December 2004

Use Synchronous Chat to Improve Online Learning Experience

Xiaoyu Chen  
New Jersey Institute of Technology

Yuanqiong Wang  
Towson University

Follow this and additional works at: http://aisel.aisnet.org/amcis2004

Recommended Citation
http://aisel.aisnet.org/amcis2004/365

This material is brought to you by the Americas Conference on Information Systems (AMCIS) at AIS Electronic Library (AISeL). It has been accepted for inclusion in AMCIS 2004 Proceedings by an authorized administrator of AIS Electronic Library (AISeL). For more information, please contact elibrary@aisnet.org.
ABSTRACT
The potential of synchronous chat through the Internet to improve online learning experiences has rarely been discussed by researchers. The case study reported in this paper discovers the needs of synchronous communication and assesses the value of online chats in distance-learning environments. Both qualitative and quantitative methods were used to analyze the value of the chat sessions. Insights into the pros and cons of the chat sessions, the factors affecting the quality of the chat, and the students’ attitude toward the chat are discussed. The effects of the chat on the students’ motivation to study, the outcome of learning, and the communication among the students and the instructor are discussed. Suggestions for the design of synchronous chat in distance-learning classes are provided.

Keywords
Distance Learning, Synchronous Communication in Distance Learning, Asynchronous Learning Network, Online Chat

INTRODUCTION
For two decades, distance learning in an asynchronous manner has been recognized for its special values. It offers flexibility to students who need to learn at their own pace and at a time and location convenient to them. It offers a wide range of interactivity through a variety of electronic media including email, discussion boards, and online resources, which are appreciated by both instructors and students (Hentea, Shea, and Pennington, 2003). Moreover, many studies suggest that asynchronous learning through a computer-mediated communication medium allows students to master course materials as effectively as students in traditional classrooms do (Alavi, Wheeler, and Valacich, 1995; Alavi, Yoo, and Vogel, 1997; Hiltz, 1994; etc.).

However, deficiencies that prevent efficient learning are also reported. Personal and interpersonal communication is lessened in asynchronous learning (Lawhead, Alpert, Bland, Carswell, Cizmar, DeWitt, Dumitru, Fahraeus, and Scott, 1997), which leads to social isolation (Hentea et al. 2003). Social isolation is not in the interest of building the academic community, a very important factor for the success of learning (Rovai, 2001). In addition, procrastination and lack of incentives for students’ participation are also drawbacks of asynchronous learning (Fich and Hiltz, 1999).

To compensate for these deficiencies, researchers adopt synchronous components in distance-learning classes. Among a number of synchronous forms, chat is a light and more easily available option. Yet, very few studies have introduced chat sessions in the distance learning environment. Spencer and Hiltz (2003) presented a field study about the use of text-based chat in 18 asynchronous-learning and asynchronous-plus face-to-face-learning courses. In those courses the students were offered non-mandatory chat media. The results showed that half of the students used chat in some extent. Students found chat more “rewarding” and less “complex” when they participated in two or more chat sessions. The disadvantages include the sacrifice of the convenience provided by the asynchronous participation and the hard time coping with the lag of reading and typing. Murphy and Collins (2001) investigated communication conventions used in online courses. It suggests that a chat environment “can simulate an instructional environment that is familiar to students … formal behavior patterns that may carry over from the face-to-face classroom, and students may find it easier to orient themselves …”

While these studies indicate that chat is perceived as being useful in online courses and can partially imitate face-to-face communication, many questions remain unsolved. Some research questions include:

RQ1: Can formal chat sessions be an active component in online courses?
RQ2: Will formal chat sessions improve the students’ online learning experience by compensating some of the deficiencies of asynchronous learning?
RQ3: What are the advantages and disadvantages of the chat sessions in a distance-learning environment?
RQ4: What chat configurations are better in facilitating learning?

This paper presents a case study aimed at answering these questions. In the following sections, the study is presented with regard to its context, i.e. the course with which the study was conducted, the research method, the results and the discussion.

COURSE DESCRIPTION AND CHAT CONFIGURATION

“Principles of Information Systems” is a required graduate-level introductory course in information systems. It involves discussions of basic concepts such as the nature of information, the human as an information processor, the organization of systems, and the role of information systems in organizations. It introduces applications and design principles of information systems in general as well as in various domains including business, knowledge management, decision support, and virtual organization. The main course materials are case studies and articles from IS professional journals, including MIS Quarterly, Journal of MIS, Decision Sciences, Information Systems Research, Communications of the ACM, etc.

The students study the course materials in a manner combining asynchronous learning and synchronous chat. The asynchronous part of the course required a student to do the following on a weekly basis: watch video lectures on a CD, read the corresponding text chapters and assigned academic articles, post something valuable that one learned from the course materials as well as discussion questions raised from the course materials, and reply to another student’s post. Each week, a single message board for the asynchronous discussion was created for all the students.

The synchronous part of the course required each student to participate in four 30-minutes chat sessions. Two sessions were based on the articles from IS professional journals, and the other two sessions were based on case studies. The sessions were led by the instructor. To keep the chat manageable, the students were divided into teams of 4 to 6 members, and each team was assigned to participate in chats during assigned weeks (see Table 1). The chats were held on the evenings of a weekday. This was under the consideration that some students need to work during the day, and that the instructor may not be able to devote all the weekends to do the course chat. In order to counterbalance the inflexibility introduced by the fixed chat schedule, a student could request to participate the chat with another team according to his/her schedule. A whole team, when more than one team members had conflict in their schedule, had the option to move their chat with the instructor to a time period that is convenient to all. In the weeks that a student did not have chat session on the articles, he needed to post discussion messages on the articles in the asynchronous discussion boards.

<table>
<thead>
<tr>
<th>Week</th>
<th>Chat Session Arrangement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Team 1</td>
</tr>
<tr>
<td>2</td>
<td>Chat on Articles 1 &amp; 2</td>
</tr>
<tr>
<td>3</td>
<td>Chat on Case study 1</td>
</tr>
<tr>
<td>4</td>
<td></td>
</tr>
<tr>
<td>5</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Chat on Articles 9&amp;10</td>
</tr>
<tr>
<td>8</td>
<td>Chat on Case study 5</td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td></td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
</tbody>
</table>

Table 1: The arrangement of the chat sessions during the semester
As for the case studies, each team did two case studies throughout the semester. They were required to submit their case study report to the instructor four days before the corresponding chat session. The length of each chat session for a case study was 30 minutes.

The instructor prepared the discussion questions based on the readings and the students’ submission before the chat sessions. Rather than restricting the discussion on those pre-designed questions, the instructor was open to any questions that the students put forward during the chat.

The chat sessions were conducted in the chat rooms provided by WebCT, an e-learning system (WebCT Inc., 2003). The interface of the chat rooms is similar to those of the popular Instant Messengers (IM) such as MSN Instant Messenger and Yahoo! Messenger, but with reduced functions. Only text-based chat is supported in WebCT.

**RESEARCH METHODS**

Among the 20 graduate students in the course, four were novice in using information technology, while others were all IT professionals in various fields. The students were divided into groups of 4 to 6 with mixed backgrounds in each team. The instructor had over two years of experience in teaching distance-learning courses.

As soon as the students finished all chat sessions, they received a questionnaire containing eighteen open-ended questions and fifteen Likert-scale questions. The open-ended questions covered the pros and cons of the chat, the preferred configuration of the chat, and the factors affecting the quality of the chat. The Likert-scale questions focused on the effects of the chat on the students’ motivation to study, the learning experience, and the communication and the relationship among the students and the instructor. The Likert-scale questions have been validated by previous research (Hiltz, Benbunan-Fich, Coppola, Rotter, and Turoff, 2000, and Wu and Hiltz, 2003).

The students were asked to return the questionnaire in one week on a voluntary base. Content analysis on the responses to open-ended questions was conducted using NVivo. The answers to the Likert-scale questions were investigated through frequency distributions. In addition, the logs of the chat sessions were analyzed for additional findings that are not revealed by the questionnaire.

**RESULTS**

**Results of the Content Analysis on the Open-Ended Questions**

18 out of 20 students returned their questionnaires. Content analysis on the answers to the open-ended questions was conducted using NVivo - a content analysis software system. The results are presented in three categories: the pros and cons of the chat, the configuration of the chat, and the factors affecting the quality of the chat.

**Pros and Cons of Course Chats and Students’ Suggestions**

The students’ feedback shows that most of them are in favor of the chat sessions in their distance-learning course. They appreciated the “real time” communication with the professor and their classmates in a “conversational setting.” The live interaction gave them a “feeling of camaraderie” that pure asynchronous methods could only approximate. It elicited “a feeling of community and belonging as opposed to feeling disconnected from the rest of the class and the professor” which they have experienced in many other distance-learning classes. It gave “a feeling of immediacy” which in turn was “intellectually stimulating.” Some students felt that live chats with the professor were challenging and hence encouraged active thinking. The active exchange of ideas “gave life” to the course materials. Students found it was more informative than going over class materials by themselves. In general, “Chat session give a student impetus to learn.”

Disadvantages were reported as well. Most concerns were focused on the sacrifice of flexibility caused by the specific schedule. Getting online at a specific time for a group chat sometimes was very difficult for students who take distance-learning courses for the flexibility. Another problem was the limited bandwidth of the chat. Communicating “complicated” answers was difficult through a text-based chatting tool. Some students commented “a response to a question may require a few sentences at a minimum, but since only short sentences/fragments are usually typed in a chat session, it makes it difficult to communicate the response effectively.” “If the response is broken up using several short sentences/fragments, then it becomes difficult to follow if others are concurrently typing messages.” “It presents a situation where if the person typing a lengthy response does so all at once before submitting, then it is not apparent to others that a response is being prepared.”

To overcome the disadvantages, the students suggested the following solutions:

- Use more flexible arrangements for the chat sessions;
• Practice the use of the chatting tool;
• Post the questions (may be the questions on a more general level) for the chat participants in advance so that participants are more adequately prepared to present the answers as opposed to hurrying to type responses;
• Establish an order of communication, i.e. moderate the chat such that a question is posed to a particular participant; and establish a rule dictating that the person is allowed to respond before others join in on the discussion. This would directly alleviate the issue of responses that span several lines being interspersed with comments from other participants.

These suggestions demonstrated the students’ desire for the structured setups of the chat.

The Configuration of the Chat

The configurations that were investigated through the open-ended questions include the size of the chat group, the communication structure, the length of the chat, and the amount of information communicated through the chat.

Students reported that a chat group of 4 to 5 was an ideal size. Occasionally, to adapt to a student’s schedule, a chat session was conducted only between one student and the professor. The two students encountered this situation reported less benefits from the chat sessions comparing to those from the sessions held with larger groups. This was due to the lack of the stimulation from the interaction between students. In the cases that chat sessions exceeded six participants, students reported more points of view generated during the chat session as well as the difficulty in coping with information overload. When the chat was held by a large group, more structured means and a longer duration were required.

The following six types of chatting structures were used and/or discussed in the post questionnaire:

• **Structure 1**: The instructor initiates the discussion by asking questions based on the course materials. The students form a flow of discussion by answering the instructor’s questions.
• **Structure 2**: The students give a “virtual presentation” – the students present what they learn from the course materials and the instructor asks questions and provides comments based on their presentation.
• **Structure 3**: All the chat participants ask questions based on the course materials and answer questions of others. No participant purely asks or purely answers.
• **Structure 4**: The discussion is initiated freely. The participants form a natural flow of conversation instead of implementing any kind of structured conversation.
• **Structure 5**: The instructor provides the questions that will be asked in the chat session in advance. The students prepare the answers in advance.
• **Structure 6**: The instructor posts the chat log after the chat session for other students to review and discuss.

While it is possible to use more than one structures in one single chat session, most students reported their preference toward Structure 1. This result confirms the assertion by Murphy and Collins (2001) that conventions in face-to-face communication will be carried on in synchronous online communications. It seems that the students preferred to answer questions from the instructor, and would like to have someone with higher authority (i.e. the instructor) break the ice. The students thought that this kind of structure would make the chat more productive. This result also indicates that the structured communication is more welcomed in the chat sessions.

In addition to a well-structured chat session, students reported that a log of the chat posted in a timely fashion was helpful for them to review the material and ideas covered during the chat. Additionally, this log could benefit those students who did not participate in the chat session.

Students’ opinions varied toward the length of the chat sessions and the amount of information communicated during the chat. However, the students’ feedback was more based on the particular course, and hence is not discussed in this paper.

Factors Affecting the Quality of the Chat

Typing speed and reading speed played a role in the chat in some cases. Students who felt their typing and reading speeds were slower than other chat participants reported difficulties in maintaining pace with the chat flow.

Information overload was not a big problem due to the appropriate size of the chat groups. Most students felt that the amount of information covered during the discussion was “just right.”

Since only text messages were exchanged during chatting session, it might be difficult for participants to identify who is...
answering which question when more than one member of the group are “speaking” at the same time. However, it did not seem to be a problem during the chat sessions conducted, since the participants spoke of one very specific subject (one article or one case statement) at a time which made most responses related to each other.

Other problems that influenced the chat sessions included the interface design of the chatting tools, network disconnects and reconnects interrupting the flow, lack of information threading and visualization of communication structure, and that the chat window “did not show previous conversation if one joined late.” Students also reported problem in the coordination and would like the instructor to set “rules” for it – “because some people speak too much (like me), there were disproportionate amount of information created and passed from each person. The instructor should first set the ‘rules’ of the chat. For instance, she can say that the student has to type ‘?’ or ‘??’ depending on if he/she wants the instructor’s attention. Then, the instructor will invite ONLY that person to speak. This way, we can hold conversations, instead of collisions that lead to bigger confusion.”

Summary of the Results of the Open-ended Questions

Overall, students felt that adding chat sessions into their distance-learning course enhanced their learning experience and would like to keep it a significant part of the course: “Every chat was a good experience, in fact one of the better qualities of this distance-learning course was chatting with my team and the professor. We exchanged our thoughts and heard everyone out, and in the end the materials we read were made more vivid and understandable.”

Results of the Likert-Scale Questions

Fifteen likert-scale questions were asked in the post chat questionnaire. The questions mainly focus on the effects of the chat on the students’ motivation to study, the learning experience, and the communication and the relationship among the students and the instructor. The majority of the students reported positive effects of the chat on these factors. Understood in combine with the students’ answers to the open-ended questions, these positive effects should have resulted from the feelings of camaraderie, community, immediacy, and challenge cultivated during the chat sessions.

Table 2 shows the summary of the students’ response to those questions. 83.33% of the students who participated in the chat session(s) reported that the course chat improved their distance-learning experience. Only 5.56% of the students reported that the chat session did not motivate them to study the course material. 88.89% of the students would like to participate such kind of chat sessions for future distance-learning study.

Interestingly enough, although students reported a favor of chat logs posted after the chat sessions in their answers to the open-ended question, when answering the Likert-style question 44.44% of the students did not think that the posted chat logs made difference in their study. This may be explained by the delay of the post of the chat logs and the text-only format of the chat logs provided by WebCT. The chat logs were edited and posted a couple of weeks before the final exam in order to help students recall the main points mentioned during the chat. It turned out to be ineffective. Posting the log right after a chat session might have helped the study of the students, especially those who did not participate the chat session.

In summary, the analysis of the Likert-scale questions shows that the chat session does play a positive role in distance-learning environment.

<table>
<thead>
<tr>
<th>Question</th>
<th>SA*(5)</th>
<th>A*(4)</th>
<th>N*(3)</th>
<th>DA*(2)</th>
<th>SD*(1)</th>
<th>Average</th>
<th>Total number of subjects</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Participating in chat sessions improved my distance-learning experience.</td>
<td>6</td>
<td>9</td>
<td>2</td>
<td>1</td>
<td>0</td>
<td>4.11</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>2. Chats on course materials motivated me to study the course materials</td>
<td>6</td>
<td>7</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>3.94</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>3. When I have a chat session, I studied the articles for chat sessions more thoroughly than the articles for the weekly asynchronous discussion in WebCT conferences.</td>
<td>8</td>
<td>6</td>
<td>2</td>
<td>2</td>
<td>0</td>
<td>4.11</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>4. The chat sessions improves my</td>
<td>6</td>
<td>5</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>3.89</td>
<td>18</td>
</tr>
<tr>
<td>Communication with Other Students</td>
<td>(33.33%)</td>
<td>(27.78%)</td>
<td>(33.33%)</td>
<td>(5.56%)</td>
<td>(100%)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>----------------------------------</td>
<td>----------</td>
<td>----------</td>
<td>----------</td>
<td>--------</td>
<td>--------</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5. The chat sessions improve my communication with the instructor</td>
<td>8 (44.44%)</td>
<td>8 (44.44%)</td>
<td>2 (11.11%)</td>
<td>0</td>
<td>0</td>
<td>4.33</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>6. The chat sessions improve my understanding on the course contents</td>
<td>7 (38.89%)</td>
<td>7 (38.89%)</td>
<td>4 (22.22%)</td>
<td>0</td>
<td>0</td>
<td>4.17</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>7. The chat sessions helped me integrate the course contents</td>
<td>2 (11.11%)</td>
<td>11 (61.11%)</td>
<td>5 (27.78%)</td>
<td>0</td>
<td>0</td>
<td>3.83</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>8. The chat sessions helped broaden my knowledge</td>
<td>8 (44.44%)</td>
<td>7 (38.39%)</td>
<td>3 (16.67%)</td>
<td>0</td>
<td>0</td>
<td>4.28</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>9. The chat sessions provided a higher presence of the instructor</td>
<td>9 (50.00%)</td>
<td>6 (33.33%)</td>
<td>1 (5.56%)</td>
<td>2</td>
<td>0</td>
<td>4.22</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>10. The chat sessions helped me obtain a closer relationship with my team members.</td>
<td>6 (33.33%)</td>
<td>5 (27.78%)</td>
<td>7 (38.89%)</td>
<td>0</td>
<td>0</td>
<td>3.94</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>11. The chat sessions helped me obtain a closer relationship with the instructor</td>
<td>7 (38.89%)</td>
<td>5 (27.78%)</td>
<td>4 (22.22%)</td>
<td>2</td>
<td>0</td>
<td>3.94</td>
<td>18 (100%)</td>
</tr>
<tr>
<td>12. The chat is NOT suitable for the study of case studies</td>
<td>0</td>
<td>0</td>
<td>1</td>
<td>7 (41.18%)</td>
<td>9 (52.94%)</td>
<td>1.53</td>
<td>17 (100%)</td>
</tr>
<tr>
<td>13. The chat is suitable for the study of academic articles</td>
<td>6 (33.33%)</td>
<td>10 (55.56%)</td>
<td>0</td>
<td>1</td>
<td>1 (5.56%)</td>
<td>1 (5.56%)</td>
<td>4.06</td>
</tr>
<tr>
<td>14. That the chat logs were posted publicly did NOT make difference in my study of the course contents.</td>
<td>4</td>
<td>4</td>
<td>6 (33.33%)</td>
<td>3 (16.67%)</td>
<td>1</td>
<td>1 (5.56%)</td>
<td>3.39</td>
</tr>
<tr>
<td>15. I would like to participate such kind of chat sessions in the future for other distance-learning courses</td>
<td>9 (50.00%)</td>
<td>7 (38.89%)</td>
<td>1 (5.56%)</td>
<td>1</td>
<td>0</td>
<td>4.33</td>
<td>18 (100%)</td>
</tr>
</tbody>
</table>

| Table 2: The results of the Likert-scale questions in the post-questionnaire |

### Results of the Analysis on the Chat Logs

An analysis on the chat logs was conducted to look for anything not revealed by the content analysis and the descriptive statistics. Interesting findings are that students liked to sit in the chats of other teams, and that during the very first chat session of the semester the number of students from other groups sitting in was the most. The students sit in to observe what was going on and asked questions regarding the course schedule, the assignments, and the instructions. Although many questions they asked had been addressed on the course web site and in the asynchronous message boards, the students still preferred to obtain an instant answer from the instructor rather than looking for the information in the text materials by themselves. Thereafter the students often asked for instructional help and clarification in the chat room before and after the chat sessions. This means that not only the efficiency of synchronous communication is still preferred once a synchronous channel is offered to distance-learning students, but also that at the beginning of the class the students need fast and interactive help to start. This initial help, as in many distance-learning courses, is inadequate.

### DISCUSSION

Based on the results of the study, some suggestions are provided for the use of synchronous chat in distance-learning courses.

- Synchronous chat online is recommended at the beginning of the course. It provides effective help for the students to start. The excitement brought by the “live communication” facilitates the built of the learning community.
- Synchronous chat is recommended for the group discussion of course materials. Communication structures are needed in the group chat. Semi-structured chat is preferred. Chat participants need both a “protocol” to keep the communication manageable and the freedom to raise spontaneous questions.
Chat logs provided to the students in a timely manner can facilitate both the retrospect of the students who have participated the chat and the study of the students who have not participated the chat.

In general, the course chat should promote the three types of interaction briefed by Moore (1989): the learner-content interaction, the learner-instructor interaction, and the learner-learner interaction.

CONCLUSION AND FUTURE RESEARCH

In this paper, the synchronous chat used in distance-learning courses has been discussed.

The study showed that formal chat sessions could actually be an active component in an online course. It could improve students’ learning experience by offering a number of advantages coming from “real time” communication with the professor and the fellow classmates, such as motivating students to study, providing communication immediacy which in turn was “intellectually stimulating,” forming the feeling of camaraderie and the feeling of community and belonging. The study also reported disadvantages of the chat such as inflexibility of the schedule, the limited communication bandwidth in contrast with the complexity of the discussion topic. The solutions to these problems have been provided through the discussion in the paper.

The study discussed the chat configurations and some factors affecting the quality of the chat. The discussion indicated that among several proposed and tested chatting structures, the one with which the instructor initiates the discussion was most favorable, and that besides typing and reading speed of participants and the technical stability, the chat session holder could consider introducing communication protocols and symbolic expression to improve the quality and efficiency of the chat session.

In general, the online chat sessions introduced in the distance learning course received positive feedback.

This research effort is the first step in utilizing synchronous communication channel to enhance the distance-learning experience. Further research will be conducted with a wider range of classes with various course settings.

REFERENCES