Christopher Hoadley

Pennsylvania State University   tophe @ psu.edu
Assistant Professor, Instructional Systems   Assistant Professor, IS&T
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Interests Research and teaching in cognitive and computer science as related to learning. Design of cognitively enabling technology, especially for collaboration and science education. Design-based research methods and research-based design methods in distributed cognition.

Education UNIVERSITY OF CALIFORNIA AT BERKELEY   BERKELEY, CA
1999 Ph.D. in interdepartmental Graduate Group in Science and Mathematics Education (SESAME). Thesis: *Scaffolding Scientific Discussion Using Socially Relevant Representations in Networked Multimedia.* Research included applications of artificial intelligence and WWW Internet tools in education; human-computer interaction in educational software development; cognitive models of social systems and collaborative learning. Thesis committee: Marcia C. Linn, Andrea diSessa, Peter Lyman.

SANTA FE INSTITUTE   SANTA FE, NM
1996 Summer School in Complex Systems. Neural networks, chaos, fractals, and non-linear dynamics in biological and physical systems. Researched dynamics of multiagent social learning systems.

UNIVERSITY OF CALIFORNIA AT BERKELEY   BERKELEY, CA
1998 M.S. in Computer Science. Areas: Artificial intelligence, multimedia, interfaces, and graphics. Thesis: *Functional Abstractions, Beliefs, and Code Reuse: A Study of Novice Programmers.* Research work on programming tools in computer science instruction, connectionist cognitive models, and networked multimedia. Thesis advisor: Michael Clancy.

MASSACHUSETTS INSTITUTE OF TECHNOLOGY   CAMBRIDGE, MA
1991 S.B. in Cognitive Science. Minor areas: Electrical Engineering/Computer Science and Music. Thesis: *Can Seventh Graders Manipulate Scientific Theories?*, a study on scientific epistemologies and ability to interpret experimental evidence. Thesis advisor: Susan Carey.

Honors Science and Design NSF Traineeship Recipient, University of California Regents' Fellow, Evelyn Lois Corey Fellow, National Science Foundation Graduate Fellowship Honorable Mention, National Merit Scholar, Robert Byrd U.S. Congressional Scholar, Presidential Scholarship finalist, Michigan Mathematics Prize Competition medalist.

Societies Member of Association for Computing Machinery, ACM Special Interest Group in Computer-Human Interaction, IEEE Computer Society, Cognitive Science Society, American Educational Research Association. Former Secretary/Treasurer for AERA Special Interest Groups "Education in Science and Technology" and "Advanced Technologies for Learning." Former Chair, AERA SIG Education in Science and Technology. Co-founder, president, International Society for the Learning Sciences.

Prior Research Positions SRI INTERNATIONAL, CENTER FOR
TECHNOLOGY IN LEARNING   MENLO PARK, CA
Research Cognitive and Computer Scientist. Summer 1998-2002. Work on knowledge management and knowledge networking for learning, building, and assessing learning communities; learning assessment of educational multimedia; design methodologies for educational software; digital libraries of educational software components, learning activities, and assessments. Contributed to over 30 research projects. Principal investigator or project leader on over $500,000 in grants.

INSTRUCTIONAL TECHNOLOGY PROGRAM AND
SCHOOL OF EDUCATION   U.C. BERKELEY
Graduate Student Researcher. Fall 1994-Spring 1998. Design, construction, and research with the KIE project, using the World Wide Web for K-12 science instruction. Software development and classroom research.

SYNTHESIS, A NATIONAL ENGINEERING EDUCATION COALITION
Project Leader. Fall 1994, Spring 1995. Co-managed two projects on multimedia assessment of engineering skills and development of networked discussion tools for engineering education reform. Wrote proposals, managed research and software development.

SRI INTERNATIONAL, ARTIFICIAL INTELLIGENCE CENTER   MENLO PARK, CA
Research Associate. May 1994-May 1995. Interface and learning studies on Distant Mentoring project, teaching industrial engineering via telepresence software on the Internet.

SYNTHESIS, A NATIONAL ENGINEERING EDUCATION COALITION
Graduate Student Researcher. Fall 1993, Spring 1994. Designed and built multimedia software for collaboration and discourse. Assessment of curricular and technological innovations in university engineering classrooms nationwide for the SYNTHESIS Coalition, a consortium of engineering schools. Coauthored grant proposal.

SCHOOL OF EDUCATION   U.C. BERKELEY
Graduate Student Researcher. Spring, Summer 1993. Designed and conducted a study on code reuse and functional knowledge of procedures in novice Lisp programmers.

SCHOOL OF EDUCATION   U.C. BERKELEY
Graduate Student Researcher, Summer 1992. Designed and implemented an interface for students to use the ECHO connectionist model of reasoning as a "reasoner's workbench".

MEDIA LAB, LEARNING AND EPISTEMOLOGY GROUP   M.I.T.
Undergraduate Researcher. Summer 1989. Performed classroom observation in Lego/Logo learning environments. Aided teacher projects at Science and Whole Learning teacher workshop. Taught an enrichment class in Lego/Logo at the Boston Museum of Science.

Prior Teaching Positions DEPARTMENT OF MATH AND COMPUTER SCIENCE   MILLS COLLEGE
2000-2002. Visiting assistant professor, Computer Science. Taught interdisciplinary course *Contemporary Computing*, an introduction to computer science and its societal effects for non-majors at a women's college.

SCHOOL OF EDUCATION   STANFORD UNIVERSITY
1998-2002. Consulting assistant professor, Learning, Design, and Technology Program. Taught core seminar with emphasis on design methodologies for educational software, assisted in curriculum design for entire graduate program.

SCHOOL OF EDUCATION   U.C. BERKELEY
Fall 1993. Course steering committee for Seminar on Interactive Multimedia. Co-taught, helped organize course readings, demonstrations, and activities for graduate seminar EMST223B-6.

COGNITIVE SCIENCE PROGRAM   U.C. BERKELEY
Fall 1992. Teaching assistant for *Introduction to Cognitive Science*. Overall teaching effectiveness rating: 6.54/7.

COMPUTER SCIENCE DEPARTMENT   U.C. BERKELEY
Graduate Student Instructor. Fall 1991-Spring 1992. Teaching assistant for *Structure and Interpretation of Computer Programs*. Helped revise course materials for collaborative learning approach. Overall teaching effectiveness rating, Spring 92: 4.8/5.

EXPLORATION SUMMER PROGRAM   WELLESLEY COLLEGE
Instructor/Residential Advisor. Summer 1990, 1991. Taught courses *Science Experimentation*, *Kitchen Chemistry*, *Senses and Perception*, and *Sound and Acoustics* to 11-14-year-olds. Directly responsible for 20 students as a residential advisor.

EXPERIMENTAL STUDY GROUP   M.I.T.
Tutor. 1988-1991 (part-time). Taught M.I.T. undergraduates single and multivariate calculus, mechanics, electromagnetism, computer science, and philosophy of science. Developed a graphics-based preparatory course in computer science.

Software Authored

Hoadley, C. M. (1998-2002) *The CILT Knowledge Network*. World Wide Web community tool linking educational technology researchers, teachers, developers, and policymakers. http://www.ciltkn.org/

Hoadley, C. M., Berman, B. P., Tran, J., and Agogino, A. (1994-7) *The SpeakEasy Networked Discussion Tool*. World Wide Web-based discussion environment.

Deloayza Associates (1996) *Children of the Crane*. Educational CD-ROM for children about the bombing of Hiroshima.

Hoadley, C. M. (1993) *WanderECHO*. Connectionist simulation of limited coherence in human reasoning.

Hoadley, C. M. and Hsi, S. (1992-3) *The Multimedia Forum Kiosk*. Multimedia bulletin board and discourse representation software.

Ranney, M. R., Schank, P. K., and Hoadley, C. M. (1992-3) *Convince Me*. "Reasoner's Workbench" for supporting coherent reasoning using ECHO connectionist simulation of reasoning processes. In J. R. Jungck, N. Peterson, & J. Calley (eds.), *The BioQUEST Library*. College Park, MD: Academic Software Development Group, University of Maryland.

Selected Grants

1998-2001. CILT Knowledge Network, Project Director, National Science Foundation and Intel via Center for Innovative Learning Technologies.

2000-2002. Collaborative Learning in Audio Engineering, co-PI, National Science Foundation ERC Program.

2000-2001. The Learning, Design, and Technology Underground: A Collaborative Institute for Early-Career Scholars on Design-Based Research Methods, PI, Spencer Foundation.

Other

Publication chair, CSCL '99 Conference. Program Committee, EuroCSCL 2001 Conference. Program Committee, CSCL '01 Conference. Doctoral consortium co-chair, ICLS 2002 conference. Member of review board, Journal of the Learning Sciences. Reviewer for AERA, AERJ, Jrnl. Ed. Comp. Res., Empirical Studies of Programmers, ICLS, ACM CSCW and CHI.

PUBLICATIONS/PRESENTATIONS

Hoadley, C. M. and Hsi, S. (in preparation). Care and feeding of a community of learners: learner centered design of collaborative technology. Draft manuscript submitted for publication.

Design-Based Research Collective. (2003). Design-based research: An emerging paradigm for educational inquiry. Educational Researcher 31(1), pp. 5-8. (Invited submission to special issue on design experiments).

Bell, P. L., Hoadley, C. M., & Linn, M. C. (in press). Design-based research as educational inquiry. In M. C. Linn, E. A. Davis & P. L. Bell (Eds.), *Internet Environments for Science Education*. Mahwah, NJ: Lawrence Erlbaum Associates.

Hoadley, C. M. (in press). Fostering collaboration offline and online: Learning from each other. In M. C. Linn, E. A. Davis & P. L. Bell (Eds.), *Internet Environments for Science Education*. Mahwah, NJ: Lawrence Erlbaum Associates.

Hoadley, C. (2002). Creating context: Design-based research in creating and understanding CSCL. In G. Stahl (Ed.), *Computer Support for Collaborative Learning 2002* (pp. 453-462). Mahwah, NJ: Lawrence Erlbaum Associates..

Hoadley, C. M., & Pea, R. D. (2002). Finding the ties that bind: tools in support of a knowledge-building community. In K. A. Renninger & W. Shumar (Eds.), *Building virtual communities: Learning and change in cyberspace* (pp. 321-354). New York: Cambridge University Press.

Hoadley, C. M. (2002). Adventures in audio: Multidisciplinary curriculum and technology design research in postsecondary audio education. In interactive symposium, Design experimentation research methods: Advancing theories of context, learning, and design, S. Hsi and I. Tabak (organizers). Presented at the *Annual Meeting of the American Educational Research Association,* New Orleans, LA, 2002.

Hoadley, C. M. and Linn, M. C. (2000). Teaching science through on-line, peer discussions: SpeakEasy in the Knowledge Integration Environment. *International Journal of Science Education.*

Roschelle, J. R., Pea, R. D., Hoadley, C. M., Means, B. and Gordin, D. (2000) Changing how and what children learn in school with computer-based technologies. *The future of children,* special issue on Children and Computer Technology. *10*(3). Los Altos, CA: Packard Foundation.

Hoadley, C. M. and Enyedy, N. (1999). Between Information and Collaboration: Middle Spaces in Computer Media for Learning. In C. M. Hoadley and J. Roschelle (Eds.), CSCL '99: Proceedings of Computer Supported Collaborative Learning 1999, p. 242-251 . Mahwah, NJ: Lawrence Erlbaum Associates.

Hoadley, C. M. and Roschelle, J. , Eds. (1999) CSCL '99: Proceedings of Computer Support for Collaborative Learning 1999. Mahwah, NJ: Lawrence Erlbaum Associates.

Fishman, B., Lee, S.-Y., Songer, N. B., Guzdial, M., Hsi, S., Hewitt, J., Scardamalia, M. and Hoadley, C. M. (1999). How can CSCL (Computer-Supported Collaborative Learning) change classroom culture and patterns of interaction among participants? Interactive symposium presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.

Pea, R. D. and Hoadley, C. M. (1999). Face-to-face and computer-based community building activities in the Center for Innovative Learning Technologies (CILT). Paper presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.

Hoadley, C. M. (1999, February 25, 1999). The social interface: how social cues in computer interfaces support learning. Paper presented at the Stanford Learning Lab 1999 Speaker Series, Palo Alto, CA.

Hoadley, C. M. (1999). Social text: learning in online peer discussion in science. Paper presented at the Winter Text Processing Conference, Jackson Hole, Wyoming.

Hoadley, C. M., Krajcik, J., Loughran, J., Gunstone, R., Perkins, D., Schwartz, D., Bransford, J., White, B. Y. and Fredericksen, J. (1999, April 19-23). Inquiry learning: how, when, and why should science inquiry be brought to the classroom? Symposium presented at the Annual Meeting of the American Educational Research Association, Montreal, Canada.

Hoadley, C. M. (1998). Scaffolding scientific discussion using socially relevant representations in networked multimedia. Unpublished Ph.D. Dissertation, University of California at Berkeley, Berkeley, CA.

Hoadley, C. M. (1998) Shaping social interactions for knowledge integration through technology. In B. K. Nichols, A. C. Kemp and D. Jackson (Eds.) *NARST Annual Meeting* (pp. 166). San Diego, California: National Association for Research in Science Teaching.

Cuthbert, A. and Hoadley, C. M. (1998, April). Designing desert houses in the Knowledge Integration Environment. Poster presented at Annual Meeting of the American Educational Research Association, San Diego, California.

Cuthbert, A. and Hoadley, C. M. (1998, April). Using KIE to help students develop shared criteria for house designs. Paper presented at Annual Meeting of the American Educational Research Association, San Diego, California.

Cuthbert, A., Bell, P. and Hoadley, C. (1997) Tracking activity patterns in online environments: implications for instructional design. *Proceedings of HCI International '97,* San Francisco, CA.

Hoadley, C.M., Kirkpatrick, D. H. (1997) Talking online: bridging science and the real world with student ideas. Paper presented at the Curricu-Tech Showcase, San Francisco State University, Oct. 24-25, 1997. San Francisco, CA.

Hoadley, C. M. (1997) Design activities for learning science: experiences and strategies. Paper presented at the Design Education Workshop, Georgia Institute of Technology, Sept. 8-9, 1997, Atlanta, GA.

Hoadley, C. M., Fishman, B., Harasim, L., Hsi, S., Levin, J., Pea, R., Scardamalia, M. and Linn, M.C. (1997) Communication, collaboration and computers: what do we think we know about networked multimedia? Panel presented at the Annual Meeting of the American Educational Research Association, Chicago, IL, March, 1997.

Hsi, S. and Hoadley, C. M. (1997) Productive discussion in science; gender equity through electronic discourse. *Journal of Science Education and Technology, 11*(1).

Hoadley, C. M. and Bell, P. L. (1996) Web for your head: the design of digital resources to enhance lifelong learning. D-Lib Magazine, September, 1996 [available at http://www.dlib.org/dlib/september96/09contents.html].

Hoadley, C. M. and Hsi, S. (1996, April). Towards a theory of collaborative networking in the science classroom. Paper presented at the Annual Meeting of the American Educational Research Association, New York, NY.

Hoadley, C. M., Linn, M. C., Mann, L. M. and Clancy, M. J. (1996) When and why do novice programmers reuse code? In Gray, W. and Boehm-Davis, D. (Eds.) *Empirical Studies of Programmers, Sixth Workshop.* Norwood, NJ: Ablex Publishing Company.

Hoadley, C. M., Hsi, S. and Berman, B. P. (1995) The Multimedia Forum Kiosk and SpeakEasy. In *Proceedings of ACM Multimedia '95*. New York, NY: ACM Press.

Hsi, S., Hoadley, C. M. and Linn, M.C. (1995) Lessons for the future of electronic collaboration from the Multimedia Forum Kiosk. *Speculations in Science and Technology*, *18***(4)**, 265-277.

Hoadley, C. M. (1995) Functional abstraction, beliefs, and code reuse: A study of novice programmers. Unpublished master's thesis, Computer Science Division, University of California at Berkeley, Berkeley, CA.

Hoadley, C. M., Hsi, S. and Berman, B. P. (1995, April) Networked multimedia for communication and collaboration. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA. (Available from ERIC: Microfiche ED382181)

Hsi, S. and Hoadley, C. M. (1995) Assessing curricular innovation in engineering: using the multimedia forum kiosk. Paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, California, April, 1995. (Available from the authors)

Hoadley, C. M., Ranney, M. and Schank, P. K. (1994) WanderECHO: a connectionist simulation of limited coherence in human reasoning. In *Proceedings of the Sixteenth Annual Conference of the Cognitive Science Society* (pp. 421-426). Hillsdale, NJ: Lawrence Earlbaum Associates.

Ranney, M., Schank, P., Hoadley, C. and Neff, J. (1994) "I know one when I see one": How much do hypotheses differ from evidence? *Proceedings of the Fifth Annual American Society for Information Science Workshop on Classification Research.*

Schank, P., Ranney, M., Hoadley, C., Diehl, C. and Neff, J. (1994). A Reasoner's Workbench for Improving Scientific Thinking: Assessing Convince Me. In G.H. Marks (Ed.), *Proceedings of the 1994 International Symposium on Mathematics/Science Education and Technology,* Charlottesville, VA:AACE.

Hoadley, C. M. and Hsi, S. (1994) Two perspectives on Using Multimedia in Education -- Multimedia: A Chance for Change. The CPSR Newsletter, Volume 12, No. 2, p.10-13. Palo Alto, CA: Computer Professionals for Social Responsibility.

Hsi, S. and Hoadley, C. M. (1994, April) An interactive multimedia kiosk as a tool for collaborative discourse, reflection and assessment. Paper presented at the *Annual Meeting of the American Educational Research Association*, New Orleans. (Available through ERIC: Microfiche ED375814.)

Hoadley, C. M., Hsi, S. and Linn, M. C. (1993) Assessing curricular change with an electronic discourse tool. NSF Engineering Education Coalitions Assessment workshop, Baltimore, Maryland, November, 1993.

Hoadley, C. M. and Hsi, S. (1993) A Multimedia Interface for Knowledge Building and Collaborative Learning. *Supplement to the proceedings of InterCHI '93 [International Conference on Computer-Human Interaction]*, Amsterdam, the Netherlands, April 24-29, 1993.

Hoadley, C. M. (1993) What is Cognitive Science?: a Primer for the uninitiated. *Educator.* Spring, 1993, Vol. 7 no. 1. Berkeley, CA: University of California.

Hoadley, C. M. (1991) *Can seventh graders manipulate scientific theories?* Unpublished bachelor's thesis, Department of Brain and Cognitive Sciences, Massachusetts Institute of Technology.