

# **AN EXPLORATORY STUDY ON THE USE OF ASYNCHRONOUS ONLINE DISCUSSION IN HYPERMEDIA DESIGN**

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## **Abstract**

One of the main challenges of designing hypermedia projects in traditional classroom environments is the limited opportunity for students to receive feedback from their classmates about their own projects. However, the use of asynchronous online discussion might provide a solution to the aforementioned challenge. In this paper, we consider how asynchronous online discussion can facilitate the design of hypermedia projects. Students' perceptions of the benefits and problems of using asynchronous online discussion are discussed and the corresponding measures to overcome the problems are suggested.

## **Introduction**

Since their advent, computer technologies have been adapted not only to reinforce existing learning theories, but also to promote new approaches to learning (Pena-Shaff, Martin, & Gay, 2001). Computer-mediated communication (CMC) is one example of such technology. According to Feenberg (1987), this particular technology has been used for higher education instruction on a small but growing scale, since 1982.

CMC can be defined as the exchange of messages among a group of participants by means of networked computers, for the purpose of discussing

a topic of mutual interest (Gunawardena, Lowe, & Anderson, 1997). Such exchanges of messages can be carried out either synchronously or asynchronously. According to Groeling (1999), facilitating asynchronous discussion has the potential to improve the teaching and learning experiences in traditional classroom formats, as well as in distance learning.

Asynchronous online discussion allows records of a participant's written messages to be kept in the virtual electronic 'space' for long periods of time (Ganeva, 1999). Participants in such a forum need not be online at the same time (Romiszowski & Mason, 1996). They can respond to the messages posted at any time they prefer and view the messages many times and long after the messages have been posted. In this way, asynchronous online discussion can resemble written communication (Ganeva, 1999). Most of the current asynchronous online discussion forums are hypertext-based, which make them dynamic environments, i.e., users can manipulate the display of the content of the conference, and view the record of messages in sequenced or 'threaded' formats (sorted according to time of contribution, grouped by author, or clustered according to topical links) (Ganeva, 1999).

The main objective of this study is to explore the use of asynchronous online discussion in the design of hypermedia projects. To achieve this end, a case study of two hypermedia design classes was carried out. Data was collected through the use of student interviews, examination of students' reflection logs and online discussion transcripts, and a questionnaire survey.

### **Main challenge in designing hypermedia projects**

Designing hypermedia projects in traditional classroom formats is not without any problems. One of the main challenges of designing hypermedia projects, as identified by the researchers, is the limited opportunity for students to receive feedback from their classmates about their own projects. Without regular feedback, students will not know if they are progressing on the right track in the design of their projects. Students, for example, may not be aware that they are employing the wrong design concepts in creating the screen layouts, background or texts.

The limited amount of feedback may be due to the following reasons:

1. Students may be shy to voice their opinions in class for fear they may be laughed at if their opinions are faulty. As a result, there is a lack of widespread student-to-student interaction, which leads to a dearth of peer feedback and comments.
2. There is limited time for students to reflect upon the concepts of hypermedia design in class. Flanders (1970) and Levin, Kim, & Riel (1990) found that traditional classroom interactions typically consist of two-thirds to three-quarters teacher talk and only one-third student talk. Even if issues are raised during classroom discussions, they are often not addressed fully during the standard class period (Wade Niederhauser, Cannon, & Long, 2001).

### **The promise of asynchronous online discussion in hypermedia design**

Asynchronous online discussion has the potential to improve the teaching and learning experiences in traditional classroom settings. As Groeling (1999, p. 1) wrote, "With it, scholars and educators have the potential to vastly expand the opportunities for students to interact outside the classroom". In brief, the literature has argued that asynchronous online discussion has the following desirable characteristics (Groeling, 1999).

#### Asynchronous online discussion increases accessibility and opportunities for interaction

Asynchronous online discussion forums are generally available 24 hours a day and 7 days a week. This is especially useful, as they allow student-to-student and student-to-tutor interactions to occur at any time and at any distance. Participants can therefore choose to join in the discussions at a time and place most convenient and suitable to them.

#### Asynchronous online discussion can break down social barriers

Asynchronous online discussion can be seen as a means to enhance student control over learning and make the educational experience "more democratic" (Harasim, 1989). Researchers also argue that such discussion can also help

enhance the participation of student who might be less willing to participate in traditional face-to-face classroom settings due to shyness, language problems or gender (Groeling, 1999). This is because communicating through a computer can take away many of the normal social cues associated with face-to-face interaction.

### Asynchronous online discussion encourages more thoughtful and reflective response

Since communication is asynchronous, participants can take their own time ordering and composing their thoughts (Groeling, 1999). McReary (1989) and Newman, Webb & Cochrane (1997) pointed out that certain critical thinking processes such as reasoning, benefit from asynchronous online discussion. The process of writing in itself also encourages reflection which helps promote higher level learning such as analysis, synthesis, evaluation as well as clear and precise thinking (Garrison, 1993).

However, despite these promises of asynchronous communication, little is known about how the use of such online discussion could help a group of Singapore pre-service teachers in designing their hypermedia projects. The following section is therefore an account of how we used asynchronous online discussion to conduct hypermedia design classes at the National Institute of Education (Singapore). In this study, we explored the potentials and problems of using asynchronous online discussion. We also discussed how the problems of using asynchronous online discussion could be overcome.

### **Context of the study**

#### *Description of the learning environment*

The core material for this research study was a course entitled, "Instructional Message Design". In this particular module, students learned important hypermedia design concepts such as learner control and the use of media. At the end of the course, students (in pairs) were required to design and develop hypermedia projects that served as instructional materials to be used in actual classroom settings. Besides the usual face-to-face tutorial sessions, two asynchronous online discussion sessions were also held. The asynchronous

online discussion sessions, which lasted approx two weeks each, were done using the discussion forum available in BlackBoard, a web-based course management software adopted by the National Institute of Education, Singapore (NIE).

Prior to the commencement of the first online discussion session, the forty-eight students were first briefed, in a face-to-face tutorial session, on the objective of the online discussion. Students were told to give their comments about some previous hypermedia projects done by other students in terms of the use of media and learner control. Altogether eleven hypermedia projects were posted onto the Web. These previous projects served as vehicles to stimulate student thinking, questioning, and idea sharing. The students were also asked to justify all the comments and views they made in the online discussion. The rationale for the first online discussion was to provide each student the opportunity to:

1. Apply what they have learnt to evaluate other people's projects. Students did not know the owners of these previous projects.
2. Help the students to get to know one another better.

The second online discussion was held soon after the completion of discussion One and when the students have completed or about to complete their hypermedia projects. This time, the students were asked to post their projects onto the Web and give constructive comments about their classmates' work. The purpose for discussion Two was twofold:

1. To provide each student an opportunity to identify design problems of their classmates' projects and give suggestions to solve the problems. Each group would therefore receive feedback about their own projects.
2. To give each group of students the opportunity to evaluate the comments and suggestions they received and respond to these.

The duration for both discussion One and Two was two weeks each.

#### *Characteristics of participants in the online discussion*

The subjects for this research were forty-eight pre-service teachers enrolled in a diploma in education program. There were 15 (31.3%) male students and

33 (68.7%) female students. Of those pre-service teachers completing an evaluation survey, 4.3% ( $n = 2$ ) said that they seldom participated in asynchronous online discussions, 40.4% ( $n = 19$ ) said they used it sometimes only, 42.6% ( $n = 20$ ) said they used it often, and 12.7% ( $n = 6$ ) said they used it many times.

## Results

Table I shows the participation details of the asynchronous online discussion.

Number of participants	48
Number of hypermedia projects	44
Total number of threads	100
Total number of postings*	531
Number of postings/participant	11

\* *excludes those of the tutor*

Students' perceived benefits and problems of using asynchronous online discussion in hypermedia design are discussed in the following sections.

### Benefits of asynchronous online discussion

#### *Convenience*

A majority of students perceived that the online discussions provided a convenient way for them to participate in the discussions. 93.6% of the students said that they often accessed the online discussion at places and times convenient to them. As one participant wrote, "I can post my discussions anytime within the discussion period and I find it is more convenient this way". Thus, the availability of the discussion forum for 24 hours a day and 7 days a week enabled the students to continue their discussions about their hypermedia projects at their own pace outside the classroom without the constraints of specific allotments of time and place.

#### *Increased student-student interaction*

In a face-to-face environment, a student with greater social presence may dominate the discussion through social cues such as social status, voice, eloquence of speech, facial or physical appearance. For example, a loud and aggressive student may deter others from expressing their views, while a

persuasive speaker may sway others. Moreover, students may hold back responses or comments that they feel may hurt or offend the other party's feelings. In the text-based medium of the asynchronous online discussion however, students do not see one another face-to-face. Text-based interactions can diminish the stereotyping associated with high external social status, physical appearance/disabilities, or cultural differences, thereby removing a significant barrier to participation (Davie & Wells, 1991; Berge & Collins, 1996; Coombs, 1989). This can help students to express their thoughts more freely and descriptively, as explained by one participant:

*The classroom environment sometimes hindered us from expressing our views. This is especially so in the Asian culture. This may be due to the awkwardness in expressing one's views in a crowd. The online discussions provide an alternative platform where such awkwardness can be evaded. There is more freedom of expression, as we do not see one another face to face. Discussions can therefore be more critical and direct, hence benefiting every user.*

Indeed, it was evident from the discussion transcripts (see Extract 1) that participants were not hesitant to challenge each other's views about their hypermedia projects. An analysis of the survey also revealed that 64.6% of the students felt that their classmates were more outspoken during the online discussion than in normal classroom situations.

Extract 1: An online discussion among students that shows the pre-service teachers challenging each other's views

Min (names of participants have been changed to ensure anonymity):	I feel that the 'Yes' and 'No' icons used in the first slide are not essential. If the user clicks on the 'No', it will bring him straight to the last slide. I certainly think that it should give the user a chance to browse through the whole software before quitting. Since there is another metaphor that can bring the user to the next slide, the 'Yes' icon is not necessary too.
Pei:	I do not agree with your statement "...browse through the whole software before quitting." User should be given a chance to choose rather than enforcing them to go through the entire software. It doesn't sound logical to me.

Mei:	I think what she's [Min] referring to is the first slide, where the student chooses yes or no. If no, the student will be taken to the credit page, missing out on the whole presentation that he will need to view. If the student needs to refer to certain slides within the presentation, it will be useful to have some metaphors for the different sections.
Chin:	<p>I do not like the first slide. The 'Yes' and 'No' icons are unnecessary. Like what Min said, it will bring the students straightaway to the last slide if they click on the 'No'. I believe the slide could be improved by...removing the 'Yes' and 'No' icons.</p> <p>However I disagree with Min when she said, "I certainly think that it should give the user a chance to browse through the whole software before quitting." Well, as mentioned in our textbook...page 58, one of the advantages of using hypermedia is students "can choose those learning activities that suit their individual preferences and needs", so it is not necessary for them to browse through the whole software before quitting.</p>

*Increased reflection*

In this study, 63.8% of the students indicated in the survey that they reflected more during the online discussion than when they were in class. One participant, attributed this increased reflection due to the larger amount of time they had. He commented, "I can have more time to think about certain issues." In a normal classroom, there is often little time for reflection, due to the spontaneity of face-to-face interactions. However, in an asynchronous online discussion environment, participants are freed from the constraint of time because they can now participate in online discussions 24-hours a day. The absence of time constraint therefore allows participants more time to think, as argued by the following participant:

*The online discussion gave us ample time to think and organize our thoughts before we comment about a project. Most of us tend to be less vocal and need time to make careful analysis before we actually feel comfortable about making careful comment about others' work, especially when we gather with classmates whom we only meet once a week.*

### *Easy access to other people's ideas*

The asynchronous online discussion forum also stores all message postings in a database for participants to retrieve and review. As one participant elaborated:

*Comments made by other participants can be reviewed, as they are stored in a database. We can always reread some of these discussions or comments made. It is more advantageous compared to verbal comments, which cannot be reviewed or repeated.*

This permanent record of message postings gives a participant an easy access to other participants' contributions. According to Ruberg, Moore & Taylor (1996), the value of being able to read what everyone had contributed had an impact on all participants, which the participants described as giving them a new perspective, a way to imagine another point of view, an ability to see things differently, or a deeper understanding of the material. As one participant said,

*By analyzing other [people's] point of views and opinions about a certain project, it creates room for me to do some critical thinking and considerations on applying certain functions or background on my project's template.*

### Problems of using asynchronous online discussion

While the use of asynchronous online discussion has its advantages, we need to be aware of its problems too. The following problems of using asynchronous online discussion in designing hypermedia projects were found in this study.

#### *Procrastination*

While the asynchronicity of asynchronous online discussion affords participants more time to think, it can also result in the problem of delays between message contributions. As one student noted, "there was no immediate response from my classmates on some ideas that I wish to clarify urgently", while another said, "some students never respond to the message

posted, as a result, the flow of communication is not so good". Therefore, the problem of delays between postings not only could lead to communication anxiety, i.e., the feeling of speaking into a vacuum (Feenberg, 1987) but also make the momentum of a discussion difficult to maintain (McCabe, 1998).

This study found that pre-service teachers felt frustrated when they received slow response to their queries or messages. 13.9 % of the students complained about having to wait for responses on some ideas they wished to clarify urgently. One student explained, "We have to wait for responses unlike in face-to-face discussion where you can have it impromptu." Another student recounted how she had to wait for a few days before someone actually commented on her ideas or suggestions.

We analyzed the students' reflection logs and interview transcripts for factors that could shed some light on this problem of delay and found the following three reasons:

1. Some students (19.4%) said they were very busy with other course modules. One student commented that "time allocated for the online discussion clashes with the deadlines of other course modules, thus the lack of time to participate." Along the same line, another remarked, "We need to access the Internet quite often and it may be difficult as time is also occupied with doing other work."
2. Another reason might be an overloaded online system, where it becomes difficult to make connections with the BlackBoard software over at NIE because the lines are busy. An analysis of the time of the message postings in this study revealed that about 260 messages were posted between 1200 and 1500 hrs. This may be the period where students had difficulty logging to the discussion forum, prompting one participant to comment, "the slow Internet access time makes online discussion a very frustrating experience."
3. In a face-to-face interaction, participants can also contribute through exchanges of non-verbal signals and cues. However, in an asynchronous online discussion, the only visible way of contribution is through written words. Some active participants might therefore be disheartened to

continue with the discussion when they did not get any non-verbal feedback from others. As one participant commented, “No facial expressions hence no feedback”.

We propose two different strategies that might help to overcome this problem of procrastination. Since one of the reasons for the poor response rate was the lack of non-verbal cues, it is important to augment the asynchronous online discussion with face-to-face sessions as well as synchronous chats. These allow more frequent responses with quicker feedback on each participant’s hypermedia project. A more direct way to improve response rate might be to ask the students to give their comments within a certain time limit.

#### *Keeping track of multiple discussions*

The many-to-many attribute of asynchronous online discussion forums allows many people to talk to many other people at the same time. As a result, the conversational practice of turn taking as in a face-to-face interaction, cannot be easily maintained because there is no way to overlap, or signal the desire to take a conversational turn (Winiecki & Chyung, 1998). As Winiecki & Chyung (1998, p. 455) remarked:

“Without the ability to signal the desire to take a turn, each student can become the next speaker in the interaction. The frequent result is that many people may respond to one message, each potentially introducing a slightly different idea that may fragment the discussion into many small pieces. If other students respond to each of these sub-ideas, there is a likelihood that one or more of them will lose coherence with the main topic...this situation can easily decompose to the point where sub-discussions spawn even smaller fragments. It becomes increasingly difficult to manage these many sub-discussions. Student and teachers alike can become disoriented and lose sight of the goal of the discussion.”

One participant gave a good description of how she got disoriented in the online discussion:

*As directed, we were supposed to give our comments about the hypermedia projects. However, I did not know if the participants were sure of the threads they were supposed to respond to. I found that they would often launch into writing something that was not in the thread or wrote it in the wrong thread. This was often frustrating when I wished to respond to that statement and yet knowing that I too would be replying to something that was not supposed to be there.*

There are a number of ways to solve this problem of disorientation. Two methods would be discussed here. The first possible solution is to use a discussion software that could display a pictorial representation of all the interactions among the messages. An example of this would be the Knowledge Forum software. The second method entails the respondent to include a short segment of the message being responded to in his or her message (Wyniecki & Chyung, 1998). Wyniecki & Chyung (1998) called this short segment a “snip” and argued that embedding these “snips” in one’s message would give the reader a reminder of the exact portion of the message one is referring to.

#### *Commenting just for the sake of participation*

Some participants noted that the messages sounded “along the same lines”. This finding is similar to what was found in a study conducted by Bodzin & Park (2000). There was not much new insight or “new twist” in the students’ responses. Bodzin & Park (2000) offered two explanations for this. First, it could be that the pre-service teachers gave their responses to the case without reading the message postings of others. These might account for the repetitions of some ideas. Second, the pre-service teachers might have taken the easy way out by reading someone else’s responses and typing it out as their own after some minor changes. As one participant explained:

*Students often tend to echo what other students have said rather than giving their own viewpoints. They will just comment for the sake of commenting on it.*

This problem of commenting just for the sake of participation might possibly be due to the awarding of grades by the tutor. Students therefore felt pressurized to “make themselves heard”.

Another participant found that some of the responses were also irrelevant to the theme of the discussion. As she explained,

*I have come across some peers who gave feedback just for the sake of the course, hence some of their feedbacks were irrelevant.*

Hew (2002) argued that one way to ensure that message postings do not “sound along the same lines” is to push the students to think out of the box. One possible strategy is to have groups of participants adopt different thinking-related roles in their discussions. These roles might include a speculator, brainstormer, optimist, pessimist or judge (Bodzin & Park, 2000). The use of such roles will force the students to think out of the norm.

## **Conclusion**

In this paper, we have identified the advantages and limitations of the use of asynchronous online discussion for hypermedia design. Asynchronous online discussion is convenient in that it transcends time and space, thus affording convenience for the participants to take part in the discussion about hypermedia design anytime and anyplace they are comfortable with. The asynchronicity nature of the discussion also gives participants more time to reflect about the design projects. Furthermore, the lack of social and facial cues in the online discussion reduces social dominance. As a result, participants feel more comfortable in expressing their thoughts more freely and descriptively, an important step to sharing ideas in order to design good hypermedia projects. The use of electronic textual discourse also allows for automatic recording and storing of all message postings. This permanent record of messages gives a participant easy access to other participants' ideas and suggestions.

On the other hand, the use of asynchronous online discussion also has its limitations. It can lead to procrastination in responding to the message postings, which makes the momentum of a discussion difficult to maintain. Participants also experienced getting disoriented in the discussion, due to the many-to-many attribute of asynchronous online discussion, which allows many people to talk to many other people at the same time. There were also some participants who were not very keen to contribute constructively to the discussion, but were content to simply echo what other participants had said. Future studies should focus on examining the effects on the participants' messages due to the use of different thinking-related roles.

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