

Appendix A. Case Citations

C101

Cifuentes, L., Murphy, K. L., Segur, R., & Kodali, S. (1997). Design considerations for computer conferences. Journal of Research on Computing in Education, 30(2), 177-201.

C102

Poole, D. M. (2000). Student participation in a discussion-oriented online course: A case study. Journal of Research on Computing in Education, 33(2), 162-177.

C103

McAlpine. I. (2000) Collaborative learning online. Distance Education, 21(1), 66-80.

C104

Zhang, P. (1998). A case study on technology use in distance learning. Journal of Research on Computing in Education, 30(4), 398 – 420.

C105

Wegerif, R. 1998. The social dimension of asynchronous learning networks. Journal of Asynchronous Learning Networks 2 (1).

C106

Murphy, K.L. & Collins, M.P. (1997). Development of communication conventions in instructional electronic chats. Journal of Distance Education 12(1/2), 177-200.

C107

Alexander, J. O. (1997). Collaborative design, constructivist learning; information technology immersion & electronic communities: A case study. IPCT Journal 7(12), [Online] Available: <http://jan.ucc.nau.edu/~ipct-j/1999/n1-2/alexander.html> Accessed Feb. 28, 2001.

C108

Bonk, C. J., Fischler, R. B., & Graham, C. R. (2000). Getting smarter on the Smartweb. To appear in D. G. Brown, (Ed.), Teaching and learning with technology: Fifty professors from eight universities tell their stories (pp. 200-205). Bolton, MA: Anker Publishing.

C109

Bullen, M. (1998). Participation and critical thinking in online university distance education. Journal of Distance Education, 13(2), 1-32. [Online] Available: <http://cade.icaap.org/vol13.2/bullen.html> Accessed Mar 11, 2001.

C110

Vrasidas, C., & McIsaac, S. M. (1999). Factors influencing interaction in an online course. The American Journal of Distance Education 13(3), 22-36.

C111

Burton, W. (1998). Facilitating online learning: Charting the conversation. Paper presented at Teaching in the Community Colleges Online Conference 1998. [Online] Available: <http://leahi.kcc.hawaii.edu/org/tcon98/paper/burton.html> Accessed Mar. 10, 2001.

C112

Carr-Chellman, A., Dyer, D., & Breman, J. (2000). Burrowing through the network wires: Does distance detract from collaborative authentic learning? Journal of Distance Education 15(1). [Online] Available: <http://cade.icaap.org/vol15.1/carr.html> Accessed Mar. 11, 2001.

C113

Chester, A., & Gwynne, G. (1998). Online teaching: Encouraging collaboration through anonymity. Journal of Computer-Mediated Communication, 4(2). [Online.] Available: <http://www.ascusc.org/jcmc/vol4/issue2/chester.html> Accessed Sep. 5, 2001.

C114

Carswell, L., Thomas, P., Petre, M., Price, B., & Richards, M. (2000). Distance education via the Internet: the student experience. British Journal of Educational Technology 31(1), 29-46.

C115

Turbill, J. (2001, July/August). A face-to-face graduate class goes online: Challenges and successes. Reading Online, 5(1). [Online.] Available: http://www.readingonline.org/international/inter_index.asp?HREF=turbill1/index.html Accessed Aug. 15, 2001.

C116

Jaffee, D. (1999, in press). Asynchronous learning: Technology and pedagogical strategy in a computer-mediated distance learning course. Teaching Sociology. [Online.] Available: <http://www.newplatz.edu/~jaffeed/esstsxx.htm> Accessed Sep. 13, 2001.

C117

Andrusyszyn, M. A., & Davie, L. (1997). Facilitating reflection through interactive journal writing in an online graduate course: A qualitative study. Journal of Distance Education 12(1/2), 103-126.

C118

Lewis, D. C., Treves, J. A., & Shaindlin, A. B. (1997). Making sense of academic cyberspace: Case study of an electronic classroom. College Teaching, 45(3), 96-100.

C119

Yakimovicz, A.D., & Murphy, K.L. (1995). Constructivism and collaboration on the Internet: Case study of a graduate class experience. Computers in Education, 24(3), 203-209.

C120

Harasim, Linda (1993). Collaborating in cyberspace: Using computer conferences as a group learning environment. Interactive Learning Environments, 3(2), 119-30.

C121

Graham, M., Scarborough, H., & Goodwin, C. (1999). Implementing computer mediated communication in an undergraduate course: A practical experience. Journal of Asynchronous Learning Networks 3(1). [Online.] Available: http://www.aln.org/alnweb/journal/Vol3_issue1/graham.htm Accessed May 18, 2001.

C122

Ragoonaden, K., & Bordeleau, P. (2000). Collaborative learning via the Internet. Educational Technology & Society 3(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2000/d11.html Accessed Sep. 15, 2001.

C123

Murphy, K. L., Mahoney, S. E., & Harvell, T. J. (2000). Role of contracts in enhancing community building in web courses. Educational Technology & Society 3(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2000/e03.html Accessed Sep. 15, 2001.

C124

Matuga, J. (2001). Electronic pedagogical practice: The art and science of teaching and learning on-line. Educational Technology & Society 4(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2001/matuga.html Accessed Oct. 1, 2001.

C125

Curtis, D. D., & Lawson, M. J. (2001). Exploring collaborative online learning. The Journal of Asynchronous Learning Networks 5(1). [Online.] Available: http://www.aln.org/alnweb/journal/Vol5_issue1/Curtis/curtis.htm Accessed Sep. 27, 2001.

C126

Orey, M., & Kim, B. (2001). Blended learning: What do they use in an online Introduction to Computers for Teachers class? Paper presented at WebNet 2001, Orlando, FL.

C127

Rada, R. (1998). Efficiency and effectiveness in computer-supported peer-peer learning. Computers & Education, 30(3/4) pp. 137-146.

C128

Adelskold, G., Aleklett, K., Axelsson, R., and Blomgren, J. (1999). Problem-based distance learning of energy issues via computer network. Journal of Distance Education, 20(1) pp. 129-143.

C129

Eggers, M. R. (1999). Web-based courses in higher education: Creating active learning environments (Doctoral dissertation, Andrews University, 1999). Dissertation Abstracts International, 60/12, p. 4301, June 2000.

C130

Dennen, V. P. (2001). The design and facilitation of asynchronous discussion activities in Web-based courses: Implications for instructional design theory (Doctoral dissertation, Indiana University, 2001). Dissertation Abstracts International, 62/02, p. 536, August 2001.

Appendix B. Case study sources

Cases were chosen from among the following sources. Sources which contained at least one chosen case study are indicated by **bold** type.

Published Journals (Paper-based)

- The American Journal of Distance Education
- **British Journal of Educational Technology**
- Canadian Journal of Educational Communication
- **Computers & Education**
- **Distance Education**
- Educational Media International
- Educational Technology
- Educational Technology Research and Development
- Educational Technology Review
- Educational Technology Systems
- **Interactive Learning Environments**
- International Journal of Educational Telecommunications
- Journal of Computer-Based Instruction
- **Journal of Distance Education**
- Journal of Educational Computing Research
- Journal of Educational Multimedia and Hypermedia
- Journal of Interactive Learning Research
- **Journal of Research on Computing in Education**
- Journal of Technology and Teacher Education
- **Teaching Sociology**
- T.H.E. (Technology Horizons in Education) Journal

Online E-journals

- The Australian Journal of Educational Technology -
<http://cleo.murdoch.edu.au/ajet/ajet.html>

- **Educational Technology & Society** - <http://ifets.ieee.org/periodical/>
- **Interpersonal Computing and Technology Journal** - <http://jan.ucc.nau.edu/%7Eipct-j/>
- **Journal of Asynchronous Learning Networks (JALN)** - <http://www.aln.org/alnweb/journal/jaln.htm>
- **Journal of Computer Mediated Communication** - <http://www.ascusc.org/jcmc/jcmcindex.html>
- **Journal of Electronic Publishing** - <http://www.press.umich.edu/jep>
- **Journal of Instructional Science and Technology** - <http://www.usq.edu.au/electpub/e-jist/>
- **Journal of Interactive Media in Education** - <http://www-jime.open.ac.uk/>
- **Online Chronicle of Distance Education and Communication** - <http://www.fcae.nova.edu/disted/>
- **Reading Online** – <http://www.readingonline.org/>

Major Conference Proceedings

- **AECT Conference Proceedings**
- **ALN Conference Proceedings** - <http://www.aln.org/alnweb/conferences/proceedings.htm>
- **ASCILITE** – <http://www.ascilite.org.au/conferences/>
- **CSCL Conference Proceedings (95/97/99)** - <http://www-cscl95.indiana.edu/csc195/toc.html>
- **Distance Learning Conference Proceedings** - <http://www.uwex.edu/disted/conference/>
- **ED-MEDIA Conference Proceedings (97/98/99/00)**
- **SITE Conference Proceedings (98/99/00)**- <http://discovery.coe.uh.edu/downloads/aace/site/1999/PROCBOOK.PDF>
- **Teaching in the Community Colleges Online Conference (98/99/00)**
- **Webnet 2001**

Published Books – Edited Volumes

- **Bonk, C. J. & King, K. S. (Eds.), (1998). Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse. Mahwah, NJ: Erlbaum.**
- **Brown, D. G. (2000). Teaching and learning with technology: Fifty professors from eight universities tell their stories. Bolton, MA: Anker Publishing.**
- Khan, B. H. (Ed.), (1997). Web-based instruction. Englewood Cliffs, NJ: Educational Technology Publications, Inc.

Miscellaneous Sources

- ERIC Database - <http://ericir.syr.edu/Eric/>
- Doctoral Research in Educational Technology: A Directory of Dissertations, 1977-2000 - <http://www.edtech.UNCo.edu/disswww/dissdir.htm>
- **ProQuest Digital Dissertations -**
<http://bert.lib.indiana.edu:2060/dissertations/gateway>

Appendix C. Interview Protocol

Interview Subject: _____

Case Study Identification: _____

Date: _____

Location: _____

Media: Audio In-person E-mail (circle one)

Welcome/Introduction: Thank you for participating in this study. As you know, your participation is completely voluntary. If at any time you would like to stop the interview and/or revoke your agreement to participate, just indicate so and we will stop. If you decide not to participate, I will destroy all records of your participation. Are you ready to continue?

Possible Questions (actual form places one question at the top of a new page)

1. Please describe the overall learning goals you wanted to achieve in this situation. What were the underlying learning values that guided the design of your course?
2. What methods of social interaction seemed to work the best in your situation? – Why? Can you envision a situation in which they would not work well?
3. Which of your learning goals were met effectively with the social interaction methods you chose? Were any of your learning goals unmet? Did the social interaction methods chosen contribute to this? Can you think of any other social interaction methods that might have helped meet those goals?
4. If you could implement any method of social interaction you wanted in your learning environment (or course), what would you choose –and why?
5. In your online learning environment (or course), what are you doing differently today – and why?
6. Ask specific questions about the values, methods, and conditions in the situationalities framework – clarifying, extending, etc. (*this will be different for each interview*)

Appendix D. Survey Protocol

Thank you for your participation. If you have not done so already, please read the Study Information Sheet provided with this survey.

Please review the document you received, entitled “Social Interaction in Online Learning: Methods and Situationalities.”

Name:

Date:

Next, answer the following questions. When you have completed this survey, please send your responses to bjbeatty@indiana.edu. At the end of the survey, please indicate whether you would like to receive a copy of the full study, when completed.

Survey Questions (Please type your response directly beneath each question.)

1. When you create online learning activities (or environments), what are the underlying learning values that guided the design of your course?
2. What methods of social interaction seem to work the best in your experience? – Why? Can you describe any situations in which they did not work well?
3. Which learning goals are usually met effectively with the social interaction methods you choose? Do any of your learning goals remain unmet, in most situations? If so, do the social interaction methods you choose contribute to this? Can you think of any other social interaction methods that might help meet those goals in future situations?
4. If you could implement any method of social interaction you wanted in your learning environment (or course), what would you choose –and why?
5. In your online learning experience, what are you doing differently today than you were one or two years ago? Why have you changed your approach?
6. Do you have any specific comments regarding the “social interaction situationalities framework” included in the document you reviewed? (Do you think it would be helpful when designing online instruction? What seems to be missing? Is there anything that seems unnecessary?)

Please indicate whether you would like to receive an electronic copy of the full study when it is completed.

_____ Yes, I would like to receive a copy of the completed study.

_____ No, I do not want to receive a copy of the completed study.

Thank you for completing this survey. Please return it to **bjbeatty@indiana.edu** no later than October 20, 2001 (specific date TBD).

Appendix E. Situationalities by Case

This appendix contains the case analysis reports for each of the 30 case studies selected for this study. Each analysis report includes case identifying information (case # and citation), values, goals, instructional methods, discussions of effectiveness, and instructional conditions for that case. To enhance the readability of this appendix, each case analysis report (except C101) begins on a new page.

C101 Cifuentes, L., Murphy, K. L. , Segur, R., & Kodali, S. (1997). Design considerations for computer conferences. *Journal of Research on Computing in Education*, 30(2), 177-201.

Value Online Collaborative Learning

Goal: Learner's learn how to control the design and content of their learning.

Method Students are required to choose a discussion topic and then prepare and moderate a weekly discussion on that topic for the entire class.

Effectiveness

When students chose topics that interested them, they participated more in the discussion. Also, when students were responsible for a topic, other students purposefully supported them with their participation, hoping for subsequent reciprocal support.

Effectiveness

When the instructor chose all the discussion topics, the students did not find the discussion relevant (in their opinion) or interesting. Therefore, they did not feel the discussions were valuable nor did they participate very much.

Effectiveness

When students chose topics that interested them, they participated more in the discussion. The instructors trusted students to choose meaningful topics.

Condition:

Instructors with more experience in using CMC found it easier to allow students to choose topics and moderate discussions than did instructors without much CMC experience.

Condition:

Students must value the use of CMC discussions, especially if there are other methods of communication available. The students must consider the general topic of the class interesting.

Condition:

There must be a trusting relationship between the student(s) and the instructor(s).

Goal: Students learn how to collaborate with peers as they learn.

Method Each student prepares and moderates one class discussion with one peer.

Effectiveness

Some students were more interested in participating and moderating the discussion than others. When students of mixed interest were paired together, some conflict arose due to an uneven sharing of the moderator workload.

Condition:

Each student must be committed to the success of the discussion and be willing to do their fair share.

Goal: Students will learn how to collaborate with the instructor and their peers.

Method Use computer-mediated-communication for instructor-student and student-student communication.

Effectiveness

When either the instructor or the students lacked technical skills or confidence using CMC software, online discussions faltered or never started. It often took several weeks for new CMC users to become familiar with the basic functioning of the software.

Condition:

Both the instructor and students must be adequately prepared to use the CMC software. External technical support should be available to class participants when needed.

C102 Poole, D. M. (2000). Student participation in a discussion-oriented online course: A case study. *Journal of Research on Computing in Education*, 33(2), 162-177.

Value Online Learning Community

Goal: Students learn how to control part of the learning process.

Method Assign each student as a moderator for a discussion topic they choose.

Effectiveness

When students chose and moderated a topic, they posted three times as many messages during that week.

Condition:

Students must be willing and prepared to choose a topic and act as moderators.

Effectiveness

When students chose and moderated a topic, they posted three times as many messages during that week.

Condition:

The instructor must be willing to give up some control over the discussion.

Goal: Students learn how to collaborate in each other's learning.

Method Provide chat as a tool for synchronous communication between collaborative pairs of students.

Effectiveness

If students had e-mail access, they tended to use it instead of chat. For these students, e-mail was more familiar and enabled all the communication they needed in order to collaborate. There was no reason to use chat.

Condition:

There must be a good reason for students to use chat - either they do not have e-mail or the collaborative task requires immediacy. Students must know how to use chat.

Method Require student's weekly participation in CMC discussions.

Effectiveness

Students without web access at home logged into the discussions much less frequently than those who had home access, leading to an uneven rate of student participation. This uneven participation hindered the creation of online community.

Condition:

Students are willing to participate in discussions frequently.

Goal: Students learn how to participate in an engaging online discussion.

Method Assign one student to the role of an instigator using a pseudonym (false identity).

Effectiveness

The student instigator generated and provoked discussion through provocative statements and questions posted to the discussion. However, some of the students were offended to find out one of their peers

Condition:

Students should be accepting of and willing to assume out-of-character and concealed identity roles as a means of inspiring interaction in the online discussion.

C103 McAlpine. I. (2000) Collaborative learning online. *Distance Education*, 21(1), 66-80.

Value Online Collaborative Learning

Goal: Students develop shared meaning.

Method Instructor opens discussion with a question, and closes the discussion after a specified time with a summary post.

Effectiveness

Students generally posted to the discussion only once and did not return to the discussion forum to interact. This method was not effective in creating true online discussion.

Condition:

Students must be able to facilitate discussion among themselves without relying on daily instructor interaction.

Goal: Students learn how to from each other.

Method Require students to work on a collaborative task within a closed group discussion forum.

Effectiveness

Some students in rural areas with poor telephone lines had difficulty contributing to discussions due to technical connection faults.

Condition:

Students must have reliable access to the computer conference.

C104 Zhang, P. (1998). A case study on technology use in distance learning. *Journal of Research on Computing in Education*, 30(4), 398 – 420.

Value Discovery learning

Goal: Students learn how to collaborate with their peers.

Method Broadcast course announcements via listserv.

Effectiveness

This method was more effective than posting announcements to the class web page because students checked e-mail more frequently than they visited the class web page.

Condition:

Students must be able and willing to check e-mail regularly.

Method Provide a class file transfer protocol (FTP) site for file exchange.

Effectiveness

FTP was not used by the students to exchange files among themselves, but was useful to the instructor as a way to distribute and collect a class survey.

Condition:

Class participants can use FTP software. This method is not recommended if simpler file sharing options (such as websites with download links or common-format e-mail attachments) are available.

Method Provide a space for students to create their own web pages in order for them to share information and exchange files with other students.

Effectiveness

Only the students with the requisite skills were able to use student-created web pages to exchange files among collaborative group members.

Condition:

Students need to know how to create their own web pages using HTML programming language or web page creation software such as Netscape Composer.

Method Students use e-mail to turn in assignments and coordinate group project work.

Effectiveness

E-mail was the most popular form of interaction. However, the overuse of e-mail quickly generated a huge volume of e-mails to which the instructor (and other students, in some cases) felt obligated to respond.

Condition:

The number of students and assignments must be small in order to keep the volume of e-mail at a manageable level.

Method Use Internet Relay Chat (IRC or chat) in project groups for group coordination, clarification, and decision-making.

Effectiveness

The students who used IRC were able to coordinate group decisions successfully. However, only a small number of students used IRC; the rest chose to coordinate all group communications and decision-making through other means, primarily e-mail.

Condition:

Students must have skills in discussion control and IRC client use.

Effectiveness

As the number of students in the chat increased, communication became less effective and harder for students to control.

Condition:

The number of students in a chat session must be small (4-5).

C105 Wegerif, R. 1998. The social dimension of asynchronous learning networks. *Journal of Asynchronous Learning Networks* 2 (1), pg 34-48.

Value Online Learning Community

Goal: Students learn how to contribute freely and openly to class discussions.

Method Students discuss weekly course topics in a CMC discussion.

Effectiveness

Some students did not have access at both their home and office, while others found the dial-in costs prohibitive from home. Students in these situations did not participate in the discussions very often.

Condition:

Discussion access should be available at times convenient to the student (both at home and office) and must be reliable and affordable.

Effectiveness

Some students joined the course late and did not participate in the discussions very often, since they felt they had to read many posts just to "catch up" to the rest of the class.

Condition:

All students should be able to start the course at the same time.

Goal: Students learn how to engage in online discussions on a frequent basis.

Method Allow students to create their own discussion topics or move an emergent thread into it's own discussion space.

Effectiveness

This method helped create a sense of ownership and togetherness. Students often met in a social discussion space, discovered a common conversational interest and then created a new discussion to continue their discussion. This aided community formation.

Condition:

The CMC software must support students' ability to create discussion topics and move existing threads into these new discussions.

Method Students discuss weekly course topics in a CMC discussion.

Effectiveness

If student backgrounds were too dissimilar, some lacked confidence in entering discussions, thinking "other students know so much more than I", or "they use much better language skills than I." This inhibited active discussion.

Condition:

Students should have similar professional or academic interests and backgrounds.

Goal: Students learn how to create a learning community.

Method Assign structured group exercises before unstructured group exercises.

Effectiveness

This method allowed students to find "common ground" and develop self-confidence in new social situations before requiring them to use their own initiative in the formation of online community.

Condition:

Students have widely dissimilar backgrounds.

C106 Murphy, K.L. & Collins, M.P. (1997). Development of communication conventions in instructional electronic chats. *Journal of Distance Education* 12(1/2), 177-200.

Value Dialog and discussion

Goal: Students will learn how to engage in a dialogic learning process.

Method Conduct large group discussions using synchronous CMC - chat.

Effectiveness

In order for this method to be effective, students had to coordinate their work and personal schedules in order to attend class at a pre-arranged time. When students were widely scattered throughout many time zones, this was very difficult.

Condition:

Students must be able to be on-line at the same time.

Effectiveness

Mis-matched typing and language skills limited student participation due to a lack of confidence or competence.

Condition:

Students must be confident in their typing and language abilities.

Effectiveness

In a large group, there were many conversation threads going on at once, which made following a particular conversation difficult.

Condition:

Students must be able to selectively attend to one (or a few) conversation topic among many.

Method Prepare students for chat sessions by meeting together via videoconference or in-person if possible.

Effectiveness

Meeting in "real life" as a group, in-person if possible, helped establish interpersonal rapport that moved the group development process through the early phases of forming and norming.

Condition:

Students must be able to meet either via videoconference or in-person.

Goal: Students learn how to solve problems and make decisions as a group.

Method Provide access to chat software for small groups to use as they collaborate and continue dialogue started during whole class discussions.

Effectiveness

This method helped students improve their chat skills in a non-threatening environment. The group experiences while learning the chat tool made small group work in other modes more effective and enhanced their communication w/other class participants.

Condition:

Students must have some overlap in the time they can be on-line so they can schedule chat sessions with their group. Students with frequent and reliable access to the chat tool make this more feasible.

- C107** Alexander, J. O. (1997). Collaborative design, constructivist learning; information technology immersion & electronic communities: A case study. *IPCT Journal* 7(12). [Online] Available: <http://jan.ucc.nau.edu/~ipct-j/1999/n1-2/alexander.html>

Value Learner-centered collaboration in rich environments supporting active learning.

Goal: Students learn how to be self-sufficient information users.

Method Provide multiple technologies (e-mail, listserv, webpages) to support online community.

Effectiveness

Technologies themselves did not produce community, rather it was a function of the task and collaborative structure. When there wasn't a significant need (or motivation) for collaboration, collaborative technologies were not used.

Condition:

Group tasks that require electronic interaction, coaching and assistance are available.

Value Rich environments supporting active learning.

Goal: Students learn how to form connections to the established community of practice in a content area.

Method Provide global experts in the content domain as resources for students to use in completing projects.

Effectiveness

Some experts who volunteered to assist students did not respond to student questions in a timely manner, leading to frustration among the students.

Condition:

Global experts must be available, accessible, and willing to provide reliable and timely responses to students.

Effectiveness

Many students expressed reluctance to pose questions to experts (written communication apprehension), since they did not know what to expect from these experts. Initial statements from the experts to the students encouraging dialog may have been helpful.

Condition:

Students must have sufficient content-area experience to be able to communicate effectively with experts on topic issues.

- C108** Bonk, C. J., Fischler, R. B., & Graham, C. R. (2000). Getting smarter on the Smartweb. To appear in D. G. Brown, (Ed.), Teaching and learning with technology: Fifty professors from eight universities tell their stories (pp. 200-205). Anker Publishing.

Value Online Learning Community

Goal: Students learn how to become part of a thoughtful online learning community.

Method Each student uses a pseudonym (avatar) to identify themselves in a publicly viewable portfolio of their posted work.

Effectiveness

The presence of a public audience increased the quality and depth of student posts. Avatars must be non-ascribable in order to preserve student anonymity.

Condition:

Public (or invited) guest access is available. Visitors are willing to "leave their mark" somehow so that students know they have viewed their work.

Method Provide a social discussion space for off-topic conversations.

Effectiveness

Content-only discussions were not enough to create community. Providing an off-topic place that encouraged social dialog helped students form emotional bonds and facilitated community building.

Condition:

Students must interact with their peers often enough to want to engage in non-content-focused social dialog.

Method Require student participation in discussions and other online interactions.

Effectiveness

Providing a "payoff" (grade, etc.) to increase participation, especially during the first few weeks of class, motivated students to participate. This early participation helped students learn the 'new' communication modes and helped form online community.

Condition:

Students must be motivated by extrinsic feedback, such as a grade, to participate, or be willing to participate for other reasons.

Method Use threaded conferences for content-focused discussions which require direct responses to other students' posts as the basis for much of the assigned coursework.

Effectiveness

Students could not "fall asleep" during class. They had to read other posts before they could create meaningful responses. When posts were evaluated in part on relevancy, students put more effort into creating meaningful initial posts and replies.

Condition:

Students have convenient access to the discussions and are willing to participate in discussions frequently.

Goal: Students learn how to expand their learning community to include international participants.

Method Include students from other locations, especially other countries, to engage in dialog about course content.

Effectiveness

The quality of student posts and student generated cases (part of the content for this course) improved with an expanded international audience. International students exhibited more desirable (thoughtful) on-line behavior than did US students.

Condition:

International students are available to participate, and a common language can be used.

- C109** Bullen, M. (1998). Participation and critical thinking in online university distance education. *Journal of Distance Education*, 13(2), 1-32. [Online] Available: <http://cade.icaap.org/vol13.2/bullen.html> Accessed Mar 11, 2001.

Value Student Interaction

Goal: Students will develop critical thinking skills.

Method Instructor responds to all or most of student posts.

Effectiveness

The instructor logged on only 1 or 2 days per week. Most students did not perceive a prompt response to their posts by either the instructor or their peers. This lack of interaction may have contributed to low student interest.

Condition:

Instructor must be able to log on regularly (daily).

Method Require student participation in weekly topical CMC discussions.

Effectiveness

When students posted the day before the discussion ended, there was no chance for true discussion or meaningful interaction. In order for true discussion to take place, there must be a period of time when all students are posting and replying to others.

Condition:

Students are willing to post to the discussion, including replying to others' posts, more than once over the allotted time for the

Effectiveness

Students in this program were used to "monological" content: fact/concept based. They did not participate in discussions very much; in part because they weren't used to this kind of "multilogical" teaching.

Condition:

Students have dedicated time for and convenient access to the CMC discussions.

Effectiveness

Students did not demonstrate the self discipline to participate as the course required them to do. They posted infrequently with very little interaction.

Condition:

Students must appreciate that an online course is different in substantial ways from a traditional course, and must be willing to adjust to different participation and interaction demands.

Effectiveness

There was minimal student interest in the topic, so students did not engage in interactive discussion.

Condition:

Students must be interested in the discussion topics and be willing to thoughtfully discuss course content with each other.

Effectiveness

In this study, active participation was awarded 15% of the class grade. There was no other compelling reason for students to use the discussions. Some of the students sacrificed 15% of their final grade and ignored the discussions completely.

Condition:

There should be relevant instructional reasons for student discussions other than just to receive a participation grade (e.g., collaborative student tasks).

- C110** Vrasidas, C., & McIsaac, S. M. (1999). Factors influencing interaction in an online course. *The American Journal of Distance Education* 13(3), 22-36.

Value Meaningful Interaction and Discourse

Goal: Students learn how to learn through dialogue with each other.

Method Provide a regular mix of face to face and online discussion meetings.

Effectiveness

Occasional face to face meetings met the social needs of these students, leading to reduced online discussion in subsequent weeks. Students viewed the online discussion weeks as "light" weeks.

Condition:

Students must be co-located for face-to-face meetings.

Method Require student participation in a weekly topical CMC discussion.

Effectiveness

A heavy workload led the students to believe this participation requirement was just busy-work. They had already written a paper on the discussion topic during the same week, so they saw no need to discuss the topic online with their peers.

Condition:

Students must have the time available to contribute to discussions and be able to balance other coursework demands.

Method Use a synchronous discussion mode, such as chat, to continue previous asynchronous discussions.

Effectiveness

Students asked "Why talk about it twice?" and did not actively participate in the synchronous discussion.

Condition:

The discussion method (asynchronous or synchronous) fits the discussion purpose and topic. Students are willing and able to use synchronous CMC mode.

Method Use student moderators during weekly CMC discussions.

Effectiveness

The student moderators did not give effective feedback or facilitate discussion among their peers, so there was very little interaction. These discussions were not effective.

Condition:

Students must be willing and able to moderate and facilitate online discussions.

- C111** Burton, W. (1998). Facilitating online learning: Charting the conversation. Paper presented at Teaching in the Community Colleges Online Conference 1998. [Online] Available: <http://leahi.kcc.hawaii.edu/org/tcon98/paper/burton.html> Accessed Mar. 10, 2001.

Value Peer-helping in a supportive learning environment

Goal: Students learn how to help each other understand course concepts.

Method Assign tasks that require peer involvement, such as peer-reviewing of assignment

Effectiveness

Peer-review assignments generated peer discussion and interaction, with the focus of the interaction on student-to-student, and not student-instructor. The resulting assignment submissions were of better quality than those submitted without peer review.

Condition:

Students are willing to participate and provide drafts for review in a timely fashion to their peers.

Effectiveness

Peer-review assignments generated peer discussion and interaction, with the focus of the interaction on student-to-student, and not student-instructor. The resulting assignment submissions were of better quality than those submitted without peer review.

Condition:

Students must be able to reliably exchange files with their peers.

Method Correct or rebuke students through private communication, such as e-mail.

Effectiveness

When the instructor publicly rebuked a student in the weekly discussion, student participation was reduced by 50% the next week.

Condition:

A private communication channel must be available for the rebuke or correction of an individual student.

Method Encourage students to answer technical "help" questions from their peers.

Effectiveness

Overly technical responses to questions in the discussion effectively shut it down. Peer-helping seemed to be better received than instructor-helping, sometimes initiating further discussion among students.

Condition:

Peers must be available, knowledgeable, and willing to offer technical help.

Method Instructor asks direct questions to students to start each weekly online discussion.

Effectiveness

Students didn't respond to general requests at the beginning of each weekly discussion to "discuss X topic", but did respond to direct questions about the topic. The use of effective questioning strategies improved the discussion experience.

Condition:

The instructor must be available at the start of each discussion, or the system must be able to reveal pre-loaded discussion topics (and initial instructor posts) at pre-specified times.

Method Instructor does not answer every student question sent to him or her, but allows fellow students to answer peer questions in the discussion.

Effectiveness

This method led to greater peer interaction. Questions began to be directed to other students rather than to the instructor. A large class provided a large pool of peers to respond to questions, increasing the likelihood of a

Condition:

Students must be available (online frequently) and able to provide answers to peer questions.

response.

Method Instructor set a "light" tone for the conference by the use of humor in initial posts.

Effectiveness

After establishing a pattern of humor in instructor posts, the instructor posted a new assignment without any humor and students assumed the instructor was sad or mad. Student discussion waned for several days.

Condition:

Students must understand the appropriate use of humor in posts.

Method Provide (and model) clear expectations for student discussion behavior.

Effectiveness

Many students were not familiar with appropriate discussion protocol in the online environment. Without explicit guidance, clear expectations, and instructor modeling, they did not engage in effective discussion.

Condition:

The instructor must practice effective online discussion behavior and protocol, and be able to communicate and model this behavior to students.

- C112** Carr-Chellman, A., Dyer, D., & Breman, J. (2000). Burrowing through the network wires: Does distance detract from collaborative authentic learning? *Journal of Distance Education* 15(1). [Online] Available: <http://cade.icaap.org/vol15.1/carr.html>

Value Authentic Problem-based Collaboration

Goal: Students learn how to collaborate to complete a project.

Method Students use shared web pages to construct a group project online.

Effectiveness

Using web pages allowed students to share ideas visually and provided a useful supplement to text based communication.

Condition:

The students must have reliable web server access.

Method Group members discuss project status during scheduled telephone conferences .

Effectiveness

Regular telephone conferences aided group decision-making and facilitated group social processes, improving the group's collaborative efforts.

Condition:

Students must be able to coordinate mutually convenient times, and must have the resources (money, technology) for regular phone conversations.

Method Provide several modes of CMC technology (discussion, chat, etc.) for small groups of 4-5 students to use as they complete a collaborative project.

Effectiveness

Experience using CMC technologies and familiarity with course content were helpful for collaboration. More experienced students implemented a more effective collaborative process.

Condition:

Students are experienced in distance teamwork and have had some experience in the content domain.

Effectiveness

When wide levels of technical skill existed among students in a group, collaboration was difficult, all available collaboration technologies were not be used, and the collaborative process was slow and ineffective.

Condition:

Students in a group should have similar technical skill levels and be trained in the use of the various technologies.

Effectiveness

Teamwork was not effective when some team members lacked self-discipline and overall commitment to the collaborative project.

Condition:

Students must have enough self-discipline to manage their time effectively and be committed to completing the team project.

Method Students and groups meet face-to-face on occasion for collaboration.

Effectiveness

Face-to-face meetings helped students groups collaborate more effectively and improved subsequent distance teamwork.

Condition:

Students are co-located or willing and able to travel to attend face-to-face meetings.

Method Students use shared web pages to construct a group project online.

Effectiveness

Using web pages allowed students to share ideas visually and provided a useful supplement to text based communication.

Condition:

Students must have either web-page building skills or the system must support simple web page construction.

- C113** Chester, A., & Gwynne, G. (1998). Online teaching: Encouraging collaboration through anonymity. *Journal of Computer-Mediated Communication*, 4(2). [Online.] Available: <http://www.ascusc.org/jcmc/vol4/issue2/chester.html> Accessed Sep. 5, 2001.

Value Online Collaborative Learning

Goal: Students learn how to become part of a learning community.

Method Provide an online forum dedicated to non-content-focused "social" discussion.

Effectiveness

Students who personally valued "community" used this space to get to know one another.

Students who did not value community did not use this discussion space.

Condition:

Students must value community among themselves and trust each other.

Method Students interact online using aliases only - no real identities are used.

Effectiveness

Many students who were normally silent in class participated actively in online discussions. Students enjoyed getting to know each other through aliases without the "normal" external complicating factors, such as gender, age, race, and appearance.

Condition:

Students must be willing to use an alias without revealing their true identity. This may be especially challenging if they are co-located and face-to-face meetings are possible.

C114 Carswell, L., Thomas, P., Petre, M., Price, B., & Richards, M. (2000). Distance education via the Internet: the student experience. *British Journal of Educational Technology* 31(1), 29-46.

Value Supporting the Student Experience

Goal: Students learn how to access learning material in the manner most convenient to them.

Method Allow students to view discussions without being forced to contribute.

Effectiveness

Students liked the ability to observe discuss without revealing their presence. They found the discussion board useful to keep track of class events. However, there was only a small percentage of students who actively participated in the discussions.

Condition:

This method requires a large class size.

Method Format course materials and discussion posts so they can be easily downloaded and read off-line.

Effectiveness

Students wanted to keep their phone bills as low as possible, so whenever possible, they downloaded material and prepared discussion responses off-line.

Condition:

The system must support the easy downloading of course material and the easy downloading and uploading of discussion posts.

Method Instructors answer student questions via e-mail.

Effectiveness

Students who previously relied upon phone contact with instructors (tutors) appreciated the freedom to contact the instructor at any time, knowing they would receive an eventual reply, even if not immediately.

Condition:

The instructor must commit to replying to each e-mail query from each student.

Method Provide online tutorial sessions via computer conference augmented by e-mail among students and between the instructor and students.

Effectiveness

Many students who would not normally attend a face to face tutorial (among remote students) participated at some level in the online tutorial. Those who did not actively participate in the tutorial did at least report reading the discussion transcripts.

Condition:

This method requires enough actively participating students to create a meaningful discussion.

Method Provide students with an option to have discussion posts (web-board) emailed directly to them.

Effectiveness

When provided a choice, most students chose the "mail posts" option and used the web-based discussion interface only as an archive of previous posts. They appreciated the promptness and convenience the "e-mail posts" option provided.

Condition:

The discussion system must support the "e-mail posts" option.

Method Provide technical help via telephone.

Effectiveness

This service was crucial during first two weeks of the course for new online students.

Condition:

Adequate telephone support must be available.

C115 Turbill, J. (2001, July/August). A face-to-face graduate class goes online: Challenges and successes. *Reading Online*, 5(1). [Online.] Available: http://www.readingonline.org/international/inter_index.asp?HREF=turbill1/index.html Accessed Aug. 15, 2001.

Value Online Learning Community

Goal: Students learn how to support each other's learning efforts.

Method Use a listserv to provide immediate and convenient access to whole group communication.

Effectiveness

The listserv was effective because students were immediately aware (through e-mail) when another student communicated (posted) to the group, enhancing the feelings of belonging to a larger group. Even communication meant for one-one became one-many.

Condition:

The students read e-mail frequently (at least daily).

Goal: Students learn how to build trusting and caring relationships with each other.

Method Include international students from other cultures in the learning environment.

Effectiveness

Including international students increased the diversity of the learning community, leading to a stronger sense of community.

Condition:

International students with a common language are willing and able to participate in the learning community.

Method Require only a small number of postings to formal online discussions while encouraging socially-focused posts.

Effectiveness

When there were too many required content-focused postings, students did not spend much time online developing interpersonal relationships with their peers and online community did not form.

Condition:

Students must have the time and desire to form interpersonal relationships with their peers.

Method Use a dedicated listserv for social dialog that is not content-focused.

Effectiveness

Students developed interpersonal relationships with each other as they shared their everyday life events with each other.

Condition:

Students are interested in sharing their lives online with the other members of their learning community.

- C116** Jaffee, D. (1999, in press). Asynchronous learning: Technology and pedagogical strategy in a computer-mediated distance learning course. *Teaching Sociology*. [Online.] Available: <http://www.newplatz.edu/~jaffeed/esstsxx.htm> Accessed Sep. 13, 2001.

Value Online Collaborative Learning

Goal: Students learn how to use course discussions to help them learn course content.

Method Ask students to voluntarily provide peer feedback in the discussions.

Effectiveness

Few students provided feedback to peer posts.

Condition:

Students must be willing and able to provide peer feedback without extrinsic motivation (reward for participation).

Goal: Students learn how to interact online with peers and the instructor.

Method Send an e-mail message to each student at the start of class, welcoming and encouraging a quick start, explaining an initial course assignment to "connect" with the group and interact with the instructor through e-mail.

Effectiveness

Most students did not connect with the class and/or the instructor until two to three weeks after the start of the course. The directions in the e-mail message were not followed immediately, delaying effective interaction.

Condition:

Students must be ready (e.g., communication technology is in place) and willing to start class right away.

Goal: Students learn how to think critically about course content.

Method The instructor weaves, organizes and synthesizes students posts at the close of a weekly online discussion (that required the application of course content to real life).

Effectiveness

Students often responded to the instructor's final posts to clarify their previous statements and arguments, providing evidence of effective instructor mediation and students' subsequent critical thinking.

Condition:

Students must be willing to access course discussions after making their initial post in order to view the comments of the instructor (and others) and post a follow-up to these comments.

- C117** Andrusyszyn, M. A., & Davie, L. (1997). Facilitating reflection through interactive journal writing in an online graduate course: A qualitative study. *Journal of Distance Education* 12(1/2), 103-126.

Value Student reflection

Goal: Students learn how to reflect thoughtfully about their own learning.

Method Students share and discuss reflective journals with instructor via e-mail.

Effectiveness

Some students reported that they did not have enough time to create, share, and discuss reflections while they were trying to learn the new technologies used in the online learning environment.

Effectiveness

The level of trust between the student and the instructor influenced the willingness of the student to share personal reflections. A greater level of trust led to greater depth of student reflection.

Condition:

Students must have adequate time available for reflection. Previous experience with technology is helpful.

Condition:

The instructor must be willing and able to establish a high degree of trust with each student.

- C118** Lewis, D. C., Treves, J. A., & Shaindlin, A. B. (1997). Making sense of academic cyberspace: Case study of an electronic classroom. *College Teaching*, 45(3), 96-100.

Value Student-centered Dialogue

Goal: Students learn how to share and debate personal views on course content.

Method Use informal e-mail messages (listserv) to engage participants in a weekly topical dialog.

Effectiveness

The participants were very open in expressing their opinions, inviting questions, and challenging the instructor's positions. Participants used many personal examples to ground the discussion.

Effectiveness

Only 40% of registered participants actually posted to the listserv. Only 15% were active contributors throughout the entire course. Some participants were first time online learners who may have only wanted to "lurk" for familiarization.

Condition:

Participants are willing to share their opinions and open themselves up to critical dialogue.

Condition:

Participants must desire to engage in dialog or else they may choose not to.

- C119** Yakimovicz, A.D., & Murphy, K.L. (1995). Constructivism and collaboration on the Internet: Case study of a graduate class experience. *Computers in Education*, 24(3), 203-209.

Value Learner-centered Collaboration

Goal: Students learn how to use peer collaboration to develop an understanding of instruction in distance education.

Method Encourage and set the expectation for students to help each other with technical problems through e-mail dialog.

Effectiveness

Students formed informal contacts with each other, shared their technical problems with each other, and offered helpful solutions to each other.

Condition:

Students are willing to share problems they have experienced and solutions they have found helpful.

Method Use e-mail and class listserv for students to participate in class discussions and collaborate on team projects.

Effectiveness

Students found the number of messages overwhelming at times and had difficulty allocating the time required for them to read every message and respond when required.

Condition:

Students must be willing and able to access e-mail regularly and be able to manage a large volume of e-mail messages.

C120 Harasim, Linda (1993). Collaborating in cyberspace: Using computer conferences as a group learning environment. *Interactive Learning Environments*, 3(2), 119-30.

Value Online Collaborative Learning

Goal: Students learn how to collaborate on learning activities with their peers.

Method Open and close each topical conference on a published weekly schedule.

Effectiveness

Both students and the instructor appreciated a regular period for posting to a topical discussion. This helped keep the discussion on task and moving ahead. Students posted on average 5-10 messages per week and posted 85-90% of all messages.

Condition:

Both the instructor and the students must be able to dedicate regular time each week to contribute to each conference.

Effectiveness

Both students and the instructor appreciated a regular period for posting to a topical discussion. This helped keep the discussion on task and moving ahead. Students posted on average 5-10 messages per week and posted 85-90% of all messages.

Condition:

The conference system must be reliably accessible at all times.

Method Provide a separate "help desk" conference for the posting of technical problems and questions.

Effectiveness

Students used this conference during the first few weeks of the course; many were reporting a feeling of being "lost in space." After several weeks this conference was rarely used.

Condition:

A knowledgeable person (support staff, instructor, peer, etc.) must be available to monitor and respond to questions asked in the conference.

Effectiveness

Students used this conference during the first few weeks of the course; many were reporting a feeling of being "lost in space." After several weeks this conference was rarely used.

Condition:

Students are able to access the help desk conference in spite of their technical difficulties.

Method Students provide a synthesis of the posts in a weekly topic using the technique of "discussion weaving."

Effectiveness

Students working individually or small groups were able to review and analyze the posts during a weekly discussion and post a synthesis to close out a particular conference.

Condition:

Students must be willing and able to synthesize a week's discussion.

Method Use small-group conference spaces for task specific discussion.

Effectiveness

Large (n>10) group conference generated a large volume of messages and were not useful for decision making or collaborative task completion. Students sometimes turned to chat, phone and face to face meetings instead.

Condition:

Students must be willing to use discussions on a group-agreed basis (schedule, content, etc).

Effectiveness

A large (n>10) group conference generated a large volume of messages and was not useful for decision making or collaborative task

Condition:

The system must support smaller conferences (group spaces).

completion. Students sometimes turned to chat, phone and face to face meetings instead.

- C121** Graham, M., Scarborough, H., & Goodwin, C. (1999). Implementing computer mediated communication in an undergraduate course: A practical experience. *Journal of Asynchronous Learning Networks* 3(1).

Value Online Collaborative Learning

Goal: Students learn how to participate effectively in group discussions.

Method Instructors check access logs and encourage students (who are not contributing to their study group discussions) by e-mail or phone.

Effectiveness

Instructors devoted quite a bit of time in the first few weeks encouraging online interactions, but by the end of the semester, almost all students were regularly participating in the online discussions.

Condition:

Instructors are willing to devote the amount of time required to encourage participation.

Goal: Students learn how to collaborate in each other's learning process.

Method Assess student performance with group evaluation.

Effectiveness

Students engaged in collaborative efforts to complete assigned projects each assumed a part of the overall task. Each group successfully submitted an agreed upon final product after peer review and revision.

Condition:

Each group member must be willing and able to be accountable for their part of the group project.

Effectiveness

Students engaged in collaborative efforts to complete assigned projects each assumed a part of the overall task. Each group successfully submitted an agreed upon final product after peer review and revision.

Condition:

Peers must be willing to critique each other's work.

Method Assign students to study groups of six at the beginning of the course.

Effectiveness

Students chose their own study groups for each 2-week topic. Student isolation was reduced and communication between students and instructors was improved.

Condition:

Students must desire the support of their peers.

Method Provide web-based discussion space for each study group with clear guidelines and expectations for participation.

Effectiveness

Students with reliable access and the skills to use the technology were able to collaborate. When access was unreliable, students became frustrated with each other, with the technology and with the overall program.

Condition:

Reliable access (both server and client side) is available.

Goal: Students learn how to collaborate in small groups.

Method Assign initial students groups on their order of logging in the first time, approximating student grouping by technical interest and skill.

Effectiveness

When students were grouped with others who did not have the same technology interest or skill, unequal participation in group discussion

Condition:

Other student attributes such as gender, age, ethnicity, and educational background are not relevant to group collaboration.

resulted, which led to frustration and poor collaborative efforts.

Method Instructors check access logs and encourage students (who are not contributing to their study group discussions) by e-mail or phone.

Effectiveness

Instructors devoted quite a bit of time in the first few weeks encouraging online interactions, but by the end of the semester, almost all students were regularly participating in the online discussions.

Condition:

Non-participating students must be willing to respond to e-mail or phone messages.

Method Provide web-based discussion space for each study group with clear guidelines and expectations for participation.

Effectiveness

Students with reliable access and the skills to use the technology were able to collaborate. When access was unreliable, students became frustrated with each other, with the technology and with the overall program.

Condition:

Students are willing to use the discussion space(s) for collaborative efforts.

- C122** Ragoonaden, K., & Bordeleau, P. (2000). Collaborative learning via the Internet. *Educational Technology & Society* 3(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2000/d111.html Accessed Sep. 15, 2001.

Value Online Collaborative Learning

Goal: Students learn how to collaborate in small groups to complete projects.

Method Students use e-mail to communicate with each other while collaborating on group projects.

Effectiveness

Students in different time zones and those with varying expectations of work pace were often frustrated when working with collaborators who did not meet their expectations of quick message replies. A synchronous communication tool might have helped.

Condition:

Students must be willing to set and work to agreed expectations. Instructor must be able to identify and facilitate group communication patterns.

Method Students work in small groups to complete a joint project which requires communication and file sharing among group members.

Effectiveness

Technical difficulties hampered communication and prevented the sharing of some files. Commonly, students were not familiar with basic word processing and internet communication tools.

Condition:

Students must be competent in the use of basic or common word processing and internet communication software such as web browsers and e-mail programs (basic technical skills).

Effectiveness

Some autonomous students preferred working independently. They expressed frustration at holding up their own work schedule waiting for their peers. Contributing factors were personal work schedules and family commitments.

Condition:

Students are willing to work together in a collaborative environment.

Effectiveness

Some autonomous students preferred working independently and did not consider collaboration to be a necessary aspect for completing the task.

Condition:

The content and learning objectives require true collaborative effort in order to achieve the desired learning.

- C123** Murphy, K. L., Mahoney, S. E., & Harvell, T. J. (2000). Role of contracts in enhancing community building in web courses. *Educational Technology & Society* 3(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2000/e03.html

Value Online Learning Community

Goal: Students learn how to collaborate on small group projects.

Method Assign collaborative tasks to small groups of students.

Effectiveness

Students must be ready to accept the technology used to create the learning environment and be able to function in a learning environment that is much more learner-centered than "regular" classes.

Condition:

Students must be willing and technically able to participate actively.

Method Collaborative groups develop a learning contract using synchronous (or face to face) communication modes.

Effectiveness

This learning contract was used to establish and agree upon group behavior, interaction, and communication protocols, member roles, and contingency plans.

Condition:

Group members must be willing to abide by the terms of the contract.

Effectiveness

This learning contract was used to establish and agree upon group behavior, interaction, and communication protocols, member roles, and contingency plans.

Condition:

Students are able to meet to synchronously or face-to-face to create learning contract prior to the start of asynchronous collaboration.

Method Instructor facilitates synchronous "conflict resolution" sessions with group members as needed.

Effectiveness

Students wanted the instructor to be the final arbitrator in conflict situations. The point of instructor arbitration should be specified in the learning contract. Using synchronous chat, the instructor was able to help group members resolve conflict.

Condition:

Students must be willing to accept arbitration decisions.

Effectiveness

Students wanted the instructor to be the final arbitrator in conflict situations. The point of instructor arbitration should be specified in the learning contract. Using synchronous chat, the instructor was able to help group members resolve conflict.

Condition:

Synchronous communication (e.g., chat) must be available for all group members.

Effectiveness

Students wanted the instructor to be the final arbitrator in conflict situations. The point of instructor arbitration was specified in the learning contract. Using synchronous chat, the instructor was able to help group members resolve conflict.

Condition:

The instructor must have conflict-resolution skills.

- C124** Matuga, J. (2001). Electronic pedagogical practice: The art and science of teaching and learning on-line. *Educational Technology & Society* 4(3). [Online.] Available: http://ifets.ieee.org/periodical/vol_3_2001/matuga.html Accessed Oct. 1, 2001.

Value Online Learning Community

Goal: Students experience "ownership" of group discussions.

Method Direct comments and feedback within a group discussion space to the entire group even if only one student was asking for commentary.

Effectiveness

When comments and feedback were directed to individuals, students stopped responding to their peers and focused on interactions with the instructor. However, some students still expected personal instructor commentary and individual attention.

Condition:

Students must be willing to interact with the instructor as a group, and not as a collection of individuals. They must accept a group identity.

Goal: Students learn how to create a learning community.

Method Form semester-long teams of students in groups of 4-6.

Effectiveness

Students formed strong emotional bonds with team members over the semester, often arranging face to face meetings at the end of semester on their own initiative.

Condition:

Students must be willing and able to work with the same group of students for an entire semester.

Goal: Students learn how to participate effectively in online discussions.

Method Provide team workspace for on-line discussions, chat, and file sharing.

Effectiveness

Teams used these spaces for collaboration throughout the course.

Condition:

The system must support team workspaces.

Method Use synchronous on-line debates for inter-group interaction on specific topics.

Effectiveness

Students who did not understand how to engage in debate rhetoric did not challenge each other or create warranted arguments, leading to dull, ineffective interaction.

Condition:

Students have debate skills or are willing and able to acquire debate skills. [More than one debate opportunity may be needed.]

- C125** Curtis, D. D., & Lawson, M. J. (2001). Exploring collaborative online learning. *The Journal of Asynchronous Learning Networks* 5(1). [Online.] Available: http://www.aln.org/alnweb/journal/Vol5_issue1/Curtis/curtis.htm Accessed Sep. 27, 2001.

Value Online collaborative learning

Goal: Students learn how to collaborate with their peers.

Method Provide a CMC tool that supports multiple modes of communication, both synchronous and asynchronous, such as: chat, discussion, group e-mail, and file sharing.

Effectiveness

Using one tool provided a consistent interface and convenient access to multiple communication modes. Students were not sure how to use each mode of the tool appropriately, however. The interface seemed to favor certain communication modes.

Condition:

The CMC tool provides equitable (equivalent) access to each mode of communication and provides sufficient guidance on how and when to use each mode.

Method Provide a means to upload files to group on-line workspace.

Effectiveness

Most students simply attached files to group e-mail messages and did not use the on-line file sharing feature. Initially, on-line file sharing was used to post first drafts of group documents, but revisions were exchanged as e-mail attachments.

Condition:

Students must be able (skill, access) and willing to use the file sharing space.

Method Provide an online discussion space for small groups of students to use for collaborative activities.

Effectiveness

Students did not use the discussion board very often. The system provided a more convenient method to send group e-mail than to access the group discussion. The discussion was useful as a threaded archive of previous

Condition:

The system must support group discussions with the same (or better) convenience of other communication modes.

Method Require students to complete collaborative tasks using asynchronous communication tools such as discussion boards and e-mail.

Effectiveness

Students expressed frustration when group members did not fulfill work schedule expectations. For some, family and work commitments impacted their on-line work.

Condition:

Students must be willing and able to complete course work on an agreed upon schedule.

Goal: Students learn how to resolve conflicts of opinion among their peers.

Method Provide a method for synchronous personal communication between students such as chat, phone, or facsimile (fax).

Effectiveness

Students chose personal modes of communication, primarily chat, to resolve conflicts with group members, or to discuss ongoing group conflict. Resolving these differences "off-line" helped maintain a sense of collaboration and "team" on-line.

Condition:

System must support synchronous communication, or students must have access to other modes of synchronous communication such as phone or fax.

- C126** Orey, M., & Kim, B. (2001). Blended learning: What do they use in an online Introduction to Computers for Teachers class? Paper presented at WebNet 2001, Orlando, FL.

Value Creating a virtual classroom

Goal: Students will experience a "virtual" classroom learning environment.

Method Use a synchronous, virtual classroom with presentation slides, streaming audio, and text CHAT for regular live class sessions online.

Effectiveness

Students enjoyed this format, reporting that they felt more connected to the instructor when they were able to hear his voice. However, slow dial-up connections, incorrect software settings, and unreliable server connections caused intermittent problems.

Condition:

Reliable network audio technologies (server, software, hardware, and technical support) must be available and accessible.

Method Use a virtual classroom session for instructor feedback and live, summative class discussion about project ideas.

Effectiveness

The instructor was only able to read about 200 of 1200 student project idea discussion posts throughout the semester. Students created a synthesis post for the instructor, summarizing the peer discussion about their

Condition:

Students are able to create a synthesis of the online discussion regarding their project idea.

Effectiveness

The instructor was only able to read about 200 of 1200 student project idea discussion posts throughout the semester. Students created a synthesis post for the instructor, summarizing the peer discussion about their

Condition:

Students must be willing and able to attend the live online session.

Value Individualized instruction

Goal: Students learn how to ask for and utilize individual help from the instructor.

Method Use synchronous chat for live instructor office hours.

Effectiveness

In three semesters, only two students ever showed up online for discussions with the instructor. The instructor will not use this method again.

Condition:

Students must have the desire and ability to meet online at a pre-specified time to discuss class-related issues with the instructor.

Value Open discussion

Goal: Students learn how to ask questions freely in a live virtual classroom.

Method Student questions are presented anonymously by the instructor in the live virtual classroom sessions.

Effectiveness

Students used a software feature to send questions to the instructor. Students felt more free to ask "stupid" questions. They were less worried about what their peers might think about their question.

Condition:

The classroom software must support the ability to conceal the identity of student questioners from the rest of the students in the class.

Value Peer helping

Goal: Students learn how to help each other complete course projects.

Method Provide a web-based discussion board for students to post project ideas and provide peer feedback on other's projects.

Effectiveness

This discussion approach was very effective. Over the course of the project timeframe, each project idea thread received an average of 16 messages. Virtually all students projects were shaped by these discussions.

Condition:

Students must be willing to read, critique, and share feedback about several peer project ideas.

C127 Rada, R. (1998). Efficiency and effectiveness in computer-supported peer-peer learning. *Computers Education* 30(3/4), pp.137-146.

Value Peer-peer interaction

Goal: Students learn how to help each other learn.

Method Students are required to post one exercise submission and at least one peer comment for each course topic. Participation is rewarded through the course grading policy.

Effectiveness

The level of student participation increased as the course progressed, though the depth of comments may have decreased. Students were able to significantly improve their grade by increasing their participation without regard to the quality of their posts.

Condition:

Students are motivated by grades.

Effectiveness

This method resulted in over 2600 peer-generated listserv posts throughout the course, a ten-fold increase over previous course offerings.

Condition:

The system must be able to track student participation.

Method Students post weekly exercise solutions on the course website for their peers to review and comment upon in the course listserv.

Effectiveness

During the course, only 5 of 247 listserv posts included peer feedback on exercise solutions. This method did not create any significant peer interaction.

Condition:

Students must be willing and able to review peer coursework and offer feedback on a timely basis.

Effectiveness

Since students were allowed to post late exercise solutions, often several weeks after the scheduled due date for the assignment, many weekly assignments were not posted until the last weeks of the course, precluding effective peer review and feedback.

Condition:

Students must post assignments on time and access the course website regularly to review peer work and offer feedback.

- C128** Adelskold, G., Aleklett, K., Axelsson, R., and Blomgren, J. (1999). Problem-based distance learning of energy issues via computer network. *Journal of Distance Education*, 20(1) pp. 129-143.

Value Problem-based learning

Goal: Students learn how to collaborate using the PBL process.

Method Provide an asynchronous discussion space for collaborative groups.

Effectiveness

This method proved to be very inefficient, requiring several days of discussion for groups just to reach agreement on moving on from step to step.

Effectiveness

Since all students in this course were all employed fulltime and completed coursework in their "free" time, it was virtually impossible for all of them to log in simultaneously. Many students had difficulty finding the time to participate frequently.

Effectiveness

Some students did not participate regularly, which delayed their group for several days while they waited for group consensus before moving on to the next phase of the problem solving process.

Condition:

Students are able to participate in the discussion frequently and regularly (at least daily).

Condition:

Students have the time available to complete collaborative coursework and participate in group discussions.

Condition:

Students must agree and meet group expectations for participation frequency and coursework progress.

C129 Eggers, M. R. (1999). Web-based courses in higher education: Creating active learning environments. Unpublished doctoral dissertation. Andrews University.

Value Active Learning

Goal: Students learn how to become actively engaged in regular small group learning interactions.

Method Form discussion groups with a mix of student discipline backgrounds (Computer Science and Biology).

Effectiveness

Including students with both of the major content disciplines in each discussion group provided a broad basis for discussion and helped ensure that all major aspects of course assignments and topics were discussed.

Condition:

Sufficient students with varying academic background are available to distribute equitably among discussion groups.

Method Form student discussion groups by time zone.

Effectiveness

Grouping students by time zones made it more convenient for all students in the group to meet at the scheduled time.

Condition:

Students are able to meet at the scheduled time.

Method Post transcripts of discussion group meetings for student review and further topical discussion during the following week.

Effectiveness

Since some students were not able to meet at the scheduled time, it was very valuable to have a transcript of the discussion group meeting available for review and further discussion. Some discussion topics were pursued further by the group via e-mail.

Condition:

The system must allow the accessible posting of synchronous discussion transcripts.

Method Schedule weekly synchronous small group discussions to discuss course assignments and related topics.

Effectiveness

Scheduled, synchronous meetings helped students keep on task by providing a regular stimulus to motivate their assignment progress. Instructors were successful in encouraging student participation throughout each study group session.

Condition:

Students are willing to prepare for and attend scheduled meetings.

Goal: Students learn how to keep abreast of the major topics of discussion among the students in the other discussion groups.

Method Each study group sends a periodic intergroup summary report to the other groups, highlighting the major topics of their own discussion and important conclusions they may have reached.

Effectiveness

Intergroup summary reports provided an opportunity for each student to keep up with the major topics of discussion and the "rich discoveries" of the students in the other discussion groups.

Condition:

Students are willing and able to summarize their group discussion.

Goal: Students learn how to become part of a learning community that extends beyond the formal class members.

Method Provide synchronous, interactive guest lectures from distinguished researchers.

Effectiveness

During the lecture, students were able to discuss information and engage outside experts which were not normally available to them. Lecturers were successful in involving students in the lectures through interactive questioning practices.

Effectiveness

During the lecture, students were able to discuss information and engage outside experts which were not normally available to them. Lecturers were successful in involving students in the lectures through interactive questioning practices.

Effectiveness

During the lecture, students were able to discuss information and engage outside experts which were not normally available to them. Lecturers were successful in involving students in the lectures through interactive questioning practices.

Condition:

Lecturers are willing and able to use interactive questioning techniques in a synchronous online environment to engage students during a lecture.

Condition:

Outside experts are available.

Condition:

Outside experts can meet at the scheduled meeting time.

- C130** Dennen, V. P. (2001). The design and facilitation of asynchronous discussion activities in Web-based courses: Implications for instructional design theory. (Doctoral dissertation, Indiana University, August, 2001). DAI, 62/02, p. 536, August 2001.

Value Self-directed learning

Goal: Students learn how to engage in thoughtful dialogue with each other.

Method Provide weekly feedback to each student regarding their participation in course discussions.

Effectiveness

Students were able to receive feedback about their posts, contributing to an overall high quality of posts in the discussions.

Condition:

Instructor has the time to read, evaluate, and generate feedback to each student each week.

Method Students participate in topical discussions as a core (fixed) part of one specific discussion group and as a rotating (temporary) member of one other discussion group.

Effectiveness

Student posts responding to others' posts were thoughtful and frequent. Most students surpassed the pre-specified interaction requirements. The questions used did not require significant student-student interactivity.

Condition:

Students are willing and able to participate regularly in group discussions early enough in the allotted timeframe to allow for interaction.

Effectiveness

Student posts to the forum were focused on course content and were completed within the time guidelines established by the instructor. Some students did not value the content discussion activities, while others enjoyed them.

Condition:

Students are willing to participate thoughtfully in discussions.

Method Use instructor-generated prompts to begin weekly student-student discussions.

Effectiveness

Carefully crafted discussion prompts were effective in initiating useful and non-redundant student responses.

Condition:

Instructor is able to create effective discussion prompts.

Goal: Students learn how to determine their own progress in the course.

Method Instructor communicates weekly with all students as a group using the web-based "instructor communication center."

Effectiveness

The weekly message from the instructor helped students assess whether they were making sufficient course progress on a regular basis.

Condition:

Students must access website weekly.

Method Instructor communicates with students via e-mail throughout the course.

Effectiveness

Students corresponded with the instructor frequently regarding course assignments.

Condition:

Students must be able to use e-mail reliably.

Appendix F. Values by Classification

Collaboration

Value	Authentic Problem-based Collaboration	Case#	C112
Value	Learner-centered Collaboration	Case#	C119
Value	Learner-centered collaboration in rich environments supporting active	Case#	C107
Value	Online Collaborative Learning	Case#	C101
		Case#	C103
		Case#	C113
		Case#	C116
		Case#	C120
		Case#	C121
		Case#	C122
		Case#	C125

Community

Value	Online Learning Community	Case#	C102
		Case#	C105
		Case#	C108
		Case#	C115
		Case#	C123
		Case#	C124

Interactive dialogue

Value	Dialog and discussion	Case#	C106
Value	Meaningful Interaction and Discourse	Case#	C110
Value	Open discussion	Case#	C126
Value	Peer-peer interaction	Case#	C127
Value	Student Interaction	Case#	C109
Value	Student reflection	Case#	C117
Value	Student-centered Dialogue	Case#	C118

Learning theory

Value	Active Learning	
	Case#	C129
Value	Discovery learning	
	Case#	C104
Value	Problem-based learning	
	Case#	C128
Value	Rich environments supporting active learning.	
	Case#	C107
Value	Self-directed learning	
	Case#	C130

Support

Value	Individualized instruction	
	Case#	C126
Value	Peer helping	
	Case#	C126
Value	Peer-helping in a supportive learning environment	
	Case#	C111
Value	Supporting the Student Experience	
	Case#	C114

Virtual classroom

Value	Creating a virtual classroom	
	Case#	C126

Appendix G. Goals by Classification

Collaboration

- Goal:** Students develop shared meaning.
Case#: C103
- Goal:** Students learn from each other.
Case#: C103
- Goal:** Students learn how to become actively engaged in regular small group learning interactions.
Case#: C129
- Goal:** Students learn how to collaborate in each other's learning process.
Case#: C121
- Goal:** Students learn how to collaborate in each other's learning.
Case#: C102
- Goal:** Students learn how to collaborate in small groups.
Case#: C121
Case#: C122
- Goal:** Students learn how to collaborate on learning activities with their peers.
Case#: C120
- Goal:** Students learn how to collaborate on small group projects.
Case#: C122
Case#: C123
- Goal:** Students learn how to collaborate to complete a project.
Case#: C112
- Goal:** Students learn how to collaborate using the PBL process.
Case#: C128
- Goal:** Students learn how to collaborate with peers as they learn.
Case#: C101

Goal: Students learn how to collaborate with their peers.

Case#: C104

Case#: C125

Goal: Students learn how to control the design and content of their learning.

Case#: C101

Goal: Students learn how to help each other complete course projects.

Case#: C126

Goal: Students learn how to help each other learn.

Case#: C127

Goal: Students learn how to help each other understand course concepts.

Case#: C111

Goal: Students learn how to solve problems and make decisions as a group.

Case#: C106

Goal: Students learn how to use peer collaboration to develop an understanding of instruction in distance education.

Case#: C119

Goal: Students will learn how to collaborate with the instructor and their peers.

Case#: C101

Community

Goal: Students learn how to become part of a learning community that extends beyond the formal class members.

Case#: C129

Goal: Students learn how to become part of a thoughtful online learning community.

Case#: C108

Goal: Students learn how to build trusting and caring relationships with each other.

Case#: C115

Goal: Students learn how to create a learning community.

Case#: C105

Case#: C124

Goal: Students learn how to expand their learning community to include international participants.

Case#: C108

Goal: Students learn how to form connections to the established community of practice in a content area.

Case#: C107

Goal: Students learn how to support each other's learning efforts.

Case#: C115

Goal: Students will learn how to become part of a learning community.

Case#: C113

Critical thinking

Goal: Students learn how to think critically about course content.

Case#: C116

Goal: Students will develop critical thinking skills.

Case#: C109

Critical thinking - reflection

Goal: Students learn how to reflect thoughtfully about their own learning.

Case#: C117

Discussion

Goal: Students learn how to ask questions freely in a live virtual classroom.

Case#: C126

Goal: Students learn how to contribute freely and openly to weekly class discussions.

Case#: C105

Goal: Students learn how to determine their own progress in the course.

Case#: C130

Goal: Students learn how to engage in dialogic learning processes.

Case#: C106

Goal: Students learn how to engage in dialogue with their peers and the instructor.

Case#: C106

Goal: Students learn how to engage in meaningful online discussions.

Case#: C105

Goal: Students learn how to engage in thoughtful dialogue with each other.

Case#: C130

Goal: Students learn how to interact online with peers and the instructor.

Case#: C116

Goal: Students learn how to keep abreast of the major topics of discussion among the students in the other discussion groups.

Case#: C129

Goal: Students learn how to learn through dialogue with each other.

Case#: C110

Goal: Students learn how to participate effectively in group discussions.

Case#: C121

Goal: Students learn how to participate effectively in online discussions.

Case#: C124

Goal: Students learn how to participate in an engaging online discussion.

Case#: C102

Goal: Students learn how to share and debate personal views on course topics.

Case#: C118

Goal: Students learn how to use course discussions to help them learn course content.

Case#: C116

Goal: The instructor maintains active communication with students.

Case#: C130

Miscellaneous - individual support

Goal: Students learn how to ask for and utilize individual help from the instructor.

Case#: C126

Miscellaneous - resolve conflict

Goal: Students learn how to resolve conflicts of opinion among their peers.

Case#: C125

Miscellaneous - self sufficient

Goal: Students learn how to be self-sufficient information users.

Case#: C107

Miscellaneous - virtual classroom

Goal: Students will experience a "virtual" classroom learning environment.

Case#: C126

Student control

Goal: Students experience "ownership" of group discussions.

Case#: C124

Goal: Students learn how to access learning material in the manner most convenient to them.

Case#: C114

Goal: Students learn how to control part of their learning process.

Case#: C102

Goal: Students learn how to control the design and content of their learning.

Case#: C101

Case#: C102

Appendix H. Methods by Classification

Synchronicity	Interactivity	Pedagogy	Method	Case#
Asynchronous	Group			
		Collaboration		
			Assign collaborative tasks to small groups of students.	C123
			Provide an online discussion space for small groups of students to use for collaborative activities.	C125
			Students work in small groups to complete a joint project which requires communication and file sharing among group members.	C122
		Discussion		
			Direct comments and feedback within a group discussion space to the entire group even if only one student was asking for commentary.	C124
			Each study group sends a periodic intergroup summary report to the other groups, highlighting the major topics of their own discussion and important conclusions they may have reached.	C129
			Post transcripts of discussion group meetings for student review and further topical discussion during the following week.	C129
			Provide an asynchronous discussion space for collaborative groups.	C128
			Provide web-based discussion space for each study group with clear guidelines and expectations for participation.	C121

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Require students to complete collaborative tasks using asynchronous communication tools such as discussion boards and e-mail.	C125
			Require students to work on a collaborative task within a closed group discussion forum.	C103
			Students participate in topical discussions as a core (fixed) part of one specific discussion group and as a rotating (temporary) member of one other discussion group.	C130
			Use e-mail and class listserv for students to participate in class discussions and collaborate on team projects.	C119
			Use instructor-generated prompts to begin weekly student-student discussions.	C130
			Use small-group conference spaces for task specific discussion.	C120
		File Exchange	Provide a means to upload files to group on-line workspace.	C125
			Students use shared web pages to construct a group project online.	C112
		Other - E-mail	Students use e-mail to communicate with each other while collaborating on group projects.	C122
	Instructor-student	Discussion	Instructor asks direct questions to students to start each weekly online discussion.	C111

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Instructor opens discussion with a question, and closes the discussion after a specified time with a summary post.	C103
			Instructor responds to all or most of student posts.	C109
			Instructor set a "light" tone for the conference by the use of humor in initial posts.	C111
			Provide (and model) clear expectations for student discussion	C111
			Provide students with an option to have discussion posts (web-board) emailed directly to them.	C114
			The instructor weaves, organizes and synthesizes students posts at the close of a weekly online discussion (that required the application of course content to real life).	C116
			Use computer-mediated-communication for instructor-student and student-student communication.	C101
		File Exchange		
			Format course materials and discussion posts so they can be easily downloaded and read off-line.	C114
			Provide a class file transfer protocol (FTP) site for file exchange.	C104
		Other - Broadcast Message		
			Instructor communicates weekly with all students as a group using the web-based "instructor communication center."	C130
		Other - E-mail		
			Instructors answer student questions via e-mail.	C114

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Send an e-mail message to each student at the start of class, welcoming and encouraging a quick start, explaining an initial course assignment to 'connect" with the group and interact with the instructor.	C116
			Students share and discuss reflective journals with instructor via e-mail	C117
		Other - E-mail/Listserv	Broadcast course announcements via listserv.	C104
		Personal Communication	Correct or rebuke students through private communication, such as	C111
			Instructor communicates with students via e-mail throughout the	C130
			Instructor checks access logs and encourages students (who are not contributing to their study group discussions) by e-mail or phone.	C121
		Review and Feedback	Provide weekly feedback to each student regarding their participation in course discussions.	C130
	Other - Mixed	Collaboration	Provide multiple technologies (e-mail, listserv, webpages) to support online community.	C107
	Student-external expert	Collaboration	Provide global experts in the content domain as resources for students to use in completing projects.	C107

Synchronicity	Interactivity	Pedagogy	Method	Case#
		Discussion	Include students from other locations, especially other countries, to engage in dialog about course content.	C108
		Review and Feedback	Each student uses a pseudonym (avatar) to identify themselves in a publicly viewable portfolio of their posted work.	C108
	Student-student	Collaboration	Each student prepares and moderates one class discussion with one peer.	C101
		Discussion	Allow students to create their own discussion topics or move an emergent thread into it's own discussion space.	C105
			Allow students to view discussions without being forced to	C114
			Assign each student as a moderator for a discussion topic they create.	C102
			Include international students from other cultures in the learning environment.	C115
			Instructor does not answer every student question sent to him or her, but allows fellow students to answer peer questions in the	C111
			Open and close each topical conference on a published weekly	C120
			Require student participation in a weekly topical CMC discussion.	C110
			Require student participation in discussions and other online activities.	C108
			Require student participation in weekly topical CMC discussions.	C109

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Require student's weekly participation in CMC discussions.	C102
			Students are required to choose a discussion topic and then prepare and moderate a weekly discussion on that topic for the entire class.	C101
			Students discuss weekly course topics in a CMC discussion.	C105
			Students provide a synthesis of the posts in a weekly topic using the technique of "discussion weaving."	C120
			Use informal e-mail messages (listserv) to engage participants in a weekly topical dialog.	C118
			Use student moderators during weekly CMC discussions.	C110
			Use synchronous on-line debates for inter-group interaction on specific topics.	C124
			Use threaded conferences for content-focused discussions which require direct responses to other students' posts as the basis for much of the assigned coursework.	C108
		Discussion - Anonymous		
			Students interact online using aliases only - no real identities are used.	C113
		File Exchange		
			Provide a space for students to create their own web pages in order for them to share information and exchange files with other students.	C104
			Students use shared web pages to construct a group project online.	C112

Synchronicity	Interactivity	Pedagogy	Method	Case#
		Other - anonymity	Assign one student to the role of an instigator using a pseudonym (false identity).	C102
		Other - E-mail	Students use e-mail to turn in assignments and coordinate group project work.	C104
			Use a listserv to provide immediate and convenient access to whole group communication.	C115
		Review and Feedback	Ask students to voluntarily provide peer feedback in the discussions.	C116
			Assign tasks that require peer involvement, such as peer-reviewing of assignment drafts.	C111
			Provide a web-based discussion board for students to post project ideas and provide peer feedback on other's projects.	C126
			Students are required to post one exercise submission and at least one peer comment for each course topic. Participation is rewarded through the course grading policy.	C127
			Students post weekly exercise solutions on the course website for their peers to review and comment upon in the course listserv.	C127
		Social	Provide a social discussion space for off-topic conversations.	C108
			Provide an online forum dedicated to non-content-focused 'social' discussion.	C113

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Require only a small number of postings to formal online discussions while encouraging socially-focused posts.	C115
			Use a dedicated listserv for social dialog that is not content-focused.	C115
		Technical Support		
			Encourage and set the expectation for students to help each other with technical problems through e-mail dialog.	C119
			Encourage students to answer technical "help" questions from their peers.	C111
			Provide a separate "help desk" conference for the posting of technical problems and questions.	C120
Mixed				
	Group			
		Collaboration		
			Provide a CMC tool that supports multiple modes of communication, both synchronous and asynchronous, such as: chat, discussion, group e-mail, and file sharing.	C125
			Provide several modes of CMC technology (discussion, chat, etc.) for small groups of 4-5 students to use as they complete a group project.	C112
			Provide team workspace for on-line discussions, chat, and file exchange.	C124
	Instructor-student			
		Discussion		
			Provide a regular mix of face to face and online discussion meetings.	C110

Synchronicity	Interactivity	Pedagogy	Method	Case#
	Student-student	Discussion	Provide online tutorial sessions via computer conference augmented by e-mail among students and between the instructor and students.	C114
Other	Group	Collaboration	Assess student performance with group evaluation.	C121
			Assign students to study groups of six at the beginning of the course.	C121
			Form semester-long teams of students in groups of 4-6.	C124
		Discussion	Assign initial students groups on their order of logging in the first time, approximating student grouping by technical interest and skill.	C121
	Instructor-student	Other - Group Exercises	Assign structured group exercises before unstructured group exercises.	C105
Synchronous	Group	Collaboration	Students and groups meet face-to-face on occasion for collaboration.	C112

Synchronicity	Interactivity	Pedagogy	Method	Case#
		Discussion	Collaborative groups develop a learning contract using synchronous (or face to face) communication modes.	C123
			Form discussion groups with a mix of student discipline backgrounds (Computer Science and Biology).	C129
			Form student discussion groups by time zone.	C129
			Group members discuss project status during scheduled telephone conferences .	C112
			Instructor facilitates synchronous "conflict resolution" sessions with group members as needed.	C123
			Prepare students for chat sessions by meeting together via videoconference or in-person if possible.	C106
			Provide access to chat software for small groups to use as they collaborate and continue dialogue started during whole class discussions.	C106
			Schedule weekly synchronous small group discussions to discuss course assignments and related topics.	C129
			Use Internet Relay Chat (IRC or chat) in project groups for group coordination, clarification and decision-making.	C104
	Instructor-student	Discussion	Conduct large group discussions using synchronous CMC - chat.	C106
			Use synchronous chat for live instructor office hours.	C126

Synchronicity	Interactivity	Pedagogy	Method	Case#
			Virtual Classroom	
			Student questions are presented anonymously by the instructor in the live virtual classroom sessions.	C126
			Use a synchronous, virtual classroom with presentation slides, streaming audio, and text CHAT for regular live class sessions online.	C126
			Use a virtual classroom session for instructor feedback and live, summative class discussion about project ideas.	C126
	Student-external expert			
		Discussion		
			Provide synchronous, interactive guest lectures from distinguished researchers.	C129
			Technical Support	
			Provide technical help via telephone.	C114
	Student-student			
		Collaboration		
			Provide chat as a tool for synchronous communication between collaborative pairs of students.	C102
		Discussion		
			Use a synchronous discussion mode, such as chat, to continue previous asynchronous discussions.	C110
			Personal Communication	
			Provide a method for synchronous personal communication between students such as chat, phone, or facsimile (fax).	C125

Appendix I. Conditions by Class

Focus	Detail	Condition	Case#
External Resource	Access	International students are available to participate, and a common language can be used.	C108
		International students with a common language are willing and able to participate in the learning community.	C115
		Outside experts are available.	C129
		Students must be able to coordinate mutually convenient times, and must have the resources (money, technology) for regular phone conversations.	C112
	Features	Public (or invited) guest access is available. Visitors are willing to "leave their mark" somehow so that students know they have viewed their work.	C108
	Motivation	Global experts must be available, accessible, and willing to provide reliable and timely responses to students.	C107
	Skills and Ability	Lecturers are willing and able to use interactive questioning techniques in a synchronous online environment to engage students during a lecture.	C129
	Synchronicity	Outside experts can meet at the scheduled meeting time.	C129

Focus	Detail	Condition	Case#
	Technical Support		
		A knowledgeable person (support staff, instructor, peer, etc.) must be available to monitor and respond to questions asked in the conference.	C120
		Adequate telephone support must be available.	C114
Instructor			
	Background		
		Instructors with more experience in using CMC found it easier to allow students to choose topics and moderate discussions than did instructors without much CMC experience.	C101
	Motivation		
		The instructor must be willing and able to establish a high degree of trust with each student.	C117
	Other - Class Size		
		The number of students and assignments must be small in order to keep the volume of e-mail at a manageable level.	C104
	Skills and Ability		
		Instructor is able to create effective discussion prompts.	C130
		The instructor must have conflict-resolution skills.	C123
	Skills and Ability - Content		
		The instructor must practice effective online discussion behavior and protocol, and be able to communicate and model this behavior to students.	C111
	Synchronicity		
		The instructor must be available at the start of each discussion, or the system must be able to reveal pre-loaded discussion topics (and initial instructor posts) at pre-specified times.	C111

Focus	Detail	Condition	Case#
	Time	Instructor has the time to read, evaluate, and generate feedback to each student each week.	C130
		Instructor must be able to log on regularly (daily).	C109
		Instructors are willing to devote the amount of time required to encourage participation.	C121
		The instructor must commit to replying to each e-mail query from each student.	C114
	Values	The instructor must be willing to give up some control over the discussion.	C102
		There must be a trusting relationship between the student(s) and the instructor(s).	C101
Other			
	Class Size	This method requires a large class size.	C114
		This method requires enough actively participating students to create a meaningful discussion.	C114
Other - Content			
	Features	Group tasks that require electronic interaction, coaching, and assistance are available.	C107
		The content and learning objectives require true collaborative effort in order to achieve the desired learning.	C122
		The discussion method (asynchronous or synchronous) fits the discussion purpose and topic. Students are willing and able to use synchronous CMC mode.	C110
		There should be relevant instructional reasons for student discussions other than just to receive a participation grade (e.g., collaborative student tasks).	C109

Focus	Detail	Condition	Case#
Student	Access	Students must access website weekly.	C130
	Background	Other student attributes such as gender, age, ethnicity, and educational background are not relevant to group collaboration.	C121
		Students are experienced in distance teamwork and have had some experience in the	C112
		Students have widely dissimilar backgrounds.	C105
		Students must have sufficient content-area experience to be able to communicate effectively with experts on topic issues.	C107
		Students should have similar professional or academic interests and backgrounds.	C105
		Sufficient students with varying academic background are available to distribute equitably among discussion groups.	C129
	Location	Students are co-located or willing and able to travel to attend face-to-face meetings.	C112
		Students must be co-located for face-to-face meetings.	C110
	Location, Synchronicity	Students must be able to meet either via videoconference or in-person.	C106
	Motivation	Each group member must be willing and able to be accountable for their part of the group project.	C121
		Each student must be committed to the success of the discussion and be willing to do their share.	C101

Focus	Detail	Condition	Case#
		Group members must be willing to abide by the terms of the contract.	C123
		Non-participating students must be willing to respond to e-mail or phone messages.	C121
		Participants are willing to share their opinions and open themselves up to critical dialogue.	C118
		Participants must desire to engage in dialog or else they may choose not to.	C118
		Peers must be willing to critique each other's work.	C121
		Students are motivated by grades.	C127
		Students are willing and able to summarize their group discussion.	C129
		Students are willing to participate and provide drafts for review in a timely fashion to their peers.	C111
		Students are willing to participate in discussions frequently.	C102
		Students are willing to participate thoughtfully in discussions.	C130
		Students are willing to post to the discussion, including replying to others' posts, more than once over the allotted time for the discussion.	C109
		Students are willing to prepare for and attend scheduled meetings.	C129
		Students are willing to share problems they have experienced and solutions they have found with their peers.	C119
		Students are willing to use the discussion space(s) for collaborative efforts.	C121
		Students are willing to work together in a collaborative environment.	C122
		Students have convenient access to the discussions and are willing to participate in discussions frequently.	C108
		Students must agree and meet group expectations for participation frequency and coursework progress.	C128
		Students must be able and willing to check e-mail regularly.	C104

Focus	Detail	Condition	Case#
		Students must be interested in the discussion topics and be willing to thoughtfully discuss course content with each other.	C109
		Students must be motivated by extrinsic feedback, such as a grade, to participate, or be willing to participate for other reasons.	C108
		Students must be ready (e.g., communication technology is in place) and willing to start class right away.	C116
		Students must be willing and able to moderate and facilitate online discussions.	C110
		Students must be willing and able to provide peer feedback without extrinsic motivation (reward for participation).	C116
		Students must be willing and able to review peer coursework and offer feedback on a timely basis.	C127
		Students must be willing and prepared to choose a topic and act as moderators.	C102
		Students must be willing to accept arbitration decisions.	C123
		Students must be willing to access course discussions after making their initial post in order to view the comments of the instructor (and others) and post a follow-up to these	C116
		Students must be willing to read, critique, and share feedback about several peer project ideas.	C126
		Students must be willing to set and work to agreed expectations. Instructor must be able to identify and facilitate group communication patterns.	C122
		Students must be willing to use an alias without revealing their true identity. This may be especially challenging if they are co-located and face-to-face meetings are possible.	C113
		Students must be willing to use discussions on a group-agreed basis (schedule, content, etc.).	C120
		Students must have enough self-discipline to manage their time effectively and be committed to completing the team project.	C112

Focus	Detail	Condition	Case#
		Students must have the desire and ability to meet online at a pre-specified time to discuss class-related issues with the instructor.	C126
		Students should be accepting of and willing to assume out-of-character and concealed identity roles as a means of inspiring interaction in the online discussion.	C102
		There must be a good reason for students to use chat - either they do not have e-mail or the collaborative task requires immediacy. Students must know how to use chat.	C102
	Other - Group Size		
		The number of students in a chat session must be small (4-5).	C104
	Skills and Ability		
		Students are able to create a synthesis of the online discussion regarding their project idea.	C126
		Students have debate skills or are willing and able to acquire debate skills. [More than one debate opportunity may be needed.]	C124
		Students must be able to use e-mail reliably.	C130
		Students must be willing and able to synthesize a week's discussion.	C120
	Skills and Ability - Content		
		Students must be able to facilitate discussion among themselves without relying on daily instructor interaction.	C103
	Skills and Ability - Technical		
		Both the instructor and students must be adequately prepared to use the CMC software. External technical support should be available to class participants when needed.	C101
		Class participants can use FTP software. This method is not recommended if simpler file sharing options (such as websites with download links or common-format e-mail).	C104

Focus	Detail	Condition	Case#
		Students in a group should have similar technical skill levels and be trained in the use of the various technologies.	C112
		Students must be able (skill, access) and willing to use the file sharing space.	C125
		Students must be able to reliably exchange files with their peers.	C111
		Students must be able to selectively attend to one (or a few) conversation topic(s) among several.	C106
		Students must be competent in the use of basic or common word processing and internet communication software such as web browsers and e-mail programs (basic technical skills).	C122
		Students must be confident in their typing and language abilities.	C106
		Students must be willing and technically able to participate actively.	C123
		Students must have either web-page building skills or the system must support simple web page construction.	C112
		Students must have skills in discussion control and IRC client use.	C104
		Students need to know how to create their own web pages using HTML programming language or web page creation software such as Netscape Composer.	C104
	Synchronicity		
		All students should be able to start the course at the same time.	C105
		Students are able to meet at the scheduled time.	C129
		Students are able to meet to synchronously or face-to-face to create learning contract prior to the start of asynchronous collaboration.	C123
		Students are able to participate in the discussion frequently and regularly (at least daily).	C128
		Students are willing and able to participate regularly in group discussions early enough in the allotted timeframe to allow for interaction.	C130

Focus	Detail	Condition	Case#
		Students must be able to be on-line at the same time.	C106
		Students must be willing and able to attend the live online session.	C126
		Students must have some overlap in the time they can be on-line so they can schedule chat sessions with their group. Students with frequent and reliable access to the chat tool make this more feasible.	C106
		Students must post assignments on time and access the course website regularly to review peer work and offer feedback.	C127
	Technical Support		
		Peers must be available, knowledgeable, and willing to offer technical help.	C111
	Time		
		Both the instructor and the students must be able to dedicate regular time each week to contribute to each conference.	C120
		Discussion access should be available at times convenient to the student (both at home and office) and must be reliable and affordable.	C105
		Students have dedicated time for and convenient access to the CMC discussions.	C109
		Students have the time available to complete collaborative coursework and participate in group discussions.	C128
		Students must be available (online frequently) and able to provide answers to peer questions.	C111
		Students must be willing and able to access e-mail regularly and be able to manage a large volume of e-mail messages.	C119
		Students must be willing and able to complete course work on an agreed upon schedule.	C125
		Students must have adequate time available for reflection. Previous experience with technology is helpful.	C117

Focus	Detail	Condition	Case#
		Students must have the time available to contribute to discussions and be able to balance other coursework demands.	C110
		The students read e-mail frequently (at least daily).	C115
	Values	Students are interested in sharing their lives online with the other members of their learning community.	C115
		Students must appreciate that an online course is different in substantial ways from a traditional course, and must be willing to adjust to different participation and interaction	C109
		Students must be willing and able to work with the same group of students for an entire semester.	C124
		Students must be willing to interact with the instructor as a group, and not as a collection of individuals. They must accept a group identity.	C124
		Students must desire the support of their peers.	C121
		Students must have the time and desire to form interpersonal relationships with their peers.	C115
		Students must interact with their peers often enough to want to engage in non-content-focused social dialog.	C108
		Students must understand the appropriate use of humor in posts.	C111
		Students must value community among themselves and trust each other.	C113
		Students must value the use of CMC discussions, especially if there are other methods of communication available. The students must consider the general topic of the class interesting.	C101
Technology	Access	Reliable access (both server and client side) is available.	C121

Focus	Detail	Condition	Case#
		Reliable network audio technologies (server, software, hardware, and technical support) must be available and accessible.	C126
		Students are able to access the help desk conference in spite of their technical difficulties.	C120
		Students must have reliable access to the computer conference.	C103
		Synchronous communication (e.g., chat) must be available for all group members.	C123
		The conference system must be reliably accessible at all times.	C120
		The students must have reliable web server access.	C112
	Features		
		A private communication channel must be available for the rebuke or correction of an individual student.	C111
		System must support synchronous communication, or students must have access to other modes of synchronous communication such as phone or fax.	C125
		The CMC software must support students' ability to create discussion topics and move existing threads into these new discussions.	C105
		The CMC tool provides equitable (equivalent) access to each mode of communication and provides sufficient guidance on how and when to use each mode.	C125
		The discussion system must support the "e-mail posts" option.	C114
		The system must allow the accessible posting of synchronous discussion transcripts.	C129
		The system must be able to track student participation.	C127
		The system must support group discussions with the same (or better) convenience of other communication modes.	C125
		The system must support smaller conferences (group spaces).	C120

Focus	Detail	Condition	Case#
		The system must support team workspaces.	C124
		The system must support the easy downloading of course material and the easy downloading and uploading of discussion posts.	C114
	Other - Anonymity		
		The classroom software must support the ability to conceal the identity of student questioners from the rest of the students in the class.	C126

Appendix J. Numerical Summary of Instructional Methods and Conditions per Case

Case No.	No. of Methods	No. of Conditions	No. of Multiples ^a
C101	3	5	1
C102	4	5	1
C103	2	2	0
C104	5	6	1
C105	3	5	1
C106	3	5	1
C107	2	3	1
C108	5	5	0
C109	2	6	1
C110	4	4	0
C111	7	8	1
C112	4	7	2
C113	2	2	0
C114	6	6	0
C115	4	4	0
C116	3	3	0
C117	1	2	1
C118	1	2	1
C119	2	2	0
C120	4	7	3
C121	5	8	3
C122	2	4	1
C123	3	6	2
C124	4	4	0
C125	5	5	0
C126	5	6	1
C127	2	4	2

C128	1	3	1
C129	6	6	0
C130	5	6	1

^aNo. of Multiples = the number of methods that were associated with more than one condition.

Appendix K. Situationalities Framework (Summative DRAFT)

Value	Learning Goal	Primary Instructional Methods	Related Instructional Conditions
Collaboration (46)	Collaboration (71)	Asynchronous Discussion	Student: skills and ability, motivation, time, synchronicity, technology access. Class size. Instructor: skills and ability, time, motivation
Community (29)	Discussion (28)	Asynchronous Collaboration	Student skills and ability, technology access, values, motivation. Technology features. Content features. External resource access, time
Interactive Dialogue (24)	Community (18)	Synchronous Discussion	Class (and group) size. Technology features. Student background, technology skills and access, synchronicity, location, motivation.
Learning Theory (25)	Student Control (11)	Synchronous Collaboration	Student synchronicity, location.
Support (16)	Critical Thinking (9)	Technical Support	Technology access, student motivation, external resource (tech support) features.
Virtual Classroom (3)	Virtual Classroom (3)	E-mail Communication	Student time and motivation Instructor time and motivation
	Miscellaneous (3)	Review and Feedback	Student motivation, synchronicity, skills and ability. Technology features. Instructor time
		File Exchange	Student technical skills and ability Technology features, access
		Virtual Classroom (Synchronous)	Student synchronicity and skills and ability. Technology access and features.
		Social Dialogue	Student values.