Chapter 9
Asynchronous Audio Discussion

9.1 Introducing Audio-Based Online Discussion

Almost all asynchronous online discussion environments are currently text-based and require typing skills and a keyboard (Girasoli and Hannafin 2008). Although such tools enable less vocal or shy students to participate in online discussions (Hewitt 2001), it poses a barrier to poor typists who find typing physically uncomfortable (Hammond 1999) and become frustrated using a keyboard (Girasoli and Hannafin 2008). A more significant barrier perhaps, as noted by Bowe (2002) is that text-based communication can be a challenge for students who have weak reading or writing skills; for example, students who are learning English as a foreign language. Inadequate English reading or writing proficiency could contribute to students' perceived information overload (Angelova and Riazantseva 1999; Eastmond 1995). This in turn could limit students' desire to contribute in the text online discussion. Such students find it very burdensome to read and respond to the online postings, and hence their participation tends to be minimal.

There is also some increase in cognitive load on students who have to concentrate on using a keyboard while trying to participate in a discussion (Girasoli and Hannafin 2008). For example, An and Frick (2006) found that this frustrated some students because it "takes too much time to type and complete a discussion" (p. 493), and hence students ceased to contribute further in the discussion. In addition, some participants find it difficult to express themselves or explain complex concepts using the text-based medium (Arend 2009; Hew and Hara 2007a). Moreover, participants may run the risk of being misunderstood easily in text discussion due to the lack of verbal cues (e.g., tonal) (Hew and Hara 2007b).

In order to overcome these drawbacks, some researchers and educators have begun to explore the use of audio-based asynchronous discussion. For example, Girasoli and Hannafin (2008) suggested that audio-based asynchronous discussion could allow students to speak more coherently and understandably, aided by the use of inflections and expressions that are missing in text-based discussion. The use of tonal cues such as inflections and expressions could potentially help the receiver understand a sender's

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message better and therefore reduce the risk of misunderstanding. Consequently, this may promote more student contribution in the online discussion.

The use of audio in online education is, of course, not new. However, although audio has been utilized for many years through radio, audiocassettes, compact disks, and recently podcasts, these technologies typically suffer from a lack of interactivity (Junor 1992). These technologies are essentially used to send or transmit information one way, usually from the instructor to the students. For example, in a review of podcast use, Hew (2009) found that the most common use of podcasting is limited to the instructor distributing voice recordings of lectures or supplementary materials such as assignment tips for students to review the subject matter at their own time and pace.

The use of asynchronous audio discussion, however, can provide a means for students to interact and discuss with one another. Similar to text-based discussion tool, audio-based asynchronous discussion is independent of time and geographical location. With tools currently available such as the Wimba Voice Board, students could simply speak a question or comment into a microphone and record it as an audio clip on a computer. No additional software or knowledge about audio editing tools is required (Yaneske and Oates 2010). Students also have the option of typing a text description to be appended to the audio clip. The clip would then be posted into a threaded organization of other audio clips (Girasoli and Hannafin 2008). Discussion posts can be exported in various audio formats such as MP3, WAV, and Speex audio. Figure 9.1 shows a sample Wimba discussion forum.

Besides the Wimba Voice Board, educators could also use VoiceThread (http://voicethread.com) for audio online discussions. VoiceThread allows participants to participate in discussions around images, documents, and videos (Brunvand and Byrd 2011). Participants could leave comments in five ways such as using voice through a microphone, text, audio file, or video through a webcam (http://voicethread.com/about/features/). Figure 9.2 shows a screenshot of VoiceThread, which was created by its developers (http://voicethread.com/?#q.b409.i848804) to give an introduction of how this tool could be used.

Researchers such as Akasha (2011), Brunvand and Byrd (2011), and Mandernach and Taylor (2011), among others have suggested that using asynchronous audio discussion can increase student engagement and motivation during the learning process. However, such claims are often made based on conjectures, rather than empirical findings. We found the number of empirical studies on asynchronous audio discussion is still relatively small. A recently conducted search (end of January 2012) using keywords such as 'asynchronous voice', 'asynchronous audio', 'voice board', or 'voice thread' on the Academic Search Premier, the education resource reference information centre (ERIC), and Google Scholar revealed only seven empirical-based papers that examined the use of asynchronous audio in the context of online discussion.

Almost all of these previous studies focused on disciplines such as language learning (e.g., learning Spanish or English as a second language), or communications studies (e.g., Cho and Carey 2001; Gleason and Suvorov 2011; Marriott and Hiscock 2002; McIntosh et al. 2003; Poza 2011; Yaneske and Oates 2010).

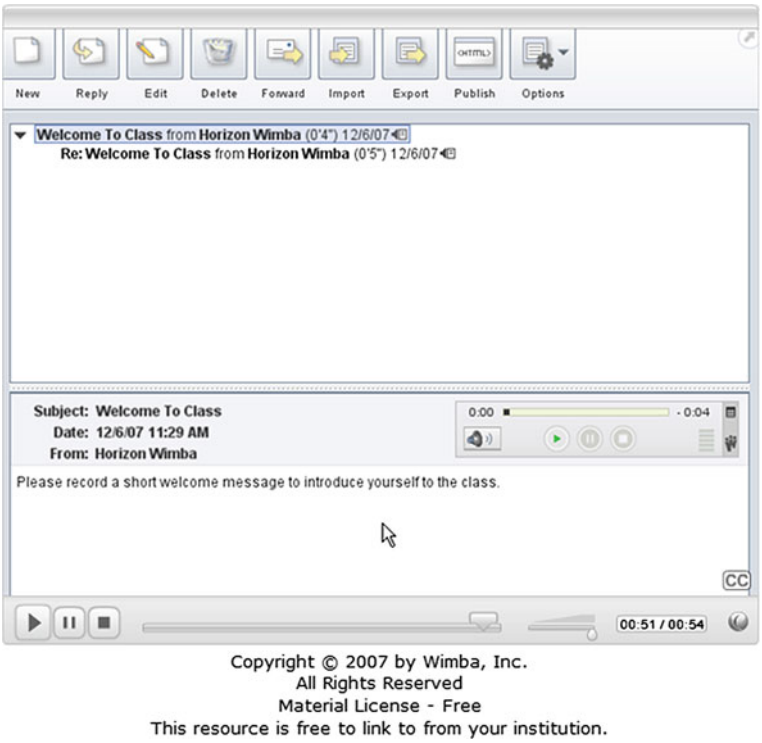

Fig. 9.1 Screen shot of a wimba voice board http://www.wimba.com/assets/videos/VoiceBoard/VoiceBoard.html)

Not surprisingly, the examination of asynchronous audio in these studies was mainly limited to how it could improve students' oral and listening skills, and whether it was easy and user friendly to use (e.g., Cho and Carey 2001; Gleason and Suvorov 2011; McIntosh et al. 2003). Only a few studies specifically examined the relative advantages or disadvantages of asynchronous audio versus text discussion (Marriott and Hiscock 2002; Yaneske and Oates 2010). Furthermore, none of the existing studies examined whether the use of asynchronous audio discussion could affect students' performance outcome such as their levels of knowledge construction. The dearth of data on asynchronous audio discussion therefore speaks to the need for more research in the area.

9.2 Descriptions of Studies 1 and 2

Recently, we conducted two studies to examine students' perceived benefits of using audio discussions, and their actual preferred mode of discussion (audio- or text-based) if given a choice. Moreover, we measured the levels of knowledge

construction exhibited by students who participated in the text-based discussions and students who used the audio-based discussions.

The first study (study 1) consisted of 41 post-graduate students. The students utilized the text-based online discussion forums, as well as the Wimba Voice Board; both are available in Blackboard. Specifically, students in the first study used the text-based discussion forums first to discuss the following issue, "What are some strategies to engage students in web-based learning? Discuss the pros and cons of using these strategies", followed by the Voice Board forums to discuss the following question, "What are some implementation issues you may face when using technology in teaching and learning? What intervention or pre-emptive strategies could help? Discuss the strategies posted by your classmates".

At the end of the online discussions, qualitative data via student reflections were collected. A reflection template containing 'trigger' questions or 'probes' was provided to help the students think about the various elements of their online discussion experiences. The reflection template incorporated the following questions: (a) "What advantages do audio-based discussions have over text-based discussions?", and (b) "Given a choice, which one do you prefer to use? Why?"

The students' reflection data were then examined using the constant-comparative approach espoused by Lincoln and Guba (1985). The responses or comments were initially examined to group similar comments into themes. The fit between each student response and the theme was evaluated. Each theme was given a suitable label, and representative statements for each theme were selected and reported.

In the second study (study 2), we examined two classes. Class A consisted of 24 students while Class B comprised 18 students. Unlike the first study, all 42 students in the study II were undergraduates. Class A was randomly assigned to use the audio-based discussion first, while Class B used the text-based forum. The topic of discussion was "Do you think it is okay for people to buy or sell organs? Justify your viewpoints". After 2 weeks of discussion, the students switched the medium of discussion for another 2 weeks. Class A now used the text-based discussion while Class B used the audio-based forum. The topic of discussion was "How can teachers engage their students in online discussions?"

Similar to study 1, students in the Classes A and B were given a reflection template that contained the same trigger questions to help them think about the various elements of their online discussion experiences. The open-ended student reflection data were also examined using the constant-comparative approach (Lincoln and Guba 1985) to determine themes concerning the advantages of audio versus text discussions and students' preference for the medium of discussion. In addition, in study 2, we examined if students' mode of online discussion is related to their exhibition of and higher level knowledge constructions. Altogether the following research questions guided our investigations in study II: (a) What advantages do audio-based discussions have over text-based discussions? (b) Given a choice, would students prefer to participate in audio-based or text-based online discussions? Why? (c) What is the relationship, if any, between students' mode of online discussion (audio or text discussions) and their knowledge construction levels?

Table 9.1 Advantages of audio discussion (ranked)

Advantages of audio-based discussion	Rank
More expressive, able to detect emotions, understand someone better	1
Useful for participants with poor typing skills or students who prefer speaking to writing	2
More realistic, encourages participation	3
Spontaneity ensures originality of ideas	4
Better tool to assess how speech is delivered, or improve oral skills	5
Able to confirm identity of student	6

We examined the levels of student knowledge construction using each mode of discussion (audio or text) using Gunawardena et al. (1997) interaction analysis model. We referred the frequency of lower level knowledge constructions to the total number of phase I occurrences, while the frequency of higher level knowledge constructions to the sum of the number of phases II–V occurrences. An independent coder coded the participants' postings for knowledge construction. In order to determine the reliability of the analysis, another independent coder coded approximately 10 % (randomly selected) of the students' postings. The intercoder reliability of the coding for the audio and text postings were 90 % and 89 %, respectively.

9.3 Findings of Studies 1 and 2

9.3.1 Advantages of Asynchronous Audio Discussion

Comparing the two studies, our overall results showed that audio-based discussions have six advantages over text-based ones. Table 9.1 summarizes these six advantages. These advantages are ranked in terms of the frequency of each advantage being reported by the participants of both studies.

We can see that students most appreciated the opportunity to express themselves using the spoken word, and to hear the tone and voice used by the participants of audio discussion. This apparently helps participants to understand one another better because the spoken word can influence a learner's cognition by adding clarity and meaning due to the presence of intonation and the expression of emotions (Durbridge 1984). The following extracts from the reflection data illustrate this point:

> In my opinion, through voice-based discussions, students will be able to portray their feelings as well through the tones of their voice. This helps me listen to them to better understand what they are trying to say and their feelings about a certain issue. (Zoe, a participant in study 2)

This was corroborated by other students. For example, Pamela, a participant in study 1, remarked:

> Audio-based discussions allow the person's emotions to come through the discussion, so it is not just words. It is therefore less likely to misinterpret the words. Also, people have to listen to the entire audio to know the other person's full opinion or viewpoint, and so they are more likely to get everything, unlike text, which people tend to skim through.

The use of audio discussion is also particularly useful for participants with poor typing skills or who prefer talking to typing. This is consistent with Girasoli and Hannafin's (2008) observation. For example, Nora, a participant in study 2 explained, "It [audio discussion] can help participants who are not good with typing, and thus can save him a lot of time and effort in ensuring that he participates in the discussion". In addition, audio-based discussion is beneficial for students who prefer speaking to writing such as auditory learners, as explained by Participant Yeo, "It comes in handy for participants like me who are better in speaking than in writing. This will ensure that I'm able to raise my views clearly and avoid confusion".

In addition, audio discussion could foster a more realistic discussion environment that draws people into participation. Durbridge (1984) suggested that the spoken word can influence a person's motivation by conveying directly a sense of the person creating those words. Clark and Walsh (2004) highlighted that "listening is instinctual, [but] reading and writing are not" (p. 5). This suggests the ability of an individual's voice acting like a magnet that motivates people to join in the discussion who may otherwise not be interested in participating in the discourse at all. For example, Gee, a participant in study 1 explained:

> I feel that the degree of interest to participate in an audio-based discussion is higher compared to a text-based one because not only it is fun to hear how one sounds, but it also gives us a feeling that we are having a real conversation with the other party. This actually encourages us to listen to other people's opinions. The possibility for us to view another party's opinion in a similar fashion in a text-based discussion will be lower it as lacks this particular enticing factor.

Interestingly, we also found that the use of audio discussion could help promote originality of ideas. Results of our analysis suggested that this was mainly due to the impromptu nature of audio discussion. It appears that participants who use the audio discussion tend to think aloud whatever that comes to their mind with less reservation. In his study of oral versus text communication Ong (1982) argued that the former requires thinking which is more immediate compared to the latter. Compared to text discussion, participants have lesser time to plan beforehand what they want to say. As Elaine, a participant in study 2 explained:

> It [audio discussion] is more impromptu. Students tend to say what they feel and would provide a more realistic picture of views. With text based, students have the time to organize their thoughts and perhaps the end product might be one of high diplomacy yet of low insight.

This was echoed by Andrew, a participant in study 1:

> I feel that the participants' responses in audio-based discussions are more raw and real than rehearsed. Therefore, viewpoints seem more original and fresh, rather than appearing to be something that has been edited again and again [as in text-based discussions].

Table 9.2 Preference of participants

Type of discussion	Frequency	Percent (%)
Audio-based	27	36
Text-based	48	64

Note There were 8 students in total who either gave ambiguous answers or failed to answer at all. Hence, the inputs of these students were not considered

In addition, some participants reported that the use of audio-based discussions could help instructors assess how their students' speech is delivered. For example, Gina in study 1 explained, "For English Language teachers such as me, it can be a handy tool to assess my students for their speech, intonation, pronunciation, etc". Carol in study 1 also suggested that audio-based discussions could help students be cognizant of their own oral skill deficiencies: "Audio discussion also allows students to be more aware of which area of speech they will need to improve on". This was corroborated by Roland in study 2, "Audio-discussion provides participants the opportunity to develop their oratorical competence, something which cannot be done in a text-based environment".

Finally, one participant in study 1 highlighted that the instructor can find out if the person contributing in an audio-based discussion is indeed the actual person doing the voice post and not somebody else. This is unlike a text-based discussion because typing is more anonymous. Using an audio-based discussion can thus prevent cheating, especially if participation in the online discussion is awarded course marks or credits.

9.3.2 Students' Actual Preference

Interestingly, contrary to expectations and despite the reported advantages, students in both studies reported that they still preferred to use a text-based discussion if given a choice. A majority of the students (n = 48 out of 75, 64 %) indicated that they would use a text-based discussion (see Table 9.2).

Analyses of the participants' reflection data suggested four main reasons for the participants' preference for text-based discussion despite the reported advantages of audio discussion. Table 9.3 shows the four main reasons for this preference, ranked in terms of the frequency of each reason being reported by the participants of both studies 1 and 2.

The primary reason was that participants preferred to have more time to structure or organize their responses or comments before posting them online. It appears that the desire for structure or proper organization takes precedence over the desire for spontaneity of thoughts. The following two extracts from the participants' reflection data illustrate this point: "Typing allows me time to think, rethink, and vet through my response of how I want to put the matter across" (Lim, study 1), and "Given these two choices, I would use the text-based discussion,

Table 9.3 Reasons for choosing text discussion (ranked)

Reasons for choosing text discussion	Rank
Text-based discussion allows me more time to structure or organize my responses/answers	1
More convenient/ease of use with text-based discussion	2
Being self-conscious of how one sounds (e.g., horrible voice, unclear pronunciation, strong accent)	3
Typed words facilitate better learning/understanding	4

which allows more room for thinking and re-thinking" (Ho, study 2). This is probably due to the cultural context of our studies. All the participants in our study were of Asian ethnicity, with a majority of them being Chinese. Asian students tend to value social harmony and avoidance of conflict (Chiu 2009; Williams et al. 2001). This might have pushed them to want more time to edit their responses or comments for fear of offending someone. The impromptu nature of audio discussion might encourage them to say something which they might regret later. However, in text discussions they could edit and re-edit their comments many times, and this reduces the risk of accidentally posting any undesired comments.

Participants also found that text discussion is an easier or more convenient tool to use. This is mainly due to two reasons. First, the Wimba Voice Board tool does not allow participants to edit their recorded voice postings if they said something wrong. Participants have to delete the entire posts and record their voices again, as students Andrew and Yeo stated, respectively, "I find audio-based discussion more cumbersome to use because it does not allow students to edit the sound file. This means if I make a mistake, I need to start all over again. It will be good if the audio-based discussion platform allows participants to do editing", and "I'm unable to edit my voice if I say something wrong". Perhaps if such a function is made available in future releases of Wimba Voice, participants would find it more convenient to use.

Second, some participants found it inconvenient to listen to the whole voice recordings. They found it easier and faster to scan through printed words, as explained by Philip in study 2:

> I would still prefer a text-based discussion. Anytime I want to refer back to a thread posted by someone, I can just skim through the whole argument and extract the relevant stuff. However, for voice-based discussion, I have to listen to the whole recording.

We also found that participants preferred text discussions because they were self-conscious about how they sounded in audio discussions. For example, Loh in study 1 explained, "When recording my voice, I am conscious about my pronunciation and to make sure that I'm speaking in standard English, rather than broken English. This makes audio-based discussion quite tedious to me". This sentiment was echoed by Tang in study 2, "I prefer text based discussion as I feel awkward speaking into the microphone". Brick and Louie (1984) found that Asian students typically regard correctness as a highly desirable quality. Hence, they may fear appearing foolish by making mistakes such as unclear pronunciations if they

Table 9.4 Knowledge construction levels by asynchronous audio and text discussion

		Knowledge construction (KC)		
		Lower level	Higher level	Total
Text discussion	Observed	69	39	108
	Expected	76.1	31.9	108.0
	% within discussion mode	63.9 %	36.1 %	100.0%
	% within KC	44.5 %	60.0 %	49.1 %
	% of total	31.4 %	17.7 %	49.1 %
	Std. residual	−0.8	1.3	–
Audio discussion	Observed	86	26	112
	Expected	78.9	33.1	112.0
	% within discussion mode	76.8 %	23.2 %	100.0 %
	% within KC	55.5 %	40.0 %	50.9 %
	% of total	39.1 %	11.8 %	50.9 %
	Std. residual	0.8	−1.2	–
	Total knowledge construction	155	65	220

participate in the audio discussions, as these can have undesired consequences for them such as being laughed at by classmates.

Finally, some participants indicated that text discussions facilitated their learning better than audio discussions because they could not clearly hear some of the audio messages posted. For example, Lynn in study 2 remarked, "Sometimes I may not understand or hear clearly what my peers are talking because their voices are muffled". Other participants agreed, "I prefer text discussion. Sometimes I can't figure out what someone is talking because he or she has an accent or the noisy environment might not make what the person is saying audible" (Jim, study 2), and "Reading their postings give me a better analysis of the contents without the disturbance of external variables such as clarity of speech" (Nurul, study 1).

9.3.3 Possible Relation between Knowledge Construction Levels and the Mode of Online Discussion

Pearson Chi-square test of independence statistics suggested a significant relationship between the levels of knowledge construction and the mode of discussions (see Table 9.4): χ^2 (1, N = 220) = 4.393, $p < 0.05$, Cramer's V = 0.141. The data in Table 9.4 suggested that students produced more than expected higher knowledge construction levels during text online discussion. On the other hand, more lower level knowledge constructions than expected were produced during asynchronous audio discussion. In other words, the results suggested that audio discussions were more likely to yield phase I knowledge construction occurrences, while text discussions were more likely to foster phases II to V knowledge constructions.

Fig. 9.2 Screenshot of the voicethread interface

What are some possible reasons for this result? Recall that phase I refers to the sharing of information such as making statements of observation, or asking questions to clarify statements, while phases II to V refer to the exploration of dissonance of ideas, negotiation of opinions, testing, and application of ideas. Demonstrating phases II–V knowledge constructions typically require participants to challenge other people's opinions and ideas (Liu et al.2008). We posit that text online discussion may be more suitable for this because it allows participants a little more time to structure their responses. Additionally, some participants commented that text discussion provides them some measure of anonymity because they could post their messages using a pseudonym. However, in an audio discussion, it is difficult to mask one's own voice. This measure of anonymity could give participants greater confidence to challenge other people's ideas or opinions.

We wish to highlight that although higher level knowledge constructions are generally preferred in online discussions, researchers such as Hew and Cheung (2011) and schellens et al. (2005) posit that a necessary, if not sufficient, condition for higher knowledge construction levels to happen is to have a relatively large amount of lower level occurrences (i.e., phase I) in order to function as a starting point to ground the rest of the online discussion. Our results thus suggest that it may be best to combine the use of both audio and text discussions as the two platforms appear to promote phase I and phases II–V, respectively.

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