Should Online Doctoral Instructors Adopt Audio Feedback as an Instructional Strategy? Preliminary Evidence

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Abstract

Literature supports that feedback is central to the learning process, and technology is central in the delivery of online education. Critical lines of research consistently identify two crucial variables associated with effective online higher education: community and learning. Thus, the current study examined how audio and text feedback as compared written feedback can contribute to 125 online doctoral students' sense of community and learning. The findings show that doctoral students who received audio and text feedback had better perceptions of their instructor and cognitive development than those who received written feedback. The students who received audio and text feedback also had better learning outcomes. There was no difference in social presence between the two groups. These results are consistent with qualitative research on audio and text feedback and are explained by media theory.

Keywords: Perceived Learning, Community of Inquiry, Learning, Audio Feedback, Doctoral Education

Introduction

As online doctoral programs become more prevalent, educators need to identify effective online instructional strategies. Technological advancements provide new opportunities for educators to promote both learning and community in their online doctoral classrooms (Cobb, 1997; Kozma, 1994; Locatis, 2007). As feedback is "the most important aspect of the assessment process in raising achievement" (Bloxham & Boyd, 2007, p. 20), research needs to focus on improving online feedback. Traditionally, instructors have provided feedback via written notes on assignments. Although this method is often effective, the advent of open source technologies and readily available features of word processing software have provided educators with potentially effective pedagogical tools to enhance their feedback (Lunt & Curran, 2010; Nortcliffe & Middleton, 2011). Educators can record feedback using open source recording systems, such as Audacity. They can then integrate the audio file into the assignment document. Providing feedback in this manner may be more effective when compared with traditional, written feedback.

The present study examines how audio feedback created with an open source audio tool can enhance online doctoral students' community and learning. The two elements, community and learning, were selected as they have been identified in the literature as critical to creating an effective online experience (Gar-

rison & Anderson, 2003; Moore, 1989; Rovai, 2002). To understand the findings, the study reviews the literature related to online asynchronous education challenges and how the integration of rich media may assist in overcoming these challenges.

Elements of an Effective Learning Experience in Online Education

Community and learning are two elements that are important in creating an effective online learning experience for both undergraduate and graduate students (Garrison & Anderson, 2003; Moore, 1989; Rovai, 2002). Establishment of community among students and between students and instructors is key to learning. The establishment of a community is highly correlated with perceived learning, deep learning, and learning outcomes (Picciano, 2002; Tu, 2002; Williams, Duray, & Reddy, 2006). In a regression analysis, Swan (2003) found that 42% of variability in perceived learning was predicted by perceived community. Conversely, doctoral students who feel isolated perform poor academically, and isolation is often a result of low levels of socialization and interaction with faculty (Terrell, Snyder, & Dringus, 2009). Tinto (1997) states that opportunities to establish community result in fostering knowledge and skills, thereby, connecting the "academic-social divide" (p. 610). Thus, this study includes both (a) the community of inquiry framework and (b) learning.

Community of Inquiry

Garrison, Anderson, and Archer's (2000) Community of Inquiry (COI) framework is used throughout the distance education literature as a measure of effectiveness (Garrison, Cleveland, Innes, Koole, & Kappelman, 2006; Nippard & Murphy, 2007; Vaughan & Garrison, 2005). The framework is comprised of three constructs. Social presence is "the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as *real people"* (Garrison, et al, 2000, p. 89). Cognitive presence is "the extent to which the participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication" (Garrison et al., 2000, p. 89). Teaching presence is the design and the facilitation that guides the cognitive and social processes for the purpose of educationally meaningful learning outcomes (Garrison, et al., 2000). Although each variable is important in and of itself, the underlying premise of the framework is that an effective learning experience occurs within a community in which all three elements exist. The establishment of a community of inquiry is important in the learning process (Garrison & Kanuka, 2004).

Learning

Learning, defined as the change in knowledge or ability, is the goal that higher education institutions set forth for all students throughout all academic programs (Council for Higher Education Accreditation [CHEA], 2003). Moreover, learning outcomes "must be the first measure by which online education is judged" (Swan, 2003, p. 13). Throughout the literature, learning has been operationally defined in numerous ways. Grades are one of the most common operational definitions of learning (Hiltz & Wellman, 1997). However, Rovai (2002) argues that grades alone may not be a valid measurement of cognitive development in graduate students. Doctoral students enrolled in research and analysis courses are not simply full time students. A doctoral student in an online program often works full time, has a family, and engages in academic and community commitments (Jimenez, 2011; Smith, Maroney, Nelson, Abel, & Abel, 2006). Cognitive development and other responsibilities influence grades. For example, a doctoral education student may serve as a principal of a school. A crisis, such as a bomb threat, may inhibit the student from returning home in a timely manner to submit an assignment on time. Thus, the grade received

reflects a late submissions deduction. Alternatively, a self-report of learning is considered a valid measure of learning. It is commonly used as a measure of learning throughout the distance education literature (Alavi, Marakas, & Yoo, 2002; McGorry, 2003). Richmond, Gorham, and McCroskey (1987) even argued that students' perceived learning is as valid as a grade. Both grades and perceived learning are important when examining the effectiveness of an instructional strategy in an online doctoral classroom.

The Challenges of Asynchronous, Text-based Instruction

Instruction and the instructor's behavior within the online classroom influence students' learning (Baker, 2004; Shea, Fredericksen, Pickett, & Pelz, 2003), and instructor-learner interaction can determine whether students' feel psychological isolation or connectedness with peers and the instructor (Chen, 2001). In a study with 2,036 online students in 32 universities, Shea (2006) stated "that a strong active presence on the part of the instructor…is related both to students' sense of connectedness and learning" (p.185). Similarly, Arbaugh and Hwang (2006) suggested that effectiveness of an online course is dependent upon the instructor's ability to facilitate learning discourse and to disseminate knowledge. In the online doctoral classroom, instructors traditionally facilitate via text-based discussion and typed feedback on assignments.

Unfortunately, the sole use of asynchronous, text-based facilitation and feedback in the online environment poses challenges. In discussing this, Russell (2005) purported that "all of these technologies lack fundamental corporeal dynamism of classroom work" (p. 3) Asynchronous, text-based communication is devoid of traditional paralinguistic cues and the richness of verbal communication. Without body language, verbal cues, and emotional expressions that are often presence in verbal and F2F communication, online students view faculty as "less friendly, emotional, or personal" (Rice & Love, 1987, p. 88). Difficulty communicating emotions results in lower sense of community and social presence as compared to hybrid classes and F2F classes (Gunawardena & Zittle, 1997; Rovai & Jordan, 2004). Further, loss of verbal cues and nuances in asynchronous, text-based facilitation results in miscommunication, information overload, and lack of higher order thinking (Eastmond, 1994; Moore & Kearsley, 2005; Nentwich 2003; Stevens-Rayburn & Bouton, 1998). Learning of complex concepts is even more challenging (Baltes, Dickson, Sherman, Bauer, & LaGanke, 2002, p. 158). Online doctoral students face the challenge of overcoming these barriers of online education (Blum, 1999; Blum & Muirhead, 2005). This is especially true when they are expected to learn highly complex concepts in research design and analysis courses and learning via text-based instruction is not conducive to their learning preferences (West, Kahn, & Nauta, 2007).

Media Richness and the Benefits of Media for Online Instruction

Researchers suggest that the integration of rich media may overcome some of the challenges posed by online asynchronous text-based facilitation. In a study of 347 online students, Rockinson-Szapkiw, Baker, Nuekrug, and Hanes (2010) found that students who were enrolled in courses that used audio and video-based media for instruction had a higher social presence than students who used asynchronous text-based instruction in their courses. Moreover, Arbaugh (2005) and Liaw and Haung (2000) found that the integration of rich media for online course instruction is positively correlated with learning.

Media Richness Theory (MRT) supports this research. MRT suggests that the use of rich media, a medium that has the ability to convey cues such as tone of voice and natural language, as compared with lean media, results in more effective communication and, thus, performance (Daft &

Lengel, 1986). This is based on the reasoning that the richer the communication medium, the more the ambiguity and uncertainty are reduced (Daft & Lengel, 1986; Dennis & Kinney, 1998). Thus, the communication is clear. The task at hand can be better understood. Similarly, cognitive load theory and multimedia learning theory purport that verbal information is more efficiently processed into students' working memory when presented in audio narration rather than text (Leahy, Chandler,& Sweller, 2003; Mayer &Moreno, 2002). Ginns' (2005) meta-analysis demonstrates this. Students who viewed presentation material with audio narration as compared to text performed better on tests. The also perceived lower cognitive load (e.g., leaving them more energy to process the concepts).

Considering media richness theory, audio feedback on assignments is more media rich than the text-based feedback. Thus, audio feedback is an instructional strategy that may assist students in better understanding complex content, as well as increase their sense of teacher presence and social presence. Audio feedback may lead to better processing and performance. Limited research is beginning to suggest that audio feedback on assignment does improve the online learning process.

Audio Feedback

Via interviews and written feedback with online teacher education students enrolled in curriculum and instruction courses, Ice, Curtis, Phillips, and Wells (2007) found that students were more satisfied with instructors' audio feedback than written feedback. Students perceived that the audio feedback increased their sense of community, their perception of teacher's care, and their retention of material. A document analysis revealed that students were more likely to apply audio feedback than written feedback (Ice et al., 2007). Oomen-Early, Bold, Wiginton, Gallien, and Anderson's (2008) study of a 156 online undergraduate and graduate students further supported these qualitative research results. Via a researcher created survey, Oomen-Early et al. (2008) discovered that students found audio feedback helpful and easy to use. Student purported that audio feedback assisted them in engaging in course content. Lunt and Curran (2010) conducted a similar study that rendered similar results. Twenty six students, using a Lickert scale and open ended question survey, positively evaluated audio feedback. They also reported that they were ten times more likely to open audio files than read written feedback. Lunt and Curran (2010) and Nortcliffe and Middleton (2011) also examined instructors' perceptions of using audio versus written feedback; they found that instructors, in some cases, found that providing feedback in audio format was efficient. The findings of these studies suggest that audio feedback may be one strategy that instructors can use to assist online doctoral students in learning and applying research and statistical concepts in their course work. Audio feedback may also increase students' teacher presence and a sense of community. Rigorous quantitative studies grounded in theory with the use of validated instrumentation is needed to confirm and extend what previous studies have found. Further, research that focuses specifically on the doctoral population is needed. Although Ice et al.'s (2007) study included eight doctoral students, the research on audio research has focused primarily on undergraduate students and courses. Undergraduate courses and students differ significantly in terms of content and characteristics, respectively, from the doctoral population and doctoral courses. Thus, research needs to examine the doctorial population. As such, the present study quantitatively compares the use of audio and text based feedback on research design and analysis assignments on online doctoral students' learning, cognitive presence, teaching presence, and social presence. The study provides empirical evidence for the use of audio feedback in online doctoral courses, and it extends the previous literature through the implementation of a rigorous quantitative study.

Purpose of the Study

Using the community of inquiry framework and learning as the measure of effectiveness in online distance education, this research study poses the following questions: (a) is there a difference between learners' social presence, cognitive presence, and teacher presence based on the type of feedback that the online learner received on written assignments? (b) Is there a difference between learners' perceived learning based on the type of feedback that the online learner received? (c) Is there a difference between learners' learning (e.g. final grade) based on the type of feedback that the online learner received?

Methodology

Participants

The present study consisted of a convenience sample of 125 doctoral students enrolled in online doctoral level research and analysis courses. The volunteer rate was 94%. The participants were predominately Caucasian. Eighty-seven (69.6%) of the participants were Caucasian, 30 of the participants were African American, six of the participants was Asian, and two of the participants classified themselves as other. This is consistent with what is understood about individuals who earn doctoral degrees in education. In 2009, 70.8% of those who earned doctorates in the field were Caucasian (National Science Foundation, 2009). The sample was almost evenly distributed in terms of sex; the sample consisted of 60 males (48%) and 65 females (52%), which is representative of national averages for doctoral education programs. Approximately 50 to 70% of individuals who enter a doctoral education program are female (National Science Foundation, 2009). Most of the participants were employed in the field of education as K-12 teachers or administrators.

Setting and Treatment

The sample was derived from eight online doctoral research and analysis courses that ran from spring 2010 to spring 2011. The research courses examined quantitative designs and analyses, and the instructional designer created the courses with the objective for students to develop knowledge and skills needed to write a quantitative research plan for a dissertation. Caucasian educators taught courses that were eight weeks in duration. The educators were experienced in online teaching and proficient in their use of the technology. All of the courses were taught via The Blackboard learning management system.

In all the research courses, the students completed reading assignments, quizzes, discussion forum posts, and a research plan. The research plan was the primary assignment for all courses. Students developed a research plan outlining a quantitative research study that they plan to use for their dissertation. The research plan contained the following sections: (a) a brief background or introduction with the problem statement or the purpose statement, (b) research question(s), (c) research hypothesis(es) in null form, (d) identification of variables, (e) research design, (f) participants and sampling, (g) setting (if applicable), (h) methods of data collection/ procedures/ instrumentation, (i) data analysis, (j) limitations, ethical considerations, and (k) assumptions. Students aligned their plans with the most current APA style guidelines. The students submitted the research plan twice during the course. The students submitted an initial research plan in which their course instructors provided detailed feedback. Incorporating the instructor's feedback from the initial research plan submission and feedback from the peer review, the students refined their research plan and submitted it for final review. Thus, the research plan assignment had three parts: (a) an initial plan, (b) a peer review, and (c) a final plan. Students received a grade for each part, which was calculated into the final grade. The final review constituted the most points.

Each course under study was divided into two groups. Using a computer-generated random numbers program, students were randomly assigned to either a text-only feedback group or an audio feedback group. Regardless of the group assignment, students received the same instructional materials and completed the same learning tasks described above. Further, the instructors interacted via discussion forums with text based posts using Socratic questioning to encourage discussion on the threads and a summary of each thread to assist students in consolidating their learning. Additionally, on quiz assignments the instructors provided individualized text based feedback as needed.

In the text only groups, the instructors provided individualized text based feedback to students on both their initial and final research plan. If students submitted their research assignments as a Word document, the instructors used comments and track changes features to provide text-based feedback throughout the document. The instructor provided a final summary and list of needed areas of improvement in text format at the end of the document. If students submitted their research assignments as a PDF, the instructors used Adobe Acrobat Pro 9's Comment and Mark Up Tool to provide comments throughout the document and a final summary and a list of needed areas of improvement at the end of the document. The instructor uploaded the students' grades and document with feedback to Blackboard Grade book for the students to review.

In addition to using text-based feedback, the instructors incorporated audio feedback on both the initial and final research plans for the audio and text group. Microsoft Words comments and track changes features or Adobe Acrobat Pro 9's Comment and Mark Up feature were used throughout the document. The instructor provided a summary and list of needed areas of improvement in audio format at the end of the document. If students submitted their assignments as Microsoft Word documents, the instructors created .mp3 audio files using Audacity freeware and inserted them into the document. If students submitted a PDF, the instructor used Adobe Acrobat Pro 9's Record Audio Comment tool to provide feedback. All instructors uploaded documents with feedback to Blackboard Grade book for the students to review.

The number of comments placed within documents varied depending on the quality of the document. The average number of comments for each group was similar. The average number of comments on the initial research plan for the text only feedback group was 47, and the average number of comments for the audio and text feedback group was 45. The average number of comments on the final research plan for the text only feedback group was 22, and the average number of comments for the audio and text feedback group was 21.

The final summary and list of needed areas of improvement at the end of the document was conversational in nature for both groups. The instructors choose to use conversational style type feedback, both audio and text, based on the personalization principle (see Clark & Mayer, 2008). Upon reading the assignments, the instructor created non-scripted audio feedback for all students. The instructor provided the audio and text feedback group with the audio file via insertion into their document. For the text only feedback group, the audio file was transcribed and the text inserted into their documents. This was done to ensure that if differences in the dependent variables were found, they would be due to the commenting modality rather than the type of feedback received. Similarly, the instructors took care to use similar comment strategies in terms of type and placement of comments to control for these confounding variables.

Instrumentation

During the final week of the course, participants completed a web-based survey that consisted of the Community of Inquiry (CoI) Framework survey (Arbaugh et al., 2008) to assess the three constructs of the CoI framework, and the Perceived Learning Instrument (Richmond et al., 1987)

to assess students' learning. Students also signed an informed consent for us to access their final course grades for the purpose of this research.

The CoI Framework survey (Arbaugh et al., 2008) assessed learners' perceived sense of social presence, cognitive presence, and teacher presence. The CoI Framework survey is a 34-item self-report consisting of three subscales of social presence, cognitive presence, and teacher presence. On a 5-point Likert scale (i.e. 4 = strongly agree, 3 = agree, 2 = neutral, 1 = disagree, and 0 = strongly disagree), participants indicated the response that best reflects their feelings about statements. Scores on the social presence scale range from 0-36, the cognitive presence scale range from 0-48, and the teacher presence scale range from 0-52. Higher scores reflected a stronger sense of social presence, cognitive presence, and teacher presence. Evidence supports good construct validity. Cronbach's coefficient alpha for the social presence, cognitive presence, and teacher presence subscales were .91, .95, and .94, respectively (Arbaugh et al., 2008). For the present study, Cronbach's coefficient alpha for the social presence, cognitive presence, and teacher presence subscales were .84, .93, and .80, respectively.

The Perceived Learning Instrument and the final course grade measured learning (Richmond et al., 1987). On the Perceived Learning Instrument, participants responded to one question: "On a scale of 0 to 9, how much did you learn in this course, with 0 meaning you learned nothing and 9 meaning you learned more than in any other course you've had?" Since the instrument is composed of a single item, internal consistency reliability is not applicable. Test–retest reliability was .85 in a five-day study with 162 adult learners (McCroskey, Sallinen, Fayer, Richmond, & Barraclough, 1996). As recorded in the syllabus, the grading scale was 94-100% of points, A; 84-93% of points, B; 74-83% of points, C; 64-73% of points, D; and less than 63% of points, F.

Procedures

During the first week of the course, using computer generated random numbers program, the instructor randomly assigned half of the students enrolled in selected course sections to either the audio and text feedback group or the text only feedback group. Regardless of the group assignment, all students participated in the 8-week course. Students participated in the same instructional tasks, and the instructor provided the same quality of feedback to all students. The only difference between the two groups was the feedback modality on their research plan assignment.

One week prior to the end of the course, all participants received an e-mail via their university e-mail accounts requesting that they complete an online survey. The instructors emphasized the importance of participating in the research for improving online teaching and learning, and students received a few points extra credit for participating in the survey. Grades of participants who signed the informed consents to participate in the study were obtained from the instructor's online grade book once final grades were assigned.

Research Design and Analysis

An experimental research design was used to compare the two groups in terms of social presence (SP), cognitive presence (CP), and teaching presence (TP), and learning. A one-way multivariate analysis of variance (MANOVA) and independent *t* tests were used to analyze the quantitative data. The effect size was calculated using the Eta squared statistic and interpreted based on Cohen's *d* (1988).

Results

Descriptive statistics disaggregated by text only *(n* =59) and combination of text and audio (*n* = 66) for each dependent variable are shown in Table 1.

Table 1: ***Dependent Variable Descriptive Statistics Disaggregated by Feedback Type***

	Text Only		Audio and Text	
Variable	*M*	*SD*	*M*	*SD*
SP	27.24	5.17	28.73	4.17
CP	36.98	7.24	40.18	6.26
TP	41.51	9.43	46.36	6.72
PL	6.78	1.75	7.82	1.70
Grades	90.10	5.68	93.30	4.05

A one-way MANOVA was conducted to investigate the differences between SP, TP, CP based on the type of feedback students received on assignments. Preliminary assumption testing was conducted. Results of evaluation of linearity, normality, and singularity were acceptable. Table 2 shows the correlation among the dependent variables.

Table 2: ***Inter-correlation Matrix***

Variable	SP	CP	TP
SP	1.00	.40*	.47*
CP	-	1.00	.52*

Note. *$p < .01$

The assumption of the homogeneity of variance-covariance was not tenable based on the results of the Box's test, $p > .001$. The results of Levene's test of equality of error provided evidence that the assumption of homogeneity of variance across groups was tenable for SP and CP; however the assumption of homogeneity of variance was not TP. Due to the violation of assumptions, a more conservative alpha level of .025 was set rather than the traditional .05 (Tabachnick & Fidell, 2007).

Results on the MANOVA yielded that there was statistically significant difference between the two groups on the combined dependent variables, Pillai's Trace = .09, F (3, 105) = 4.12, p = .008, partial η^2 = .09. The observed power was strong at .84. Post hoc comparisons were used to consider the dependent variables separately with the Bonferroni adjusted alpha level of .008. Analyses yielded a statistical significance difference for the two groups for teaching presence, $p >$ .001, partial η^2 = .08, and for cognitive presence, p = .003, partial η^2 = .05. There was no statistical significance difference for the two groups for social presence, p = .08. An inspection of the mean scores indicated that students who received the audio and text feedback on written assignments reported higher perceptions of teaching presence and cognitive presence than students who received only text based feedback on written assignments.

An independent *t* test was conducted to compare the perceived learning scores for students who received audio and text feedback on written assignments and students who received only text based feedback on written assignments. Preliminary assumption testing was conducted and found satisfactory. The results of Levene's test of equality of error provided evidence that the assumption of homogeneity of variance across groups was tenable, F (1,123) = 2.92, p = .09. Results of the *t* test yielded a significant difference between groups, t (123) = 3.37, p = .001, partial η^2 =.26. The observed power was .99. An inspection of the mean scores indicated that students who

received the audio and text feedback on written assignments reported higher perceptions of learning than students who received only text based feedback on written assignments.

An independent *t* test was also conducted to compare the final grades for students who received the audio and text feedback on written assignments and students who received only text based feedback on written assignments. Preliminary assumption testing was conducted and found satisfactory. The results of Levene's test of equality of error provided evidence that the assumption of homogeneity of variance across groups was not tenable, F (1, 123) = 11.85, p = .001. Thus, results for equal variance not assumed are reported. Results of the *t* test yielded a significant difference between groups, t (103.68) = 3.60, $p < .001$, partial η^2 = .71. The observed power was 1.00. An inspection of the means indicated that students who received the audio and text feedback on written assignments higher final grades than students who received only text based feedback on written assignments.

Discussion

The present study examined the differences in social presence, cognitive presence, teaching presence, perceived learning, and final grades between online doctoral students who received audio and text feedback on written research assignments and students who received text-based feedback on written research assignments. In the first analysis, the results provided evidence that students did not differ in terms of social presence. However, students who received audio and text feedback reported higher perceptions of teaching presence and cognitive presence than students who received only text based feedback. In the second and third analysis, the results demonstrated that the audio and text feedback had higher perceived learning scores and final grades than the text-based feedback group. These results support previous findings (Ice et al., 2007; Oomen-Early et al., 2008) that online students feel that they learn more and are more satisfied with their instructors when instructors use audio and text feedback rather than written. Findings also align with Olsen's research that suggests that nuance via feedback are important in students' perceptions of instructor's care and MRT that suggests the use of richer media for communication results in more satisfying communication and effective performance (Daft & Lengel, 1986).

These results are practically significant for online doctoral instructors as they strive to improve their online facilitation and students' learning. The main contribution of this research is its empirical support of audio and text feedback over text feedback in doctoral research and analysis courses. Feedback in the online environment is essential for engagement and cognitive growth (Sheridan & Kelly, 2010). Research shows listening to an instructor takes less cognitive effort than reading and understanding comprehensive notes (Copley, 2007). As such, providing audio and text feedback allows students to focus more cognitive effort on learning the material. The auditory component also enhances the feedback because students can use their auditory senses to further comprehend complex material that is often hard to grasp when only presented in text based form (Klass, 2003). Hearing the instructor's voice also helps to humanize the online instructor, who may otherwise only interact with students via text.

It is important, however, to recognize that the results of this study do not suggest the replacement of all text based feedback with audio and text feedback rather the integration of audio and text feedback with text based feedback to convey the more complex concepts in the course. Matching content and student learning preference is still important to consider when deciding what type of instructional facilitation strategy to use when giving feedback. Researchers purport that personal factors influence learning in online research courses, and certain types of instruction may be more conducive to some students learning preferences (West et al., 2007). Auditory online learners may prefer audio and text feedback as they prefer to listen to instruction; the same may not be true for visual online learners (Copley, 2007).

Limitation

Study limitation existed. The generalization of results for the study is limited to the courses at the universities under study. As I was one of the course instructors and researcher, researcher bias may be present. Self-report measures may also have introduced a limitation. The web-based survey may have eliminated apprehension. Thus, student participants may have been more honest and felt safer disclosing their feelings (Van Selm & Jankowski, 2006); however, the nature or self-report instruments have the potential for dishonest reporting.

Conclusion

Doctoral educators seeking to enhance traditional written feedback methods and, thus, enhance student learning need to be aware that technological advancements can provide them with opportunities to do this. The present study provided evidence that audio feedback created with an open source audio tool can enhance online doctoral students' learning and perceptions of their instructor. By providing doctoral students with audio feedback as a supplement to text feedback in a course, educators convey cues such as tone of voice and natural language, thus, resulting in less ambiguous meaning and clearer instruction (Daft & Lengel, 1986; Dennis & Kinney, 1998). Students are then able to better understand complex concepts.

It is important to recognize that it is the combination of both audio and text that resulted in the better learning and more positive perceptions of the instructors; it was not the use of audio feedback alone. Educators choosing to use audio feedback should do so judiciously within assignments and during appropriate times in the course. Formative assessment has been identified as one of the most important times in which feedback can be used to enhance achievement; thus, formative assessments may considered a strategic place to insert this type of feedback (Bloxham & Boyd, 2007). Educators also need to ensure that the tone in which audio feedback is delivered is personable and conversational (see Clark & Mayer, 2008). Lack of concern about style and concern could lead to less than positive results.

Cautious application of these results to various doctoral populations should be made as the conclusions of this study are based on one sample enrolled in a doctoral education program at one university. Ongoing research is needed to generalize these findings across universities, programs, and courses. A better understanding of the utility of audio feedback on different types of assignments and different times within the course is also needed. Since the study examined the immediate effects of audio feedback on doctoral students' learning and perceptions, researchers need to study the long-term effects of the use of audio feedback on student performance. If audio feedback enhances students' teacher presence and learning, it may consequently result in better student persistence rates and more success in the writing of dissertations. Effectiveness studies that focus on doctoral persistence and dissertation quality would extend this present study. Further, research on the use of video rather than simply audio feedback would extend this study.

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Biography

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