.edu >.*

Dr Jack Keeler is professor and Director of the Doctoral Studies Program in the College of Communication and the Arts at Regent University, 1000 Regent University Dr., Virginia Beach, VA, 23464, E-mail: <johnkee@regent.edu > .

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