

VITA

Ward Mitchell Cates, Professor
Department of Education and Human Services, College of Education, Lehigh University

EDUCATION

- Ed.D. Duke University: Curriculum and Instruction (Instructional Design)
Dissertation: *An examination of the conceptual foundations of communication and of their implications for school personnel in devising and selecting strategies for communicating with their publics.*
- B.A. Duke University: English/Education (w/secondary teaching certification: 7-12 English; 7-12 Social Studies)

PROFESSIONAL EXPERIENCE

- 8/91 - Lehigh University (Bethlehem, PA), College of Education, Education & Human Services Department
- Associate Dean, August 2007 - present
 - Acting Director, Office of Teacher Certification, June - August 2012
 - Acting Director, Office of Teacher Certification and Field Placements, July 2010 - February 2011
 - Interim Associate Dean for Educational Practice, November 2005 - July 2007
 - Professor, August 2001 - present
 - Technology-based Teacher Education Program Director 2004 - 2005
 - Educational Technology Program Director 1995 - 2005
 - Associate Professor, August 1991 - July 2001
- 8/86 - 7/91 George Mason University (Fairfax, VA), College of Education and Human Development, Center for Interactive Educational Technology
- Associate Professor
- 8/80 - 1/81 Unified School District 250 (Pittsburg, KS) - Mini-sabbatical
- High school English grammar teacher (1 class)
 - Elementary language arts teacher (K-5)
- 8/75 - 7/86 Pittsburg State University (Pittsburg, KS), Department of Curriculum and Administration
- Associate Professor, 1981 - 1986
 - Assistant Professor, 1975 - 1981
- 8/74 - 8/75 Burlington City Schools (Burlington, NC)
- Project director, Title V-C ESEA
- 9/73 - 6/75 Duke University (Durham, NC), Department of Education
- Media Specialist [staff position]
- 9/72 - 6/73 Richmond Public Schools (Richmond, VA), George Wythe High School
- Classroom English teacher
- 9/71 - 6/72 Richmond Public Schools (Richmond, VA), The Learning Center
- Classroom Special Education teacher (LD/EBD)

TEACHING EXPERIENCE:

Professor & Associate Professor, Lehigh University (8/91 – present)

Courses taught (all graduate):

- Instructional Design (formerly Instructional Systems Design) [Completely online Spring 2001, Fall 2002]
- Foundations of Educational Technology
- Designing Learning Environments
- Principles of Instructional Interface Design [Completely online Fall 2001, Fall 2002]
- Technology-based Teaching and Learning: Problems and Methods
- Overview of Learning Science & Technology
- Advanced Instructional Design
- Planning for Implementing Technology in School Settings [International completely online Spring 2003, Fall 2005]
- Research Topics in Educational Technology
- Research Methods
- Critical Reading and Writing in Educational Technology (writing for publication)
- Integrating Experience in Educational Technology (product and portfolio development)
- Applied Research in Educational Technology
- Managing e-Learning Projects [Blended/hybrid 2005]

Associate Professor, George Mason University (8/86-8/91)

Courses taught (all graduate):

- Instructional Design
- Utilization of Instructional Technology (technology-based methods for secondary teachers)
- Education Methods of Research (masters level)
- Introduction to Computer-based Training (CBT)
- Seminar in Computer Applications in Education
- Programming Microcomputers in BASIC for Instructional Applications
- Introduction to Authoring in Computer-based Instruction
- Designing Instructional Materials for Microcomputers

Assistant & Associate Professor, Pittsburg State University, Pittsburg, KS (8/75 – 8/86)

Courses taught:

- Educational Psychology (undergraduate)
- Utilizing Audiovisual Techniques in Teaching (undergraduate)
- Introduction to Microcomputers (graduate)
- Effective Use of Film in the Classroom (graduate)
- Introduction to Filmmaking (undergraduate)
- Elementary Language Arts Methods (undergraduate)
- Elementary School Social Studies Methods (undergraduate)
- Research Methods (graduate)
- Advanced Methods for Teaching Elementary School Language Arts (graduate)
- Advanced Filmmaking (undergraduate)

DISSERTATION & QUALIFYING PROJECT COMMITTEES**Chair, completed dissertations**

[Please note: Although I will take my current three doctoral advisees to completion, I am accepting no new doctoral advisees.]

- Violet A. Kulo (2011). *Design, development, and formative evaluation of a Geographic Information System-supported science Web-based inquiry module*
[Recipient of Lehigh University's Elizabeth V. Stout Dissertation Award for the College of Education]
- Mari P. King (2002). *Deterrents to participation In Web-based continuing professional education for radiologic technologists in the Commonwealth of Pennsylvania*
[Moved from member to acting chair upon retirement of previous chair.]
- Mary Jean Bishop (2000). *The systematic use of sound in multimedia instruction to enhance learning*
[Recipient of Young Scholar Award, Association for Educational Communications and Technology]
- Jeannette S. Berkley (2000). *A comparison of metaphorical and non-metaphorical graphical user interfaces for delivering a computer-based instructional program on stress and stress management*
- Susan Goodling (1995). *An empirical investigation of the effectiveness of learning options in two interactive multimedia spelling programs*

Member, completed dissertations

- Tonya Amankwatia (2008)
- Patricia Slaughter von Tryon (2008)
- Louise Shive (2003)
- Carla Repsher Krieger (1997)
- Floyd Miller (1994)
- Barbara Fischel (1994)
- Adam Nelson (1994)
- Carolyn Lang Elder (1988)

Chair, completed doctoral qualifying projects

- Violet Kulo (2005). *Investigating the instructional design of science inquiry Web sites* [Findings published in national refereed journal]
- Andrea Harmer (2005). *Blended learning 6th grade scientific inquiry: Design and development findings* [Findings published in national refereed journal]
- Robert Varisco (2005). *Survey of Web-based educational resources in self-identified US art museums* [Findings published in national refereed journal]
- Yufeng Qian (2001). *Investigation of existing Web-based instructional design principles and exemplary instructional Web sites*
[Findings published in national refereed journal]
- Woei Hung (1998). *The effect of systematically designed sounds on immediate recall of instructional materials delivered in educational multimedia programs*
- Kristel Kemmerer (1997).

Member, completed qualifying project committees

- Xiaoli Zhang (2009).
- Robert Weidman (2006).
- Patricia Slaughter von Tryon (2005).
- Tonya Amankwatia (2005).
- Barry Kramer (2005).
-

RESEARCH INTERESTS

- How museums and public history sites are using the World Wide Web to fulfill their educational missions.
- Those aspects of instructional products and interfaces that affect cognitive processing. This leads to an interest in mental models, imagery research, and the use of sound, video, and animation to reduce cognitive load and enhance processing and retention. One manifestation of this is my interest in metaphorical graphical user interfaces.
- How new technologies (like the World Wide Web) may be used most effectively. My primary focus in this area is on making certain that instructional materials designed for such new technologies emphasize sound principles of instruction and recognize the fact that new technologies often impose higher cognitive loads on learners and teachers. One manifestation of this is my work on applying instructional design principles and appropriate affordances to the World Wide Web.
- How limitations in learner information processing can be overcome in new types of environments. For instance, how to overcome navigational confusions and metacognitive deficiencies in free-form hyperlinked environments like the World Wide Web. One manifestation of this is my interest in learner support systems.
- The effectiveness of 1:1 laptop initiatives. This leads to my work as an external evaluator and presenter.
- How to create a greater sense of connection between online learners and instructors in synchronous and asynchronous online courses.
- How novice instructional developers learn their crafts (“learning the profession”). This leads to exploring ways to reduce start-up time and produce more efficient development teams. One manifestation of this is my research on production ratios and development team dynamics.

Please note: I am accepting no new doctoral advisees to help me pursue my research interests.

BOOKS

- Cates, W.M. (1990). *Panduan amali untuk penyelidikan pendidikan*. {S. Abdullah, Trans., *A practical guide to educational research*}. Malaysia, Kuala Lumpur: Dewan Bahasa dan Pustaka & Allyn and Bacon.
- Cates, W.M. (1985). *A practical guide to educational research*. Englewood Cliffs, NJ: Prentice-Hall.
- Cates, W.M. (1975). *The school communications system: A handbook for school personnel*. Burlington, NC: US Office of Education and the North Carolina Department of Public Instruction.

PUBLICATIONS IN NATIONAL/INTERNATIONAL JOURNALS

[PEER=Peer Refereed; PNREF=Prestigious Non-refereed; PRACT=Practitioner’s Journal]

2012	Kulo, V., & Cates, W.M. (<i>in press</i>). The heart of implementation fidelity: Instructional design and intent . <i>Educational Technology</i> , xx(x), xx-xx.	PNREF
	Cates, W.M., & Mattke, P.H. (<i>in press</i>). Web consulting for non-academic educational missions: How instructional design offers competitive advantage . <i>Educational Technology</i> , xx(x), xx-xx.	
	Cates, W.M., & Mattke, P.H. (<i>scheduled</i>). Perry: What makes learning fun? Principles for the design of intrinsically motivating museum exhibits (Book review). <i>Educational Technology</i> , xx(x), xx-xx.	
2011	Cates, W.M. (2011). Richey, Klein & Tracy: The instructional design knowledge base: Theory, research, and practice (Book review). <i>Educational Technology Research and Development</i> , 59, 737-739. Doi: 10.1007/s11423-011-9213-6	PEER
2009	Kulo, V., & Cates, W.M. (2009). Avoiding the perils of “teacher-proof” online design: A content analysis . <i>Computers in the Schools</i> , 26, 1-15.	PEER
	Cates, W.M., & Mattke, P.H. (2009). Open educational resources on U.S. public history Websites: Implications for designers and developers . <i>Educational Technology</i> , 49(1), 9-18.	PNREF
2008	Duffield, J.A., & Cates, W.M. (2008). Establishing and maintaining professional development schools: A Delphi study . <i>School-University Partnerships</i> , 2(2), 27-50.	PEER
	Bishop, M.J., Amankwatia, T.B., & Cates, W.M. (2008). Sound’s use in instructional software to enhance learning: A theory-to-practice content analysis . <i>Educational Technology Research & Development</i> , 56, 467-486	

2007	Harmer, A.J., & Cates, W.M. (2007). Designing for learner engagement in middle school science: Technology, inquiry, and the hierarchies of engagement. <i>Computers in the Schools</i> , 24, 105-124.	PEER
2006	Cates, W.M., & Duffield, J.A. (2006). Technology-enriched integrated professional development schools: Enhancing connections between teacher education and U.S. schools. <i>Global Issues in Educational Technology</i> , 7, 274-320.	PEER
	Ohl, T., & Cates, W.M. (2006). The nature of groups: Implications for learning design. <i>Journal of Interactive Learning Research</i> , 17(1), 71-89.	PEER
2005	Varisco, R., & Cates, W.M. (2005). Survey of Web-based educational resources in selected U.S. art museums. <i>First Monday</i> , 10(7). Available online at www.firstmonday.org/ISSUES/issue10_7/varisco/index.html	PEER
	Martindale, T., Cates, W.M., & Qian, Y. (2005). Analysis of recognized Web-based educational resources. <i>Computers in the Schools</i> , 21(3/4), 101-117.	
2004/5	Cates, W.M., Bishop, M.J., & Hung, W. (2004/5). Characterization versus narration: Empirical investigations of drama's role in multimedia instructional software. <i>Journal of Educational Technology Systems</i> , 33, 437-460.	PEER
2004	Shive, L.E., Bodzin, A.M., & Cates, W.M. (2004). A national science standards-based study of Web-based inquiry in chemistry. <i>Journal of Chemical Education</i> , 81, 1066-1072.	PEER
2003/4	Bodzin, A.M., & Cates, W.M. (2003/4). Enhancing preservice teachers' understanding of Web-based scientific inquiry. <i>Journal of Science Teacher Education</i> , 14, 237-257.	PEER
2003	Cates, W.M., & Bishop, M.J. (2003). Learner as bobsled operator: The physics of learner engagement. <i>Journal of Educational Technology Systems</i> , 31, 291-305.	PEER
	Cates, W.M., Price, B., & Bodzin, A.M. (2003). Implementing technology-rich curricular materials: Findings from the Exploring Life project. <i>Computers in the Schools</i> , 20, 153-169. [Also published as a chapter in D.L. Johnson & C.D. Maddox (Eds.) (2003). <i>Technology in education: A twenty-year prospective</i> . Binghamton, NY: Haworth Press.]	
	Martindale, T., Cates, W.M., & Qian, Y. (2003). Educational Web sites: A classification system sites for educators and learners. <i>Educational Technology</i> , 43(6), 47-50.	PNREF
2002	Cates, W.M. (2002). Calculating production ratios for multimedia computer-based instruction: Descriptive analyses of production data of experienced developers. <i>Journal of Educational Computing Research</i> , 26, 109-131.	PEER
	Bodzin, A.M., & Cates, W.M. (2002). Inquiry dot com. <i>Science Teacher</i> , 62(9), 48-52.	
	Cates, W.M. (2002). Systematic selection and implementation of graphical user interface metaphors. <i>Computers & Education</i> , 38, 385-397.	
2001	Bishop, M.J., & Cates, W.M. (2001). Theoretical foundations for sound's use in multimedia instruction to enhance learning. <i>Educational Technology Research & Development</i> , 49(3), 5-22.	PEER
	Guest editor, special January-February 2001 issue of <i>Educational Technology</i> on instructional software design that included:	PNREF
	o Cates, W.M. (2001). Introduction. <i>Educational Technology</i> , 41(1), 5-6.	
o Cates, W.M. (2001). Splamulating one's way to understanding: The uncanny physics-of-energy experience. <i>Educational Technology</i> , 41(1), 48-59.		
	o Cates, W.M., & Bishop, M.J. (2001). Authors' discussion of special issue. <i>Educational Technology</i> , 41(1), 60-61.	
2000	Cates, W.M., & Bruce, R. (2002). Conceptualizing learner support space. <i>Educational Technology Research & Development</i> , 48(1), 85-98.	PEER

1997	Cates, W.M., & Goodling, S. (1997). The relative effectiveness of learning options in multimedia computer-based fifth grade spelling instruction. <i>Educational Technology Research & Development, 45</i> (2), 27-46.	PEER
	Ohl, T., & Cates, W.M. (1997). Applying metaphorical design principles to the World Wide Web. <i>Educational Technology, 37</i> (6), 25-38	PNREF
	Cates, W.M. (1997). Computerized instruction. <i>World Book Encyclopedia (1997 ed.)</i> .	PRACT
1996	Cates, W.M. (1996). The technology of educational restructuring: Planning for change in teacher education. <i>Computers in the Schools, 11</i> (4), 65-83.	PEER
1994	Cates, W.M. (1994). The influence of default values on the evaluative behavior of respondents completing computerized evaluations. <i>Computers in Human Behavior, 10</i> , 333-345.	PEER
	Cates, W.M. (1994). Estimating the time required to produce computer-based instructional lessons: Descriptive analyses of the production data of novice instructional developers. <i>Journal of Educational Computing Research, 10</i> , 29-40.	
1993	Cates, W.M., Fontana, L., & White, C. (1993). Designing an interactive multimedia instructional environment: The <i>civil war</i> interactive project. <i>Journal of the Association for Learning Technologies, 1</i> (2), 5-16.	PEER
	Cates, W.M., & McNaull, P. (1993). The influence of inservice training and university coursework on the expressed attitudes and reported microcomputer use of teachers of 7th and 8th grade learning disabled students. <i>Journal of Research on Computing in Education, 25</i> , 447-463.	
	Cates, W.M. (1993). New optical technologies. <i>The Clearing House, 66</i> , 324-325.	PRACT
	Cates, W.M. (1993). The instructional design debate. <i>The Clearing House, 66</i> , 133-134.	
	Cates, W.M. (1993). A small-scale comparison of the equivalence of paper-and-pencil and computerized versions of student end-of-course evaluations. <i>Computers in Human Behavior, 9</i> , 401-409.	
Cates, W.M. (1993). The importance of subject matter instructional expertise in research on the effectiveness of instructional computer programs. <i>Journal of Educational Technology Systems, 21</i> , 363-367.	PEER	
1992	Cates, W.M. (1992). The influence of microcomputer ownership on the academic achievement of graduate students: How real is the effect? <i>Journal of Research on Computing in Education, 24</i> , 399-409.	PEER
	Cates, W.M. (1992). What's new in instructional technology: Making sense of high tech acronyms. <i>The Clearing House, 65</i> , 260-261.	PRACT
	Cates, W.M. (1992). Fifteen principles for designing more effective hypermedia/multimedia instructional products. <i>Educational Technology, 32</i> (12), 5-9.	PNREF
1991	Cates, W.M. (1991). An instructional designer's evaluation of the ABC news InterActive package: Martin Luther King, Jr. <i>Social Education, 55</i> , 165-168.	PEER
	Cates, W.M. (1991). What we need to teach students before they work on computer-assisted instruction: Lessons gleaned from CAI failures. <i>International Journal of Instructional Media, 18</i> (2), 129-140.	
	Cates, W.M. (1991). What's new in instructional technology: Making the most of multimedia: Advice for developers. <i>The Clearing House, 65</i> , 70-71.	PRACT
1990	Cates, W.M. (1990). Helping students learn to think critically: Detecting and analyzing bias in films. <i>The Social Studies, 81</i> , 15-18.	PEER
	Cates, W.M. (1990). Adding professional recording effects to instructional audiotapes. <i>The Clearing House, 63</i> , 405-410.	PRACT
1989	Cates, W.M. (1989). Making more effective use of films and videotapes in the classroom. <i>The Clearing House, 62</i> , 401-407.	PRACT
	Cates, W.M. (1989). Research findings applied to software design: Computerized instructional spelling programs. <i>Journal of Computer-Based Instruction, 16</i> , 1-10.	PEER

1988	Cates, W.M. (1988). Putting student spelling devils out of your misery in three to ten minutes a day: A teacher's guide to new techniques. <i>The Clearing House</i> , 58, 101-107.	PRACT
1985	Cates, W.M. (1985). A review of the Zenith educational system (ZES). <i>Computers in Math and Science Teaching</i> .	PRACT
1984	Cates, W.M. (1984). Retesting: A logical alternative in college teaching. <i>Improving College and University Teaching</i> , 20, 50-67.	PEER
1983	Cates, W.M. (1983). Teaching time/rate/distance problems, Or ladies and gentlemen, start your engines. <i>Arithmetic Teacher</i> , 30, 35-37.	PEER
1982	Cates, W.M. (1982). The efficacy of retesting in relation to improved test performance of college undergraduates. <i>Journal of Educational Research</i> , 75, 230-236.	PEER
1981	Cates, W.M. (1981). Do or die spelling: Teaching spelling without the struggle. <i>English Journal</i> , 71, 45-47.	PNREF/ PRACT
	Cates, W.M. (1981). Perhaps, sorta, kinda, maybe: The student as faker. <i>Clearing House</i> , 51, 217-218. [Reprinted in (1981). <i>Education Digest</i> , 47, 50-52.]	PRACT
1980	Cates, W.M. (1980). Animation for the Sesame Street generation. <i>Instructional Innovator</i> , 25, 41.	PRACT
	Cates, W.M. (1980). Sharp shooting: Adjusting your camera's diopter for sharper focus. <i>Super8Filmmaker</i> , 8, 43-45.	PRACT
1978	Cates, W.M. (1978). Organized non-activity: A proposed solution to some common classroom problems. <i>Clearing House</i> , 51, 220-222. [Reprinted in (1978). <i>Education Digest</i> , 43, 36-37.]	PRACT
1976	Cates, W.M. (1976). Recording tips for teachers. <i>Clearing House</i> , 49, 229-230. [Reprinted in <i>Multi-Media Forum</i>].	PRACT
	Cates, W.M. (1976). Electrifying the reading course, Or how I galvanized 'em into reading. <i>English Journal</i> , 63, 97-98.	PNREF/ PRACT

BOOK CHAPTERS AND MONOGRAPHS

Cates, W.M. (1991). Dynamic history in the classroom: How one teacher makes it happen. In *The Civil War hypermedia project design document* (pp. 1-30). Fairfax, VA: Center for Interactive Educational Technology, George Mason University, the Corporation for Public Broadcasting, and Florentine Films.

Cates, W.M. (1991). Design and operational specifications of the hypermedia environment. In *The Civil War hypermedia project design document* (pp. 57-87). Fairfax, VA: Center for Interactive Educational Technology, George Mason University, the Corporation for Public Broadcasting, and Florentine Films.

Cates, W.M. (1984). Evaluation and testing. (Associate editor) in *The Clearing House: A closer look*. Washington, DC: Heldref.

Cates, W.M., & Clinesmith, R. (1978). *Exploring new teaching strategies*. Pittsburg, KS: Pittsburg State University School of Education and Nevada Missouri Public Schools.

VALIDATED TESTS AND INSTRUMENTS

Bodzin, A.M., & Cates, W.M. (2000-02). Web-based inquiry for learning science (WBI): Instrument and manual: Version 1. Available at http://www.lehigh.edu/~amb4/wbi/wbi-v1_0.pdf

Bodzin, A., Waller, P., Edwards, L., Cates, W.M., & Shive, L. (2003-04). The reflective practice inventories: Science in the inclusive classroom [Component inventories: Curriculum and instruction (RPI: SIC-CI), Technology use (RPI: SIC-TU), and Communication (RPI: SIC-Com)]

TECHNICAL AND EVALUATION REPORTS SUBMITTED TO EXTERNAL FUNDERS

- Cates, W.M. (2006). *Enhancing Education through Technology*. Report to the Pennsylvania Department of Education: Findings of the Final Evaluation Measures for the Allentown School District Project
- Cates, W.M. (2005, August). Bethlehem Area School District *One-to-One Laptop Initiative: Final Report*
- Cates, W.M. (2005, March). Bethlehem Area School District *One-to-One Laptop Initiative: Interim Report*
- Cates, W.M. (2005). *Enhancing Education through Technology* Report to the Pennsylvania Department of Education: Findings of the First-year Evaluation Measures for the Allentown School District Project
- Bodzin, A.M., et al. (2003). *Exploring Life: Biology* Year 3 Final Report to the National Science Foundation (Analyzed data, generated findings, participated in group discussion of findings and supported writing of report.)
- Cates, W.M. (2003). Effectiveness of *Multi-user Virtual Museum Multimedia* Project: Final Report to National Science Foundation. [Contributed Analysis and Findings Subsection]
- Bodzin, A.M., et al. (2002). *Exploring Life: Biology* Year 2 Report to the National Science Foundation (Analyzed data, generated findings, participated in group discussion of findings and supported writing of report.)
- Dede, C., Fontana, L., et al. (2002). Effectiveness of *Multi-user Virtual Museum Multimedia* Project: Report to National Science Foundation. [Contributed Analysis and Findings Subsection]
- Bodzin, A.M., et al. (2001). *Exploring Life: Biology* Year 1 Report to the National Science Foundation (Contributed detailed interface analysis, participated in group discussion of analyses, and supported writing of report.)
- Cates, W.M. (1995). Final Evaluation Report on Lehigh University Modern Foreign Languages Department Faculty Development Grant: Year 3 (Culpeper Foundation)
- Cates, W.M. (1994). *Metacognition and Multimedia Leadership Instruction: A Vision for the United States Air Force Academy*
- Cates, W.M. (1994). Evaluation Report on Lehigh University Modern Foreign Languages Department Faculty Development Grant: Year 2 (Culpeper Foundation)
- Cates, W.M. (1993). Evaluation of Lehigh University Modern Foreign Languages Department Faculty Development Grant: Year 1 Report (Culpeper Foundation)
- Cates, W.M. (1993). *Exploring the Reasons Behind Design Decisions: Designing Interactive Multimedia Learning Environments for Science* [Bilingual Multimedia Science for the *Jason Project*]

PRESENTATIONS AT NATIONAL OR INTERNATIONAL MEETINGS (partial, since 1991)

PROCEEDINGS=Published proceedings; **PAPER**=Paper presented; **INVITED**=Invited presentation; **POSTER**=Poster session; **PANEL**=Panel/Symposium; **RND**=Roundtable; **PRESENT**=No paper

2012	Zhang, Y., & Cates, W.M. (2012, November, <i>accepted</i>). Designing instructor-facilitated online multicultural modules: National needs assessment findings. Paper to be presented at the annual convention of the Association for Educational Communications and Technology, Louisville, KY.	PAPER
	Cates, W.M., & Mattke, P.H. (2012, November, <i>accepted</i>). Design and development of scaffolded online OER databases: Research findings. Paper to be presented at the annual convention of the Association for Educational Communications and Technology, Louisville, KY.	PAPER
2011	Kulo, V., & Cates, W.M. (2011, November). Measuring implementation fidelity for newer instructional models: A conceptual framework. Paper presented at the annual convention of the Association for Educational Communications and Technology, Jacksonville, FL.	PAPER
	Cates, W.M., & Zhang, Y. (2011, November). Designing online diversity training for higher education. Paper presented at the annual convention of the Association for Educational Communications and Technology, Jacksonville, FL.	PAPER
	Cates, W.M. (2011, November). Faculty/student mentoring symposium (sponsored by the AECT Graduate Student Association). Panel discussion followed by small group session with graduate students at the annual convention of the Association for Educational Communications and Technology, Jacksonville, FL.	INVITED/ PANEL

	Cates, W.M. (2011, November). Breakfast with champions. Two consecutive leadership mentoring table sessions at the annual convention of the Association for Educational Communications and Technology, Jacksonville, FL.	INVITED/ PANEL
	Cates, W.M. (2011, July). Doing more effective strategic planning in a professional organization. Workshop presentation at the annual summer leadership conference, Jacksonville, FL.	INVITED/ PRESENT
	Cates, W.M. (2011, July). Motivation and Leadership: Supporting enlightened self-interest. Workshop presentation at the annual summer leadership conference, Jacksonville, FL.	INVITED/ PRESENT
2010	Kulo, V., & Cates, W.M. (2010, October). Geospatial information technologies in support of science inquiry: Implementation study findings. Paper presented at the annual convention of the Association for Educational Communications and Technology, Anaheim, CA.	PAPER
2009	Kulo, V., Cates, W.M., & Bodzin, A.M. (2009). Designing for geospatial information technologies. <i>Proceedings of the 2009 national convention of the Association for Educational Communications and Technology: Vol. 1: Selected research and development papers</i> , 32, 291-300.	PROCEEDINGS
	Cates, W.M., & Mattke, P.H. (2009, October). Open educational resources on science museum Websites: Best practices. Paper presented at the annual convention of the Association for Educational Communications and Technology, Louisville, KY.	PAPER
	Cates, W.M. (2009, October). Socratic seminar: What I believe – A leader's philosophy of education. Invited presentation at the annual convention of the Association for Educational Communications and Technology, Louisville, KY.	INVITED/ PANEL
2008	Cates, W.M., & Mattke, P.H. (2009, November). Public history on the Web: Design of educational resources. Paper presented at the annual convention of the Association for Educational Communications and Technology, Orlando, FL.	PAPER
	Cates, W.M. (2008, November). What does leadership in instructional design and technology look like? A view from three perspectives. Invited presentation at the annual convention of the Association for Educational Communications and Technology, Orlando, FL.	INVITED/ PANEL
2007	Cates, W.M. (2007). One laptop for each middle schooler: Practical findings from a recent study. <i>Proceedings of the 2007 national convention of the Association for Educational Communications and Technology: Vol. 1: Selected research and development papers</i> , 30, 36-45.	PROCEEDINGS
	Cates, W.M. (2007). Understanding and enhancing the adoption of technology in education. <i>Proceedings of the 2007 Korean Society for Educational Technology conference: Towards emerging instructional design theories and models for the future</i> , 104-110.	PROCEEDINGS
	Duffield, J.A., & Cates, W.M. (2007, April). Important issues and concerns facing professional development schools: A Delphi study. Paper presented at the annual convention of the American Educational Research Association. Chicago, IL.	PAPER
2006	Kulo, V., & Cates, W.M. (2006). Perils of teacher-proof online design: Study findings from science WBIs. <i>Proceedings of the 2006 national convention of the Association for Educational Communications and Technology: Vol. 1: Selected research and development papers</i> , 29, 194-203.	PROCEEDINGS
	Cates, W.M. (2006, March). How 1-to-1 affects teachers and the culture of teaching and learning: Recent findings. Invited paper presentation at the annual One-to-One Computing Conference. State College, PA.	INVITED/ PAPER
2005	Harmer, A., & Cates, W.M. (2005, October). Blended learning 6 th -grade scientific inquiry: Design and development findings. Paper presented at the annual convention of the Association for Educational Communications and Technology, Orlando, FL.	PAPER
2004	Bodzin, A., & Cates, W. (2004, May). Summative evaluation of the Biology: Exploring Life curriculum. Poster presentation at the annual National Science Foundation K-12 Math, Science, and Technology Curriculum Developers Conference, Washington, DC.	POSTER
	Cates, W.M., & Varisco, R. (2004, October). Analyzing online educational practices of U.S. art museums. Paper presented at the annual convention of the Association for Educational Communications and Technology. Chicago, IL.	PAPER

2003	Cates, W.M., & Varisco, R. (2003, October). Closed Mondays: Assessing museum online educational practices in the U.S. Paper presented at the annual convention of the Association for Educational Communications and Technology, Anaheim, CA.	PAPER
	Bodzin, A.M., Cates, W.M., Price, B., & Pratt, K. (2003, June). Implementing a Web-integrated high school biology program. Web poster presentation at the National Educational Computing Conference, Seattle, WA.	POSTER
	Cates, W.M., Bishop, M.J., & Slagter van Tryon, P.J. (2003, April). Web-based audio online teaching: Findings and concerns. Poster presentation at the Computer-assisted Learning (CAL'03) annual conference, Belfast, N. Ireland.	POSTER
	Bodzin, A.M., Cates, W.M., & Price, B. (2003, March). Formative evaluation of the Exploring Life curriculum: Year two implementation findings. Paper presented at the annual meeting of the National Association for Research in Science Teaching, Philadelphia.	PAPER
	Bodzin, A.M., & Cates, W.M. (2003, January-February). Preparing preservice science teachers to understand Web-based inquiry. Paper presented at the Association for the Education of Teachers in Science annual international conference, St. Louis, MO.	PAPER
2002	Shive, L., Bodzin, A.M., Cates, W.M. (2002, March). Pedagogical and design characteristics of chemistry-related Websites. Presentation at the annual meeting of the National Association for Research in Science Teaching, New Orleans, LA.	POSTER
	Cates, W.M., & Slagter van Tryon, P.J. (2002, November). Thinking systematically about online learning: Strategies for enhancing social connectedness. Paper presented at the annual convention of the Association for Educational Communications and Technology, Dallas, TX.	PAPER
	Bodzin, A.M., Price, B., Cates, W.M., Heyden, R., & Weidenaar, J. (2002, June). Developing a Web-enhanced high school biology program. Web poster presentation at the annual National Educational Computer Conference, San Antonio, TX.	POSTER
	Price, B., Cates, W., & Bodzin, A. (2002, June). Challenges in implementing technology-rich curricular high school biology materials: First year findings from the Exploring Life project. Paper presented at the National Educational Computing Conference, San Antonio, TX.	PAPER
	Bodzin, A., Price, B., Cates, W., Williamson, B., & Campbell, N. (2002, April). Formative evaluation of the design and development of a Web-based biology curriculum: Y1 findings. Paper presented at the National Association for Research in Science Teaching Annual Meeting, New Orleans, LA.	PAPER
	Shive, L., Bodzin, A., & Cates, W.M. (2002, April). The status of Web-based inquiry for secondary school chemistry. Paper presented at the National Association for Research in Science Teaching Annual Meeting, New Orleans, LA.	PAPER
	Martindale, T., & Cates, W.M. (2002, November). What makes a Website "exemplary"? Paper presented at the annual convention of the Association for Educational Communications and Technology, Dallas, TX.	PAPER
2001	Martindale, T., Qian, Y., & Cates, W.M. (2001). Categorizing exemplary educational Websites. <i>Proceedings of the 2001 national convention of the Association for Educational Communications and Technology: Vol. 2: Selected papers on the practice of educational communications and technology</i> , 24, 441-445.	PROCEEDINGS
	Cates, W.M., & Bodzin, A. (2001, November). Designing for Web-based scientific inquiry: Research findings into practice. Paper presented at the annual meeting of the Association for Educational Communications and Technology, Atlanta, GA.	PAPER
	Bishop, M.J., & Cates, W.M. (2001, October). Sound decisions in Web-based learning: Moving from text-based to two-way. Paper presented at the annual meeting of the Association for Educational Communications and Technology, Denver, CO.	PAPER
	Bodzin, A., Cates, W.M., & Vollmer, V. (2001, March). Codifying Web-based inquiry activities: Preliminary instrument development. Paper presented at the annual meeting of the National Association for Research in Science Teaching, St. Louis, MO.	PAPER
2000	Bishop, M.J., & Cates, W.M. (2000). A model for the efficacious use of sound in multimedia instruction. <i>Proceedings of the 2000 national convention of the Association for Educational Communications and Technology: Vol. 1: Selected research and development papers</i> , 22, 8-18.	PROCEEDINGS

	Cates, W.M., & Berkley, J. (2000). What price metaphor? Calculating metaphorical interfaces' return-on-investment. <i>Proceedings the 2000 national convention of the Association for Educational Communications and Technology: Vol. 1: Selected research and development papers</i> , 22, 59-70.	PROCEEDINGS
	Cates, W.M., Bishop, M.J., & Hung, W. (2000). Characterization versus narration: Empirical investigations of drama's role in multimedia instructional software. <i>Proceedings of selected research and development presentations at the 2000 national convention of the Association for Educational Communications and Technology</i> , 22, 43-58.	PROCEEDINGS
	Cates, W.M., Rieber, L., Merrill, M.D., Hannum, W., Matzko, M., & Bishop, M.J. (2000, February). Different designers: Different designs. A session presented at the annual convention of the Association for Educational Technology & Communications, Long Beach, CA.	PANEL
1999	Bishop, M.J., & Cates, W.M. (2000, February). Necessary bells and whistles: Some guidelines for the systematic use of sound in computerized instruction. A paper presented at the annual convention of the Association for Educational Technology & Communications, Houston, TX.	PAPER
	Cates, W.M. (1998, February). Déjà vu all over again: Considering instructional design and the world wide Web. A paper presented at the annual convention of the Association for Educational Technology & Communications, St. Louis, MO.	PAPER
1998	Berkley, J., & Cates, W.M. (1998, February). From "vaporware" to functional metaphorical interface: Delivering the goods. A paper presented at the annual convention of the Association for Educational Technology & Communications, St. Louis, MO.	PAPER
	Schaeffer, R., & Cates, W.M. (1998, February). Analyzing color's role across the spectrum of instructional software: Guidelines for instructional designers and developers. A paper presented at the annual convention of the Association for Educational Technology & Communications, St. Louis, MO.	PAPER
	Cates, W.M., Bishop, M.J., Fontana, L., & vanNest, C. (1998, February). The thoughtful reporter, one year later: An update on the multimedia thinking skills project. A paper presented at the annual convention of the Association for Educational Technology & Communications, St. Louis, MO.	PAPER
	Bishop, M.J., & Cates, W.M. The physics of immersion: Investing one's energy in designs that motivate learners to get involved. Paper presented at the annual convention of the Association for Educational Communications and Technology, Albuquerque, NM, February.	PAPER
	Berkley, J., & Cates, W.M. (1997, February). User-centered design calls for the active voice: Using focus groups to improve instructional software and metaphorical interfaces. Paper presented at the annual convention of the Association for Educational Communications and Technology, Albuquerque, NM.	PAPER
1997	Cates, W.M., & Bruce, R. (1997, February). Designing learner support devices in interactive multimedia software. Paper presented at the annual convention of the Association for Educational Communications and Technology, Albuquerque, NM.	PAPER
	Toporski, N., & Cates, W.M. (1997, February). Transparency is a pane: Metaphorical language and graphical user interfaces. Paper presented at the annual convention of the Association for Educational Communications and Technology, Albuquerque, NM.	PAPER
	Cates, W.M., Bishop, M.J., & vanNest, C. (1997, February). The Thoughtful Reporter: Teaching thinking skills using the Internet. Paper presented at the annual convention of the Association for Educational Communications and Technology, Albuquerque, NM.	PAPER
1996	Cates, W.M. (1996). Toward a taxonomy of metaphorical graphical user interfaces: Demands and implementations. <i>Proceedings of selected research and development presentations at the 1996 national convention of the Association for Educational Communications and Technology</i> , 18, 101-110.	PROCEEDINGS
	Bishop, M.J., & Cates, W.M. (1996). A door is a big wooden thing with a knob: Getting a handle on metaphorical interface design. <i>Proceedings of selected research and development presentations at the 1996 national convention of the Association for Educational Communications and Technology</i> , 18, 80-88.	PROCEEDINGS

	Berkley, J., & Cates, W.M. (1996). Building coping skills on a firm foundation: Using a metaphorical interface to deliver stress management instruction. <i>Proceedings of selected research and development presentations at the 1996 national convention of the Association for Educational Communications and Technology</i> , 18, 71-79.	PROCEEDINGS
	Schaeffer, R., & Cates, W.M. (1996). Cooperative software for the Internet. <i>Proceedings of selected research and development presentations at the 1996 national convention of the Association for Educational Communications and Technology</i> , 18, 674-682.	PROCEEDINGS
1995	Cates, W.M., & Goodling, S. (1995, February). Interactive research-based spelling software: Stage I — The design. A paper presented at the Annual Meeting of the Association for Educational Communications and Technology, Anaheim, CA.	PAPER
1994	Cates, W.M. (1994). Designing hypermedia is hell: Metaphor's role in instructional design. <i>Proceedings of selected research and development presentations at the 1994 national convention of the Association for Educational Communications and Technology</i> , 16, 95-108.	PROCEEDINGS
	Cates, W.M. (1994). Exploring the reasons behind design decisions: Interactive multimedia learning environments. In M. Orey (Ed.), <i>Proceedings of the thirty-fifth international ADCIS conference</i> , (pp. 207-214). Nashville, TN: Association for the Development of Computer-Based Instructional Systems.	PROCEEDINGS
1993	Cates, W.M. (1993, April). Making the most of imagery: Theoretical issues in selecting metaphorical images. A paper presented at the Annual Meeting of the American Educational Research Association, Atlanta, GA.	PAPER
	Cates, W.M., (1993, June). 750,000 students under the sea: Interactive bilingual multimedia science instruction. A presentation at the Annual Meeting of the National Educational Computing Conference, Orlando, FL.	PRESENT
	Fontana, L.A., Dede, C., White, C., & Cates, W.M. (1993). Multimedia: A gateway to higher order thinking skills. <i>Proceedings of selected research paper presentations at the annual convention of the Association for Educational Communications and Technology</i> , 15, 351-364.	PROCEEDINGS
1992	Cates, W.M. (1992, April). Considerations in evaluating metacognition in interactive multimedia/hypermedia products. A paper presented at the Annual Meeting of the American Educational Research Association, San Francisco, CA.	PAPER
1991	Cates, W.M. (1991, November). Fifteen principles for designing effective instructional multimedia products. A paper presented at the Annual Meeting of the Minnesota Educational Computing Consortium, Minneapolis, MN.	PAPER
	White, C., Cates, W.M., & Fontana, L. (1991). The Civil War Interactive Project: Meeting four major design challenges. <i>Proceedings of the International Conference on Multi-Media in Education and Training, Japan Association for Educational Technology and International Society for Technology in Education</i> , Tokyo, Japan.	PROCEEDINGS
	Fontana, L., White, C., & Cates, W.M. (1991). The Civil War Interactive: Using interactive multimedia to teach history. <i>Proceedings of Interactive Multimedia '91 Conference, The Society for Applied Learning and Technology</i> , Washington, DC.	PROCEEDINGS
	Cates, W.M., White, C., & Thomas, W. (1991, June). Reflections on building a multimedia project development team. A project paper presented at the National Educational Computing Conference, Phoenix, AZ.	PAPER
	Cates, W.M. (1991, April). Differential effects of default values in computerized evaluations of instructional performance: Implications and applications. A paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.	PAPER
	Cates, W.M., & Austin, M. (1991, April). A comparison of the reliabilities of evaluations obtained using computerized and noncomputerized forms. A paper presented at the Annual Meeting of the American Educational Research Association, Chicago, IL.	PAPER

INSTRUCTIONAL COMPUTER PROGRAMS

2001	<p>Rallytowne: The Physics of the Bicycle (a <i>Thoughtful Reporter</i> science product; see below): A Web-based product on the physics and history of the bicycle. For both Windows and Mac. Part of the two-year <i>Multi-user Virtual Museum Project</i> funded by NSF. (Product beta tested, fall 2001.)</p> <p>ROLE: Working with representatives of the National Museum of American History at the Smithsonian Institution, science teachers, and a science education expert, I developed the scaffolding in inquiry-based science and specified or formulated most of the content in the database.</p>
2000	<p>(with Lehigh Valley Hospital). Community-oriented Primary Care: An Initiative-based Introduction (a <i>Thoughtful Reporter</i> medical training product; see below): A CD-ROM-based product for medical residents on community-oriented primary care. For both Mac and Windows.</p> <p>ROLE: I helped generate/derive the content, produced many of the learning objects, and supervised the programmer. (Prototype tested fall 2000)</p>
1999	<p>Sexist PorQué (with Michael Bender). A 15-minute program on sexist stereotypes. Designed for use with Multicultural Issues-type courses. For both Windows and Macintosh. Written in Oracle Media Objects.</p> <p>ROLE: I designed the instructional approach and directed the programming and graphics staff.</p>
1998	<p>The IPP Package-shipping Center (with Woei Hung and MJ Bishop). A 15-minute computer-based lesson on the Information-processing model. Written in Oracle Media Objects for both Windows and Macintosh.</p> <p>ROLE: I formulated the original instructional design and worked with one of my doctoral students on its creation and coding. I acted as subject matter expert for the project as well.</p>
	<p>The 1850's: An Increasingly Divided Nation (a <i>Thoughtful Reporter</i> history product; see below): A CD-ROM-based product on the period leading up to the Compromise of 1850. Coded in mTropolis for both Windows and Macintosh. Field-tested in three countries in Europe in spring 1998. The new version was further field-tested in the United States and Europe in 1999. Funded through the President's Technology Initiative (PTI) for use in DoDDS (Department of Defense) schools worldwide.</p> <p>ROLE: I directed the coding and worked with a team of subject matter experts on its content.</p>
	<p>Accuracy (a <i>Thoughtful Reporter</i> thinking skills development course; see below). Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I was principally responsible for the instructional design and content of the course and directed its coding.</p>
1997	<p>(with M.J. Bishop) Synthesis (a <i>Thoughtful Reporter</i> course on analyzing potential historical sources to create multimedia class presentations; see below). Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I collaborated with one of my doctoral students on the instructional design. I supplied the content of the course and directed its coding.</p>
	<p>Credibility (a <i>Thoughtful Reporter</i> thinking skills development course; see below). Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I was principally responsible for the instructional design and content of the course and I directed its coding.</p>
	<p>Interpreting Graphs (a <i>Thoughtful Reporter</i> course on interpreting and analyzing data; see below) This was developed under NSF funding. Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I served as content expert and designer and supervised the coding.</p>
1997	<p>Our Waters, Our World (a <i>Thoughtful Reporter</i> science product; see below): A CD-ROM-based product on the ecology of watersheds. Funded through NSF. Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I directed its coding and worked with a team of subject matter experts on its content.</p>
	<p>Thomas Jefferson: The Founding of a Nation (a <i>Thoughtful Reporter</i> history product; see below): A CD-ROM-based product on the life and presidency of Thomas Jefferson. Funded through the Department of Defense and president's Technology Initiative. Presently in use in DoDDS schools in Europe. Coded in mTropolis for both Windows and Macintosh</p> <p>ROLE: I directed its coding and worked with a team of subject matter experts on its content.</p>

	<p>Computer Hardware. A CD-ROM-based interactive multimedia program that teaches about computer equipment. Coded in Oracle media objects for both Windows and Macintosh.</p> <p>ROLE: I guided the original design and worked with the students who did the actual coding. My work accounts for approximately 40% of the product's content.</p>
1996-97	<p>(with J. Berkley) Building Coping Skills on a Firm Foundation. A stress-management instructional program for college freshman. Written in mTropolis and Macromedia Director for both Windows and Macintosh.</p> <p>ROLE: I collaborated with my doctoral student to produce this program and directed its programming.</p>
1995-99	<p>The Thoughtful Reporter: A large-scale patented instructional shell that uses a metaphorical interface to deliver instruction. It supports formal and indirect instruction in thinking skills while teaching learners to create presentations using primary source materials. Dynamically linked to the World Wide Web. Presently offers instruction in American History (slavery and government) and Science (ecology). For both Windows and Apple Macintosh computers. Written in Filemaker Pro, Macromedia Director, and mTropolis. The shell's major components include a Log-in, a Virtual Office, and a Source Investigator.</p> <p>ROLE: I led the team that created the operational specifications for this shell and was principally responsible for how its scaffolding was conceptualized and executed, including both instructional design and interface operation. I directed the project in which it was created and I am co-inventor on the patent granted.</p>
	<p>Slavery in the United States (a <i>Thoughtful Reporter</i> history product; see above): A CD-ROM-based product on slavery. Field-tested in three countries in Europe in spring 1997 in its Oracle Media Objects version and then recoded in summer 1997 in mTropolis. Funded through the Department of Defense. The recoded version was used in DoDDS schools worldwide. Both Windows and Macintosh.</p> <p>ROLE: I directed its coding and worked with a team of subject matter experts on its content.</p>
1996	<p>Assignments (a <i>Thoughtful Reporter</i> thinking skills development course; see above). Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I was principally responsible for the instructional design and content of the course and I directed its coding.</p>
	<p>Relevance (a <i>Thoughtful Reporter</i> thinking skills development course; see above). Coded in mTropolis for both Windows and Macintosh.</p> <p>ROLE: I was principally responsible for the instructional design and content of the course and I directed its coding.</p>
	<p>ModMath. An instructional multimedia program for teaching college undergraduates about modular math. For both Macintosh and Windows computers. Written in Oracle Media Objects.</p> <p>ROLE: I worked with a math professor at Kutztown who served as the subject matter expert. I was responsible for the instructional design and directed the actual coding of the program, working with one of my doctoral students (M.J. Bishop).</p>
1995-96	<p>Learning the American Psychological Association Referencing Style: An instructional unit of five lessons that teaches the learner how to use APA style correctly. For both MS-DOS and Apple Macintosh computers; written in Oracle Media Objects.</p> <p>ROLE: I served as instructional design team leader and contributed about 30% of the total design personally.</p>
1994-95	<p>(with S. Goodling). You Toucan Spell. An instructional program for teaching spelling to fifth graders using innovative (cognitive research-based) instructional approaches. Coded in Macromedia Director for Macintosh computers.</p> <p>ROLE: The design was based on my previous work in spelling research and I was largely responsible for the interface and instructional design employed.</p>
	<p>(with S. Goodling). S.P.O.T.S. (Skills Outcomes Targeting Spelling). An instructional program for teaching spelling to fifth graders using more traditional instructional approaches, but based on research findings. Coded in Macromedia Director for Macintosh computers.</p> <p>ROLE: The design was based on my previous work in spelling research and I was largely responsible for the interface and instructional design employed.</p>
1994	<p>CBI Design: Screen Design. An instructional lesson on how to design and compose screens for microcomputer-based instructional lessons. This lesson was the first in a series on CBI design. Written in IBM Toolbook for MS-DOS computers.</p> <p>ROLE: I served as subject matter expert as well as instructional design and authoring team leader for the project.</p>

1991	<p>The Civil War Interactive. A working demonstration hypermedia interactive computer program written for the Macintosh computer, with accompanying laserdisc of video segments from Ken Burns' PBS film series, <i>The Civil War</i>, along with the audio compact disc of music from that series. This program implemented new instructional design approaches for hypermedia programs, including reduced cognitive load, readily-available metacognitive support, and minimal navigational confusion. Funded by the Corporation for Public Broadcasting (CPB) as a proof-of-concept extension of design work performed under an earlier CPB grant. Prototype was demonstrated in March 1991 as an exemplar at the Senate Open Hearings on Technology in Washington, DC.</p> <p>ROLE: I was principally responsible for both the instructional design and interface design of the prototype. I personally coded the entire prototype in Apple HyperCard.</p>
1990	<p>The Hersey-Blanchard Effectiveness Model. An instructional lesson on this leadership model which is the first lesson in the computer-based instructional unit Five Educational Leadership Models. MS-DOS computers. (Total: 5 hours of instruction)</p> <p>ROLE: I designed and programmed this lesson and was leader for both the instructional design and programming teams for the development of the five-lesson unit.</p> <p>Gagné's Nine Significant Events. An instructional unit on the application of Gagné's model to classroom and industrial instruction. MS-DOS computers. (Total: 2 hours of instruction)</p> <p>ROLE: I served as instructional design team leader and programming supervisor for this unit.</p>
1987	<p>Writing Performance Objectives. A computer-based instructional lesson on performance objectives. For MS-DOS computers.</p> <p>ROLE: I designed/created the lesson using my custom lesson-creation software, <i>FileAuthor</i> (see next section).</p>
1982	<p>Computer Poet. An instructional unit on writing four types of poems. Apple II.</p> <p>ROLE: I designed and programmed the unit shell and its four lessons.</p> <p>Grading on the Curve. An instructional multi-lesson unit on the theory behind grade curving. Apple II.</p> <p>ROLE: I designed and programmed the unit shell and its lessons.</p>
1981	<p>How to Operate an Apple II Computer. Instructional introduction to the Apple II.</p> <p>ROLE: I designed and programmed the unit shell and its lessons.</p>

EDUCATIONAL TOOL SOFTWARE FOR COMPUTERS

- (1988-90). **Student Course Evaluator and Summation Package, which includes:**
 - o **Evalshell.** A program that permits students to enter their evaluations of a course on disk. The program traps the number and type of keystrokes employed and response latency values. This program also incorporates a small word processing module to permit students to enter comments.
 - o **Evalstat.** A series of programs that compile and analyze the data gathered in Evalshell and create files for statistical analysis using *Research Analyst*. MS-DOS computers.
- (1987). **FileAuthor.** An authoring package for lesson delivery that works with multiple external text files to deliver lessons including content, examples, embedded assessments and detailed feedback. MS-DOS computers.
- (1982-89). **Research Analyst.** Complete multivariate analysis and statistical package. (3 disks & documentation. Requires 256K and hard disk). MS-DOS computers. (Versions 1.0 - 4.0)
- (1984). **Survey Analyst.** Complete multivariate item analysis of survey data. (4 diskettes, documentation. Requires minimum 256K and hard disk). MS-DOS computers.
- (1983). **School Assigner.** A custom database management system for assigning students to teaching assignments. MS-DOS computers.
- (1982). **Quick Grader.** A grading and record-keeping program for teachers. MS-DOS; Apple; Radio Shack computers.
- (1982). **Test Item Analysis Program.** A multi-stage program for computing test item difficulty and discrimination. MS-DOS computers; Apple; Radio Shack.

PATENTS

Fontana, L.A., & Cates, W.M. (2002). **A system for instructional thinking skills: The multimedia thinking skills engine** (Patent # 6,361,326 B1).

INSTRUCTIONAL VIDEOTAPES

(1975-78). I worked with the staff of the university's instructional television studio to produce a series of one-inch instructional videotapes for broadcast to in-service and pre-service teachers. I scripted the videos and served as the on-screen instructor as well. These tapes include:

- Operating the Bell & Howell Autoload 16mm projector.
- Operating the Bell & Howell filmstrip projector.
- Operating the Kodak Caramate slide-tape projector.
- Setting up a portable auditorium-size movie screen.
- Operating the Kodak Carousel slide projector.
- Operating the Dukane sound-filmstrip projector.
- Operating the Viewlex filmstrip projector.
- Setting up and using the Sony Portapak portable videorecorder (five-part series).
- The opaque projector.
- Using cassette audiotape recorders.
- Using reel-to-reel audiotape recorders.
- Using the Kodak Visualmaker.
- Introducing the Voxcom card reader.
- Body language for teachers.
- Using filmloop projectors.
- Overhead projection: 3M's Thermofax machine and the overhead projector.

EDITORIAL/REVIEW PANEL PARTICIPATION

- *Educational Technology Research and Development* (ETR&D)
 - Research, Consulting Editor & Reviewer
 - Development, Consulting Editor & Reviewer
- *Educational Technology*, Contributing Editor
- Association for Educational Communications and Technology (AECT)
 - Books, Monographs, & White Papers
 - ✓ *Non-Periodic Publications Committee* (Chair, 1995-98)
 - ✓ *Brown Outstanding Book Award Selection Panel* (member, 1995-98)
 - ✓ *Publications Committee* (member, 2002-present)
 - Journal Articles
 - ✓ *AECT Outstanding Journal Article Award Selection Panel* (member, 2012)
- *Handbook of Research on Educational Communications and Technology* (3rd ed.)
 - Chapter Reviewer (2011-12).

AD HOC MANUSCRIPT REVIEWING

- *Journal of Educational Multimedia and Hypermedia*
- *Computers and Education*
- *Journal of Educational Computing Research*

HONORS AND AWARDS

- (2008). **Distinguished Service Award**, Association for Educational Communications and Technology.
- (2003). **Outstanding Service to the Division Award**, Design and Development Division, Association for Educational Communications and Technology.
- (2001). **Outstanding Reviewer Award**, *Educational Technology Research and Development* (Research).
- (2000). Coauthor with MJ Bishop of the **Young Scholar** paper, Association of Educational Communications and Technology, Research award.
- (1991). **Distinguished Service Award**, Instructional Technology Special Interest Group, American Educational Research Association.
- (1981). **MacDonough Outstanding Chapter Counselor Award**, Sigma Phi Epsilon Fraternity, national award received year the Kansas Theta chapter—the campus fraternity for which I was university adviser and chapter counselor—was recognized as one of the top chapters in the nation.

GRANTS AND EXTERNAL FUNDING

YEAR	TITLE	AMOUNT/ DURATION	TO WHOM SUBMITTED	ROLE
2006-07.	<i>High School Laptop Evaluation Project</i>	\$16,000/ 1 year	Pennsylvania Department of Education: Enhancing Education Through Technology [Partner: Bethlehem Area School District, Bethlehem, PA]	Co-wrote grant. Evaluation consultant.
2004-05.	<i>Middle School One-to-One Laptop Initiative Evaluation Project</i>	\$48,000/ 1 year	Pennsylvania Department of Education: Enhancing Education Through Technology [Partner: Bethlehem Area School District, Bethlehem, PA]	Wrote grant. PI: External evaluator.
2004-06.	<i>Enhancing Elementary Math Instruction Through Professional Development and Technology Mentor Support</i>	\$952,000/ 2 years; Lehigh: \$95,000/ 2 years.	Pennsylvania Department of Education: Enhancing Education Through Technology [Partner: Allentown School District, Allentown, PA]	Member of grant-writing team. External project evaluator.
2003.	<i>Syandus Physician Education Software Development</i>	\$6,500/ 1 year	National Science Foundation: Small Business Innovation Research	Subcontract: Created instructional design model, designed product interface.
2000-03.	<i>Biology: Exploring Life</i>	Lehigh: \$990,000/ 3 years	National Science Foundation: Instructional Materials Development	Project consultant: Evaluated and redesigned interface for online science materials to accompany textbook in year 1. In years 2 and 3, served as evaluation specialist, designing and validating measurement instruments and protocols; assisted in analysis and interpretation of findings.
2002.	<i>Exploring Complex Biological Concepts in Interactive 3-D Learning Environments over the Internet.</i>	Lehigh: \$17,500/ 1 year	National Science Foundation: Small Business Innovation Research	Subcontract: Conducted formative evaluation on software prototype (<i>BioMachine Cellular World 3-D</i>) and prepared external usability evaluation report.
2000-02.	<i>Building a Multi-user Virtual Environment (MUVE) for Museum Exhibits.</i>	\$1,010,000/ 2 years; Subcontract: \$90,000/ 2 years	National Science Foundation [Partners: Harvard University, George Mason University, Thoughtful Technologies]	Subcontract: Linked the Multimedia Thinking Skills product line (as scaffolding for thinking skills) to a MUVE so that learners could use the World Wide Web to explore Smithsonian Museum "virtual" exhibits.
1999-2000.	<i>Introduction to Community-oriented Primary Care (COPC) for Medical Residents.</i>	\$39,247/ 10 months	Lehigh Valley Hospital	PI: Developed a proof-of-concept MMTS content unit on COPC using thinking skills.
1997-98.	<i>Multimedia Thinking Skills in Political Science.</i>	\$65,000/ 6 months	Advanced Research Projects Agency: Computer-Aided Education and Training Initiative [Partners: George Mason University and Fountain Communications]	Subcontract: Expanded work done for both Defense Department and National Science Foundation. Created prototype of MMTS content unit for 8 th grade students on American government: <i>The 1850's, An Increasingly Divided Nation.</i>
1996-97.	<i>How Can an Information Environment Support Higher-order Thinking Skills in Science Education?</i>	\$125,000/ 11 months	National Science Foundation (CDA-9616478) [Partners: George Mason University and Fountain Communications]	Subcontract: Expanded previous work done for the Defense Department. Created prototype of MMTS science content unit focused on water ecology for eighth graders: <i>Our Waters, Our World.</i>

YEAR	TITLE	AMOUNT/ DURATION	TO WHOM SUBMITTED	ROLE
1995-97.	<i>Collaboration, Critical Thinking, and Networked Multimedia Systems.</i>	\$1,999,998/ 2 years Subcontract: \$236,992/ 2 years	Advanced Research Projects Agency: Computer-Aided Education and Training Initiative [Partners: George Mason University, Fountain Communications]	Subcontract: Designed, developed, and field-tested computer program to deliver instruction to Department of Defense Dependent schools worldwide over the Internet. The program supported development of critical thinking skills and metacognitive awareness through modeling and implicit and explicit instruction. Two history MMTS content units for 8th graders produced: <i>Thomas Jefferson, The Founding of a Nation</i> , and <i>Slavery in the United States</i> . Also incorporated an artificial intelligence assessment engine.
1991.	<i>The Civil War Interactive Project Prototype.</i>	\$6,000/ 6 months	Corporation for Public Broadcasting [Partner: Florentine Films]	Software developer: Created a prototype of the educational software designed under 1990 initial funding.
1990-91.	<i>The Civil War Interactive Design Project.</i>	\$250,000/ 1 year	Corporation for Public Broadcasting [Partner: Florentine Films]	Senior instructional designer: Designed educational software based on Ken Burns' PBS film series, <i>The Civil War</i> .
1980.	<i>Writers and Scholars Conference</i>	\$500/ 6 months	Phi Delta Kappa District Board	PI. Hosted faculty training conference on how to prepare grant proposals and write for publication, Pittsburg State University.
1974-75.	<i>Reporting School Performance to the Public.</i>	\$21,900/ 1 year.	Title V-C Elementary and Secondary Education Act [Partner: Burlington Public Schools]	PI. Created handbook for public schools on how to enhance communication with their constituencies.

GRANT PROPOSALS SUBMITTED BUT NOT FUNDED

YEAR	TITLE	AMOUNT/DURATION	TO WHOM SUBMITTED	ROLE
(2005).	<i>Technology-for-Teaching Grant</i>	\$15,500 + \$55,000 in equipment/ 15 months	Hewlett-Packard Corporation	Co-PI
(2005).	<i>Web-Based Inquiry for Environmental Literacy</i>	\$499,782/ 3 years.	Office of Education and Sustainable Development (OESD), National Oceanic and Atmospheric Administration (NOAA)	Co-PI
(2003).	<i>The EnviroSci Inquiry WBI Curricular Enhancement Module: Learning Environmental Education with Web-based Science Inquiry Activities</i>	\$300,000/ 2 years	National Science Foundation: Instructional Materials Development	Co-PI
(2000).	<i>ThoughtSpeed Project</i>	\$4,350,000/ 2 years	Office of Educational Technology, Pennsylvania Department of Education	Co-PI
(1996).	<i>Technology Journals Digital Enhancements Site</i>	\$3,000/ 3 years	Association for Educational Technology and Communications	PI
(1995).	<i>CPrime: Internet-based Chemistry Instruction.</i>	\$5,000,000/ 5 years	National Science Foundation	Co-PI
(1994).	<i>Multimedia Diabetes Program for Patient Care</i>	\$72,000	Eli Lilly and Company	Consultant
(1994).	<i>Improving Diabetic Patient Compliance Using a Multimedia Instructional Program</i>	\$115,000/ 18 months	Dorothy Rider Pool Foundation	Co-PI
(1989).	<i>George Mason University Proposal to House the National Center for Educational Technology</i>	\$5,000,000 5 years	U.S. Department of Education	Co-PI

ACADEMIC HONORARIES / PROFESSIONAL AFFILIATIONS**Association for Educational Communications and Technology**

National/International Offices	
AECT Immediate Past President and ECT Foundation Board Liaison, 2007-08	ECT Foundation Board President-elect 2011
AECT International President, 2006-07	ECT Foundation Board Secretary, 2009-11
AECT President-elect and Convention Chair, 2005-06	ECT Foundation Executive Committee (member), 2009-present
AECT Board Executive Committee (member), 2003-08	ECT Foundation Board of Trustees (member), 2008-present
AECT Board of Directors (member), 2002-08	
Design and Development Division, President 2001-02	
Design and Development Division, Vice-president 2000-01	
Committees and Task Forces	
AECT Membership Committee (member), 2009-present	AECT/ECT Foundation Intern Selection Task Force (member), 2012
AECT Nominations Committee 2007-08 (chair), 2009-10 (member)	AECT Organizational Transition Task Force (member), 2012
ECT Mentor Scholarship Award Selection Committee (member), 2009-10	ECT Foundation Finance Committee Task Force (chair), 2012
AECT Distinguished Service Awards Selection Committee (member), 2009	ECT 503c Governance Policy Task Force (chair), 2010
AECT/ECT Foundation Investment Policy Committee (member), 2009	
AECT Publications Committee (member), 2002-present	
AECT National Convention Program Planning Committee (member), 2000-01	

American Educational Research Association

- Instructional Technology Special Interest Group, Founding member and Newsletter Editor 1987-91

Phi Delta Kappa

- Chapter president 1979-80; Treasurer 1980-81; Research Representative 1980-82

Kappa Delta Pi**Pennsylvania State Teacher Education Organizations**

- Pennsylvania Deans Forum (representative) 2005-present
- Graduate Teacher Preparation Programs Forum (moderator) 2008-2012
- Pennsylvania Department of Education
 - Instructional Technology Specialist Certification Work Group for Incorporation of Special Education and English Language Learner Additional Competencies (member) 2009
 - Post-baccalaureate Programs Work Group (member) 2008-09
 - Education Portal State Advisory Board (member) 2005

UNIVERSITY SERVICE

Chair, Major University Committee



(Chair 2008-09). **Faculty Personnel Committee** (*Lehigh*)

This committee hears all appeals of tenure and promotion denials and any other faculty personnel-related appeals. It also formulates changes to the Rules and Procedures of the Faculty that govern appointments and appeals. This committee brought to the faculty changes related to tenure and promotion and to joint appointments. The term of service for those elected to the committee is five years and one may only serve a single term.



(Chair 1997-98). **Graduate and Research Committee** (*Lehigh*)

This committee approves all curricular changes and formulates and proposes to the university faculty policies related to graduate study and research. I chaired the committee during the period when—at the direction of the university administration, the Faculty Steering Committee, and the Board of Trustees—the GRC designed and field-tested an evaluation system for all graduate programs at Lehigh. In addition to my duties as chair of the GRC as a whole, I served as chair of the sub-committee that designed the initial instruments for the field test. I guided the conducting of the initial field test in academic year 1997-98. In June of 1998, I was personally responsible for writing a report to each of the 29 graduate programs, a report I based on reports of the two or three evaluation teams that examined each program dossier. I also served as a member of one such evaluation team.



(Chair 1985). **University Computer Facilities Committee** (*Pittsburg State*).

This committee made all decisions about implementation of computing technology across campus. It controlled resource allocation for facilities development and equipment purchases. The UCFC oversaw the operation of the University Computing Center and had authority to make policies governing the operation of university computing.

Program Director

- (2010). Acting Director, Integrated Professional Development School Program (*Lehigh*)
- (2004-05). Technology-based Teacher Education program director (*Lehigh*)
- (1995-2005). Educational Technology program director (*Lehigh*)
- (1987). Human Resources Master's program director (*George Mason*)

Chair, Non-major University Committee

- (1994-98). University Library Users Committee (*Lehigh*).
- (1978–81). Parking Violations Appeal Board (*Pittsburg State*).
- (1977–78). Instructional Media Committee (*Pittsburg State*).
- (1977–78). Library Media Master's Degree Development Committee (*Pittsburg State*).

Chair, College Committee

Lehigh University (1991-present):

- (2012 -) New College of Education Website Project (project manager)
- (2012). Search Committee for Director of Office of Teacher Certification
- (2010-11). Search Committee for Teacher Certification and Field Placements Office positions: Director and Coordinator of Field Placements
- (2010-11). Search Committee for COE Director of Information Technology (co-chair)
- (2010). Integrated Professional Development School Policy Committee
- (2009, 2012-present). Elizabeth V. Stout Outstanding Dissertation Award Selection Committee
- (2009, 2012-present). College of Education Graduate Leadership & Service Award Committee
- (2009). College of Education Space Allocation Review Task Force

- (2007-10). Teacher Certification Curriculum Revision Committee
- (2008). College of Education Promotion and Tenure Committee
- (2003-05). Learning Sciences and Technology Ph.D. Design Committee
- (2001-03, *Designer*). Classroom of the Future [innovative multimedia teaching facility]
- (1999-2000). Search committee for new Educational Technology faculty
- (1994-95). Task Force on Resource Allocation and Utilization

Pittsburg State University (1975-1986):

- (1981-82). North Central Accreditation Learning and Resources Committee
- (1980-81, *Director*). Minimal Competency Testing Program
- (1980-81, *Designer*). Multimedia Classroom for Teacher Education

Chair, Departmental Committee

Pittsburg State University (1975-1986):

- (1985-86). Undergraduate Teacher Education Committee
- (1985-86). Elementary Education Program Committee

Member, University Committee

Lehigh University (1991-present):

- (2012). University Internal Grants Review Panel (Faculty Innovation and CORE Grants)
- (2011). Search Committee for Director of Admissions Information Systems and Technology
- (2010-present). Enhancing Graduate Education Strategic Planning Workgroup
- (2005-present). Graduate Associate Deans Council
- (2005-present, Chair Fall 2012). Committee on Standing of Graduate Students
- (2005-present). University Mentor
- (2005-present). University Commencement Committee
- (2003-present). Lehigh Lab Consortium
- (1995-98; 2001-04; 2005-present). Graduate and Research Committee
- (1997-98; 2008-10). Faculty Steering Committee
- (2005-10). Faculty Personnel Committee
- (2008-09). Provost Search Committee
- (2008-09). Sloan Committee [for Enhancing Recruitment and Retention of Faculty]
- (2007-08). Search Committee for Director of Distance Education and Summer Programs
- (2006). Presidential Inauguration Ceremonies Planning Committee
- (2004-05). Global Information Program 20/20 Design Committee
- (2002-04). Distance Education Marketing and Planning Committee
- (2001-04). Environmental Initiative Planning Committee
- (2000). College of Education Dean Search Committee
- (2000). Planning Committee, Information Technology/Information Science Workshop
- (1997-98, 1999-2000). Lehigh Publications Board
- (1995). Learning Innovations Committee
- (1994-95). Search Committee for the Vice-Provost for Information Resources
- (1993-94). University Library Users Committee
- (1992-97). Computer Center Advisory Committee
- (1991-93). High Speed Network Advisory Committee

George Mason University (1986-1991):

- (1990). University Student Center Committee
- (1988-91). Faculty Committee on the Library
- (1988-91). Faculty Senate Representative (Parliamentarian, 1988–90)
- (1989-91). University Learning Initiatives Task Force
- (1987-91). Masters of Arts in Telecommunications Program Committee
- (1987-89). Social Affairs Committee

Pittsburg State University (1975-1986):

- (1983). Information Systems Advisory Committee
- (1978-82). University Honors Committee
- (1980-83). University Teacher Education Committee
- (1981-83). Kansas Regents Press Editorial Committee
- (1981-83). University Public Relations Committee
- (1976-77). Library Media Master's Degree Development Committee
- (1977-78). University Student Affairs Committee
- (1976). Student Course Evaluation Committee

Member, College Committee

Lehigh University (1991-present):

- (2011). Teaching, Learning, and Technology Professor of Practice Search Committee
- (2010-11). Teacher Education Transition Workgroup
- (2004-12). Integrated Professional Development School Policy Committee.
- (2010). College of Education Graduate Leadership & Service Award Selection Committee.
- (2004-07). College Promotion and Tenure Committee
- (2003-04). Mentoring Guidelines Committee
- (2003-04). Learning Sciences and Technology Ph.D. Design Committee
- (2001). College Promotion and Tenure Revisions Committee
- (1995-98, 1999-2007). Program Coordinators/Directors' Council
- (1999-2000). Shared Core Planning Committee
- (1998). Educational Technology Futures Committee
- (1996-98). Retention and Diversity Committee
- (1994-95). Steering Committee for College Planning Retreats

George Mason University (1986-1991):

- (1990-91). Search Committee for Department Chairperson
- (1988-89). Doctor of Arts in Education Committee
- (1986-91). Center for Applied Research in Education
- (1986-91). College Parliamentarian
- (1986-88). Academic Appeals Committee
- (1986-87). NCATE Accreditation Steering Committee

Pittsburg State University (1975-1986):

- (1982-86). Coordinator of Computer Utilization
- (1985). School of Education Computer Facilities Committee
- (1977-86). Numerous position-search committees as member or chair

Member, Department Committee

Lehigh University (1991-present):

- (1991-present). Numerous position-search committees

George Mason University (1986-1991):

- (1986-91). Center for Interactive Educational Technology Committee
- (1988-91). Instructional Applications of Microcomputers Program Committee
- (1988-91). Departmental Liaison to the Library

Pittsburg State University (1975-1986):

- (1980-84). Elementary Education Program Committee
- (1978-86). Departmental Honors Committee
- (1977-86). Numerous position-search committees as member or chair

University-related Community Service

Lehigh University (1991-present):

- (2011). Focus group member/consultant, Instructional Technology Strategic Plan, Bethlehem Area School District

Pittsburg State University (1975-1986):

- (1977-82). Faculty advisor to Sigma Phi Epsilon Fraternity
- (1980).
 - Chapter named one of the 13 best chapters in the nation
- (1982-85). District Governor (Nebraska and Kansas) for Sigma Phi Epsilon
- (1985-86). United Way Board of Directors
- (1985). City Division Captain for United Way
- (1978). Campus Chairperson for United Way
- (1979-84). United Way campus building worker
- (1976-77). United Way campus building worker

External Reviewer for Tenure and Promotion Candidates

- (2012). [REDACTED]
- (2012). [REDACTED]
- (2007). University of South Alabama
- (2006). Indiana University
- (2006). Pennsylvania State University
- (2002, 2005). University of Colorado at Denver
- (2002, 2006, 2010). Syracuse University

NATIONAL CONSULTATION

- (March 1994). I served on the Air Force Academy's National Technology Symposium. My area of specialization was the integration of metacognition, thinking skills, and technology. The purpose of the symposium was to inform the instructional and administrative staff of the Academy about issues in adopting instructional technology and to advise the General and the 19 permanent professors on how the Academy should approach the implementation of technology in the preparation of Air Force officers.

CORPORATE & BUSINESS EXPERIENCE

- (1995-present). *Intelligent Applications Development* (Owner/President), Center Valley, PA
IAD is a software-development firm that specializes in both interface and instructional design of training and educational programs. It has had contracts for design, development, and evaluation projects with a wide range of clients, including DARPA, NSF, and various private companies.
- (2002-05). *Thoughtful Technologies, LLC* (Co-owner, Senior vice-president), Baltimore, MD
T2 was a company created to market the patented Multimedia Skills product, including its *Thoughtful Reporter* line of critical-thinking software.
- (1983-86). *MicroSupport, Inc.* (Co-owner/President), Pittsburg, KS
MicroSupport was a software-development and hardware sales firm. It had a 2000-square-foot IBM-authorized retail computer store selling computers and a wide range of software. It also had a 20-seat corporate training center to provide training in the use of software.