

**P600 Topic Seminar in Learning, Cognition, and Instruction (LCI):  
"Interactive Tools for Learning and Collaboration" (3 Cr)  
Fall 1999, Room 1210, Fridays 8:00-10:45 Section 5688**

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(see <http://php.indiana.edu/~cjbbonk/p600syl.html> for information on assignments)

**Course Description:**

The use of computers as educational tutors, tools, and tutees was advocated nearly 2 decades ago by Robert Taylor. While these three metaphors continue to promote innovative ideas about technological bridges to human learning, in this seminar, the notion of the computer as an educational learning tool and collaborative device will be prominent. We will consider how a range of collaborative educational learning tools (e.g., conferencing tools, hypermedia, groupware, microworlds, electronic databases and knowledge building mechanisms, notecards and planning aids, idea processors, scientific computer probes, and animation and graphical aids) can accomplish differing learning goals. In addition, we will spend significant time exploring how learning is impacted in distance education environments; in particular, the Web. For instance, we will discuss how to design research around computer conferencing environments and analyze online learning discourse.

While I value a student-centered learning approach to technology integration, I hope to provide a roadmap to some of the key human learning and development principles underlying each of these technologies. We will use my edited book featuring research performed on learner-centered technologies right here at IU!

Clearly, this course will be applicable to students interested in teaching or conducting research with computer tools. While we wrestle with cognitive, instructional, and sociocultural theory issues, we shall ground this discussion with researchable questions, actual tool development dilemmas, and school implementation possibilities. There are some optional final projects in the course that may entail working on real world problems. To complete these projects, we will have free access to various types of Web-based courseware. In addition to project-based learning, this class will incorporate an assortment of lectures, demonstrations, videos, and small and large group discussion activities. Students will also be encouraged to demonstrate one technology tool or prototype during the semester.

During this class, I intend for students to begin to design unique tools and curricula while discovering exciting conferences, campus resources, and technology success stories. After the course, students should be able to (1) appreciate the diverse application of learning technologies, (2) design plans to use technology as a learning tool, (3) understand that knowledge is not possession but access, and (4) perceive new knowledge construction and peer collaboration possibilities.

**Required Texts:**

1. Bonk, C. J., & King, K. S. (1998). *Electronic collaborators: Learner-centered technologies for literacy, apprenticeship, and discourse*. Mahwah, NJ: Erlbaum.
2. Course Book of Readings: A copy will be in the education library.

**Optional Texts:**

1. Susan Lajoie & Sharon Derry (Eds.). (1993). *Computers as Cognitive Tools*. Hillsdale, NJ: Erlbaum.
2. Vosniadou et al. (Eds.), (1996). *Int'l Perspectives on the Design of Tech-Supported Lrng Envir's*. Erlbaum.
3. Tim Koschmann (Ed.). (1996). *CSCL: Theory and Practice of an Emerging Paradigm*. Mahwah, NJ: Erlbaum.

Possible Topics (this is not set in stone yet):

- Week 1. Intro to Interactive Technologies for Learning and Collaboration
- Week 2. Linking Tools to Learner Centered Psychological Principles
- Week 3. More Tool Theory: Cognitive and Constructivistic.
- Week 4. Still More Theory: Collab Educational Learning Tools
- Week 5. Writing Tools for Idea Generation & Cognition Enhancement
- Week 6. Multimedia Composition and Knowledge Construction
- Week 7. Science Tools for Conducting Inquiries and Forming Lrng Communities.
- Week 8. Adventure on the Internet, Global Collab, Virtual Fieldtrips
- Week 9. Computer Conferencing and Electronic Apprenticeships
- Week 10. Computer-Mediated Communication Frameworks and Analyses
- Week 11. Distance Ed: Videoconferencing
- Week 12. Distance Ed: Web Pegagogy and Instruction
- Week 13. Strategies for Network Interaction and Collaboration
- Week 14. Student Self-Selection Week
- Week 15. Reforming Schools and Instruction with New Tools and Recap

This course is only offered every 2-3 years, so I would caution against waiting.

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Tentative Tasks and Grading:

30 pts/15%	A. Weekly Attendance and Class Participation (15%)
60 pts/30%	B. Weekly Mentoring & Collaboration with Undergrads ( <i>Due Dec. 8th; Must participate 1-2 each week</i> )
40 pts/20%	C. Definitions and Taxonomy of Cognitive Tools and Sociomedia ( <i>Due Nov 10th</i> )
70 pts/35%	D. Major Project: Eight Options ( <i>Due: Final due Dec. 8th</i> )
200	Total Points

We will use a point system for each project, evenly dividing points among aspects of each assignment. Total points will determine your final grade. I will use the following grading scale:

A+ = high score	B- = 160-164 points
A = 185-200 points	C+ = 153-159 points
A- = 180-184 points	C = 145-152 points
B+ = 174-179 points	C- = 140-144 points
B = 166-173 points	F/incomplete = no work rec'd or signif. inadequate/impaired

Projected Seminar Weekly Topics:

- Week 1. (Sept. 1st) Introduction to Interactive Technologies for Learning and Collaboration
- Q: What is a tool?
  - Do: Review syllabus and expectations.
  - Guest: Sonny Kirkley, CEE.*
- Week 2. (Sept. 8th) Linking Tools to Learner Centered Psychological Principles
- Q: Why is the psychology of learning important here?
  - Do: Video on Learner-Centered Principles and Technology.
- Week 3. (Sept. 15th) More Tool Theory: Cognitive and Constructivistic.
- Q: What is learner centered design? What is constructivistic design?
- Week 4. (Sept. 22nd) Still More Theory: Collaborative Educational Learning Tools
- Q: Why are the effects of electronic collaboration?
- Week 5. (Sept. 29th) Writing Tools for Idea Generation and Cognition Enhancement
- Q: What tools do you use to write or compose?
  - Q: What is a knowledge tool? What are knowledge skills?
  - Do: Demo some writing tools.
- Week 6. (Oct. 6th) Multimedia Composition and Knowledge Construction
- Q: What is a knowledge tool? What are knowledge skills?
- Week 7. (Oct. 13th) Adventure on the Internet, Global Collaboration, and Virtual Fieldtrips
- Q: Why is info access so important? Can we teach "search" skills?
  - Do: Video on Turner Adventure Learning.
- Week 8. (Oct. 20th) Computer Conferencing and Electronic Apprenticeships
- Q: How do you communicate? How about in 5 yrs or 5 yrs ago?
  - Do: Demo COW, Alta Vista, FirstClass, and Allaire Forums.
- Week 9. (Oct. 27th) Computer-Mediated Communication Frameworks and Analyses
- Q: How can electronic conferencing data be analyzed?
- Week 10. (Nov. 3rd) The Internet, World Wide Web, Videoconferencing, and Other Info Systems
- Q: How soon will videoconferencing and web-based technology merge?
  - Do: Video of the Knowledge Navigator, AT&T Tape, others.
- Week 11. (Nov. 10th) Science Tools for Collaboration in a Learning Community
- Q: What are the teacher and student roles in a learning community?
- Week 12. (Nov. 17th) Science Tools for Conducting Inquiry
- Q: Why have kids conduct inquiry? Any research questions here?
  - Do: Debate utility of tools and future trends.
- Week 13. (Nov. 24th) Strategies for Network Interaction and Collaboration
- Q: What are the strategies for electronic interaction?
  - Guest: Nancy Schwartz, CEE.*
- Week 14. (Dec. 1st) Student Self-Selection Week
- Q: What did we miss?
  - Do: Student discussion and presentation of self-selections.
- Week 15. (Dec. 8th) Reforming Schools with New Tools and Recap
- Q: What's next? What inventions are still needed?
  - Q: Ok, did we learn anything here? What specifically?
  - Do: Student continue to discuss and present self-selections.

### Class Tasks:

A. Weekly Attendance and Participation. (15%--30 points = 15 points for attendance; 15 pts for partic.) Besides reading 3 of the 4 assigned articles each week, during the semester I want you to read 3 of the tidbits in your packet as well as 7-10 additional articles related to this class including the self-selection articles for Week 14. Because unique activities will be incorporated into each class, it is your responsibility to experience them. A combination of readings, verbal and written reactions to ideas, observing demonstration videos, and hands-on activities will be critical to your growth as a class. *Participation is encouraged at all times.*

### B. Weekly Electronic Mentoring of Undergraduates (25%--50 points)

Throughout the semester, my web-based undergraduate educational psychology class will be attempting to create "Smarter Schools," while reading a book on this topic. During this project, they will electronically work in small groups of 4-6 members representing different majors. Each week these groups will accomplish one or more activities which lead them to their final presentations at the end of the semester. You will be assigned to one of these groups as an electronic mentor, advisor, and teacher. As a mentor, you will assist in the learning process of this group by posing questions, instructing the group, offering praise and feedback, providing task advice, pushing them to explore more resources, giving personal examples and stories, prompting them to articulate and elaborate on their ideas, and generally encouraging group dialogue. These discussions will take place on the World Wide Web (WWW) using two different software tools: (1) Alta Vista, and (2) Conferencing on the Web (COW). In this way, you will learn firsthand about the possibilities and pitfalls of software tools for learning and collaboration. Naturally, you will receive some instruction in the use of these tools. You will be expected to interact with your group at least twice per week and turn in your printouts of your mentoring and collaboration logs on *December 8th* along with a 1-2 page single spaced reflection of what you learned and experienced during this task. Grading will be based on a six part scale: (1) Insight; (2) Helpfulness; (3) Team Builder; (4) Pushes Group; (5) Diverse Feedback; and (6) Reflective. You will also be expected to attend the final undergraduate presentations and give them feedback on *Saturday December 13th from 9:00-1:30.*

### Weekly Electronic Mentoring of Undergraduates Criteria (30 Points):

1. Insightful: offering analogies/examples, relationships drawn, interlinkages, connecting weekly ideas.
2. Helpfulness/Responsive: prompt, encouraging, informative, numerous suggestions, advice, quick fdbk.
3. Team Builder: links group members, there for your group, group sage/teacher, not idea squelcher.
4. Pushes Group: moves group to new heights, exploration is fostered, breadth & depth, fosters growth.
5. Diverse Feedback: many forms of learning assistance, response specific to activity and need.
6. Reflective: self-awareness and learning displayed in reflection, coherent and informative reflection.

*(Note: We could also create a newsgroup or listserv to discuss articles for this class if the class so chooses.)*

### C. Definitions and Taxonomy of Cognitive Tools and Sociomedia (20%--40 points)

How do these readings fit together? I want you to begin to indicate--through a visual representation--just what you have internalized by depicting the cognitive and sociomedia tools in your field of study. Maximum visual representation size is a folded 11 X 17 sheet of paper. First, lay out some important terms here (perhaps 20-30 words) and provide broad tool-related definitions. Second, link these terms into common categories that relate to particular weekly discussions or important concepts. Above these categories you might provide a listing a learner-centered psychological and design principles, while attempting to create an overarching taxonomy of the tools in your field. Third, I want you to verbally describe what this visual representation of broad tool definitions, categories, and principles represents. Please summarize and interpret your visual display in a 2-3 page single-spaced paper. In effect, there are three key indicators of learning here: (1) definitional; (2) visual; and (3) verbal interpretation. *This is due Nov. 10th.* (Examples from previous years may be available.)

#### D. Major Project: Eight Options (40%--80 points)

With the eight options listed below, you have a chance to experiment with or observe the uses of technology tools in schools and nontraditional learning environments, propose a totally unique software tool, or provide help to your peers. We will discuss these briefly during the final class period. You have a choice of the following: (1) Naturalistic Study; (2) Research Intervention; (3) Research/Grant Proposal; (4) Tool Design Proposal; (5) Curriculum Integration Proposal; (6) Research Presentation; (7) Educational Tool Demonstration; (8) Usable Class Product. A joint pilot research project with a fellow student or faculty member is a possibility. CAUTION: For option #1 or #2, you may need human subjects approval before proceeding. *The project is to be completed by December 8th.*

#### Summary of Eight Major Project Options:

*(Note: Many of the research ideas below can be completed with work at the Center for Research on Learning and Technology (CRLT) or at Wisdom Tools and you are strongly encouraged to check this out. Work at the CRLT may substitute for both tasks "C" and "D." See your instructor or Tom Duffy at the CRLT for details.)*

1. Naturalistic Study: You might perform a case study or pilot observation of workers/students using collaborative tools or collaborative tool interaction in a school, workplace, or informal learning setting. For instance, you might decide to complete a case study of a young person or adult using a collaboration or learning tool for the first time; including at least five careful observations and commentary of the person and tutor/teacher. The commentary should reflect your learning and provide insights as to how to make this tool more educationally meaningful. If you are looking at student-teacher-tool interaction patterns, teacher guidance, or simply tool use, you will need to design coding schemes and observation log sheets to help interpret tool functionality in this environment (*see p. 6 for details*).

2. Research Intervention: In Option #2, you might want to try to use and analyze a specific task, tool, or theory. Based on your interests and existing theory, you should form specific research questions before your intervention. Though your study can take many forms, the research report you submit should detail the purpose and framework of the intervention (i.e., why was this particular project chosen), include a literature review, method section, a description of what occurred (were you successful?), explanation of the results, and possibilities for extending this study (*see p. 6 details*).

3. Research/Grant Proposal: Option #3 can be either a grant or research proposal. In this option, students must write a paper on a possible study of the use of new collaboration or learning technologies which: (1) extends/modifies the research, or (2) suggests a totally unique but reasonable research project/study. It may be either a quantitative intervention or qualitative study. It should include a(n): introduction, brief review of the important literature, methods section (e.g., hypotheses, subjects, materials/resources, variables, procedure, instruments, and anticipated analyses), and discussion of expected results (including the meaning and relationship to the field). Your proposal can be within any aspect of technology tools for impacting learning and thinking. You may target any age group or population (*see p. 6 details*).

4. Tool Design Proposal: Choose Option #4 if you would you like to design a unique collaborative educational learning tool or at least propose the design of a unique educational tool, instructional design model, or unique curriculum application of an existing tool. Instructional design does not need to include any programming. However, it must clearly indicate: (a) the purpose (e.g., the skills addressed); (b) how it might be implemented; (c) the advantages of using this tool, theory, or application to accomplish your educational goals; (d) possible grant sources for programming or design; (e) a mock-up sample of design documents; and (f) description of applicable learner centered design principles.

5. Curriculum Integration Proposal: Here you might contemplate the curriculum impact of one or more learning tools. How are you going to use it? What would change? What training would there be needed for successful use? How might faculty, students, administrators, and parents react to all this? Include a description of tool, how it could or should be used in traditional or nontraditional learning, and what you believe to be its strengths and weaknesses.

6. Research Presentation: Again, in the spirit of an interactive seminar, the purpose of this option is to allow for student input and also provide practice in presenting information in the style required for conferences. Here, you are to orally present a research proposal or synthesize aspects of the research or readings for the class wherein you point out a new direction that researchers or teachers might want to head. Presenters should meet with me prior to the presentation in order to discuss the topic and proposed organization of the presentation. Given time constraints, the presentation length will be no longer than 20-25 minutes (*see p. 6 details*).

7. Educational Tool Demonstration: You might want to demonstrate a learning or collaboration software tool that is promoted for an educational setting such as a library, corporate training center, computer lab, museum, zoo, classroom, or learning center. See the instructor about the possibilities of demonstrating a particularly interesting tool you have found.

8. Usable Class Product: Students choosing Option #8 will create or perform a meaningful activity for the class. For example, you might summarize the learning principles embedded in all the articles we read this semester, locate the 10-20 most popular collaborative educational learning tools (CELT) for public schools, uniquely categorize the tools studied, summarize the weekly articles read, or create a database summarize major themes and trends in a technology or psychology journal for a 3-5 year period. Your final report, however, will be your own design as there is no preconceived format.

A. Software evaluation forms (e.g., for Journal of Computing in Education).

B. Research (e.g., for Virtual Learning Environments Inc (VRLI))

C. Business Ideas/plans.

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Sample Grading of Major Project (70 Total Points or 10 pts each dimension):

1. Review of the Problem/Lit/Purpose (*interesting, relevant, current, organized, thorough, grounded*)
2. Hypothesis/Research Questions/Intentions (*clear, related to class and theory, current, extend field*)
3. Method/Procedures (*subjects/age groups approp, materials relevant, timeline sufficient, controls*)
4. Research Activity/Design/Topic/Tool (*clear, doable/practical, detailed, important, implications, future*)
5. Overall Richness of Ideas (*richness of information, elaboration, originality, unique*)
6. Overall Coherence (*unity, organization, logical sequence, synthesis, style, accurate*)

7. Overall Completeness (*adequate info presented, explicit, relevant, precise, valid pts*)



## Some Sample Final Project Formats

### Sample Format Option #1 or #2. Naturalistic/Research Activities: (8-16 pages)

- I. Title Page (Name, affiliation, topic title, acknowledgements)
- II. Topic Literature and Method (7-14 pages)
  1. Res topic & materials; 2. Brief stmt of problem and why impt (1-2 pages)
  3. Brief review of the relevant literature (3-4 pages)
  4. Methods: (2-6 pages)
    - a. Subjects & design (i.e., who/how selected); 2. Materials/setting (i.e., hard/software, text)
    - c. Procedure (i.e., how data was obtained)
    - d. Coding Schemes & Dep. meas/instr (i.e., how segment/code data); e. Analyses or comparisons
- III. Results and Discussion 1. Preliminary Results; 2. Discussion of results (4-8 pages)
- IV. References (APA style: see syllabus for example)
- V. Appendices (e.g., pictures, charts, figures, models, tests, scoring criteria, coding procedures)

### Sample Format for Option #3 or #4. Inquiry or Tool Design Grant Proposal: (14-20 pages)

- I. Title Page (Name, affiliation, topic title, acknowledgements)
- II. Review of the Literature (6-12 pages)
  1. Intro to Tool or Problem (purpose, history, importance) (1 page)
  2. Review of Relevant Lit (contrast related tools and relevant literature on the topic) (6-9 pages)
  3. Stmt of Design Questions or Hypoth (what do you expect to occur) (1 page)
- III. Method Section (3-7 pages)
  1. Tool Design (i.e., common features) or Subjects (i.e., sample, who and how assigned to groups)
  2. Tool Configuration (i.e., requirements) Or Setting (i.e., hardware, software, text, models, figures)
  3. Tool Options (e.g., windows, linkage features) or Dependent measures/instruments (i.e., tests)
  4. Tool Development Process (i.e., timeline) or Procedure (i.e., training);
  5. Other (e.g., related tools) or Other (e.g., coding, other materials);
  6. Pilot Tests, Anticipated Analyses or Comparisons
- IV. Results and Discussion (OPTIONAL) 1. Antic/dummied results; 2. Disc. of results
- V. References (APA style: see syllabus for example)
- VI. Appendices (e.g., pictures, charts, figures, models, tests, scoring criteria, coding procedures)

### Sample Format for Option #6. Research Presentation (20-25 minutes)

- I. Title of Topic
- II. Purpose or Rationale for Study or Product
  1. Current dilemma in field, confusion, or need

### III. Review of Existing Literature

1. Intro to Topic/Problem (purpose, history, importance)
2. Review of Lit (contrast relevant literature on the topic)
3. Stmt of Hypoth/Res Q's (what do you expect to occur)

### IV. Method Section

1. Subjects and design (i.e., sample, who and how assigned to groups)
2. Materials/setting (i.e., hardware, software, text, models, figures)
3. Dependent measures/instruments (i.e., tests)
4. Procedure (i.e., training); 5. Other (i.e., coding, other materials); 6. Exp analyses or comparisons

### IV. Results and Discussion (OPTIONAL) 1. Antic/dummied results; 2. Disc. of results

### V. Visuals (e.g., pictures, charts, figures, models, tests, scoring criteria, coding procedures)

Weekly Reading (typically we will read 3 of 4; sometimes 3 of 5 articles; T = Tidbit)

Week 1. (Sept. 1st) Introduction to Interactive Technologies for Learning and Collaboration

Week 2. (Sept. 8th) Linking Tools to Learner Centered Psychological Principles

1. CSCL: (1996). Preface and Chapter 1 by Koschmann. Paradigm shifts and instructional technology.
2. CSCL: (1996). Chapter 2 by Feltovich, Spiro, Coulson, & Feltovich. Collab within and among minds.
3. CSCL: (1996). Chapter 4 by Koschmann, Kelson, Feltovich, & Barrows. Computer-supported PBL.
4. Crook, C. (1994). Computers in education: Some issues. In Computers and the collab exper of learning.
5. Salomon, G. (1990). Cognitive effects with and of computer technology. Communication Research.
  - T1. Soloway, Kuzdial, & Hay (1994). Learner-centered design: The challenge for the 21st century.
  - T2. Wagner & McCombs. (1995). Learner-centered psych principles in practice: Designs for dist educ.

Week 3. (Sept. 15th) More Tool Theory: Cognitive and Constructivistic.

1. Collins, A. (1996). Design issues for learning environments.
2. Brown, J. S. (1985). Process versus product: A perspective on tools for communal & informal elect lrng
3. Kozma, R. B. (1987). The implications of cognitive psychology for computer-based learning tools.
4. Knuth & Cunningham (1991). Tools for constructivism. In Duffy et al. (Eds.) Design enviro for cons lrng.
5. Scott, Cole, Engel (1992). Computers and Educ: A Cultural Constructivist Perspective.
  - T1. Papert, S. (1996). A word for learning. In Kafai & Resnick (Eds.), Constructivism in practice.
  - T2. Papert, S. (1993). Ch 1: Yearners and schoolers. In the Children's Machine.

Week 4. (Sept. 22nd) Still More Theory: Collaborative Educational Learning Tools

1. Bonk & Cunningham (in press) Searching for lnr-cent, construct, & sociocult comp of collab lrng tools.
2. Blumenfeld, Marx, Soloway, & Krajcik (1996). Learning with peers: From small grp coop. to collab com.
3. Harasim, L. (1990). Online education: An enviro for collaboration and intellectual amplification.
4. Adelson & Jordan (1992). The need for negotiating in coop work
  - T1. Schrage (1990). Shared Minds. Ch 8: Collaborative tools: A first look

Week 5. (Sept. 29th) Writing Tools for Idea Generation and Cognition Enhancement

1. CSCL: (1996). Chapter 6 by Neuwirth & Wojahn. Learning to write: Computer support for a coop process.
2. Reynolds & Bonk (1996). (ETR&D) Creating computerized writing partner and keystroke mapping tools.
3. Salomon, G. (1993). On the nature of pedag computer tools: The case of the Writing partner
4. Bonk et al. (1996). The social and cognitive transformation of workplace writing environments.
  - T1. Kellogg, R. T. (1989). Idea processors: Computer aids for planning and composing text.
  - T2. Smith (1996). Thomas Jefferson's computer.
  - T3. Schorr, J. (1994). Smart think: Eight programs that help you think creatively and plan. Macworld.

Week 6. (Oct. 6th) Multimedia Composition and Knowledge Construction

1. CSCL: (1996). Chapter 10 by Scardamalia & Bereiter. Computer sup for knowledge-bldg communities.
2. Bonk, Hay, & Fischler. (1996). Five key resources for an elect community of elem weather forecasters.
3. Lehrer, R. (1993). Authors of knowledge: Patterns of hypermedia design
4. Landow, G. (1993). Bootstrapping hypertext: Student-created docs, Intermedia, & the soc cons of know

Week 7. (Oct. 13th) Adventure on the Internet, Global Collaboration, and Virtual Fieldtrips

1. CSCL: (1996). Chapter 8 by Riel. Cross-classroom collaboration: Communication and Education.
2. Siegel, M. A. & Kirkley, S. E. (in press). Adventure learning as a vision of the digital lrng environment.
3. Bonk & Sugar (in press). Student role play in the World Forum: Analyses of an Arctic lrng apprenticeship.
4. Songer, N. (in press). Can technology bring students closer to science?
  - T1. Steger, W. (1996). Dispatches from the Arctic Ocean. National Geographic.
  - T2. The Globe Program. (1995).

Week 8. (Oct. 20th) Computer Conferencing and Electronic Apprenticeships

1. Ann Brown et al. (1993). Distributed expertise in the classroom.
2. Teles, L. (1993). Cognitive apprenticeship on global networks
3. Bonk, Hansen, Grabner, Lazar, & Mirabelli (in press). Time to "Connect": Syn & asyn case-base dialogue.
4. Riel & Harasim (1994). Research perspectives on network learning.  
T1. Edutopia. (1994). Newsletter of the George Lucas Educational Foundation.

Week 9. (Oct. 27th) Computer-Mediated Communication Frameworks and Analyses

1. Kuehn (1994). Computer-mediated communication in instructional settings: A research agenda.
2. Henri, F. (1992). Computer conferencing and content analysis.
3. Slatin, J. M. (1992). Is there a class in this text: Creating know in an elect classroom
4. Levin, Kim, & Riel (1990). Analyzing instructional interactions on electronic message networks.
5. Finholt, Sproull, & Kiesler (1990). Communication and performance in ad hoc task groups.

Week 10. (Nov. 3rd) The Internet, World Wide Web, Videoconferencing, and Other Information Systems

1. Owston, R. D. (1997). The World Wide Web: A technology to enhance teaching and learning.
2. Bonk, Appelman, & Hay. (1996). Elect conferencing tools for student apprenticeship & perspective taking.
3. Fetterman, D. (1996). Videoconferencing on-line: Enhancing communication over the Internet.
4. Egido, C. (1990). Teleconferencing as a technology to support cooperative work.  
T1. Mergendoller (1996). Moving from technological possibility to richer student learning.

Week 11. (Nov. 10th) Science Tools for Collaboration in a Learning Community

1. CSCL: (1996). Chapter 7 by Pea. Seeing what we build together: Distrib multimedia envir's for trans com.
2. CSCL: (1996). Chapter 11 by Soloway et al. Tech support for tchrs transitioning to proj-based sci pract.
3. Schauble, Raghavan, Glaser. (1993). The disc & reflec notation: A graph trace for support self-reg
4. Edelson, Pea, & Gomez. (1996). Constructivism in the collaboratory.  
T1. Rubin, A. (1993). Video laboratories: Tools for scientific investigation.  
T2. Grant, W. C. (1993). Wireless coyote: A computer-supported field trip.

Week 12. (Nov. 17th) Science Tools for Conducting Inquiry

1. CSCL: (1996). Chapter 3 by Goldman. Mediating microworlds: Collab on high school science activities.
2. CSCL: (1996). Chapter 9 by Rochelle. Learning by collab: Convergent conceptual change.
3. Goldman et al. (1996). Anchoring science instruction in multimedia environments.
4. Nelson, Watson, Ching, & Barrow (1996). The effect of teacher scaffolding and student compreh. mon.  
T1. Lee & Kazlauskas (1995). The Ecole Moderne: Another perspective on educational technology.

Week 13. (Nov. 24th) Strategies for Network Interaction and Collaboration

1. Harasim, Hiltz, Teles, & Turoff (1995). Designs for learning networks (Chapter 4 and Appendix A)
2. Sproull & Kiesler (1993). Computers, networks, & work.
3. Bonk & Reynolds (1997). Lrnr-centered web instr for higher-order thinking, teamwork, & apprenticeship.
4. Wolfe, R. (1990). Hypertextual perspectives on educ computer conferencing.  
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Week 14. (Dec. 1st) Student Self-Selection Week

Week 15. (Dec. 8th) Reforming Schools with New Tools and Recap

1. CSCL: (1996). Chapter 5 by Morrison & Goldberg. New actors, new connections: The role of local infra.
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T1. Mehlinger, H. (1996). School reform in the information age.  
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T3. Nickerson, R. S. (1988). Tech in ed: Poss influences on context, purposes, content, & methods.