J. EDUCATIONAL COMPUTING RESEARCH, Vol. 43(1) 113-134, 2010

AN ANALYSIS OF STUDENTS' PERCEPTIONS OF THE VALUE AND EFFICACY OF INSTRUCTORS' AUDITORY AND TEXT-BASED FEEDBACK MODALITIES ACROSS MULTIPLE CONCEPTUAL LEVELS

PHIL ICE
American Public University System

KAREN SWAN
University of Illinois Springfield

SEBASTIAN DIAZ
West Virginia University

LORI KUPCZYNSKI
Texas A&M University Kingsville

ALLISON SWAN-DAGEN
West Virginia University

ABSTRACT

This article used work from the writing assessment literature to develop a framework for assessing the impact and perceived value of written, audio, and combined written and audio feedback strategies across four global and 22 discrete dimensions of feedback. Using a quasi-experimental research design, students at three U.S. universities were provided with text-based, audio-based, and a combination of text- and audio-based feedback over the course of a semester. A survey asking students to indicate their feedback preferences was administered and analyzed using multiple statistical techniques. The findings indicated that students preferred a combination of feedback modalities; however, selective delivery strategies may be preferable at various levels.

doi: 10.2190/EC.43.1.g
http://baywood.com

BACKGROUND

Critics of online learning frequently contend that the lack of nuance in asynchronous text-based interactions can lead to loss of meaning for participants in computer-mediated communication (Bullen, 1998). As such, it is argued that asynchronous learning is not sufficiently rich to support the socially mediated practices Vygotsky (1978) and social constructivists describe as necessary for the construction of knowledge. However, this narrow interpretation of Vygotsky discounts the ability of learners to conceptualize "being" as something other than a physical construct.

The ability of a medium to fully support interpersonal communication was initially termed social presence by Short, Williams, and Christie (1976), who proposed that the inability of low bandwidth media to transmit verbal and nonverbal information directly impacted the degree to which presence was perceived. Researchers familiar with online discussion forums, however, not only contested this notion, arguing that presence was a perceptual not a physical quality (Gunawardena & Zittle, 1997; Walther, 1992), but appropriated the term "social presence" in their research (Anderson, Rourke, Garrison, & Archer, 2001; Swan, 2002).

Lombard and Dutton (1997), for example, viewed this creation of a presence in online courses as the ability to project oneself into a virtual environment. Laffey, Lin, and Lin (2006) described how the social element of asynchronous communication evolves as learners come to view their interactions as being a fluid, integrated process rather than as a series of tasks. They compared this process to a speaker interacting with others in a foreign language. The more fluent the speaker becomes with the new language, the less difficult interactions become. Gunawardena and Zittle (1997) found that the sense of "being there" could be established in the online environment through providing and interpreting emoticons as a replacement for nuance and nonverbal cues. Using a 14-item questionnaire, they found 60% of the variance in student satisfaction was attributable to perceptions of social comfort and presence. Rovai (2002) similarly argued that this type of satisfaction can occur when purely text-based, but socio-emotionally driven interactions promote a sense of connectedness among learners in asynchronous learning networks (ALN).

Nevertheless, as more media options are becoming readily available to online educators, notions of "media richness" (Rice, 1992) should be revisited. Various surveys of online learners, for example, indicate that they prefer multimedia over text-only presentations of content (Bargeron, Grudin, Gupta, Sanocki, & Leetiernan, 2002). In a foundational study on embedded asynchronous audio feedback, Ice, Curtis, Phillips, and Wells (2007) examined whether such preferences also apply to feedback on online course assignments.

Using the audio commenting tool in Adobe Acrobat Pro, Ice et al. (2007) alternatively embedded text- or audio-based feedback in assignments in an online

graduate course in education. In addition to spontaneous positive reactions to the audio feedback from students enrolled in the course, 26 of 31 students indicated they preferred audio feedback to text-based feedback on an end-of-course survey. Semi-structured post-course interviews with 27 students identified four types of explanations for their preferences: better understanding of instructor's intent; perception of instructor caring; enhanced feelings of involvement in the educational experience; and increased retention of material. To further explore the latter explanation, the researchers conducted document analyses of final course projects. The document analyses revealed that students used content from assignments for which audio feedback was provided approximately three times more often than content for which text-based feedback was received. In addition, students were five to six times more likely to apply the higher levels of Bloom's Taxonomy (analysis, synthesis, evaluation) to content from work on which audio feedback was received than to content for which text-based feedback was received (Ice et al., 2007). In a confirmatory, mixed methods study with a larger student sample (n = 156), Oomen-Early, Bold, Wiginton, Gallien, and Anderson (2008) found a large majority of students (85.5%, n = 138) believed that audio feedback was more helpful than text-based feedback for the same four reasons identified by Ice et al. (2007). Oomen-Early et al. (2008) also found that most students believed audio feedback improved their understanding of course content (91%, n = 142) and the instructor-student relationship (82.4%, n = 106).

Ice et al. (2007) conducted a mixed methods confirmatory study with an even larger, multi-institutional sample (n = 1138) using a survey containing seven Likert-type items designed to explore student responses to audio feedback and an open-ended item to probe for additional themes. The results demonstrated that students preferred audio over text feedback in relation to clarity, motivation, retention, presence, and level of care provided by the instructor. No additional themes were revealed by the analysis of data from the open-ended question. Moreover, no difference among learners or institutional types was found. However, one note of interest that requires further study was some indication that audio feedback may not be as effective when employed by instructors who are not native English speakers.

In addition to the confirmatory part of his study, Ice (2008) also explored the effects of audio feedback on teaching, social, and cognitive presence, as defined by the Community of Inquiry (CoI) framework (Garrison, Anderson, & Archer, 2001). This was done by comparing responses to CoI survey items (Swan, Richardson, Ice, Garrison, Cleveland-Innes, & Arbaugh, 2008) between the aforementioned audio feedback group (n = 1138) and a comparable multi-institutional group that did not receive audio feedback (n = 1031). They found significant differences ($p < .05$) in mean scores favoring the audio feedback group on three teaching presence items (e.g., "The instructor was helpful in identifying areas of agreement and disagreement on course topics that helped me to learn"; "The instructor encouraged course participants to explore new concepts in this course";

"The instructor provided feedback that helped me understand my strengths and weaknesses relative to the course's goals and objectives"), one social presence (e.g., "Online or web-based communication is an excellent medium for social interaction"), and two cognitive presence items (e.g., "I felt motivated to explore content related questions"; "Reflection on course content and discussions helped me understand fundamental concepts in this class"). No other significant differences between groups were found. The results suggest that the use of audio feedback in online courses can enhance student perceptions of the social interactions through which knowledge is constructed and thus improve their understanding of course content. Indeed, content analysis of final projects found that students were more likely to apply higher levels of Bloom's taxonomy when discussing concepts for which audio feedback was provided than when discussing concepts for which text-based feedback was provided. Further study is necessary to validate these findings.

Simonsson, Kupczynski, Ice, and Pankake (2009) explored the use of audio feedback for remote dissertation advising. Their study found that audio feedback was perceived as being extremely useful for providing feedback related to complex themes requiring higher-order thought. In contrast, dissertation students found text to be more effective for providing mechanical feedback, such as APA style, syntax, and document structure. An unexpected finding from this study was that the use of audio feedback accelerated the dissertation writing process as students did not have to wait for scheduled appointments or commute to campus to receive it.

In a study of the utilization of audio feedback in blended literacy courses, Swan-Dagen, Rinehart, Mader, and Ice (2008) found that audio feedback allowed for more detailed responses, characterized by increased attention to assignment content and subject matter. Additional exploration revealed that the audio feedback examples contained not only more information but richer language and greater elaboration of concepts.

Despite the many findings confirming the overall effectiveness of audio feedback, anecdotal feedback at West Virginia University's College of Human Resources and Education, as well as indications in the work of Oomen et al. (2008) and Simonsson et al. (2009) suggest that students desire visual mark-ups and some text comments in addition to audio feedback. Subsequent work has demonstrated that text or other visual components (e.g., highlighting, underlining, or circling of text) are considered valuable by learners. Using the session capture feature in Adobe Connect, for example, Crews and Wilkinson (2009) captured the entire work product review process and found that students overwhelmingly believed that being able to see instructors' mark-up process was beneficial to understanding the thought processes involved in evaluations. In similar work, Greivenkamp, Stoll, and Johnston (2009) used Adobe Captivate to capture both the visual and auditory components involved in the review of student projects and found that the visual component allowed students to more effectively

contextualize audio comments. However, the question as to which instances are optimal for audio, text, or a combined audio/text feedback modality remains unanswered. Here, work from the field of composition and rhetoric is considered informative, as significant work on the general topic of feedback from this discipline can be used to guide and structure specific inquiries into feedback in online environments.

Stern and Solomon (2006), for example, identified three principles for effective feedback that appear to be consistent across the literature: provide positive comments in addition to corrections; provide feedback only on a few select areas that are deemed important for that particular assignment, such as those tied to its learning goals; and provide comments that identify patterns of weaknesses, errors, and strengths.

In an effort to assess the type of feedback higher education faculty are giving on graded papers and to determine if the feedback is consistent with the above mentioned principles, Stern and Solomon (2006) collected 598 graded papers from a wide range of content areas and course sections. Instructors' comments were coded and, through thematic induction, a four-level, 23-category hierarchy was devised. The following describes the top three levels of the feedback hierarchy:

- *Global comment categories* captured comments that looked at the paper and writing as a whole. The five coding categories for this level were: overall quality; paper structure; organization; creativity; and voice.
- *Middle-level comment categories* captured comments that focused on ideas and support for them, as well as how the ideas were conveyed at the paragraph/sentence level. The five coding categories for this level were: quality of specific thoughts and claims; procedure and technique; support/evidence for claims; request for content clarification; and paragraph and sentence structure/style.
- *Micro-level comment categories* captured all the basic "technicalities" of writing and referencing sources. The six categories for this level included: word choice/phrasing; missing words and pieces; grammar/punctuation; spelling/typos; technical style; and references/citations (Stern & Solomon, 2006, pp. 29-30).

Table 1 taken from Stern and Solomon (2006, pp. 30-31), identifies the categories embedded within each of these levels and provides descriptors.

As there are indications that differing media modalities may be better suited to different feedback purposes (Crews & Wilkinson, 2009; Oomen et al., 2008; Simonsson et al., 2009), the research reported in this article investigated the perceived utility of audio, text, and combined (audio and text) feedback across the levels defined by Stern and Solomon (2006). The intent was to determine how to optimize feedback strategies vis-a-vis perceived student utility and effect so as to provide feedback in a manner that is perceived as most beneficial to the majority

Table 1.

Type of comment	Categories	Examples from papers
Global level	Overall quality	Needs work Good writing style Great paper
	Paper structure and organization	Poorly organized Hard to follow Good flow Logically organized Well integrated lit review
	Creativity	Creative!
	Voice	Eliminate passive voice Write in active 1st or 3rd person
Middle-level	Quality of specific thoughts and claims	No! This is an extreme claim Good reasoning Interesting idea
	Procedure and technique	Incorrect measurement Wrong tool Good technique Nice choice of method
	Support/evidence for claims	Insufficient data/proof Give an example Good data Great support
	Request for contact clarification	What does this mean? What is the point? Define Why?
	Paragraph and sentence structure/style	Paraphrase rather than quote P too long Repetitive Parallelism Effective summary Good paragraph

Table 1. (Cont'd.)

Type of comment	Categories	Examples from papers
Micro-level	Word choice/ phrasing	Awk wordy (wrote in new word and crossed out one of students)
	Missing Words & Pieces	Add sentence Word needed (wrote in a new word/phrase)
	Grammar/ Punctuation	Noun/verb agreements Deleted commas Fixed grammar Frag Run-on Verb tense
	Spelling/Types	
	Technical Style	(corrected format) (corrected citation style) (location of page break)
	References/ Citations	Need citation Source? Cite your sources Good cite Good sources
Other Comments	Invitations to Discuss Paper	If you need further clarification, see me . . . See me
	Personal Expressions & Advice	Wow! Unbelievable I found the same things . . .
	Scholarly Advice	Refer to chapter 2 in book For further study, see . . .
	"Road Maps"	See above note Ditto Same as above

Table 1. (Cont'd.)

Type of comment	Categories	Examples from papers
Other Comments (cont'd.)	Tracking Marks	Underline (with no comment by it) Check marks Late
	Rubric/Grading Sheet	If used one: 1 = low detail 2 = moderate detail 3 = high detail
	Unidentifiable	(anything illegible)
	Other	(anything that does not fit) within one of the above categories)

of learners. The notion here is that the utility of feedback is arguably ostensive to those for whom the feedback is provided; that is, on some important level, the student receiving the feedback is the best judge of how useful it is. The research question addressed, then, was:

> Does the perceived effectiveness of differing media modalities for delivering feedback on online assignments vary according to the level of the feedback provided?

METHODS

Participants and Setting

Subjects (n = 196) were students enrolled in graduate level education courses at three public universities in the eastern and central United States. Most were practicing teachers. Seven instructors at these universities were given training on how to use electronic tools to insert audio, visual, and typed feedback into pdf documents. In a total of 11 graduate level education courses, these instructors provided both text and audio feedback to their students on written assignments, and highlighted or circled sections to visually indicate what portions of student work were being referenced. The survey was administered to students in the 11 aforementioned courses at the end of the semester. A total of 196 out of the 363 students enrolled in the courses (54% response rate) completed the surveys.

Data Collection and Analysis

Using the categories developed by Stern and Solomon (2006), a survey instrument was developed to determine students' perceptions of the relevance of each type of feedback as well as their preferred feedback modality for receiving it (Appendix A). Relevance questions asked students to rate their agreement/disagreement (on a 5-point Likert-type scale) with statements regarding how they valued the differing types of feedback which included multiple examples to insure correct identification (e.g., "I believe feedback regarding the Overall Quality (e.g., "needs work" or "great paper") is valuable"). Each of these questions was followed by a most effective modality question, which asked students to identify the modality they found most effective for receiving that particular type of feedback. It should be noted in this regard that the "effectiveness" of feedback modalities is essentially an ostensive proposition; that is, students themselves are arguably the best judges of what sort of feedback is most useful to them. Hence, self-report is clearly a valid, if not the most valid, measure of the efficacy of feedback modalities.

Student responses on the surveys were analyzed using descriptive statistics and categorical data analysis. For the categorical analysis, data were aggregated within feedback levels and the Cramer's V statistic, which is appropriate when one or both of the independent variables contain more than two levels, was employed.

RESULTS

The following tables give the means and standard deviations for the perceived relative importance of each type of feedback, as well as the number of respondents who believed the most effective modality for receiving that type of feedback was stand-alone written comments, stand-alone audio comments, or a combination of written and audio comments. Table 2 shows the results for feedback provided at the Global Level, Table 3 shows the results for feedback provided at the Mid-Level, and Table 4 gives the Micro-Level findings. Other types of feedback identified by students are summarized in Table 5. In all tables, the "N/A" column indicates the number of students who did not receive any feedback of this type.

With regard to the relevance questions, it is interesting to note that the responding students barely valued feedback at any level (average global level = 3.13, average mid level = 3.28, average micro level = 2.97, average other = 3.06, with 3 indicating neither agreeing nor disagreeing with the value statements). Indeed, the most valued type of feedback was one not given by Stern and Solomon (2006) but rather identified by the students themselves—rubrics/grading sheet. It would seem, perhaps unsurprisingly, that the feedback the majority of students were most interested in was feedback concerning their grades.

Table 2. Student Perceptions of the Importance of Global Level Feedback and Their Preferences for Feedback Modalities

	Mean	*SD*	Written	Audio	Combination	N/A
Overall quality	3.19	.898	29	9	159	0
Paper structure and organization	3.27	.703	32	33	128	4
Creativity	3.12	.632	24	31	129	13
Voice	2.97	.731	44	19	85	49

Table 3. Student Perceptions of the Importance of Mid-Level Feedback and Their Preferences for Feedback Modalities

	Mean	*SD*	Written	Audio	Combination	N/A
Quality of specific thoughts and claims	3.35	.634	28	28	125	16
Procedure and technique	3.32	.559	25	33	120	19
Support/evidence for claims	3.29	.625	37	14	136	10
Request for contact clarification	3.29	.618	34	24	117	22
Paragraph and sentence structure/style	3.17	.708	77	6	103	11

Overall, modality effectiveness data indicated that students felt stand-alone written feedback was more effective than stand-alone audio feedback, and that the combination of written and audio feedback was the most effective of all. Categorical data analysis was used to investigate potential variations in the perceived efficacy of feedback modalities related to different feedback levels.

Two assumptions must be met for categorical data analyses. The first is that any individual subject can belong to only one level for each of the variables

Table 4. Student Perceptions of the Importance of Micro-Level Feedback and Their Preferences for Feedback Modalities

	Mean	*SD*	Written	Audio	Combination	N/A
Word choice/ phrasing	3.10	.776	77	6	96	18
Missing words & pieces	3.09	.698	45	0	101	57
Grammar/ punctuation	2.95	.716	64	2	73	58
Spelling/Typos	2.77	.847	77	0	37	83
Technical style	2.79	.906	51	3	66	77
References/Citation	3.12	.567	82	6	82	27

Table 5. Student Perceptions of the Importance of Other Types of Feedback and Their Preferences for Feedback Modalities

	Mean	*SD*	Written	Audio	Combination	N/A
Invitations to discuss paper	3.28	.615	30	35	80	52
Personal expressions & advice	3.17	.802	29	37	114	17
Scholarly advice	3.19	.547	55	7	98	37
“Road Maps”	2.70	.902	65	0	45	87
Tracking marks	2.53	.901	47	0	52	98
Rubric/grading sheet	3.47	.593	52	0	121	24
Unidentifiable	NR	NR	NR	NR	NR	NR
	NR	NR	NR	NR	NR	NR

examined. The second assumption that must be met is that the sample must be adequate enough to ensure that at least five ($n = 5$) respondents are represented in each of the cells created by the intersection of the levels of the variables examined. This study meets both assumptions. As opposed to utilizing the conventional χ^2 statistic, this study employs Cramer's V statistic, which is appropriate when one or both of the independent variables contain more than two levels.

Given the research question and that the survey addressed each of the components within Stern and Solomon's (2006) levels (and a fourth level labeled "Other"), and that these components are not consistent across levels, this study aggregated frequencies within each particular level and computed the percentage of total responses within them favoring each feedback modality. For example, the figure given in Table 6 for the number of students preferring written feedback at the global level (129) represents the sum of individuals who indicated a preference for written feedback across Stern and Solomon's four global level coding categories (29 + 32 + 24 + 44 = 129). As there were 788 total global level responses, 129 represents 16.4% of the total. In addition, note that the choice of *Not Applicable* is examined statistically along with the choices of feedback modalities since it is somewhat indicative of a respondent's perception of feedback. That is, there may be instances in which a student has received a particular type of feedback from the instructor, yet failed to recognize it, whereas another student receiving the same type of feedback did recognize it. Table 6 gives both the raw numbers and percentages for each of the preferred feedback modalities (and NA) at each of the Stern and Solomon (2006) levels.

Categorical data analysis yielded a statistically significant result (Cramer's $V = 0.190$, $df = 9$, $p < 0.000$), which indicates that the percentages of students identifying differing feedback modalities as most effective differed according to the levels of feedback provided. Although the magnitude of Cramer's V suggests that the relationship between feedback level and efficacy of feedback modality is less than moderate in degree, the results clearly suggest an inverse relationship between the utility of written feedback and feedback level; that is, the perceived efficacy of written feedback was greater for mid-level feedback than for global level feedback, and greater still for micro-level feedback than for mid-level feedback. On the other hand, both audio feedback alone and combined audio and written feedback were seen as much more effective at the global and mid-levels than at the micro feedback level.

When receiving feedback on those aspects that comprise Stern and Solomon's global level, for example, respondents were 5.45 times more likely to prefer a combination of written and audio feedback to audio feedback alone, and 3.88 times more likely to prefer the combination to written feedback alone. When receiving feedback on those aspects that comprise Stern and Solomon's mid-level, respondents were 2.99 times more likely to prefer a combination of feedback

Table 6. Most Feedback Modalities by Levels of Feedback

		Written	Audio	Combination	N/A	Total
Level						
Global level	Count	129	92	501	66	788
	% within level	16.4%	11.7%	63.6%	8.4%	100%
Mid-level	Count	201	105	601	78	985
	% within level	20.4%	10.7%	61.0%	7.9%	100%
Micro-level	Count	396	17	455	320	1188
	% within level	33.3%	1.4%	38.3%	26.9%	100%
Other level	Count	278	79	510	315	1182
	% within level	23.5%	6.7%	43.1%	26.6%	100%
Total	Count	1004	293	2067	779	4143
	% within level	24.2%	7.1%	49.9%	18.8%	100%

styles to written feedback alone and 5.72 times more likely to prefer a combination of feedback to audio feedback alone.

At the remaining two levels, the micro-level and the level containing all other types of feedback identified by students, a combination of written and audio feedback remains as a style preferred most often (38.3% and 43.1%, respectively), but at these levels, a higher proportion of respondents preferred written feedback alone (33.3% at the micro-level and 23.5% at the other level), and a lesser proportion preferred audio feedback alone (1.4% and 6.7% respectively). Additionally, as compared to the other levels, a higher proportion of respondents indicated that the items comprising Stern and Solomon's micro-level and the level labeled *Other* were not applicable (26.9% and 26.6%, respectively), since they perceived not having received this type of feedback.

DISCUSSION AND CONCLUSIONS

This study indicates that the combination of written and audio feedback is perceived to be the most effective feedback modality at all levels of feedback identified by Stern and Solomon (2006) and students responding to the survey. At the micro level, however, students in this study were more likely to believe written feedback was most effective than they were at the other levels, with the preference for written feedback being equivalent to or greater than the preference for a combination of written and audio feedback in the Reference/Citations and

Spelling/Typos categories respectively. As indeed all but 1.4% of participating students indicated the need for some sort of written feedback at the micro feedback level, these results indicate that micro feedback is not very useful when delivered via audio alone, most likely because it is difficult to retain details presented in a temporal medium. The high preference for written feedback alone at this level might indicate that the use of multiple feedback modalities actually confused some students, perhaps because of cognitive overload.

However, the preference for a combination of feedback remained the preferred mode across the micro level, and indeed across all levels including that categorized as "other." As such, this study provides support for the anecdotal observations at West Virginia University, tangential findings in the work of Oomen and colleagues (2008) and Simonsson and colleagues (2009), and generalized findings by Crews and Wilkinson (2009) and Greivenkamp, Stoll, and Johnston (2009) which indicate that a combination of audio- and text-based feedback is perceived by students as being the most effective. Significantly, utilization of the extreme low level feedback classifications developed by Stern and Solomon (2006) provided for a comprehensive analysis of the feedback spectrum, negating any significant possibility of excluding relevant feedback domains in which modal preference would prescribe use of one stand-alone technique over the other or over the combination of the two.

Aside from confirmation of and elaboration on related work, the most obvious result from this study is consistent with the educational movement advocating for curriculum that is aimed at a broader diversity of learning styles. At all four levels examined in this study, either a marked majority or a plurality of respondents indicated a preference for a combination of written and audio feedback. However, it should be noted that at the micro level the preference for written feedback increased significantly, indicating that perhaps a small amount of audio and a large amount of written feedback is most effective at this level. As an example, an instructor might mark up a paragraph for typographic errors and make one holistic comment regarding the general class of errors.

One particular finding from this research has significant implications for curriculum and faculty-development initiatives. As mentioned earlier, many students perceived not having received particular types of feedback at the micro and other levels. Is this because faculty members are more likely to provide feedback at the global and mid levels while neglecting the remaining two levels, or is it because students are less likely to recognize when such feedback is provided, especially in instances when such feedback manifests itself more subtly (as when general comments include noting that the word "environment" is consistently misspelled throughout the document)? The answer may involve a combination of the two. Regardless, faculty members and their respective institutions have a responsibility to provide feedback to students that not only represents the diversity of learning styles but also represents the diversity of feedback outlined by Stern and Solomon.

LIMITATIONS

The most obvious limitation of this study is that it involved only students from colleges of education. In addition, all of the participants were graduate level students, thus limiting generalizability of the findings to undergraduates or community college learners.

Second, although work on audio feedback by Simonsson and colleagues (2009) included students who were English as a second language speakers, the *n* for that study was small. In the current work, anecdotal accounts of issues related to clarity and comprehension among second language learners emerged. Although no data were collected regarding second language status, however, it is very likely that the overwhelming majority of students in the study were native English speakers. This may limit the generalizability of the findings as well.

DIRECTIONS FOR FURTHER RESEARCH

In accordance with the first limitation, more generalizable research is needed. Although previous research by Ice (2008) across a multitude of academic disciplines and involving both graduate and undergraduate students indicated no significant difference in preferences for audio feedback, similar research needs to be conducted on combined written and audio feedback.

With respect to the second limitation, a larger population of English as a second language students needs to be studied utilizing combined written and audio feedback with an eye toward assessing the value of a more significant written component for English as a second language learners.

Third, as per the discussion, it is likely that a combination of written and audio feedback appeals to and is consistent with a greater spectrum of learning styles; however, future research needs to assess this hypothesis. Furthermore, this research can be expanded to more diverse student populations in more diverse educational settings. Significant qualitative research may further inform this discussion as well as help tease out other factors that are not apparent through quantitative analysis.

Qualitative analysis may also be especially helpful in understanding the higher prevalence of preference for written feedback at the micro level. Although a hypothesis related to this trend is put forth in the discussion, qualitative work could be beneficial in reinforcing or modifying this explanation.

Finally, Stern and Solomon's (2006) construct was developed for delivery of feedback in the face-to-face setting. As described in initial work related to the Community of Inquiry Framework (Anderson et al., 2001), the online learning environment is significantly different from the face-to-face environment. Thus, it would be desirable to collect a larger sample size and conduct factor analyses to determine if the core level constructs developed by Stern and Solomon hold true in the online environment.

APPENDIX A

The goal of this study is to determine what types of feedback and feedback delivery mechanisms are most effective in online courses. The information generated by the study will be used for research purposes. As such the findings of the study will be published and / or presented at conferences.

Before you begin the survey, please be aware of the following:

- Your participation is entirely voluntary. You may choose to discontinue the survey at any time and/or choose not to answer certain questions.
- Your responses will remain anonymous and the course instructor cannot determine which survey you completed. Complete confidentiality will be maintained. At no time will your identity be revealed either by the procedures of the study or during reporting of the results.
- No negative consequence will result for choosing not to participate.

Please describe what you really think and feel; this will be the most helpful in trying to find out how to improve things for students and faculty members in the future.

Thank you for your participation in this research.

During the course of this semester you received feedback in three different modalities: written (including both typed and handwritten comments as well as underlining, highlighting, etc.), audio and a combination of the two. The following survey lists several different types of feedback, with examples. You may or may not have received feedback addressing different aspects of your work. However, consider how important each of the types of feedback are to you (even if you did not receive them in this course) and respond in part a. If you did receive a specific type of feedback select which modality (written, audio or a combination of the two) was most effective. Make your selection in part b. If you did not receive this type of feedback, you should indicate so in part B.

1a. "I believe feedback regarding the Overall Quality (e.g. 'needs work' or 'great paper') is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

1b. Which feedback modality did you find most effective when receiving feedback regarding Overall Quality?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Overall Quality

2a. "I believe feedback regarding Structure and Organization (e.g. hard to follow, good flow) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

2b. Which type of feedback did you find most effective when receiving feedback regarding Structure and Organization?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Structure and Organization

3a. "I believe feedback regarding Creativity (e.g. very creative) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

3b. Which type of feedback did you find most effective when receiving feedback regarding Creativity?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Creativity

4a. "I believe feedback regarding Voice (e.g. this work should be written in 1st or 3rd person, active voice needed) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

4b Which type of feedback did you find most effective when receiving feedback regarding Voice?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Voice

5a. "I believe feedback regarding the Quality of Specific Thoughts and Claims (e.g. good reasoning, interesting idea) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

5b. Which type of feedback did you find most effective when receiving feedback regarding the Quality of Specific Thoughts and Claims?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to the Quality of Specific Thoughts and Claims

6a. "I believe feedback regarding Procedure and Technique (e.g. nice way to address this) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

6b. Which type of feedback did you find most effective when receiving feedback regarding Procedure and Technique?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Procedure and Technique

7a. "I believe feedback regarding Support/Evidence for Claims (e.g. insufficient proof, give an example, well supported) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

7b. Which type of feedback did you find most effective when receiving feedback regarding Support/Evidence for Claims?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Support/Evidence for Claims

8a. "I believe feedback regarding Clarification (e.g. what does this mean?, clarify, why?) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

8b. Which type of feedback did you find most effective when receiving feedback regarding Clarification?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Clarification

9a. "I believe feedback regarding Sentence Structure/Style (e.g. too long, effective summary, good paragraph) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

9b. Which type of feedback did you find most effective when receiving feedback regarding Sentence Structure/Style?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Sentence Structure/Style

10a. "I believe feedback regarding Word Choice/Phrasing (e.g. awkward, wordy, well put) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

10b. Which type of feedback did you find most effective when receiving feedback regarding Word Choice/Phrasing?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Word Choice/Phrasing

11a. "I believe feedback regarding Missing Words and Pieces (e.g. add sentence, word needed) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

11b. Which type of feedback did you find most effective when receiving feedback regarding Missing Words and Pieces?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Missing Words and Pieces

12a. "I believe feedback regarding Grammar/Punctuation (e.g. delete commas, fragment, run-on, verb tense) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

12b. Which type of feedback did you find most effective when receiving feedback regarding Grammar/Punctuation?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Grammar/Punctuation

13a. "I believe feedback regarding Spelling/Typos is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

13b. Which type of feedback did you find most effective when receiving feedback regarding Spelling/Typos?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Spelling/Typos

14a. "I believe feedback regarding Technical Style (e.g. check format, check style) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

14b. Which type of feedback did you find most effective when receiving feedback regarding Technical Style?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Technical Style

15a. "I believe feedback regarding References/Citations (e.g. citation needed, source?, good sources) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

15b. Which type of feedback did you find most effective when receiving feedback regarding References/Citations?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to References/Citations

16a. "I believe feedback regarding Invitations to Discuss Paper/Topic (e.g. if you want to talk more about this contact me) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

16b. Which type of feedback did you find most effective when receiving feedback regarding Invitations to Discuss Paper/Topic?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Invitations to Discuss Paper/Topic

17a. "I believe feedback regarding Personal Expressions and Advice (e.g. I found the same thing, if I were you I might…) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

17b. Which type of feedback did you find most effective when receiving feedback regarding Personal Expressions and Advice?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Personal Expressions and Advice

18a. "I believe feedback regarding Scholarly Advice (e.g. if you want to know more about this check…) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

18b. Which type of feedback did you find most effective when receiving feedback regarding Scholarly Advice?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Scholarly Advice

19a. "I believe feedback regarding Road Maps (e.g. see above, ditto, same as before) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

19b. Which type of feedback did you find most effective when receiving feedback regarding Road Maps?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Road Maps

20a. "I believe feedback regarding Tracking Marks (e.g. underline, check marks) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

20b. Which type of feedback did you find most effective when receiving feedback regarding Tracking Marks?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Tracking Marks

21a. "I believe feedback regarding Rubric/Grading Sheets (e.g. comments related to grading criteria) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

21b. Which type of feedback did you find most effective when receiving feedback regarding Rubric/Grading Sheets?
1) written, 2) audio, 3) a combination of the two, 4) I did not receive feedback relative to Rubric/Grading Sheets

22a. If your received other types of feedback in this course please specify. If not, skip to question 23a.

22b. "I believe other types of feedback (described in 22a) is valuable."
1) strongly disagree, 2) disagree, 3) neutral, 4) agree, 5) strongly agree

22c. Which type of feedback did you find most effective when receiving other types of feedback (described in 22a)?
1) written, 2) audio, 3) a combination of the two

23a. Did you receive any feedback that you were not able to identify? If no you are done. If yes, did unidentifiable feedback appear in (mark all that apply):
1) written, 2) audio, 3) a combination of the two

REFERENCES

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks, 5*(2), 1-17.

Bargeron, D., Grudin, A., Gupta, E., Sanocki, F., & Leetiernan, S. (2002). Asynchronous collaboration around multimedia applied to on-demand education. *Journal of Management Information Systems, 18*(4), 117-145.

Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education, 13*(2), 1-32.

Crews, T., & Wilkinson, K. (2009, April 22). *Auditory and visual assessment preferred by learners*. Paper presented at the 2009 Teaching and Learning with Technology Conference. Retrieved July 22, 2009, from http://www.itap.purdue.edu/tlt/conference/presentation.cfm?propid=90

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence and computer conferencing in distance education. *American Journal of Distance Education, 15*(1), 7-23.

Greivenkamp, D., Stoll, C., & Johnston, H. (2009, April 21). *Demystifying invisible processes using mediated feedback.* Paper presented at the 2009 Teaching and Learning with Technology Conference. Retrieved July 25, 2009, from http://www.itap.purdue.edu/tlt/conference/presentation.cfm?propid=133

Gunawardena, C., & Zittle, F. (1997). Social presence as a predictor of satisfaction within a computermediated conferencing environment. *The American Journal of Distance Education, 11*(3), 8-26.

Ice, P. (2008, April). *The impact of asynchronous audio feedback on teaching, social and cognitive presence.* Paper presented at the First International Conference of the Canadian Network for Innovation in Education, Banff, Alberta.

Ice, P., Curtis, R., Phillips, P., & Wells, J. (2007). Using asynchronous audio feedback to enhance teaching presence and student sense of community. *Journal of Asynchronous Learning Networks, 11*(2), 3-25.

Laffey, J., Lin, G., & Lin, Y (2006). Assessing social ability in online learning environments. *Journal of Interactive Learning Research, 17*(2), 163-177.

Lombard, M., & Dutton, T. (1997). At the heart of it all: The concept of presence. *Journal of Computer Mediated Communication, 3*(2). Retrieved July 25, 2009, from http://jcmc.indiana.edu/vol3/issue2/lombard.html

Oomen-Early, J., Bold, M., Wiginton, K. L., Gallien, T. L., & Anderson, N. (2008). Using asynchronous audio communication (AAC) in the online classroom: A comparative study. *Journal of Online Learning and Teaching, 4*(3). Retrieved July 25, 2009, from http://jolt.merlot.org/vol4no3/oomen-early_0908.htm

Rice, R. E. (1992). Contexts of research in organizational computer-mediated communication. In M. Lea (Ed.), *Contexts of computer-mediated communication*. New York: Harvester Wheatsheaf.

Rovai, A. P. (2002). Development of an instrument to measure classroom community. *The Internet and Higher Education, 5*(3), 197-211.

Short, J., Williams, E., & Christie, B. (1976). *The social psychology of telecommunications.* Toronto, ON: Wiley.

Simonsson, M., Kupczynski, L., Ice, P., & Pankake, A. (2009, April). *The impact of asynchronous audio feedback in the dissertation advising process.* Paper

presented at the American Educational Research Association Annual Meeting, San Diego, CA.

Stern, L. A., & Solomon, M. A. (2006). Effective faculty feedback: The road less traveled. *Assessing Writing, 11*(1), 22-41.

Swan, K. (2002). Building communities in online course: The importance of interaction. *Education, Communication and Information, 2*(1), 34-49.

Swan, K., Richardson, J. C., Ice, P., Garrison, D. R., Cleveland-Innes, M., & Arbaugh, J. B. (2008). Validating a measurement tool of presence in online communities of inquiry, *eMentor, 24*(2). Retrieved July 15, 2009, from http://www.e-mentor.edu.pl/artykul_v2.php?numer=24&id=543

Swan-Dagen, A., Rinehart, S., Mader, C., & Ice, P. (2008). Can you hear me now? Providing feedback using audio commenting technology. Navigating the Literacy Waters: Research Praxis and Advocacy. *College Reading Association Yearbook 2008,* 153-166.

Vygotsky, L. (1978). *Mind in society: The development of higher psychological processes.* Cambridge, MA: Harvard University Press.

Walther, J. B. (1992). Interpersonal effects in computer mediated interaction: A relational perspective. *Communication Research, 19*(1), 52-90.

Direct reprint requests to:

Dr. Phil Ice
Director of Course Design, Research and Development
American Public University System
111 West Congress
Charles Town, WV 25414
e-mail: pice@APUS.edu