Students' use of Asynchronous Voice Discussion in a Blended-Learning Environment: A study of two undergraduate classes

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Abstract: Contemporary discussions of education in blended-learning environments increasingly emphasize the social nature of learning which emphasizes interactions among students, or among students and instructors. These interactions can occur asynchronously using a text based discussion forum. A text-based discussion forum, however, may not work well for all participants as some find it difficult to explain complex concepts in words, while others complain of being misunderstood due to the absence of verbal cues. In this study, we investigated the use of a Wimba Voice Board to support asynchronous voice discussion. A quasi-experiment research design involving two classes of undergraduate students was conducted. One of the classes (n = 24 students) used the Wimba Voice Board while the other (n = 18 students) used a text discussion forum in BlackBoard. The results of an independent *t*-test analysis suggested that there was no significant difference in the students' degree of participation in the two classes, asynchronous voice discuss class (M = 2.92, SD = 1.586) and text discussion class (M = 2.78, SD = 1.353), (t = 0.299, df = 40, p = 0.767) at the 0.05 level of significance. However, the online discussion appeared to be more sustained in the asynchronous voice discussion group. Analyses of the students' reflection data suggested that asynchronous voice discussion have several advantages over text forums. Specifically, an asynchronous voice discussion: enables students to understand one another's messages better, allows students, who prefer speaking to writing, or students who are not proficient in written English, to participate in the discussion, promotes originality of students' ideas, and helps to foster a sense of online community.

Keywords: blended-learning, asynchronous online discussion, voice board, discussion forum, participation, Wimba Voice Board

1. Introduction

The use of the blended learning approach is increasingly being adopted in many colleges and universities around the world (Cheung and Hew 2011). However, many scholars and educators realize that it is not sufficient to merely place content on a web site for students to read or download materials for a blended learning course to be successful. Maximizing success in a blended-learning environment requires a well-supported approach (Dzuiban et al., 2004) that includes on-going technical support for both faculty and students, as well as opportunities for students to interact with one another, among others. In fact, contemporary discussions of education increasingly emphasize the social nature of learning (Palincsar and Herrenkohl 2002) which emphasizes interactions or discussions among students, or among students and instructors. A discussion provides a means for students to exchange opinions, share multiple perspectives, and clarify various thoughts (Dunlap 2005). Some scholars have identified student discussion as being one of the activities that students found most beneficial to their learning (Ertmer et al 2007; Richardson and Swan 2003).

In a blended-learning environment, discussions among students and instructors may occur synchronously or asynchronously over the Internet. The former such as chat room requires students to simultaneously log on to the software or platform in order to interact with one another, while the latter such as Google Group does not. Of the two modes of communication, the time-independent nature of asynchronous discussion makes it particularly well received by many educators (Hew, Cheung and Ng 2010; Romiszowski and Mason 2004) because participants can choose to post their comments or questions at their own convenience. In addition students have time to respond to other students' comments (Murphy and Coleman 2004), which could help students develop critical thinking skills, and solve ill-structured problems (Hew and Knapczyk 2007).

In this paper, we report a study of two undergraduate classes situated within the context of teacher education. Students in these two classes attended face-to-face tutorials, in addition, to working independently in their own time during the online component. One of the classes used the Wimba Voice Board, while the other employed a threaded text based discussions forum. The Wimba Voice Board allows users to record and post audio messages. The audio messages are arranged in threads, similar to threaded text discussion forums. Students also have the option of typing a text description to be appended to the audio clip. The text description can be entered in a small text box located at the bottom of the Wimba Voice Board screen. At the end of the two classes, students' online posts were tabulated. In addition, students' reflection about the advantages of voice-discussion were coded and counted. An independent *t*-test analysis suggested no significant difference in terms of number of message posted between students who used the Voice Board and their text-based counterparts. However, the online discussion appeared to be more sustained in the asynchronous voice discussion group. Analysis of the reflection data indicated that voice discussion has several advantages over text based discussion.

2. Literature review

In this section, we discussed the importance of student participation in asynchronous online discussion, followed by a summary of some past available research on asynchronous voice discussion. First it is important to note that the benefits of asynchronous online discussion can only be enjoyed if students choose to participate in the discussions in the first place (Hew & Cheung, 2008). If no postings of messages are made, there will be no messages for students to read in the first place, let alone discuss. Indeed, the findings of several previous studies have suggested that a necessary, if not sufficient, condition for a discussion to aid learning is for students to participate by posting a sizeable number of messages such as comments or questions (Davies & Graff, 2005; Gaspar, Langevin, Boyer, & Armitage, 2010; Nagel, Blignaut & Cronje, 2009; Palmer, Holt, & Bray, 2008; Yukselturk, 2010). Nagel et al. (2009), for example, reported that high performing students on average were active in the discussions. They posted their viewpoints and responded to other students' comments. Students who failed or abandoned a course, on the other hand, posted on average significantly fewer messages in the online discussions than their successful counterparts.

Unfortunately, more often than not, student participation in online discussions is limited (Hew & Cheung, 2012). Previous studies have found that students tend to post very few messages in the discussions. Wan and Johnson (1994), for example reported that students posted less than one message per week, while Kucuk et al. (2010) lamented that close to 95% of students did not contribute a single note in the online discussion. One possible reason for this lack of student participation could be the medium by which the online discussion is conducted.

Many of the current asynchronous online discussion environments are text-based and require typing skills and a keyboard (Girasoli and Hannafin 2008). This, however, may not successfully meet the needs of all students; therefore their participation in the online discussion tends to be minimal. Some participants, for example, find it difficult to explain complex concepts using the text-based discussion, while others find that they run the risk of being misunderstood due to the lack of verbal cues (Hew and Hara 2007). Still others find it very burdensome to read and respond because they have weak reading or writing abilities (Bowe, 2002). In order to overcome this obstacle, we have begun to examine the use of asynchronous voice discussion. Some of the available technological tools that support asynchronous voice discussion include the Wimba Voice Board, and Voice Thread.

The use of audio or voice in blended-learning is, of course, not new. According to Yaneske and Oates (2010), audio has been employed for many years through radio, audiocassettes, compact discs, and recently podcasts, which refer to audio files that can be automatically downloaded to a learner's computing device. However, such voice technologies suffer from a lack of interactivity (Junor 1992). Many instructors tend to use these technologies to transmit information one-way to the students. In an extensive review of podcast, Hew (2009) found that the most common use of podcasting is limited to either the instructor distributing voice recordings of lectures or supplementary materials (e.g., assignment tips) for students to listen and review the subject matter at their own time and pace.

The use of asynchronous voice discussion, however, provides a means for multiple-way interaction such as students interacting with other students, or with the instructor. Similar to text-based discussion tool, asynchronous voice discussion technologies such as Wimba Voice Board and Voice

Thread are independent of time and geographical location; hence allowing students time to think and respond.

Overall, our analysis of the literature suggested that asynchronous voice discussion has the following advantages: it helps participants, particularly students who are learning English as a second language, to practise speaking, listening, and do self-diagnosis of pronunciation errors (Gleason and Suvorov 2011; Yaneske and Oates 2010), it can help increase social presence because the ability to hear other people's voices helps foster a more personal connection to them (Yaneske and Oates 2010), it is relatively easy to use (Gleason and Suvorov 2011; McCormack 2010), it provides a more natural and hence easier way to present ideas and respond to others (Marriott and Hiscock 2002), and it provides participants with a richer means of communication such as verbal cues and emotional context which helps enhance the meaning of a message posted (Marriott and Hiscock 2002; Yaneske and Oates 2010). This last advantage could potentially help the receiver understand a sender's message better and therefore reduce the risk of misunderstanding. Consequently, this may promote more student participation the online discussion

On the other hand, some of the challenges of using asynchronous voice discussion include the following: it is difficult to correct errors because participants were unable to edit the recordings once they were posted (Gleason and Suvorov 2011; Marriott and Hiscock 2002), some participants were embarrassed to record their voices and let others hear how they sounded (Marriott and Hiscock 2002; McIntosh et al 2003; Yaneske and Oates 2010), the absence of an ability to sort and search messages (Yaneske and Oates, 2010), and an inability to skim audio quickly forces participants to replay the message repeatedly should they want to hear something again or could not hear it properly (Yaneske and Oates 2010).

We found several limitations concerning the existing research on asynchronous voice discussion. The studies were limited to an examination of students' affective outcome such as their satisfaction of using asynchronous voice discussion. This highlights the need to investigate whether the use of asynchronous voice discussion could affect other outcomes such as students' degree of participation. The majority of studies focus on disciplines such as communications studies or second language learning, and involved students from North America. Therefore, there is a need to examine other contexts such as students from the Asia Pacific region to better understand the use of asynchronous voice discussion.

3. Research questions

The study addresses the following research questions:

- Is there a significant difference in the degree of students' participation in asynchronous voice based compared to text based discussion?
- How do thread depths differ between the asynchronous voice and text based discussion groups?
- What advantages do asynchronous voice discussions have over text based discussions?

4. Methodology

4.1 Participants

This study is situated in an Asian-Pacific, teacher education context. A total of 42 undergraduate students from a teacher education institute participated in the current study. The 42 students came from two classes of 24 and 18 each. The ages of the students were between 19 and 24 years old. All 42 students were studying for a bachelor's degree in education at the time of the study. The same instructor taught the two classes for a semester (12 weeks) on the same topic entitled *Use of Technology in Teaching and Learning*. In both classes, students used the same course materials, did the same assignments, attended face-to-face tutorials, as well as worked on their own time and at their own pace during the asynchronous discussion component.

4.2 Procedure and data analysis

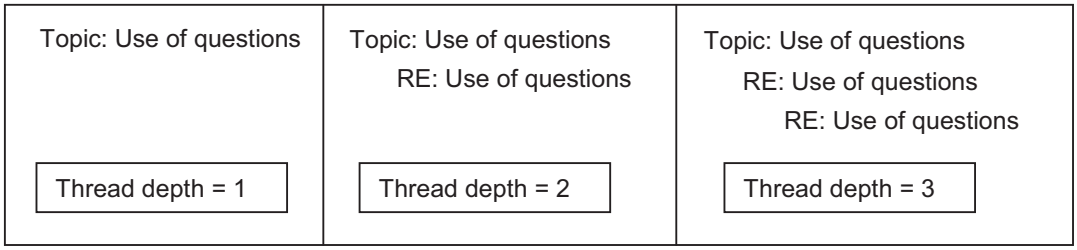
A mixed-method research design approach that involved the collection and analysis of both quantitative and qualitative data was carried out in this study. One of the two classes (n = 24 students) used the Wimba Voice Board while the other (n = 18 students) used a text discussion forum. It is to be noted that the Voice Board class had used a text discussion forum before in their

previous classes but this was the first time they employed an asynchronous voice discussion forum. Therefore, students in the Voice Board class were given an introduction to the tool, along with some hands-on-experience before the actual class online discussion commenced. Both the Voice Board and the text discussion forum were available in BlackBoard. The two classes used the same topic for their discussions – *How can teachers engage students during an online discussion*? In addition, both classes were given the same time duration of two weeks to complete the discussions.

To answer question (1) "Is there any significant difference in the degree of students' participation in asynchronous voice versus text discussions?", online messages posted by the students in the asynchronous voice and text discussion platforms were analyzed. The number of postings was tabulated and the difference between the classes was examined using an independent sample *t*-test.

To answer question (2) "How do thread depths differ between the asynchronous voice and text based discussion groups?", we also examined the students' online messages. Specifically, we refer thread depth to the number of messages that are linked together consecutively in a particular thread. For example, a thread that has only a starter message has a thread depth of one, while a thread that has a starter message and one reply has a thread depth of two, and a thread that has three consecutive messages has a thread depth of three (see Figure 1). According to Hew and Cheung (2008), a greater thread depth not only suggests that an online discussion is taking place but also the possibility that the discussion is sustained. A sustained discussion should ideally be the norm because it usually takes more than a few message exchanges for students to share opinions, negotiate issues, and create mutual understandings (Guzdial & Turns, 2000). Essentially, a thread that has only a thread depth count of one is an orphaned thread; it is basically a dead thread that does not generate any responses at all. A thread that has a depth of two is also very limited because there is no further response beyond the second message.

Figure 1:Thread depth



To answer question (3) "What advantages do audio discussions have over text based discussions?", students who used the Wimba Voice Board were asked to comment on two open-ended questions at the end of the course: "What do you think are the benefits of using asynchronous voice discussions?", "What do you think are the challenges of using asynchronous voice discussions?" The students' open-ended responses were examined by a qualitative coding approach that followed the methods of Neuman (2006). Basically, the students' responses were initially examined to group similar comments into themes. The relationship between the themes and the fit between each statement and the theme were then evaluated. Finally, each theme was given a label and a representative statement for each was selected.

5. Results and discussion

Is there any significant difference in the degree of students' participation in asynchronous voice versus text discussions?

The results of the independent t-test analysis suggested that there was no significant difference in the students' degree of participation in the two classes, asynchronous voice discuss class (M = 2.92, SD = 1.586) and text discussion class (M = 2.78, SD = 1.353), (t = 0.299, df = 40, p = 0.767) at the 0.05 level of significance, although the mean number of posts in the former was higher than that in the latter.

From this result, we may conclude that students tended to participate more or less equally in either asynchronous voice or text discussion forum, despite the findings of some previous research studies suggesting that voice discussion provides a more natural and hence easier way to present ideas and

respond to others, as well as its ability to increase social presence due to the ability to hear other people's voices (Marriott and Hiscock 2002; Yaneske and Oates 2010).

Why is this so? Analyses of the students' reflection open-ended responses suggested that not all students find the Wimba Voice Board a convenient tool. Some students complained that they could not edit their voice postings if they said something wrong. Instead they had to delete their entire voice postings and record their voices again. This whole procedure of delete-and-record-again makes it very bothersome for some students to participate in the voice discussion.

We also found some participants being very self-conscious about how they sounded in the asynchronous voice discussion environment. Several students reported that they were afraid of appearing foolish should they speak too fast or that their voices sounded too high pitched, while others felt awkward speaking into a microphone.

How do thread depths differ between the asynchronous voice and text based discussion groups?

Although there was no significant difference in the number of messages posted by the two groups, we found that the asynchronous voice discussion group had an overall greater thread depth (see Table 1).

Table 1: Comparison of thread depth between the asynchronous voice and text based discussion groups

	Thread depth			
Type of discussion	1	2	3	4
Voice	4	6	5	3
Text	6	12	3	0

On the whole, the asynchronous voice discussion group had five 3-level deep threads and three 4-level deep threads, while the text discussion group had only three 3-level deep threads, and zero 4-level deep threads. This suggests the possibility that the online discussion is more sustained in the voice discussion group. We also found the text based discussion group had twice as many threads that were only two-level deep as compared to the asynchronous voice group. This indicates that a sustained discussion is not really taking place in the text group because such threads contained only two posts – the starter message and a reply to the starter.

One possible reason for finding more sustained discussions in the asynchronous voice group is the ability of the spoken word to project a sense of actually dealing with real people as compared to text discussions. According to Durbridge (1984), this sense of realism could motivate an individual to continue conversing with other people. This is highlighted by the following representative students' statements:

> "A voice-based discussion, clearly gives the sense of dealing with real people because we get to hear their voices, making us feel as if we are in a real discussion rather than within the boundaries of technology [sic]."
>
> "A voice forum appears more personal [as we can hear people's voices], hence creating a closer sense of realism for communicating with real people in real-life [sic]."
>
> "The voice-based discussion instills a sense of actually dealing with real people as it is more realistic with real voice, intonation and emotions, compared to the mere reading of printed texts off the computer screen [sic]."

What advantages do asynchronous voice discussions have over text discussions?

Analyses of the students' open-ended responses revealed several advantages of using voice discussions. We discuss four main ones in this paper. First, students were able to understand one another's messages better because they could hear the tone and emotion expressed by the voice participants. This finding is consistent with that reported in some of the previous studies (Marriott &

Hiscock, 2002; Yaneske & Oates, 2010). The following representative statements from some of the students' data help to illustrate this point:

> *"We are able to interpret not only the ideas presented but how it is presented such as the intonations that may give us a clearer picture of the message posted [sic]."*
>
> *"In my opinion, through voice-based discussions, participants will be able to portray their feelings through the tones of their voice. This will enable those who listen to them to better understand what they are trying to say about a certain issue [sic]."*

Second, the use of asynchronous voice discussion is particularly useful for learners who prefer talking to writing, or who may not be proficient in the use of grammar as highlighted by the following comments:

> *"It [asynchronous voice discussion] comes in handy for those who are better in speaking than in writing. This will ensure that he/she is able to raise his/her views clearly and avoid confusion [sic]."*
>
> *"Voice-based discussions have several advantages such as enabling a participant to voice out his/her views as much as possible without having to worry about grammar or vocabulary as compared to writing, hence making the person actually enjoys what he or she is doing [sic]."*

Third, we found that the use of asynchronous voice discussion could help promote originality of ideas. Results of our analysis suggested that this was mainly due to the spontaneity nature of voice discussion. The following representative statements from some of the students' data help to illustrate this point:

> *"It is more in promptu. People tend not need to over think before they say, and hence their spoken comments provide a more realistic picture of what they actually feel [sic]."*
>
> *"It enables us to speak our minds without the need for any type and delete, type and delete going on. It will be like truly speaking our mind without any hesitation [sic]."*

Fourth, the use of asynchronous voice discussion could help foster a sense of online community:

> "I think that a voice-based discussion puts forth the notion of the strong sense of online community because we (virtually) let our voice and opinions be heard and when all of these 'voices' come together, a sense of unity is felt, together with shared emotions that we hear from the voices [sic]."
>
> *"It creates a stronger sense of online community within a group because we could actually listen to each other. This would help to bond us together [sic]."*

6. Conclusion

In this study, we investigated the impact of using asynchronous voice discussion on the degree of student participation. We also explored the students' perceptions of the advantages of asynchronous voice discussion. Overall, the results of the current study showed no significant difference in terms of the number of message posted between students who participated in the asynchronous voice discussion environment and their text-discussion counterparts. However, the online discussion appeared to be more sustained in the asynchronous voice discussion group, In addition, students who took part in the asynchronous voice discussions reported four main advantages of using audio. These include: the ability to understand someone better due to the presence of emotions and tonal cues, greater convenience and ease for students who prefer speaking to writing or who are weak in grammar to participate in the online discussion, the ability to foster a sense of online community, and the ability to help promote originality of ideas due to the spontaneity or impromptu nature of oral communication.

Due to the relatively small number of participants (n=42), the results of this study should be interpreted with caution. A larger sample would be needed to further test and confirm the veracity of the findings. Whether the findings would hold true with students from other courses, disciplines and academic abilities is unclear.

The actual online discussion in the current study took place over a relatively short period of two weeks. For many students, this was the first time they recorded their voices using microphones.

Therefore, it is not very surprising that some students felt a sense of awkwardness using the asynchronous voice discussion tool. Whether the students would participate more often on the Voice Board platform when this sense of awkwardness fades is still uncertain.

Despite these limitations, we believe that the findings are useful to other researchers and educators who are similarly interested in examining the use of asynchronous voice discussion in e-learning or blended-learning environments. For future research, we suggest that a longer duration of study be conducted. Perhaps, students could be given the opportunity to participate in asynchronous voice discussion for an entire semester. Further research about the use of asynchronous voice discussion should also be conducted using a larger cohort of students from various disciplines.

We also urge future research to examine aspects of students' performance outcome such as their level of critical thinking in asynchronous voice discussion environments, and how these may differ from text-input forums. Students' level of critical thinking may be assessed in terms of their level of information processing – surface or in-depth. Surface level of information processing includes: making prediction, generalizations, conclusions or judgements without offering justification or suggesting which is most appropriate, sticking to prejudices or assumptions, and off-topic/faulty reasoning (Cheung & Hew, 2006). On the other hand, in-depth level of information processing may involve setting out the advantages and disadvantages of an idea or solution, making prediction, generalizations, conclusions or judgements supported by justification, providing proof or examples, and bringing outside knowledge or experience to bear on problem (Cheung & Hew, 2006). Other students' performance outcomes that could be investigated include the levels of student social construction of knowledge, and student problem solving skill (Hew, Liu, Martinez, Bonk, & Lee, 2004).

Finally, future research should also examine the use of asynchronous voice discussion on small screen wireless mobile devices. Examples of such devices include PDAs with wireless access and smart phones (e.g., iPhones) (Cheung & Hew, 2009). Since it is not easy for students to post messages using a text-based input on small screen mobile devices, asynchronous voice discussion input via built-in microphones may be a viable alternative. Furthermore, the cost of text entry may be too high to scale towards multiple communication sessions using mobile devices (Zinman, 2006), hence asynchronous voice could be a superior medium to support scalable group communication.

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