Wendy Elizabeth Mackay

Address

43 Kingston Street
Somerville, MA 02144
(617) 666-8838
E-mail: mackay@athena.mit.edu

Project Athena, E40-366
Massachusetts Institute of Technology
Cambridge, MA 02139
(617) 253-0171

Education

Ph.D. candidate	Massachusetts Institute of Technology	Management of Technological Innovation	11/88
Ph.D. candidate	Northeastern University	Experimental Psychology	6/80
M.A.	Northeastern University	Experimental Psychology	6/79
B.A.	University of California, San Diego	Honors Psychology	3/77

Employment

1987-1989. GEEP Fellow. Business and Office Systems Engineering, Digital Equipment Corporation. Two-year scholarship at full salary to complete Ph.D. in Managing Technological Innovation at MIT.

1986. Technical Liaison. External Research, Digital Equipment Corporation. Responsible for External Research's part of contract negotiations between Digital and MIT on Project Athena's continued funding. Member MCC Human Interface Steering Committee.

1983-1986. Research and Development Manager. Educational Services Research and Development, Digital Equipment Corporation. Developed a 5-year strategic plan, with a yearly budget of $2 million and 18 professional researchers. Managed three research groups concentrating on: Human Engineering, Multi-Media Information Architectures, and Integrated Learning Environments. Reduced cost of multi-media software development to 1/5 of previous costs with a significant increase in user satisfaction. Appointed to Digital's Sponsored Research Board and editor of the R&D Technical Report Series and the R&D Newsletter. Taught research methods to 12 Master's student interns from U. Mass. Amherst.

1982-1983. Cost Center Manager. Systems Based Courseware, Educational Services, Digital Equipment Corporation. Managed $2 million/year cost center with two supervisors and 33 developers. Produced over 35 software products all shipped on time and on or under budget. First in the industry to provide integrated computer-based instruction at first-customer ship of all three of Digital's personal computers. Reduced hot-line calls by 30%. Considered the industry standard (Seybold Report).

1981-1982. Unit Manager. Systems Based Courseware, Educational Services, Digital Equipment Corporation. Reduced average software development cost by 60%, which resulted in new projects and 300% growth. Automated budgeting and billing. Developed new authoring language, created software and graphics standards, and established process for interactive videodisc course development.

1979-1980. Educational Specialist. Systems Based Courseware, Educational Services, Digital Equipment Corporation. Designed and programmed Digital's first two computer-based instruction courses. VMSCAI remains Digital's top-selling packaged course. EDTCAI was described as "so effective that we use it as a design model for developing our own in-house computer-based courses." Created a program generator that significantly reduced course development time, participated in the design and development of a new authoring language, trained 24 new course developers. Presented technical papers at ADCIS, NEADCIS, and IDECUS.

1979.Lecturer. Department of Psychology, Northeastern University. Taught laboratory course on animal learning and human memory.

1977-1979. Teaching Assistant. Department of Psychology, Northeastern University. Co-taught course on tutoring techniques for undergraduate tutors. TA'd several courses in Experimental Psychology.

1975-1977. Teaching Assistant. Department of Psychology, University of California, San Diego. Co-taught physics course entitled "Frontiers of Science" (with Prof. Bernd Matthias). TA for courses in Statistics, Experimental Psychology, and Physics.

Research Experience

Electronic Communication. MIT Sloan School of Management and Project Athena. Organized two-year study of the Information Lens; conducted interviews; collected and analyzed data; published results. Applied results in iterative design of a general purpose message filter and annotator. Designed a three-dimensional model of computer-based message systems that integrates electronic mail, on-line consulting, bulletin boards, computer conferencing and educational software.

Video Analysis. MIT Project Athena. Designed a research methodology for analyzing videotaped research data (EVA: Experimental Video Annotator). Published paper. Organized workshop on *Video as a Research and Design Tool.* Guest editor of special issue of *SIGCHI Bulletin* base on workshop. Developed iterative design techniques that were applied to award-winning educational software.

Educational Research. Research Manager at Digital, Visiting Scientist at MIT's Laboratory for Computer Science. Conducted experiments on intelligent tutoring systems and problem-solving strategies. Developed a unified model that redefined instructional approaches based on user's immediate information needs. Involved in iterative evaluation of the Boxer language at MIT and design of a multi-media version at Digital.

Experimental Psychology. Graduate student and undergraduate. Introduced original methods to investigate learning of associates not previously considered susceptible to investigation with behavioral techniques. Doctoral dissertation proposal approved, two of four experiments completed. (Funded by NIH pre-doctoral grant. Thesis Advisor: M. Sidman.) *Master's Thesis:* Conducted experiments on pre-linguistic cognitive behavior in human children and rhesus monkeys. (Thesis Advisor: M. Sidman.) *Honors Bachelor's Thesis:* Study of behavioral contrast in pigeons. (Thesis Advisor: B. A. Williams.)

Software Experience

Information Filter/Annotator. Designed and managed the development and empirical testing of a generalized message annotator and filter, *Argus*, at Project Athena, orginally based on the Information Lens. Personally programmed special purpose data collection and annotation software.

Communication Systems. Designed and managed the development of a prototype multi-media message system, *Pygmalion*, with distributed video and smooth integration of public and private messages.

Data Analysis Software. Designed and personally programmed the *Experimental Video Annotator* to facilitate evaluation and analysis of video data. Programmed data analysis system to analyze research data in Psychology lab.

Multi-Media Software. Managed software development of the Navigation video database project, Video Boxer, generalized *Wizard of Oz* and an Object-oriented multi-media database. Programmed software for an experiment in intelligent tutoring.

Authoring Languages. Managed initial design and development of the authoring language *Producer*, Digital's multi-media authoring language. Programmed the *CBI program generator* in Teco, DCL, and Pascal which creates standardized computer-based instruction courses.

Educational software. Managed the development of over 30 CBI courses running on: PDP-8, PDP-11 (RT-11, RSTS-E, RSX), Rainbow (CPM), PDP-20 (Tops 20), and VAX (VMS) systems. Designed and programmed *VMSCAI*, Digital's second and top-selling computer-based instruction course, in Pascal. Designed and programmed *EDTCAI*, Digital's first computer-based instruction course in Basic and DRAW.

Honors and Fellowships

Digital Equipment Corporation GEEP Scholarship, Northeastern University Fellowship
Phi Beta Kappa Honor Society, Honors Psychology B.A., magna cum laude, Provost's Honor List, U.C.S.D., California Scholarship Federation, National Honor Society

Grants

Research Grants: Digital, Open Software Foundation, NYNEX, N.I.H. Predoctoral Training Grant

Professional Societies

acm/SIGCHI: Elected Chair (1989-1991), Secretary/Treasurer (1987-1989). Video Chair: CHI '86.
Program Chair: Workshop on Video as a Research and Design Tool. Co-founder & Chair, Greater Boston Chapter. acm/SIGGRAPH: Multi-Media Communication Chair.

Reviewer

IEEE Software, Communications of the ACM, Journal of Educational Computing Research, Advances in Human-Computer Interaction, Computers in Human Behavior, and SIGGRAPH User Interface Forum.

Refereed Publications

Mackay, W.E. and Davenport, G. (July 1989). Virtual Video Editing in Interactive Multi-Media Applications. *Communications of the ACM*, Vol. *32*(7).

Mackay, W.E.,Malone, T.W., Crowston, K. Rao, R., Rosenblitt, D., and Card, S. (May 1989). How do experienced information lens users use rules? *CHI '89 Conference on Human-Computer Interaction*. Austin, Texas: ACM/SIGCHI.

Mackay, W.E. (October 1988). Diversity in the Use of Electronic Mail: A Preliminary Inquiry. *ACM Transactions on Office Information Systems*, Vol. *6*(4).

Mackay, W.E. (1988). More than Just a Communication System: Diversity in the Use of Electronic Mail. *Conference on Computer-Supported Cooperative Work*. Portland, Oregon: ACM.

Books and Book Chapters

Mackay, W.E. (1988). Tutoring, Information Databases and Iterative Design. In D. Jonassen (Ed.), *Instructional Designs for Microcomputer Courseware*. Hillsdale, New Jersey: Lawrence Ehrlbaum Associates.

Mackay, W.E. (1987). Integrated Learning Environments. In Moonen, J. and Plomp, T. (Ed.), *EURIT 86: Developments in Educational Software and Courseware*. Oxford: Pergamon Press.

Mackay, W.E. (1987). Managing CBI Projects. In Moonen, J. and Plomp, T. (Ed.), *EURIT 86: Developments in Educational Software and Courseware*. Oxford: Pergamon Press.

Mackay, W.E. (1986). Interactive Videodiscs: Database Driven Courseware. In M. M. Geerling (Ed.), *Computer Based Education in Banking and Finance*. Amsterdam: Elsevier Science Publishers B.V., North Holland.

Mackay, W.E. (1981). *Computer-Based Instruction Authoring Guide*. Bedford, MA: Digital Equipment Corporation.

Other Publications

Mackay, W.E. (October 1989). EVA: An Experimental Video Annotator for Symbolic Analysis of Video Data. *SIGCHI Bulletin*, Vol. *21*(2). Special Issue: Video as a Research and Design Tool.

Mackay, W.E. (1989). Video as a Research and Design Tool. *SIGCHI Bulletin*, Vol. *21*(2). Guest Editor of Special Issue.

Ackerman, M. and Mackay, W.E. (May 1989). Context Issues for Users in Multi-Windowing, Multi-Tasking Environments: The Case of X. *CHI '89 Workshop on Context: in the eyes of users and in computer systems*. Austin, Texas: ACM/SIGCHI, Position Paper.

Mackay, W.E. (September 1989). Pygmalion: A Multi-Media Communication System. Submitted to SIGGRAPH '89 Committee.

Mackay, W.E., Gardner, B.R., Mintz, T.H., Pito, R.A., and Siegal, J.B. (August 1989). Argus Design Specification. Submitted to MIT Project Athena.

Mackay, W.E. (1987). Integrated Learning Environments. *Optical Insights*, *1*(1), 5-7. Boston Computer Society.

Mackay, W.E. (1987). *Strange Bedfellows: Research Alliances Among Competitive Firms* (Tech. Rep.). Digital Equipment Corporation,

Mackay, W.E. (1985). *Does Tutoring Really Have to Be Intelligent?* (Tech. Rep. 2). Digital Equipment Corporation, Educational Services,

Mackay, W.E. (1985). *Unpacking Information* (Tech. Rep. 2). Digital Equipment Corporation, Educational Services,

Mackay, W.E. (1979). *Stimulus Class Formation with an Oddity Procedure*. Master's thesis, Northeastern University,

Mackay, W.E. (1977). *Behavioral Contrast in Pigeons*. Honors Bachelor's thesis, University of California, San Diego.

Invited Talks and Panels

Mackay, W.E., Treese, W., Applebaum, D., Gardner, B., and Michon, B. (July 1989). Pygmalion: Multi-Media Communication. *Computer Graphics: SIGGRAPH '89 Conference Proceedings*. Boston, MA: ACM/SIGGRAPH, Special event presentation.

Mackay, W.E. and Ackerman, M. (September 1989). Dueling Toolkits: User Interface Issues in Multi-Tasking Window Environments. *HCI International '89: 3rd International Conference on Human-Computer Interaction*. Boston, MA.

Mackay, W.E. (May 1989). Tools for Supporting Cooperative Work Near and Far: Highlights from the CSCW Conference. *CHI '89 Conference on Human-Computer Interaction*. Austin, Texas: ACM/SIGCHI, Panel presentation.

Mackay, W.E. (October 1988). Telecommunications in the 1990's: Human Factors Issues for the Information Age. *Proceedings of the Human Factors Society, 32nd Annual Meeting*. Anaheim, CA: Human Factors Society, Panel presentation.

Mackay, W.E. (1988). *A Designer's View of the X Window System*. Atlanta, Georgia: ACM/SIGGRAPH. Tutorial Notes Published at SIGGRAPH '88 Conference.

Mackay, W.E. (1988). Video: Data for Studying Human-Computer Interaction. *CHI '88 Conference on Human-Computer Interaction*. Washington, D.C.: ACM/SIGCHI, Panel presentation.

Mackay, W.E. and Ackerman, M. (1988). *User Interfaces to Educational Software*. Washington, D.C.: ACM/SIGCHI. CHI '88 Tutorial Notes.

Mackay, W.E. (1987). User Interface Issues with X. *Xhibition '87*. , Panel presentation.

Mackay, W.E. (1986). Project Athena: A University-Based Case Study. *Laseractive '86*. Laseractive '86, Invited talk.

Mackay, W.E. (1986). Beyond the Wizard of Oz. *CHI '86 Conference on Human-Computer Interaction*. Boston, MA: ACM/SIGCHI, Demonstration presentation.

Mackay, W.E. (1980). Creating Graphic Displays on Non-Graphic Terminals. *ADCIS'89 Conference Proceedings*. Association for the Development of Computer-Based Instruction.

Video Publications

Mackay, W.E. (1989). Video Editing in Multi-Media Interactive Applications. Video published with July 1989 issue of CACM.

Mackay, W.E. (1988). EVA: Experimental Video Annotator. Videotape Presented at CHI '88.

Mackay, W.E. (1986). Beyond the Wizard of Oz. Videotape presented at CHI'86.

Hodges, M., Arnold, T., Spencer, J., Kulhlman, B., and Mackay, W.E. (1984). Navigation Research Videodisc. Videodisc. Experimental videodisc produced by Educational Services Research and Development.

Arnold, T., Parkes, P., Mackay, W., and Michon, B. (1983). R&D Animation Research. Videodisc. Experimental videodisc produced by Educational Services Research and Development.