A Field Study of Use of Synchronous Chat in Online Courses

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Abstract

A field study of Computer Mediated Communication (CMC) as used in higher education asks the questions, "Will students take part in synchronous chat sessions if they are scheduled? " and "What do students and faculty perceive to be the problems and the advantages of synchronous chat sessions?" Media Mode is the independent variable, characterized by four nominal values derived from the mixture of asynchronous discussion forums, here called Asynchronous Learning Networks (ALN), with various levels of synchronous media use.

Data were collected from 29 course sections, for which instructors were interviewed, students were surveyed online to investigate their perceptions of the use of chat in online courses, and university records were used to determine grade distributions.

The percentage of students participating in scheduled chat sessions varied from 5% to 50% and many of the instructors report problems with organizing the sessions as well as ideas about how to do it better "next time." Instructors were nevertheless generally positive about the potential usefulness of synchronous sessions in terms of their ability to bring the students closer to the instructor. They report some small success in their first chat session and the experience leads to better facilitation in subsequent sessions. Students significantly find chat more 'Rewarding' and less 'Complex' in classes that scheduled sessions two or more times than students in asynchronous-only classes. The implication is that when students actually use chat they do find it 'Rewarding' and not 'Complex.' Given the problems with implementation of chat sessions, however, it is not surprising that its use is not significantly related to predicted improvements in outcomes for courses.

1. Introduction

Asynchronous and synchronous communication has very different rhythms and purposes. Might adding synchronous chat to primarily asynchronous Computer-Mediated Communication in online classes overcome some of the disadvantages of asynchronous communication and lead to better overall processes and outcomes in courses? This section briefly reviews the concepts, literature, and theoretical model that motivated the study.

1.1. Media Characteristics

1.1.1. Asynchronous Learning Networks [ALN]. An Asynchronous Learning Network (ALN) is a teaching and learning environment located within a Computer-Mediated Communication (CMC) system designed for anytime/anyplace use through computer networks [1]. The computer network enables the interaction of students with students and instructor to continue without interruption [10].

Computer-mediated communications are asynchronous when the participants do not expect immediate response to the proffered comment. Students and instructors use email, bulletin boards, or full-feature conferencing systems or "platforms" for online learning (such as WebCT and Blackboard) to place comments for later viewing by the intended recipients.

Fully featured asynchronous forum sites include multiple forums for the class to use on different assignments, document retrieval and submission, message status indicators, email services, gradebooks, and more. The student 'attends' the class through the daily interaction on the forum. Class members 'meet' and form study groups, establish professional relationships, debate class topics, and act as a class would if held continually. Through the forum, most educational activities offered on campus are matched by this on-line analog [10].

1.1.2. Synchronous Computer Communication. Computer communications are synchronous when the participants are aware of real time interaction with others online simultaneously. Video and audio are synchronous when the participants can see and hear other participants, more or less in real time. Chat rooms and multi-user domains (MUDs) are usually synchronous. Interactive television and telephone conferencing are synchronous [12].

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Even ALNs may have some synchronous media use [2]. The first day of 'class' is filled with unknowns for the student (and the teacher) that can be resolved more quickly by synchronous communication such as a telephone call. Ambiguities surface if only because of inexperience on the students' end. This research l investigates the efficacy of synchronous media as a planned session in the ALN. What is the effect of some students' participation in a synchronous media session during a mostly asynchronous discussion online course?

Chat sessions consist of users logging on to a common server and posting short messages to a common viewing area. The effect is that of a conversation, with the group watching the stream of messages pass by while occasionally making a comment or posting some longer text. Internet Relay Chat (IRC) software is designed to service this process and is widely used in public chat 'rooms' or forums. Proprietary or commercial groupware products such as LotusNotes® and WebBoard® with built-in messaging services host many private chat sessions [12].

Chat is a CMC in same time synchronicity. Some systems use digitized audio or video, but most use text only communication. Users who are online at the same time can exchange comments in a real time discussion forum. At NJIT this can be scheduled as a window to be opened at that time using controls in the WebBoard® or WebCT® mostly asynchronous discussion forum. A secondary window appears with a section to view comments scrolling up as they are entered from others and a section for the user to enter comments. The schedule can be at the suggestion of the instructor or by student project groups. The class can also use the regular asynchronous threaded (meaning logically arranged messages) discussion board in a quasi-synchronous mode that has to be refreshed to see the latest messages. This use of the regular (normally asynchronous) discussion medium in this synchronous manner has the advantage of maintaining the synchronous discussion for later review by the whole class, those who may have missed the chat session and showing the messages in logical (threaded) order.

1.2. Media Synchronicity Theory and Potential Advantages of Chat

Media synchronicity theory [4] predicts that as the needs of the group change over time and task, the characteristics of the media needed will also change. This work investigates which of four modes of CMC will best aid the group (class) to resolve ambiguity and uncertainty [3], resulting from increased social presence and appropriate information richness. Social presence [9], [14] is defined as that sense of 'intimacy and immediacy' or 'we are together' feeling, leading to increased enjoyment, involvement, task performance, persuasion, and socio-emotional interaction. Each mode is expected to provide different levels of synchronous CMC supporting ALN classroom needs.

The totally asynchronous online class may fail to include some salient features of the traditional face-to-face class and its regular synchronous meetings. The asynchronous online class provides no quick feedback environment to resolve ambiguities and unforeseen student needs, which may be especially prevalent at the beginning of the course.

1.3. Theoretical Foundations

1.3.1. Information Richness Theory. (IRT) predicts communication effectiveness is a function of the match of uncertainty and ambiguity of information richness of the media. Media richness is defined for this context as the rate (understanding/time) with which the media can resolve uncertainty and ambiguity [3].

Uncertainty is defined as the level of absence of an objective answer to a specific question by the participants. Ambiguity is defined as the level of absence of the specific question that should be asked by the participants. In the classroom example uncertainty would be high when students have yet to read the course syllabus with its standard information or have questions not answered by the syllabus. Ambiguity would be high when students have yet to understand the course complexity or have conflicting information about the course.

Rich media convey rich information that can be expected to resolve ambiguity at a high rate. Face-to-face communication is considered a rich medium and is predicted to be the best choice to resolve ambiguity. Less rich media, such as asynchronous computer-mediated communication, are predicted to be the best choice to resolve uncertainty.

Choice of the medium may be either a positive or negative influence upon the group's effectiveness. Information richness theory predicts that when the discussion concerns ambiguous information, rich media would resolve the ambiguity faster than less rich media. Conversely, to communicate with increased certainty, the theory suggests using a less rich medium such as text only asynchronous email. In this research, the independent variable is mode of communication, having various levels of richness.

The initial meeting of class members online, arriving with different backgrounds, might be left with ambiguous information in the minds of the students without a rich medium for communication. Conversely the syllabus and course schedule should be posted online for certain understanding of the plan of the course. The richer medium (synchronous) is predicted to better process ambiguous information for faster understanding while the less rich medium (asynchronous) will better transmit well-understood information structures. Students and teacher have the ability to pick the medium of choice, either

synchronous regular class meeting or asynchronous discussion out of class. The completely asynchronous online class leaves the students and teacher only one medium of communication. This research also studies two intermediate modes of communication, each with a different amount (one or many instances) of synchronous media use as adjunct to ALN, chosen at will by the group.

1.3.2. Media Synchronicity Theory. Media synchronicity theory (MST) extends media richness theory to give a dynamic time-changing value to the richness of the media [4]. Rich media at one instant of information mediation may not be appropriate, therefore as rich, at another time in the process of information understanding.

Media synchronicity is the extent to which the medium is synchronized with the recipient's communication needs. Groups that need to work together on one activity need media that provide communication in 'real time.' The extent of this synchronicity is related to the medium's immediacy of feedback, symbol variety, parallelism, rehearse-ability, and reprocess-ability. See Rice, [13]. The conveyance of the information may not require a high level of media synchronicity; the convergence of a shared meaning of that information may, however, require a high media synchronicity.

Immediacy of Feedback refers to the time at which the reply and subsequent response are separated from the initial comment [3]. The medium with low immediacy of feedback would limit the communicants' ability to rapidly exchange information or alternate replies so that significant time elapse occurs between individual messages. A medium with high immediacy of feedback would facilitate the rapid exchange of messages so that it would be described as a conversation.

Symbol Variety refers to the ways information can be transmitted by the medium. A medium with low symbol variety may prevent some forms of information from being transmitted such as body language in a text-based medium. A medium of high symbol variety provides opportunity for the sender to use more than one representation of the information or to match the symbol to the type of information.

Parallelism refers to the number of channels that can simultaneously be in use in the medium. An example of a medium with low parallelism is the telephone where the number of simultaneous speakers is limited. High parallelism media exhibit multiple conversations at the same time such as the use of asynchronous CMC bulletin boards in this research.

Rehearsability in a medium allows the users to compose their response to a received message before transmission. This allows reading and editing the proposed message before sending. Examples of media with high rehearsability include email and asynchronous CMC bulletin boards. Voice transmission has low rehearsability if sent over the telephone but medium if the speaker encounters some voice mail or answering systems.

Reprocessability is the corollary of rehearsability in that the receiver may read or listen to the message more than once. Reprocessability is the ability to reread in text based CMC and in some audio/video CMC, rewind and replay.

Where information **convergence** is the goal (or task) of the users, media providing high synchronicity (high feedback and low parallelism) will be of benefit. Where information **conveyance** is the task, media providing low synchronicity (low feedback and high parallelism), will be of benefit. The task and communication requirements of students will change over time, representing the need to maintain media synchronicity over time. Newly formed online classes need to resolve ambiguity in group-well-being and individual support that can be served by high media synchronicity. The same class needs information such as provided by the syllabus that can resolve uncertainty of schedule and assignment, best communicated with low synchronicity media. The balance of the needs of the class will vary over the semester. This research examines one communication mode that serves only low synchronicity needs (ALN only), one that serves both high and low synchronicity needs in early weeks and low thereafter (One synchronous session plus ALN), and two modes that supply both low and high synchronicity needs throughout the semester (Face-to-face plus ALN), (Multiple synchronous sessions plus ALN). See Figure 1

Mode	Feedback	Symbol Variety	Parallelism	Rehearsability	Reprocessability
ALN only	Low	Low	High	High	High
FtF plus ALN	High plus low	High plus low	Low plus high	Low plus high	Low plus high
One sync plus ALN	Low	Low	High	High	High
Multiple sync plus ALN	Medium plus low	Medium plus low	Medium plus high	Medium plus high	Medium plus high

Figure 1. Relative Trait Salience of Communication Mode [4]

From Figure 1 it can be seen that ALN only mode and the use of ALN in the other modes is appropriate for information conveyance. The need for rapid feedback and extensive symbol variety is low when intentions are to accurately and unambiguously transfer information. The high level of parallelism gives many users the simultaneous opportunity to use the medium both as a sender and receiver. Both also benefit from ALN traits of previewing the message and reviewing the message.

The ALN only mode, however, is not the best medium for information convergence with many users. Low synchronicity with rapid feedback and symbol variety limit the group progress toward common understanding. By adding other media use in addition to the traditional ALN use of asynchronous bulletin boards, an increased synchronicity with feedback and symbol variety is offered to the users. In this research, that is operationalized in the form of face-to-face meetings (in the second mode) and multiple sessions of synchronous chat activity (in a fourth mode). Both of these modes are expected to show increased user convergence of information (agreement). The third mode shown is ALN with only one chat session. This mode is expected to exhibit the same media synchronicity as ALN only. The one early synchronous chat session may encourage the users to adapt the asynchronous to be more useful in convergence of information. In sum, use of a synchronous medium as an adjunct to a primarily asynchronous CMC online class is predicted (by media synchronicity theory) to better match the needs of the group/class. This support to the group is expected to increase the information richness communicated, a basis of increasing social presence as perceived by the users. In addition, constructivist education theory predicts that groups that communicate with peers more successfully will construct meaning more effectively.

1.3.3. Social Presence Theory. Social presence is the degree to which a medium is perceived as conveying the presence of the communicating individuals [15]. Social presence theory is related to media richness theory [3] in that both predict the effect of medium choice in the communication of information. "The essential underlying principle in both theoretic traditions is that a good match between the characteristics of a medium (such as high in social presence or media richness) and one's communication activities (such as socio-emotional activities like getting to know someone, or equivocal tasks like strategic decision making) will lead to 'better' (more effective, satisfying, etc.) performance" [14, p. 453].

Social presence theory predicts that different media create in the users different levels of perceived intimacy and immediacy. When people participate in communication they can assess how much they feel that they are present in a real setting. Face-to-face yields the highest level of social presence and some forms of asynchronous communication result in the lowest level of social presence [9].

Rice [14] concluded that social presence has two dimensions, related to intimacy and immediacy, described by interpersonal versus mediated and asynchronous versus synchronous. This study can use these two dimensions in an online class to measure the progress of group interaction from initial exploration to substantive teamwork.

Although Short, et al., [15] regard social presence as a quality inherent in the medium, they measure it in terms of individual perceptions, usually using semantic differential scales, and hence convert it from an objective to a subjective property of the communication system [11, p. 54]. The implication for the present study is that getting a social presence established early in the semester using synchronous sessions may draw in potential non-participants and better prepare the class to participate in collaborative and constructivist learning online.

1.4. Theoretical Model

Constructivist learning theory suggests that these same qualities of the group experience lead to greater learning than more objectivist/directed teaching methods. It is the social context and its peer interactions that students find useful to construct meaning and knowledge [7], [8]. For the online class members to construct meaning from interaction among participants, increased social presence will serve as the context of increased learning and satisfaction. An increase in the participants' perceived level of social presence would be expected to lead to increased learning on their part. The resulting theoretical model is shown in Figure 2.

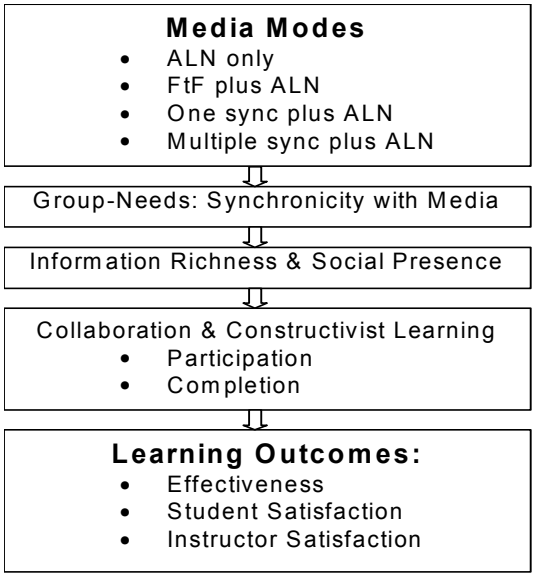

Figure 2. ALN Media Theoretic Causal Model

1.5. Summary of Research Questions

Despite the theoretical reasons for predicting that the addition of synchronous chat sessions to a primarily asynchronous online class will be beneficial, we also know that introducing a new medium can introduce new complexities and problems, too. Faculty and students who are experienced in the use of asynchronous CMC may find synchronous chat confusing or difficult to use. Students who sign up for primarily asynchronous online courses may find it difficult or impossible to be "present" for sessions scheduled for a specific time rather than "anytime." This leads to the primary research questions addressed in the study and in this paper:

RQ1. **Use of Synchronous Media**. If students are invited to participate in synchronous CMC sessions will they join the discussion? How do students in ALN classes using synchronous CMC rate its usefulness? What are the advantages and disadvantages of synchronous CMC sessions?

RQ2. **Social Presence.** When synchronous chat is used, will perceptions of a social presence develop more quickly, to draw students to regularly contribute? Does an initial synchronous media session give a 'fast start' to the socio-emotional content and social presence?

RQ3. **Outcomes** Can use of synchronous CMC in the predominately asynchronous process increase student 'attendance' or involvement in the class? Specifically, will use of synchronous CMC in combination with ALN result in a lower withdrawal rate?

This paper presents the key results of RQ1 only. Results of RQ2 and RQ3 will be presented in future papers.

2. Research Methodology

Over four semesters (spring 2001 to spring 2002), 112 instructors teaching ALN classes were asked to participate in interviews, observation and to consider using a synchronous medium in conjunction with the ALN; 29 agreed to do so.

This research incorporated aspects of action research and participant observation. The researcher asked instructors for time and cooperation in completing interviews, making transcripts of online discussions available for analysis and encouraging their students to fill out course questionnaires. As a form of reciprocity the researcher played the role of a technical facilitator, becoming knowledgeable about the synchronous and asynchronous systems available for the instructor to use and assisting in the use of the media the instructors chose. The researcher did not participate in course discussions except to answer technical questions and to help use the CMC software. The research project proposal was submitted to and approved by the NJIT Human Subjects Research Review Board.

Student surveys- The online student survey forms consisted of eight pages, four of which were Likert type and semantic differential scale check boxes. (See instruments at http://alnresearch.org) Survey web location was posted in the asynchronous discussion forum in the last few weeks of the semester [16]. Some instructors indicated that the students' participation in the survey would count toward the course requirement for discussion participation. Attempted survey participation numbered 200 of which 133 from 18 course sections had sufficient data to include in the analysis.

Instructor Interviews- The pre-course interview was informal and had the goal of getting the confidence of the instructor. Basic understandings about the research and the instructor's teaching methods were discussed. Medium of the independent variable "Mode" was established. Some interviews were conducted in person but most used email as the primary communication medium.

Post-course interviews were conducted during the last week of the session. The interviews were tape-recorded and notes taken to highlight specific responses. Most interviews lasted about half an hour. Each interview concluded with the instructor filling in a short survey similar to the student survey using likert type responses.

3. Results

3.1. Media Usage Results

The student survey commenced with statements about the communication media used by the class. Several statements were designed to learn the extent of the student's personal use of the asynchronous and synchronous CMC with five possible responses to each statement listed once below: This study research questions included: If students are invited to participate in synchronous CMC sessions will they join the discussion?

I logged onto the online discussion:
I posted messages to the online discussion:
I used email to communicate with fellow students in the online class:
I used email to communicate with my instructor in the online class:
I used scheduled Chat to communicate with fellow students and my instructor in the online class:
I used Instant Messenger to communicate with my instructor in the online class:
[1] Never[2] A few times[3] Once or twice a week[4] Nearly once a day[5] Many times a day

3.1.1. Media Use Means by Communication Mode. Three characteristics reported by students are significant between communication modes. The 'Posted' characteristic refers to the number of times per day or week the student posted a message in the asynchronous discussion forum. When comparing means of 'Posted' characteristic among the communication modes the results are significant ($F = 2.84$, $p = 0.044$). Students in classes that used some synchronous medium report more active posting of comments in the asynchronous discussion forum than students in ALN only or face-to-face classes supported by ALN.

The mean reported frequency of use of 'Chat' when compared across communication mode is significant ($F = 11.38$, $p < 0.001$) and serves to confirm the communication mode as reported during instructor interviews. Students reported that they used chat a few times to daily in 50% of the cases and Mode Synchronicity of "Two or more sync sessions plus ALN" students' mean frequency of use was nearly one step of use above "ALN only" or "FtF plus ALN."

A Bonferroni pair-wise comparison of means shows that students reported significantly ($p<0.05$) more postings to the "Two sync sessions plus ALN" communication mode than to the "FtF plus ALN" mode. This is not surprising in that the FtF classes would seem to be an outlet for synchronous communication not available to the more distant student except through chat.

The pair-wise comparison of means of chat shows students reporting significantly ($p<0.001$) more chat use in "Two or more sync sessions plus ALN" communication mode than in either "ALN only" or "FtF plus ALN" communication mode. This supports the contention that students will use more chat if the instructor as an additional method of communication offers it and serves to confirm the application of the independent variable.

Students also could have communicated with other students using email. Email is an asynchronous communication mode that can have the characteristics of synchronous CMC if it is used repeatedly in a short time frame. The evidence of students using email to one another suggests collaboration and some degree of social presence. Email by students to the instructor is probably one on one and suggests instant messenger type communication. Email from student to student was not significantly different across communication modes.

3.2. Student Perception of Chat Characteristics.

Students reported their perceptions of chat sessions as part of the online survey. The four semantic differential scales shown below elicited 116 complete cases with a 0.60 Chronbach Alpha Reliability, too low for the combining of the four scales.

This study research questions included: How do students in ALN classes using synchronous CMC rate its usefulness? Since 50% (66 out of 131) of the reporting students claimed to have never used chat in relation to the online class this measure of chat usefulness is not to be used without careful comparison with other measures of student perceptions. Eliminating those cases of students who claimed to never have used chat in the online classes skews the percentages toward the more supportive of chat and lowers the significance across mode. Alpha reliability did not change by considering only claimed users of chat.

3.2.1. Perceptions of Chat Means Comparison. Comparison of the means of the four factors of student perception of chat in Table 1 is made for each of the four modes of communication. Two of the factors have variance between modes that are significant, UselessChat at the 90% confidence level and Complex at the 95% level.

Both significant factors of student perceptions of chat, Usefulness and Complexity have increasing means from ALN only mode through One sync session plus ALN to the highest mean reported by students in the mode with Two or more sync sessions plus ALN. Higher means indicate more usefulness and less complexity as can be seen in the semantic differential scales above. This result would support the contention that the more the students use chat in online classes the more they will be favorably disposed toward that use.

A Bonferroni means pair-wise comparison test reveals that students in "Two or more sync plus ALN" mode classes find chat more rewarding than students in the "ALN only" classes at the 95% confidence level. Students assessing the complexity of chat sessions report a similar result. ALN only students perceive chat sessions more complex. Since presumably students in the "ALN only" mode classes did NOT use chat this result may well signal a fear of students to use a more unforgiving communication medium. When it is offered and students use it the perception of its usefulness will improve. A t-test was run on the data comparing student responses in the "One sync session plus ALN" to the "Two or more sync session plus ALN." This test would have revealed significant differences in perception between the two groups that did use chat. It did not show any differences, also suggesting that once students have one experience with chat they will be more receptive to its value.

I found scheduled chat sessions were:								
Useless	1(9%)	2(17%)	3(7%)	4(23%)	5(16%)	6(14%)	7(15%)	Rewarding
Revealing	1(15%)	2(22%)	3(18%)	4(31%)	5(4%)	6(10%)	7(1%)	Confusing
Complex	1(2%)	2(7%)	3(12%)	4(37%)	5(15%)	6(16%)	7(11%)	Primitive
Supportive	1(18%)	2(21%)	3(14%)	4(33%)	5(5%)	6(5%)	7(4%)	Redundant

Table 1: Means of Student Perceptions of Chat

ModeSyncronicity		UselessChat	Revealing	Complex	Supportive
ALN only	Mean	3.36(^)	3.28	3.96(*)	3.64
	Std. Deviation	1.753	1.275	1.306	1.800
FtF plus ALN	Mean	4.21	3.43	3.93	2.86
	Std. Deviation	1.528	1.222	1.207	1.027
One Sync plus ALN	Mean	3.90	3.60	4.20	3.20
	Std. Deviation	1.969	1.350	1.033	1.317
Two or more sync plus ALN	Mean	4.55 (*)	3.07	4.87(*)	3.10
	Std. Deviation	1.917	1.654	1.526	1.667
Total	Mean	4.20	3.21	4.50	3.20
	Std. Deviation	1.885	1.501	1.460	1.609
(*) Bonferroni p<.05	ANOVA sig.	p= .054	p= .671	p= .015	p= .436

3.3. Instructor Perceptions of Use of Synchronous Media

The researcher interviewed instructors at the end of the semester. Twelve open-ended questions were used as a guide. Below are two of the questions and sample responses with comments by the researcher. The responses to the two questions are excerpts from the recorded interview transcript. The comments of the researcher are from notes taken during the interview. These questions were to obtain the instructor's perception of two research questions: (1)If students are invited to participate in synchronous CMC sessions will they join the discussion? (2)What are the advantages and disadvantages of synchronous CMC sessions?

3.3.1. Student Use of Synchronous Media. Question number four from the instructor survey guide elicited the following responses from instructors (inside border) with comments by the researcher.

> **4. Did you try any synchronous communication media, such as chat, IM, NetMeeting? How many students participated and how many comments per student were made?*

Instructor 3: Telling about chat but showing that she is very hesitant to use various synchronous media. Note that she has used chat in another venue, and does not think that the facilitator needs to facilitate.

> Tried chat. I don't know what IM is? No no that's, my daughter does that all the time. NetMeeting, I have used Netmeeting in another venue. As part of an organization. Not within teaching... We had to establish protocols to keep things going. It's not there yet either.

Instructor 3: Explaining why chat did not materialize in her class. She does have ideas for making it work.

> Chat: It died. I take all the blame. I didn't set it up properly. I didn't reinforce it. I didn't put it up front and reinforce it. So it didn't become part of the course. I would use it though again and would set it up differently and reinforce it.

Instructor 3: Expressing fear of the computer communication via Instant Messenger. Expressing desire to be in control. Trying to control when students send messages to the instructor is the goal of this instructor.
*Interviewer: IM can be set up to...

> That sets up an expectation that you're available all the time.
> I think if you set up the times that you are going to be available online and times that you are going to check into the discussion boards and all of that. I think if you set that up and force and reinforce it, I think that helps.
> Expectations, right.

Instructor 4: Expressing frustration with instant messenger. Pleased when it worked but not sure that students will use it. Amazed that the students can find IM names and contact the instructor. This is an example of the instructor and students questioning the role of discussion in learning.

> IM, I signed up for IM, I gave them my IM, and nobody IM'd me. I have talked to a few students who found my personal social IM on AOL, they are like "we saw this, that's so similar to your user name, so we tried it." Well you found me. BUT they've been good discussions. Students tried to ask their questions then we just get off the topic talking about them or talking about my work.

Instructor 4: Frustrated with student response to scheduled chat sessions. Deciding not to use it in the future. This instructor probably does schedule real office hours.

> I tried chats scheduling twice and I was the only person sitting in the chat room. SO I told them if you're not going to come I'm not going to schedule them because it s time out of my schedule.

Instructor 4: Expressing need for office hours but not satisfied with the current media. This instructor used face-to-face tutorials.

> I do the two tutorials where I come and stay as long as they have questions. I think, one thing I like about the async is it also depends on the professor too because I know a friend of mine has problems with async, she's actually gotten out of it

Instructor 5: Expressing ambivalence about synchronous media. Probably never used any.

> Tried chat, page, and sometimes virtual discussion.

Instructor 6: Expressing frustration with chat and PAGE. Probably will not use it in the future. This instructor does regularly use IM. Probably will not use scheduled chat.

> The one time I scheduled something with chat, nobody showed up. Several students used PAGE to get a hold of me but that seems to be buggy. I'd respond to one student couldn't find them couldn't get back to them. I couldn't even find a record of the person. The page goes away once you've looked at it. I don't have that great short term memory so it's gone, useless.

Instructor 6: Expressing some satisfaction with instant messenger. Probably going to try more of that in future classes. The introspection has started the instructor to think of ways to use the 'weird way of communicating.'

> There have been a couple of conversations with IM and they have worked pretty well. It's a strange medium because you're always one topic behind the person writes and by the time you respond to that, they're responding to your previous message. So it's a weird way of communicating.

3.3.2. Benefits and Problems. Question number five from the instructor survey guide elicited the following responses from instructors (inside border) with comments by the researcher.

> **5. What are the benefits and problems of using synchronous media? Does it enhance the student learning experience? Will you use synchronous media in future online classes?*

Instructor 1: Expressing approval of the idea of using chat in an online class. Probably has not used it, but is interested.

> I think it does enhance because you can have somewhat of what the field naysayers call lack of human touch.
>
> Even though it's still text going back and forth the spontaneity of real time. I think closes the gap somewhat.
> Or it can, it may, I don't know. I haven't had the opportunity yet. But I'd like to try it again.

Instructor 2: Expressing interest in using instant messenger for office hours. Lack of idea of how to get the use in online classes. Has doubts about student interest in IM.

*Interviewer: Would you try synchronous in the future, IM, office hours?

> Oh, I would yes, I would try IM.
> I would try office hours.
> Some students have said they want it but not too many have been interested.

Instructor 3: Expressing frustration with getting students to use the media offered. Vowing to be more organized in the future about use of the media.

> Yah, organizational skills. It goes to that role of manager that we wrote about in the roles of ALN faculty, That the manager role was to be greater at you have to really be on top of these kinds of details.

Instructor 4: Positive about synchronous media but worried that some distant students might be at a disadvantage. Talking about face-to-face orientations and scheduling conflicts of chat sessions. Worried that those students who participate in discussions will have an unfair advantage over those who do not.

> I feel that it has enhanced. But for an asynchronous class you have to make sure that the students who opt to do synchronous work aren't getting an edge over those students who have an inability to do synchronous work. I have students who just can't travel here. And it's unfair to give the students who are here and just taking it because they want a class free.

Instructor 4: Talking about the problems of holding face-to-face orientation sessions. How to summarize for the non-participants. Scheduling for students becomes a problem when they are expecting a class with no fixed schedule.

> I'll just come up with a list of topics and I'll put that up and say this is what's discussed these were the points that were brought up and if you have any questions please ask. A lot of them don't like to have to be somewhere at a certain time. And then getting every body together is an interesting thing because everybody always has a class or work or their mother's birthday and they have t see you they have to be part of it and trying to please everybody has been fun. Some semesters I've gotten to the point where I just hold two. I'll do one at night and on the weekend come to whichever one you want.

Instructor 4: Frustration at scheduled chat sessions that people forget to attend. It may be the experience of the instructors who do few sessions at irregular times.

> Chat sessions if they want it. Problem: People say they want it and then they don't show up. And students have to be committed to want to do synchronous. It becomes very frustrating to show up to teach tem how to use a WebBoard and be the only person there. I feel like I'm being stood up.

Instructor 5: Talking about experiences of finding a good schedule for chat sessions.

> The one problem was getting the distance learning students or even a group of them together at the same time. They're really conditioned to doing it whenever they want. Some would prefer lunch, others can't sign -on during the work day, others prefer evenings at home, some work in it at work, at home to get'm together... It's even easier in the traditional world for them to get together than the online cause they're conditioned to do it.

Instructor 5: Offering a suggestion to avoid conflicts during the course. Don't try to set it up after the class starts.

> If you set the course up right at the beginning and set this DL class and the group synchronous action will be from 7-830pm Monday from the beginning, the its scheduled. Then I think it would work well. Ad hoc it's pretty hard.

Instructor 5: Advice that scheduled chat hours can be thought as homework. Compensation is needed for time lost to chat. This subject never is considered for asynchronous work.

> And of course if you were going to do that you would have to affect some of the homework. You'd have to think of that as hour's participation and just add it on. You'd have to say that's in replace of this...

Instructor 6: Expressing doubt to the value of synchronous media. Feels that the essence of distance learning is asynchronicity.

> I don't really see any purpose for it in distance learning. I mean basically one of the key reasons that people are using the distance learning is its asynchronous nature. They get to it when they can get to it. And synchronous would destroy that.

3.4. Summary of Results

Will students use chat? Students seem more satisfied with face-to-face courses that use ALN as alternative communication media than courses that were entirely ALN based. Students reported the FtF plus ALN courses as the most effective ($p<.10$). If students are invited to participate in synchronous CMC sessions will they join the discussion? Although only 50% of students reported chat use, students in courses scheduling chat sessions were reporting significantly more asynchronous discussion forum posting ($p<.001$). Instructors report some synchronous session work is beneficial but it is difficult to schedule a time that is acceptable to many students.

Instructors are just learning to be creative in their approach to discussion with students and the addition of new media is somewhat intimidating. Students will perceive chat as more satisfying or rewarding if they have some experience with it. Students with little experience with chat will, when asked, give more negative responses to the perceived value of using a synchronous medium.

If the student is offered synchronous media they will use it but only a few will use it at one time. If instructors are encouraged to try new communication media some will be "early adopters" and some will talk themselves out of using it.

3.4.1. Student Perceptions. Students reported their use of the media by answering questions in the online survey. Half the students reported using chat to some extent. Students in classes scheduling chat sessions reported more use of chat, confirming the manipulation of the communication mode. A crosstab comparison of student reports of posting to the asynchronous conferences with their reports of use of chat shows positive correlation. Student perceptions of chat was mixed. On a scale of 'Useless' to 'Rewarding' students claimed 33% unfavorable ratings and 44% favorable ratings. Students significantly find chat more 'Rewarding' and less 'Complex' in classes that scheduled sessions two or more times than students in ALN only classes. The implication is that when students actually use chat they do find it 'Rewarding' and not 'Complex.'

3.4.2. Instructor Perceptions. Instructors reported during interviews that chat sessions were hard to schedule because of time commitments of students. The instructors complained that when students requested a particular time that most did not participate. Chat sessions did give the instructor another opportunity to communicate with students and many were encouraged to use the sessions as 'office hours' at regular times. Instant messaging use by instructors was only reported by two. The recording of chat sessions for review by the whole class was not done in most cases. Some sessions were recorded by students and posted to the asynchronous discussion forum. Some synchronous sessions were held using the threaded discussion forum otherwise used asynchronously. The ephemeral nature of synchronous chat may be an advantage, drawing students to use the medium lest they miss something.

4. Discussion

This research investigated the interplay of synchronous and asynchronous CMC as used in online courses. Significant data were found to indicate the effect of synchronous media in a mostly asynchronous discussion

forum. The ability of synchronous media to foster social presence is not shown or disproved by this research. The instructors were positive about its potential usefulness and ability to bring the students closer to the instructor.

As instructors have had to learn how to facilitate classes using asynchronous CMC this research shows some hope that they will also learn how to effectively use synchronous media in ALN. They report some small success in their first chat session and the experience leads to better facilitation in subsequent sessions. This research needs to be continued with better controls on the use of synchronous media and the collection of data. Instructors were very generous with their time and most expressed good hopes for the use of synchronous media in future classes.

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