UNIVERSITY OF BRITISH COLUMBIA

Department of Curriculum Studies

Winter I 2005

TSED 508 (031): Review of Research in Cognition, Emotion and Technology: How We Learn (Technology Across the Lifespan)

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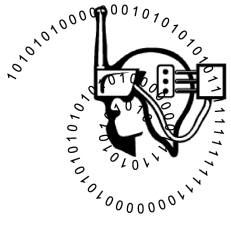

Course Description:
At the turn of the early 21st century, to ask the question "how do we learn?" is to ask the question "how do we learn technology across the lifespan?" However, technological change seems too fierce— too intense— to conclude that learning technology is smooth and developmental. In this course we will explore interdependencies among cognition, emotion and technology and the way these they play out in the lives of children, adolescents, teenagers and adults. We will explore school-based studies and workplace studies of how we learn; we will reconcile research into children and technology with research into adult learning and gerontechnology. How we learn (technology across the lifespan) means asking "how do we age (gracefully) with technology in this new age?"

Texts (Required):
1. Bransford, J. D., Brown, A. L. and Cocking, R. (Eds.). (2000). *How people learn: Brain, mind, experience and school*. Washington D.C.: National Academies Press.http://www.nap.edu/catalog/9853.html. Download from http://137.82.15.154/NewMediaResearchLab/Research/HowWeLearnNRCBook.pdf.
2. TSED 508 Course Packet. (cost recovery)

Valued Ends of the Course:
My intention, as teacher in this course, is to help you develop a framework for understanding cognition, emotion and technology— as a contradiction of borders and boundaries. The guiding end is for all of us to work on developing a sense of cognition and emotion as cultural and social. I will encourage you to examine your own biases toward cognition, emotion(s), and technology. A major effort will be in providing you with a background for research into cognition, technology and emotion(s) and how we learn (technology across the lifespan)..

Communication:
A listserv has been set up for TSED 508 students for communication in this course, and for general issues that arise during the term. Please subscribe. To subscribe, send the following message to:
majordomo@interchange.ubc.ca
In the body of the message include the following:
subscribe n-mrl
*Do not include a signature

Assessment:
1. Participation (30%)
2. Seminar Leadership (groups of 2) (30%)
3. Scholarly Essay **OR** Media Production (40%)

General Assessment Criteria for Final Marks

A+ (90-100) A (85-89) A- (80-84)	Outstanding in all aspects of course. Excellent coverage of requirements for assignments. The assignments are coherent and comprehensive. Great examples are used to supplement ideas. Communication and presentation are of a high standard— the assignments look professional and are clean (nearly free of typos, few digital file problems, etc.). The formats followed adhere to the formats provided. Participation in course is outstanding.
B+ (76-78) B (72-75) B- (68-71)	Very good in nearly all aspects of course. Semi-comprehensive coverage of required content. Assignments are drawn from a range of sources, are coherent but not entirely comprehensive. Good examples are used to supplement ideas. Communication and presentation are good— the materials look semi-professional and are nearly clean (nearly free of typos, digital file problems, etc.). The formats followed adhere somewhat to the formats provided. Participation in course is of a high level.
C+ (64-67) C (60-63) C- (55-59)	Average in nearly all aspects of course. Shoddy coverage of required content. Assignments are somewhat incoherent and not very comprehensive. Few examples are provided. Communication and presentation are ok— the materials look amateurish and have typos, digital file problems, etc.). The format used does not adhere to the format provided. Participation in course is ok.
D (50-54)	A barely adequate performance. Limited coverage of requirements. Limited number of examples. Little attempt at being comprehensive. Format and presentation minimal. Poor communication and presentation. Few attempts to participate or perform.
F (0-49)	An inadequate and incomplete performance. Patchy coverage of criteria with omissions in certain areas. No attempt at meeting requirements.

Participation:

Please remember that in a graduate course, you have a responsibility to do the readings and participate in discussions. Participation is valued at 20% of your final grade. We refer to the scholarly level of participation as **academic conversation**. Students often get anxious over academic work and the charge that they are "talking from nowhere." The other extreme is "talking from everywhere," a form of what Donna Haraway called a "God trick." "Talking from somewhere" is the goal— this somewhere may be your experience (with examples) or it may be from what you've read or from the theory we are addressing. We want you to theorize and this is different than merely providing your opinion, which is what so many professors dislike. There is a difference between your narrative or experience and opinion.

Low----------Avg----------High

Appropriately and accurately summarizes key constructs and themes in cognition, technology and emotion(s)
1----------5----------10

Reveals an attempt to synthesize knowledge or uses personal narrative to ground knowledge in cognition, technology and emotion(s)
1----------5----------10

Analyses constructs— reflectively engages with content in ways that advance the student's knowledge, and/or contributes to an advance in collective knowledge, and/or an attempt to create new knowledge about cognition, technology and emotion(s)
1----------5----------10

Total: xx/30

Assignments:

1. **Seminar Leadership**— Choose one day and topic on the schedule to coordinate the seminar. It will be your responsibility to clearly re/present the topic and reading(s), and to coordinate the discussions. Briefly present what the authors said, what they did not say, and what they should have said. Format: 45 minutes to 1 hour with overheads, including discussion period (Group Project— groups of 2).

   Assessment:

   Clarity of communication

   C**ommunication**: Is the topic clear and concise? Is the seminar organized?
   Content: Is the presentation substantial? Is it sufficiently "critical"? Is it sufficiently descriptive? Are conceptual frameworks and categories explained with sufficient depth?
   Media: How effectively do the media communicate? Are the media well organised?

Low----------Avg----------High
Addresses key concept(s) in readings 1----------2.5----------5
Synthesizes with theory (and theorists) 1----------2.5----------5
Sufficient examples are provided 1----------2.5----------5
Communication and media are professional in format— Style is clean and coherent 1----------2.5----------5
Discussion and time are managed and relevant— ethical rules are used 1----------5----------10
Total: xx/30

2. **Scholarly Essay**— Choose a topic that corresponds to the course theme and write a scholarly paper that explores theoretical as well as empirical issues. The essay should provide a clear, cogent description of the topic at hand. Take a position and provide evidence, through examples and narrative, to support the position. Issues such as AI, emotional agents, affective computing, and gaming are example topics to explore, but by no means exhaust the possibilities. Be creative and choose a topic that really interests you!

   Assessment:

   1. Clarity of communication/writing
      a. Is the writing clear and concise?
      b. Are the ideas focused and organized?
   2. Development of Argument
      a. Is the argument coherent? Thoughtful? Analytical? Critical? Sophisticated?
   3. Exploration of content and theory
      a. Is there evidence of critically exploring the issues?
      b. Are the ideas synthesized, extended or applied?
   4. Grammar & Style
      a. Organization, sentence structure, paragraphs, spelling
      b. APA Style (format, references)

Low----------Avg----------High

Communication and presentation are clear
1----------2.5----------10

Synthesized with theory (and theorists)
1----------5----------10

Sufficient examples are provided
1----------5----------10

Grammar & Style
1----------5----------10

Total: xx/40

2. Thematic New Media Production

New media productions are the hallmark of cyberspace— Communication and participation are blends or convergences of image, text and sound. Certainly, students of new media ought to be conversant in all of these modalities. This assignment challenges you to creatively express yourself as well as apply your technical skills. Produce a new media production that thematically responds to a component of the course theme. Prepare mediated responses that indicate your thoughtful engagement with the content. The media should be thorough and designed to inspire dialogue.

The thematic media production should be *either* a **video** (use compressed formats such as .avi, .mpg, .qt, .rm, or swf), or an **animation** (use formats such as .avi, .gif or .swf). The production should be about 5 minutes in length. One simple approach would be to script an interview of yourself in front of a camera. A better approach would be to design a chatbot (SitePal makes this easy).

Low----------Avg----------High

Addressed key concept(s) in course
1----------2.5----------5

Synthesized with theory (and theorists)
1----------5----------10

Sufficient examples are provided
1----------5----------10

Communication and media are professional in format—
Style is clean and coherent
1----------5----------10

Media take advantage of a range of technologies
1----------2.5----------5

Total: xx/40

Course Schedule:
Each session will generally consist of discussion based on readings, with the balance of time dedicated toward lab work.

Date	Topic	Readings
6 Sept	Introduction: How we Learn (Technology Across the Lifespan)	Syllabus
13	How People (might) Learn	Bransford, Brown & Cocking, *How People Learn*, Chaps. 1-5, pp. 3-127
20	From Natural Born Cyborgs to Transhumanism:	Clark, *Natural Born Cyborgs*. pp. 3-58. Hollin, Hutchins & Kirsh, "Distributed Cognition"
27	Power to the Feelings!	Boler, "Disciplined Emotions;" Hoschild, *The Managed Heart*, pp. 3-23; Harding & Pribram, "The Power of Feeling;" Scherer, "Emotional Experience"
4 Oct	How We Learn (Technology in the Early Years)	Gentile & Sesma, "Developmental Approaches;"
11	How We Learn (Technology Through Adolescence)	Tully, "Growing up in Technological Worlds;" Selwyn, "Doing IT."
18	How We Learn (Technology Through Adulthood)	Selwyn & Gorard, "Exploring the New Imperatives;" Poynton, "Computer Literacy"
25	How We Learn (Technology Through the Senior Years)	Ardeldt, "Intellectual Versus Wisdom;" Purdie & Bulton-Lewis, "The Learning Needs of Older Adults;"
1 Nov	I (Love my) Robot(s)	Billard, "Robota;" Sparrow, "The March of the Robot Dogs;" Turkle, "Cuddling Up"
8	Everything I Know I Learned from Video Games	Bates, "The Role of Emotion;" Frasca, "Rethinking Agency;" Goldstein, "People@Play;" Nutt & Ralsdton, "The Sims"
15	Do Technologies Make us Smarter?	Salomon & Perkins, "Do Technologies;" Cole & Derry, "We Have Met Technology"
22	Autopoiesis and The Embodied Mind	Varela, Thompson & Rosch, *The Embodied Mind*, pp. 1, 13; 148-184.
29	How we Learn (to Party!)	

Selected References in Cognition and Technology

Ardeldt, M. (2000). Intellectual versus wisdom-related knowledge. *Educational Gerontology, 26*(6), 771-789.

Bers, M. U. (2001). Identity construction environments: Developing personal and moral values through design of a virtual city. *Journal of the Learning Sciences, 10*(4), 365-415.

Bransford, J. D., Brown, A. L. and Cocking, R. (Eds.). (2000). *How people learn: Brain, mind, experience and school*. Washington D.C.: National Research Council.

Braundy, M., O'Riley, P., & Petrina, S. with Dalley, S. & Paxton, A. (2000). Missing XX chromosomes or gender in/equity in design and technology education? The case of British Columbia. *Journal of Industrial Teacher Education*, 37(3), 54-92.

Brosnan, M. (1998). *Technophobia: The psychological impact of information technology*. New York: Routledge.

Bryson, M. and de Castell, S. (1996). Learning to make a difference: Gender, new technologies, and in/equity. *Mind, Culture and Activity, 3*(2), 119-135.

Bryson, M., Petrina, S., Braundy, M. & de Castell, S. (2003). "Conditions for Success?" Gender in technology-intensive courses in British Columbia secondary schools. *Canadian Journal of Science, Mathematics and Technology Education*, *3*(2). 185-193.

Burnam, B., and Kafai, Y. (2001). Ethics and the computer: Children's development of moral reasoning about computer and internet use. *Journal of Educational Computing Research, 25*(2), 111-127.

Chaiklin, S. and Lave, J. (Eds.). (1993). *Understanding practice: Perspectives on activity and context*. Cambridge: Cambridge University Press.

Darrah, C. (1996). *Learning and work: An exploration in industrial ethnography*. New York: garland.

Davies, T. and Elmer, R. (2001). Learning in design and technology: The impact of social and cultural influences on modelling. *International Journal of Technology and Design Education 11*(2), 163–180.

Davis, B. and Sumara, D. (2002). Constructivist discourses and the field of education: problems and possibilities. *Educational Theory, 52*(4), 409-428.

Druin, A. (Ed.). (1999). *The design of children's technology*. San Francisco: Morgan Kaufman.

Druin, A. (2002). The role of children in the design of new technology. *Behaviour and Information Technology, 21*(1), 1-25.

Druin, A. and Hendler, J. (Eds.). (2001). *Robots for kids: Exploring new technologies for learning experiences*. San Francisco: Morgan Kaufman.

Druin, A., and Fast, C. (2002). The child as learner, critic, inventor, and technology design partner: An analysis of three years of Swedish student journals. *International Journal of Technology and Design Education, 12*(3), 189-213.

Eastman, C., McCracken, W. M. and Newstetter, W. (Eds.). (2001). *Design knowing and learning: Cognition in design education*. New York: Elsevier.

Engeström, Y. (2000). Activity theory as a framework for analyzing and redesigning work. *Ergonomics, 43*(7), 960-974.

Engeström, Y. (2001). Expansive learning at work: Toward activity theoretical reconceptualization. *Journal of Education and Work, 14*(1), 133-156.

Field, J. (2002). *Lifelong learning and the new educational order*. Sterling: Trentham.

Field, J. and Leicester, M. (Eds.). (2000). *Lifelong learning: Education across the lifespan*. New York: Routledge.

Flor, N. and Hutchins, E. (1991). Analyzing distributed cognition in software teams. In J. Koenemann-Belliveau et al., eds., *Proceedings of the Fourth Annual Workshop of Empirical Studies of Programmer*s (pp. 36-59). Norwood, NJ: Ablex.

Freudenthal, D. (2001). The role of age, foreknowledge and complexity in learning to operate a complex device. *Behaviour and Information Technology, 20*(1), 23-35.

Harel, I. and Papert, S. (Eds.). (1991). *Constructionism*. Norwood, NJ: Ablex.

Hmelo, C., Holton, D. and Kolodner, J. (2000). Designing to learn about complex systems. *Journal of the Learning Sciences, 9*(3), 247-298.

Hollan, J., Hutchins, E. and Kirsh, D. (2000). Distributed cognition: Toward a new foundation for human-computer interaction research. *ACM Transactions on Computer-Human Interaction, 7*(2), 174-196.

Hutchby, I. and Moran-Elles, J. (Eds.). (2001). *Children, culture and technology: The impacts of technologies in children's everyday lives*. New York: Routledge.

Hutchins, E. (1995). *Cognition in the wild*. Cambridge, MA: MIT Press.

Hutchins, E. (in press). Material anchors for conceptual blends. *Journal of Pragmatics*.

Ingold, T. (2000). *The perception of the environment: Essays on livelihood, dwelling and skill*. New York: Routledge

Kafai, Y., Ching, C. C. and Marshall, S. (1997). Children as designers of educational multimedia software. *Computers in Education, 29*(2-3), 117-126.

Kafai, Y. and Resnick, M. (Eds.). *Constructionism in action*. Mahwah, NJ: Erlbaum.

Kittleson, J. and Southerland, S. (2004). The role of discourse in group knowledge construction: A case study of engineering students. *Journal of Research in Science Teaching, 41*(3), 267-293.

Latour, B. (1996a). On interobjectivity. *Mind, Culture and Activity,* 3(4), 228-245.

Latour, B. (1996b). Cogito Ergo Sumus! Or psychology swept inside out by the fresh air of the upper deck. *Mind, Culture and Activity,* 3(1), 54-63.

Lave, J. & Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.
Nardi, B. (Ed.). (1996). Context and consciousness: Activity theory and human-computer interaction. Cambridge, MA: MIT Press.
Papert, S. (1987). Computer criticism vs. technocentric thinking. *Educational Researcher, 16*(1), 21-30.
Papert, S. (1992). *The children's machine*. New York: Basic Books.
Pea, R. (1987). The aims of software criticism: Reply to Professor Papert. *Educational Researcher, 16*(4), 4-8.
Pea, R. and Kurland, D. M. (1987). On the cognitive effects of learning computer programming. In R. Pea and K. Sheingold, Eds., *Mirrors of minds: Patterns of experience in educational computing* (pp. 147-177). Norwood, NJ: Ablex.
Pea, R., Kurland, D. M. and Hawkins, J. (1987). LOGO and the development of thinking skills. In R. Pea and K. Sheingold, Eds., *Mirrors of minds: Patterns of experience in educational computing* (pp. 178-197). Norwood, NJ: Ablex.
Petrina, S. (1998). The politics of research in technology education: A critical content and discourse analysis of the *Journal of Technology Education* . *Journal of Technology Education* ,*10*(1), 27-57.
Petrina, S. (2003). 'Two cultures' of technical courses and discourses: The case of computer-aided design. *International Journal of Technology and Design Education*, *13*(1), 47-73.
Petrina, S. and Dalley, S. (2003). The politics of curriculum reform in Canada: The case of technology education in British Columbia. *Canadian Journal of Science, Mathematics and Technology Education*, *3*(1), 117-144.
Petrina, S., Bryson, M., Dobson, T. and Fels, L. (2004). *Technology and emotion(s)*. UBC Hampton Fund.
Petrina, S. Feng, F. and Kim, J. (2004a). *How we learn (about, through and for technology)*. Washington, D.C.: National Academy of Engineering. (52 pp.)
Petrina, S., Feng, F. and Kim, J. (2004b). Technological literacy across the lifespan: Key findings from research. In M. J. DeVries, Ed., *Proceedings of the Fourteenth Annual Pupil's Attitudes Toward Technology Conference*, Albuquerque, NM.
Petrina, S., Feng, F. and Kim, J. (under review). How we learn (about, through and for technology): A review of research, 1998-2003. *Review of Educational Research*, 1-45.
Roschelle, J., Pea, R., Hoadley, C., Gordin, D., & Means, B. (2000). Changing how and what children learn in school with computer-based technologies. *The Future of Children, 10*(2), 76-101.
Prensky, M. (2001a). Digital natives, digital immigrants. *One the Horizon,* October*,* 1-4.
Prensky, M. (2001b). Digital natives, digital immigrants, pt. II. *One the Horizon,* December, 1-45.
Purdie, N. and Boulton-Lewis, G. (2003). The learning needs of older adults, *Educational Gerontology, 29*(2), 129-149.
Stempfle, J. and Badke-Schaub, P. (2002). Thinking in design teams: An analysis of team communication. *Design Studies, 23*(5), 473-496.
Tapscott, D. (1999). *Growing up digital.: the rise of the net generation*. New York: McGraw Hill.
Taxen, G., Druin, A., Fast, C. and Kjellin, M. (2001). KidStory: A technology design partnership with children. *Behaviour and Information Technology, 20*(2), 119-125.
Varela, F. J., Thompson, E. and Rosch, E. (1991). *The embodied mind: Cognitive science and human experience*. Cambridge: MIT Press.
Verillon, P. and Rabardel, P. (1995). Cognition and artefacts: A contribution to the study of thought in relation to instrumented activity. *European Journal of Psychology of Education, 10*(1), 77-101.
Weil, M. W. and Rosen, L. (1997). *Technostress: Coping with technology @work @home @play*. New York: John Wiley & Sons.
Winograd, T. and Flores, C. F. (1986). *Understanding computers and cognition: A foundation for design*. Norwood, NJ: Ablex.

Selected References in Technology and Emotion(s)

Arkin, R. C., Fujita, M. T., & Tsuyoshi Hasegawa, R. (2003). An ethological and emotional basis for humane robot interaction. *Robotics & Autonomous Systems, 42*(3/4), 191.
Barrett, L. F., Robin, L., Pietromonaco, P. R., & Eyssell, K. M. Are Women the "More Emotional" Sex? Evidence From Emotional Experiences in Social Context. *Cognition & Emotion, 12*(4), 555.
Basabe, N., Paez, D., Valencia, J., Gonzalez, J. L., Rim, B., & Diener, E. Cultural dimensions, socioeconomic development, climate, and emotional hedonic level. *Cognition & Emotion, 16*(1), 103.
Bates, J. (1994). The role of emotion in believable agents. *Communications of the ACM, 37*(7), 122.
Bendelow, G., & Williams, S. J. (1998). *Emotions in social life: critical themes and contemporary issues*. London; New York: Routledge.
Bers, M. U. (2001). Identity construction environments: Developing personal and moral values through the design of a virtual city. *The Journal of Learning Science, 10*(4), 365-415.

Boden, S., & Williams, S. J. (2002). Consumption and Emotion: The Romantic Ethic Revisited. *Sociology, 36*(3), 493-512.
Bogner, M. R., & Franklin, U. S. (2000). "Consciousness" and conceptual learning in a socially situated agent. In K. Dautenhahn (Ed.), *Human cognition and social agent technology.* (pp. 113-135). Amsterdam, Netherlands: John Benjamins Publishing Company.
Bolte, A. G., & Kuhl, T. J. (2003). Emotion and intuition. *Psychological Science, 14*(5), 416.
Bolton, S. C. (2002). *Introducing A Typology Of Workplace Emotion*. Lancaster.
Boyle, M. V. (2001). *Organisational Masculinity and Hegemonic Emotionality within an Emotion-laden Organisation.* Paper presented at the Gender Stream Critical Management Studies Conference 2001, Manchester.
Breazeal, C. (2003). Emotion and sociable humanoid robots. *International Journal of Human-Computer Studies, 59*(1/2), 119.
Brown, J. (2000). What is a Psychoanalytic Sociology of Emotion? *Psychoanalytic Studies, 2*(1), 35-49.
Carr, A. (2001). Understanding emotion and emotionality in a process of change. *Journal of Organizational Change Management, 14*(5), 421.
Chan, F. Y., & Khalid, H. M. (2003). Is talking to an automated teller machine natural and fun? *Ergonomics, 46*(13/14), 1386.
Cockton, G. (2002). From doing to being: bringing emotion into interaction. *Interacting with Computers, 14*(2), 89.
Craib, I. (1995). Some comments on the sociology of the emotions. *Sociology, 29*(1), 151.
Cutting Edge (Group). (2000). *Digital desires: language, identity and new technologies*. London New York New York: I.B. Tauris; Distributed in the USA and Canada by St. Martin's Press.
Damasio, A. R. (1994). *Descartes' error: Emotion, reason, and the human brain*. New York: G.P. Putnam.
Damasio, A. R. (1999). *The feeling of what happens: body and emotion in the making of consciousness* (1st ed.). New York: Harcourt Brace.
Darden, D. K., & Marks, A. H. (1999). Boredom: A socially disvalued emotion. *Sociological Spectrum, 19*(1), 13-37.
Denzin, N. K. (1983). A Note on Emotionality, Self, and Interaction. *The American Journal of Sociology, 89*(2), 402-409.
Denzin, N. K. (1984). *On understanding emotion* (1st -- ed.). San Francisco: Jossey-Bass.
Denzin, N. K. (1985). Emotion as lived experience. *Symbolic Interaction, 8*, 223-240.
Denzin, N. K. (1991). The Sociology of Emotions: Original Essays and Research Papers (Book). *Contemporary Sociology, 20*(1), 133.
Dittrich, Y., Floyd, C., & Klischewski, R. (2002). *Social thinking-software practice*. Cambridge, Mass.: MIT Press.
Dourish, P. (2001). *Where the action is: the foundations of embodied interaction*. Cambridge, Mass.: MIT Press.
Dror, O. E. (1998). Creating the emotional body: Confusion, possibilities, and knowledge. In P. N. L. Stearns, Jan (Ed.), *An emotional history of the United States.* (pp. 173-194). New York, NY, US: New York University Press.
Duguid, F. (2002). *Emotion work learning: Findings, gaps and suggestions*.
Dunn, J., & Hughes, C. Young Children's Understanding of Emotions within Close Relationships. *Cognition & Emotion, 12*(2), 171.
Ellis, C. (1991a). Emotional sociology. *Studies in Symbolic Interaction, 12*, 123-145.
Ellis, C. (1991b). Sociological Introspection and Emotional Experience. *Symbolic Interaction, 14*(1), 23.
Epstein, J. H. (1998). Computers with emotions. *Futurist, 32*(3), 12.
Freeman, D., & Wright, W. (2003). *Creating emotion in games: The craft and art of emotioneering*: New Riders.
Game, A. (1997). Sociology's emotions. *Canadian Review of Sociology & Anthropology, 34*(4), 385.
Gibbs, W. W. (2004). Why machines should fear. *Scientific American, 290*(1), 37-37A.
Goldstein, J. H. (1998). *Why we watch: the attractions of violent entertainment*. New York: Oxford University Press.
Gorden, S. L. (1990). Social structural effects on emotons. In T. D. Kemper (Ed.), *Research agendas in the sociology of emotions* (pp. 145-1179). Albany: State University of New York Press.
Greek, D. (1998). Robots go through the emotions. *Professional Engineering, 11*(22), 28.
Griffiths, M. (1999). Violent video games and aggression: A review of the literature. *Aggression and Violent Behavior, 4*(2), 203-212.
Gross, K. D. _., Lisa. (2004). Framing emotional response. *Political Psychology, 25*(1), 1-29.
Halberstam, J. (1991). Automating gender: Postmodern feminism in the age of the intelligent machine. *Feminist Studies, 17*(3), 439.
Harding, J. P., & Deidre, E. (2002). The power of feeling: locating emotions in culture. *European Journal of Cultural Studies, 5*(4), 407.
Harre, R. Emotion across cultures. *Innovation: The European Journal of Social Sciences, 11*(1), 43.
Hawley, M. (2001). Playing by heart. *Technology Review, 104*(4), 26.
Hochschild, A. R. (1979). Emotion work, feeling rules and social structure. *The American Journal of Sociology,*

85(3), 551-575.
Hochschild, A. R. (1983). *The managed heart: commercialization of human feeling*. Berkeley: University of California Press.
Hoffmann, G., & Hornung, A. (1997). *Emotion in postmodernism*. Heidelberg: Universit?sverlag C. Winter.
Kemper, T. D. (1978). Toward a sociology of emotions: Some problems and some solution. *American Sociologist, 13*(1), 30-41.
Kemper, T. D. (1981). Social Constructionist and Positivist Approaches to the Sociology of Emotions. *The American Journal of Sociology, 87*(2), 336-362.
Kemper, T. D. (1987). How Many Emotions Are There? Wedding the Social and the Autonomic Components. *The American Journal of Sociology, 93*(2), 263-289.
Klein, J., Moon, Y., & Picard, R. W. (2002). This computer responds to user frustration: Theory, design, and results. *Interacting with Computers, 14*(2), 119.
Kort, B., & Reilly, R. (2002). Theories for Deep Change in Affect-sensitive Cognitive Machines: A Constructivist Model. *Educational Technology & Society, 5*(4), 56-63.
Ledoux, J. E. (1996). *The emotional brain: the mysterious underpinnings of emotional life*. New York: Simon & Schuster.
Leidner, R. (1999). Emotional labor in the service economy: Emotional labor on the job: Emotinoal labor in service work. 2003
MacDonald, G. J. (February 05, 2004). If you kick a robotic dog, is it wrong? *The Christian Science Monitor*.
Maier, M. D. (1999). Move Over Technology--Make Room for Emotions. *TMA Journal, 19*(4), 34.
Melson, L. G. (2001). *Why the wild things are: animals in the lives of children*. Cambridge, MA: Harvard University Press.
Nardi, B. A. (1996). *Context and consciousness: activity theory and human-computer interaction*. Cambridge, Mass.: MIT Press.
Nathanson, D. L. (1993). Understanding Emotion - New Theories, New Therapy - About Emotion. *Psychiatric Annals, 23*(10), 543-555.
Nofz, M. P., & Vendy, P. (2002). When Computers Say It with Feeling: Communication and Synthetic Emotions in Kubrick's 2001: A Space Odyssey. *Journal of Communication Inquiry, 26*(1), 26.
Parkinson, B. What We Think about when We Think about Emotion. *Cognition & Emotion, 12*(4), 615.
Picard, R., Kort, B., & Reilly, R. (2000). *Project Summary: Exploring the role of emotion in propelling the SMET learning process*: MIT Media Lab.
Picard, R. W. (1997). *Affective computing*. Cambridge, Mass.: MIT Press.
Picard, R. W. (1999). *What does it mean for a computer to "Have" emotions?* Cambridge: MIT Media Laboratory.
Picard, R. W. K., Jonathan. (2002). Computers that recognise and respond to user emotion: theoretical and practical implications. *Interacting with Computers, 14*(2), 141.
Rose, E. (2002). Boundary Talk: A Cultural Study of the Relationship between Instructional Design and Education. *Educational Technology, 42*(6), 14-22.
Saito, R. (2002). Anxiety and Waiting: A Heideggerian View of Instructional Computer Simulation. *Educational Technology, 42*(1), 56-58.
Scheff, T. J. (1983). Toward integration in the social psychology of emotion. *Annual Review of Sociology, 9*, 333-354.
Schwarz, N. (2000). Emotion, cognition, and decision making. *Cognition & Emotion, 14*(4), 433.
Steele, M. M., & Steele, J. W. (Winter 2002-2003). Applying Affective Computing Techniques to the Field of Special Education. *Journal of Research on Technology in Education, 35*(2), 236-240.
Suchman, L. (2000). Human/machine reconsidered. Retrieved October 3, 2004, from http://www.comp.lancs.ac.uk/sociology/papers/Suchman-Human-Manchine-Reconsidered.pdf
Suchman, L. (2002, August 2). Replicants and irreductions: Affective encounters at the interface. *European Association the Study of Science and Technology (EASST)* Retrieved November 14, 2004, from http://www.comp.lancs.ac.uk/sociology/papers/suchman-replicants-and-irreductions.pdf
Suchman, L. (2004). Figuring personhood in sciences of the artificial. Retrieved December 2, 2004, from http://www.comp.lancs.ac.uk/sociology/papers/suchman-figuring-personhood.pdf
Technology, M. I. o., & Area, A. C. R. (1999). *Applications for Affective Computing*: Massachusetts Institute of Technology.
Terada, R. (2001a). *Feeling in theory: emotion after the "death of the subject"*. Cambridge, Mass.: Harvard University Press.
Terada, R. (2001b). Introduction: Emotion after the "death of the subject". In *Feeling in theory: Emotion after the "death of the subject"*. Cambridge, England: Harvard University Press.
Thoits, P. A. (1989). The Sociology of Emotions. *Annual Review of Sociology, 15*, 317-342.
Waldron, V. R. (1994). Once more, with feeling: Reconsidering the role of emotion in work. *Communication Yearbook, 17*, 388-416.
Wang, C. L., & Ahmed, P. K. (2002). Emotion: The missing part of systems methodologies.

Weinstein, N. (1997). Socrates at the Terminal: Emotion's Neglected Role in High-Tech Education. *Educom Review, 32*(6), 52.

Williams, S. J. (1998). Modernity and the Emotions: Corporeal Reflections on the (IR)Rational. *Sociology, 32*(4), 747-769.

Williams, S. J., & Bendelow, G. A. (1996). Emotions and `sociological imperialism': A rejoinder to Craib. *Sociology, 30*(1), 145.

Wilson, I. (1999). Artificial Emotion: Simulating Mood and Personality. *Gamasutra, 3*(18).

Zorn, T. E. (2002). The emotionality of information and communication technology implementation. *Journal of Communication Management, 7*(2), 160.