CRITO
CENTER FOR RESEARCH ON INFORMATION TECHNOLOGY AND ORGANIZATIONS

Fall/Winter 2000 **University of California, Irvine**
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CRITO STEWARDSHIP PROGRAM

CRITO introduces the Stewardship Program. The program is designed to foster relationships between CRITO faculty and the Consortium members of the NSF sponsored Industry-University Cooperative Research Center. The stewardship program pairs industry members with specific faculty and projects.
Each industry member becomes a "steward" for one of the currently funded projects headed by a CRITO faculty member. The "steward" is asked to:

- Become familiar with the project (proposal, interim reports, papers)
- Communicate with the faculty member about the project on a monthly basis
- Suggest materials that could be discussed at the next Industry Advisory Board (IAB) meeting
- Facilitate discussion of the project's themes at the next IAB meeting
- Share ideas about related work by the steward and/or his or her company

Specific goals for the program include building awareness of interesting issues relating to IT, promoting mutual learning and enhancing the sense of community among Consortium members and faculty.

This program was developed during the IAB Steering Subcommittee Meeting on August 9, 2000**. Tina Haines, Ashwin Rangan** and **Chuck Rieger** met with **Ken Kraemer**, the Faculty Advisory Committee (**James Danziger Vijay Gurbaxani**, and **Alladi Venkatesh**) and CRITO research staff.

"The Stewardship Program provides another excellent opportunity for communication and the sharing of ideas between industry members and faculty. I appreciate the willingness of the stewards to engage in active consultation with the faculty on the projects. The Program should facilitate even greater collaboration and mutual benefit from the partnership that is the essence of the Consortium," says Dr. James Danziger.

Professor Danziger is Acting Director of CRITO during Dr. Ken Kraemer's sabbatical to Germany during Fall 2000.

Presented below is a list of current projects with industry member stewards and faculty.

Project	Industry Member Steward	Faculty
E- QUAL	Arnold Campbell, **Nortel**	Mary Gilly and Mary Wolfinbarger
IT Returns	Chuck Rieger, **IBM**	Ken Kraemer
E-Commerce Returns	Chuck Rieger, **IBM**	Kevin Zhu
E-Markets	Ashwin Rangan, **Conexant** Bill Fink, **Sun**	Vijay Gurbaxani
Networked Household	Dan Fay, **Microsoft**	Alladi Venkatesh
IT Structuring for E-Commerce	Kevin Daly, **ATL Products**	Rebecca Grant
Group Collaboration/ Decision Making	James Underwood, **Canon** Dan Fay, **Microsoft**	Gloria Mark
IT Learning/Training	Tina Haines, **Seagate**	James Danziger
Expertise Networks	Steve Poltrock, **Boeing**	Mark Ackerman

NSF ANNOUNCES AWARDS IN INFORMATION TECHNOLOGY RESEARCH INITIATIVE

The National Science Foundation (NSF) announced its first grants under the new $90 million Information Technology Research (ITR) initiative. The awards, which will spur fundamental research and innovative applications of IT, are a step toward building on U.S. leadership in this area of growing importance to the economy.

Selected from over 1,400 proposals, the newly funded activities will promote IT-driven science and engineering. Included are 62 large projects that will average $1 million per year for three to five years, involving 41 institutions in 22 states. Another 148 smaller projects will each total $500,000 or less for up to three years, involving 81 institutions in 32 states.

"This initiative will help strengthen America's leadership in a sector that has accounted for one-third of U.S. economic growth in recent years," said President Bill Clinton. "High technology is generating jobs that pay 85 percent more than the average private sector wage. I am pleased that the National Science Foundation is expanding its investment in long-term information technology research. I urge the Congress to provide full funding for NSF so that they can continue to make these kinds of investments in America's future."

"These projects represent major innovations in information technology, rather than routine applications of existing technology," said NSF director Rita Colwell. "Our strategy to support long-term, high-risk research responds to a challenge from the President's Information Technology Advisory Committee (PITAC), which called for increased federal investment to maintain the U.S. lead in this important sector of the global economy."

ITR emphasizes the subject areas of software; scalable information infrastructure; information management; revolutionary computing; human-computer interfaces; advanced computational science; education and workforce; and social or economic implications of IT. The program's main goals are to augment the nation's IT knowledge base and strengthen the IT workforce.

Dr. Ken Kraemer, CRITO Director and Professor of IT in UCI's Graduate School of Management, received an award to study the adoption of electronic commerce worldwide, comparing data from technologically advanced countries with newly industrialized and developing nations.

A series of eight country case studies will provide details on national environments, policies, and the diffusion and impacts of e-commerce. The case studies will look at the growth of e-commerce nationally, and also in more detail in three critical industry sectors: information and communications technology (ICT), financial services, and retail.

Data will be gathered on environmental factors such as income, education, telecommunications infrastructure and other factors that might have an impact on e-commerce use. This data will be used to identify trends and to test hypotheses about the relationship between environmental factors and diffusion.

Other UC Irvine awarded projects includes an award to **Dr. Mark Ackerman,** Associate Professor in Information and Computer Science and CRITO Associate, and **Walt Scacchi**, Senior Research Scientist in Information and Computer Science. The study will develop empirically grounded models and theories of the social processes, technical systems configurations, organizational context and interrelationships that give rise to open software.

Associate Professor **Debra Richardson** and Assistant Professor **David Redmiles**, both in the Department of Information and Computer Science have been awarded a grant to research innovative user interface approaches to delivering critical design-related quality assessment information to software developers as they interactively develop designs.

Sharad Mehrotra, Associate Professor in Information and Computer Science, will explore next generation database management system technology that provides effective support for information processing in highly distributed and dynamic sensor-enriched environments.
Professor **Kane Kim**, Dr. **Lynn Choi**, Associate Professor **Douglas Schmidt** and Dr. **Phillip Chen-Y Sheu** all from the Department of Electrical and Computer Engineering will study system engineer's productivity in constructing distributed real-time applications systems.

Information and Computer Science Professor **Tatsuya Suda** received an award to propose a new network architecture called the Bio-Networking Architecture, which is inspired by mechanisms in the biological world necessary to achieve such key requirements as self-organization, scalability, adaptation and evolution.

Professors **Fadi Kurdahi** and **Nader Bagherzadeh** with Dr. **Walid Najjar**, all from the Department of Electrical and Computer Engineering, will develop the

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design methodology, software tools and programming environment for the automated synthesis of Mission-specific Processors (MSPs) based on the Morphosys architecture developed at UC Irvine.

NSF has also just kicked off its second ITR competition. The foundation's ITR budget request for fiscal 2001 is $190 million of additional funding, although the actual appropriation is yet to be determined by Congress.

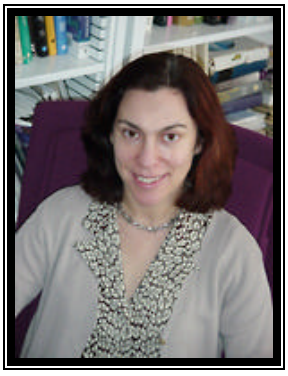
We congratulate all of the UC Irvine award recipients.

For a complete list of ITR awards and project abstracts, see: http://www.itr.nsf.gov/

CRITO CONSORTIUM WELCOMES NEW ASSOCIATES

Dr. Paul Dourish's main interests are in Human-Computer Interaction and Computer-Supported Cooperative Work. He is interested not just in how we build novel interactive systems, but also in what happens when people start to use them. He has worked on topics such as media spaces, awareness systems, self-disclosing systems, computational reflection, collaborative toolkits and workflow. http://www.ics.uci.edu/~jpd/ Professor Dourish presented "Managing Information for Personal, Group and Organizational Work" at this Fall's CRITO Hour.

Dr Alfred Kobsa's research focuses on user-adaptive information environments, Human-Computer Interaction, user modeling, information visualization, expert finders, multimedia educational software, and user interfaces for handicapped and elderly people. http://www.ics.uci.edu/~kobsa/ Professor Kobsa presented "Web Personalization, Privacy and Security" at this Fall's CRITO Hour.



Dr. Gloria Mark's research interest is in the design and usability of collaborative technologies, known as Computer-Supported Cooperative Work (CSCW). In particular, her focus is in technologies that can support virtually collocated teams and also in Human-Computer Interaction. Dr. Mark is also interested in how the design of a particular technology affects collaborative behavior. http://www.ics.uci.edu/~gmark/. Professor Mark presented "Electronic Social Presence and Task Performance" with Erin Bradner at this Fall's CRITO Hour.

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THE CRITO HOUR

The first CRITO Hour series was held during Fall 2000. This informal hour of conversation meant to build the sense of community within CRITO and UCI. Here are some of the interesting topics of conversation:

Mark Poster, Professor in the Department of History, presented "Napster, Education and Commodification."

Mike D'Zmura, Professor of Cognitive Sciences in the School of Social Sciences and Director of UCI's Virtual Reality Lab, presented "Multi-user Virtual Environments with Embedded Browsing."
Hank Becker, Professor in the Department of Education, presented "Oversold and Underused? A Response to a Skeptic's Claim About the Fit Between Computers and Schooling."
Visiting Researcher Heinrich Reinermann, Professor of the German Post-Graduate School of Administrative Sciences in Speyer, Germany, presented "Trends in Electronic Governance."
Mary Gilly, Professor of Marketing in the Graduate School of Management, presented "Nibbling on the Net: Are We Having Fun yet?"
Professors Mark, Dourish and Kobsa also presented.

SOCIAL AFFORDANCES OF COMPUTER-MEDIATED COMMUNICATION TECHNOLOGY: UNDERSTANDING ADOPTION by Erin Bradner

This research is part of the doctoral research done by Erin Bradner, a CRITO Graduate Student Researcher. For more information on the research, please contact Erin at ebradner@ics.uci.edu.

Computer-mediated communication (CMC) technology includes messaging systems, such as e-mail, and conferencing technologies designed to facilitate group work. CMC adoption fails when it interferes with subtle and complex social dynamics of groups. Yet empirical studies of CMC use *which explicitly associate social behavior with design features* are largely absent from the literature. So too are conceptual tools for detecting and describing such behavior. This research addresses this absence by closely examining how CMC design supports social interaction among distributed work groups and thus stimulates or suppress adoption.

MOTIVATION

The primary motivation for my research is what I see as a compelling likeness between the problem of social factors surrounding groupware adoption and the problem of perceptual factors surrounding software usability. Groupware experts contend CMC is resisted when it interferes with subtle and complex social dynamics of groups. Similarly, for over 15 years, perceptual psychologists have contended software interfaces are misinterpreted when design interferes with the complex dynamics of human perception. They offer the concept of object affordances to describe the relationship between human perception and usability. I believe a principled understanding of groupware adoption – *which accounts for social factors* – can be modeled after theories of perceptual psychology. Specifically, I think the concept of affordances can be appropriated to account for social factors in CMC adoption. Furthermore, designing for adoption requires relating patterns of social behavior in groups to CMC design. Yet empirical studies of CMC use *which explicitly associate social behavior with design features* are largely absent from the literature. So too are conceptual tools for detecting and describing such behavior. This research addresses this absence by closely examining how CMC design supports social interaction among distributed work groups and thus stimulates or suppress adoption.

RESEARCH PROBLEM

Social factors impacting the adoption and use of computer-mediated communication (CMC) technologies in the workplace have been studied for over a decade. Authors of these studies suggest that behavior and social conventions affect adoption. A common conclusion being that understanding adoption requires careful examination of the interactions between technological features and the social context of use. My research focuses on the social aspects of adoption. Specifically, I study social factors in adoption of CMC among small groups in the workplace. In an effort to conceptually disentangle the social and technical factors in adoption I examine the following *research question*: What are examples of social affordances of CMC and how can the notion of social affordances inform our understanding of CMC adoption among distributed work groups? By identifying some social affordances impacting adoption, I hope to build a generalizable description of social factors in adoption. My goal is to describe, in a principled manner, the notion that social affordances of CMC technology impact adoption and ongoing use.

IMPLICATIONS

Since social affordance theory identifies and describes specific ways design mediates social interaction, it can be used to inform design. For example, traditionally 'media spaces' using video and application sharing have been designed to maintain a perpetually 'open' channel of communication between users. Yet, because these technologies afford continual monitoring of users' face and screen activity, and because monitoring, which is both a social and perceptual act, can have negative effects on performance, a better design for a media space is one which includes an interface allowing users to 'shield' their screen activity and video image. A design, which allows users to temporarily suspend and easily restore the communication channel, would minimize the

negative social effects on performance. Thus, in much the same way the concept of physical affordances can guide design of 'user friendly' software, I believe the concept of social affordances can guide design of 'group-friendly' software. This research provides the conceptual groundwork for future studies examining specific *design and adoption tradeoffs*.

CRITO ASSOCIATE UPDATES

Association of Information Technology Professionals Names Professor Paul Gray "Educator of the Year"

The Educational Special Interest Group of AITP honored CRITO Associate and Claremont Graduate University Professor Paul Gray with the "Educator of the Year" award at the annual Information Systems Educators Conference in Philadelphia on November 11, 2000. Dr. Gray added the award to his long list of distinctions that include being President of two professional societies and being the founding editor of the Communications of the Association of Information Systems.

Publications

"A Programming Model for Active Documents" **Paul Dourish**, Keith Edwards, Jon Howell, Anthony LaMarca, John Lamping, Karin Petersen, Michael Salisbury, Douglas Terry and Jim Thornton, Proceedings of the ACM Symposium on User Interface Software and Technology UIST 2000 (San Diego, CA). ACM: New York.

"The Doctor is IN: Helping End-Users Understand the Health of Distributed Systems" **Paul Dourish**, Marvin Theimer and Daniel Swinehart, Proceedings of the 11th IEEE Symposium on Distributed Systems Operations and Management DSOM 2000 (Austin, Texas). IEEE: New York.

"Social Navigation: Techniques for Building More Usable Systems" Andreas Dieberger, **Paul Dourish**, Kristina Hook, Paul Resnick and Alan Wexelblat.) Interactions, Nov-Dec 2000.

Data on Human Resource Indicators for Brazil and Other Countries from the article entitled "Industry Protection to Industry Promotion: IT Policy in Brazil" authors Antonio Jose Junqueira Botelho, **Jason Dedrick**, **Ken Kraemer** and Paulo Bastos Tigre, were published in the Brazilian Green Book on Information Society.

Talks, Seminars and Conference Presentations

Vijay Gurbaxani's course on Critical Issues in Information Systems Management and Electronic Commerce was featured in The Industry Standard, August 28, 2000. Dr. Gurbaxani stated that understanding theory is the top priority in his class, but sometimes in the world of e-commerce even that isn't abstract enough. "I am trying to get students to think for themselves because there isn't established research on these issues". Professor Gurbaxani was a panelist on ``E-Marketspaces and Vertical Markets," IBM Global Services Academic Conference, August 1-2, 2000, Armonk, NY.

Alfred Kobsa gave an invited keynote lecture on "User Modeling, Privacy and Security" at the International Conference on Adaptive Hypermedia and Adaptive Web-Based Systems, Trento, Italy, Aug. 28-30, 2000.

Ken Kraemer was a panelist on ``Company Globalization," IBM Global Services Academic Conference, August 1-2, 2000, Armonk, NY.

Paul Dourish presented a paper entitled, "A Programming Model for Active Documents", at ACM Symposium on User Interface Software and Technology, San Diego, November 6. He also presented "A New Approach to Information Management for Personal, Group and Organizational Work" at the Information Studies Seminar Series, UCLA, November 16.

Paul Gray was Honorary Chair of the American Conference on Information Systems (AMCIS) in Long Beach, Summer 2000. He presented a keynote speech: "Three Challenges for Information Systems", co-chaired the panel "Experiences with the MSIS 2000 Curriculum" and was a panelist for the "IS Journal Connection".

Mary F Wolfinbarger and **Mary C. Gilly**, presented ``Nibbling on the Net: Are We Having Fun Yet?" at the Association for Consumer Research Conference, October 21, 2000 and ``Motivations for Online Shopping," 2000 Americas Conference on Information Systems (AMCIS 2000), August 10-13, 2000, Long Beach, CA.

Paul Tallon presented a paper co-authored with **Ken Kraemer** entitled, "Investigating the Relationship between Strategic Alignment and IT Business Value: The Discovery of a Paradox", to faculty at the Smurfit School of Business, University College Dublin, Ireland and later at the Seventh European Conference on IT Evaluation at Trinity College Dublin. Copies of the paper are available on request from ptallon@uci.edu.

Jason Dedrick participated in an international experts seminar sponsored by the Asian Development Bank Institute on "Assessing East Asian Export Performance from 1980-1996," held in Tokyo on November 6. He made a presentation titled "The Personal Computer Industry and East Asian Export Competitiveness: Evolution and Emerging Trends".

Mary Wolfinbarger and Richard Celsi, presented ``The Evolving IT-Marketing-Strategy Relationship: Will Business Schools Meet the Need?" (Named best paper, e-commerce curriculum mini-track) and ``A Conceptual Taxonomy of Technology Adoption and Diffusion in the Classroom," at the 2000 Americas Conference on Information Systems (AMCIS 2000), August 10-13, 2000, Long Beach, CA.

DOCTORAL AND GRADUATE STUDENT UPDATES

CRITO provided data and assistance in the efforts by **Geunjoo Lee** to complete his dissertation. He is currently with The Korean Institute of Public Administration, Seoul, Korea. Dr. Lee's dissertation received the Best Dissertation Award for 1999 given by the Public and Nonprofit Division of the Academy of Management.

CRITO Fellow **Chris Claisse** is working with **Professor Vijay Gurbaxani** on researching B2B Exchanges in Retail and Automotive Industries.

CRITO Fellow **Vikramjit Singh**, is working with **Professor Ken Kraemer** and Senior Researcher, **Jason Dedrick** on two projects. Project 1 is a case study on barriers to the growth of the Internet in India and Project 2 involves understanding the usage and integration of E-Commerce and software in EMS companies.

CRITO Fellow **Rob Keller** and former Fellow **Eric Yee** are working with **Professor James Danziger** on field research studies of IT training and skills development in high tech companies.

NEW IAB MEMBERS

We are delighted to welcome **James Underwood**, Information Systems Manager for Canon Information Systems Inc. located at 110 Innovation Dr., the new IAB Member for Canon.

Mr. Underwood is interested in virtual collaboration, understanding the role that new technologies can play in organizations, the experience of others with those technologies, and how to implement them effectively.

The current CRITO projects that interest him most are "The Home of the Future and the Convergence of IT-Based Technologies" and "The Role of Awareness Information in Virtually Collocated Work".

UPCOMING EVENTS

The **CRITO Consortium Industry Advisory Board Meeting** will be held on, February 1-2, 2001