Communications of the Association for Information Systems

Volume 9 Article 20

11-16-2002

AMCIS 2002 Panels and Workshops I: Human-Computer Interaction Research in the MIS Discipline

Ping Zhang
Syracuse University, pzhang@syr.edu

Izak Benbasat
University of British Columbia, IZAK.BENBASAT@COMMERCE.UBC.CA

Jane Carey
Arizona State University West, jcarey@asu.edu

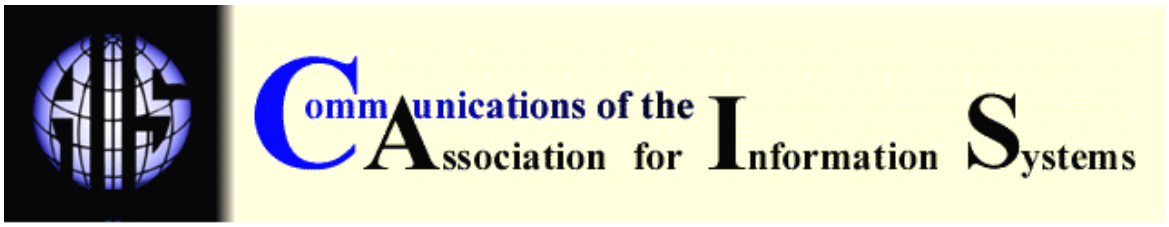
Fred Davis
University of Arkansas, fdavis@walton.uark.edu

Dennis F. Galletta
Katz School of Business, University of Pittsburgh, galletta@katz.pitt.edu

See next page for additional authors

AMCIS 2002 Panels and Workshops I: Human-Computer Interaction Research in the MIS Discipline

Authors
Ping Zhang, Izak Benbasat, Jane Carey, Fred Davis, Dennis F. Galletta, and Diane Strong



AMCIS 2002 PANELS AND WORKSHOPS I: HUMAN-COMPUTER INTERACTION RESEARCH IN THE MIS DISCIPLINE

Ping Zhang
Syracuse University
pzhang@syr.edu

Izak Benbasat
University of British Columbia

Jane Carey
Arizona State University West

Fred Davis
University of Arkansas

Dennis Galletta
University of Pittsburgh

Diane Strong
Worcester Polytechnic Institute

ABSTRACT

Human Computer Interaction(HCI) or Human Factors studies in MIS are concerned with the ways humans interact with information, technologies, and tasks, especially in business, managerial, organizational, and cultural contexts. This article describes the existence and importance of HCI research in the MIS discipline, its historical development, some of its characteristics, publication opportunities, and future research directions. It is believed that HCI is the subject of a strong research stream in MIS, and will continue to be strong in the foreseeable future. It is hoped that HCI studies can provide the evolution of the human centered technology development that enhances our work/job, our various needs, our organizations, our societies, and ourselves.

KEYWORDS: Human-Computer Interaction (HCI), Human Factors in Information Systems (HFIS), user-computer interface, individual differences, cognition, affect, computer self-efficacy, technology acceptance, user resistance, IS/IT use, user perception, user attitude, user intention, user behavior, user productivity, user satisfaction

I. INTRODUCTION

Human-Computer Interaction (HCI) is

> *"a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them." [Hewett et al., 1992]*

As an interdisciplinary field, HCI attracts researchers, educators, and practitioners from many different fields. Accordingly, many associations, special interest groups, and working groups focus on HCI or HCI-related studies.

In the Information Systems field, HCI issues are explored from a distinctive perspective: MIS researchers and educators take managerial and/or organizational issues into consideration. Human Factors in Information Systems

> *"is the scientific study of the interaction between people, computers, and the work environment. The knowledge gained from this study is used to create information systems and work environments which help to make people more productive and more satisfied with their work life." [Beard & Peterson, 1988]*

In general, Human Computer Interaction studies in MIS are concerned with the ways humans interact with information, technologies, and tasks, especially in business, managerial, organizational, and cultural contexts.

The broadly defined field of HCI research gained even more attention during recent years as technology developed more rapidly. To use advanced technology, we need to improve our understanding of humans, their tasks within different contexts, and the interplay among humans, tasks, information technologies, and contexts/environments. MIS oriented HCI research can provide a unique perspective that would certainly be conspicuous in its absence [Galletta, 2002].

The objective of this tutorial is to recognize the existence and importance of MIS oriented HCI research (MIS/HCI), its historical development, some characteristics, publication opportunities, and future research directions. By doing so, the authors hope to promote this sub-field of study, attract more interest in research and teaching, and collaborate with other HCI related fields or associations. Due to time and space considerations, this article is not intended to provide a comprehensive picture of the sub-field. Unless cited or quoted, the opinions in the paper reflect the authors' perspectives.

II. ARE MIS SCHOLARS INTERESTED IN HCI?

The answer is yes. This conclusion is supported by evidence in at least three areas:

- self reported interests in the ISWORLD Faculty Directory,
- sessions and tracks in major Information Systems conferences in recent years, and
- historical development and interests.

STATISTICS FROM ISWORLD

To obtain a rough idea of what interests IS scholars in the HCI side of MIS studies, one of the authors did a heuristic query on the ISWORLD Faculty Directory. Some existing human factor taxonomies [Beard & Peterson, 1988; Carey, 1988, 1991, 1995, 1997] were considered, together with some common HCI terms and other terms that have to do with the human side of MIS, such as gender issues in IT. Tables 1 and 2 summarize the query results. Appendix I lists the query

keywords used for each of the research themes. Different keywords are used by IS scholars in describing their research interests. Therefore, the tables are indicators rather than being a comprehensive picture. The query does, however, show that the level of research and teaching interest in HCI is high among IS scholars.

Table 1. ISWORLD Faculty Directory Research Interests

Research Theme	Hits
Attitude, behavior, perception, motivation	26
Cognitive	128
End User Computing	90
Ergonomics	12
Gender Issues in IT	32
Human factor	55
Human-Computer Interaction	192
Impact of IT	29
Information architecture	9
Information presentation and visualization	36
Interactive system design and evaluation	97
IS Professional	127
IT acceptance and use	194
Training & Learning	18
User Interface	110

Queried on 10/28/2002

Table 2. ISWORLD Faculty Directory Teaching Interests

Teaching Area	Hits
O-17. Human-computer interaction & interface design	416
O-21 IS Professionalism and Ethics	231
IS97.02 Personal Productivity with Information Systems technology	262

Queried on 10/28/2002

MAJOR MIS CONFERENCES THAT COVER HCI/MIS ISSUES

Research papers and ideas addressing the pertinent HCI issues in an IS context are presented at several major IS conferences. Table 3 lists the tracks, mini-tracks, and sessions at three major IS conferences (AMCIS, HICSS and ICIS) in recent years where HCI related research results (again, heuristically judged rather than scientifically classified) were presented.

SOME HISTORICAL DEVELOPMENT AND INTERESTS

HCI or human factors research has a long history. Culnan [1987] identifies Individual Differences and Human Factors as two of several MIS sub areas, which is evidenced by (limited) publications in the 70's and early 80's. Among the many notable events and efforts were the HFIS series.

J. Carey from Arizona State University West organized a series of symposia on Human Factors in Information Systems (HFIS) during the late 80's to early 90's. The meetings were to provide a forum for the exchange of ideas, conceptual work, and empirical research in the area of HFIS. Five meetings were held:

- October 1986, Texas A&M University [Carey 1988]
- February 1989, Sacramento, CA [Carey 1991]

- October 1990, Norman, OK [Carey 1995]
- February 1992, Phoenix AZ [Carey 1997]
- October 1993, Case Western Reserve University (Cleveland)

These symposia covered a broad range of issues of particular interest to IS scholars and resulted in a series of books published by Ablex Publishing, Inc.

Table 3. Major IS Conferences in Recent Years
Where HCI Research Studies Were Presented

AMCIS (2002)	Minitracks	HCI Studies in MIS Training and Use of Emerging Technologies Trust in an Organizational and E-Business Context
AMCIS (2001)	Minitracks	Human Factors in Web-based Interaction Trust in Electronic Commerce
	Metatracks	Information Quality and Antecedents of Learning Use of IT in Teaching
AMCIS (2000)	Minitracks	Intelligent Interface with Computers
AMCIS (1997)	Minitracks	Organizational Research - Individual Level Considerations User Satisfaction/Performance
AMCIS (1996)	Minitracks	Information Visualization
HICSS 35 (2002)	Minitracks	Mobile Informatics - Research Concerning Mobile Information Technology Use Marketing and e-commerce (Consumer Behavior in E-Commerce) Community Informatics Virtual Work Environments
HICSS 34 (2001)	Minitracks	Non-traditional Computer Support for User Evaluation
HICSS 33 (2000)	Minitracks	Digital Document Understanding and Visualization
HICSS 32 (1999)	Minitracks	Human Factors and Usability Issues
HICSS 31 (1998)	Minitracks	Coping with Information Overload
ICIS (2001)	Sessions	Technology Fear and Deception in the Internet Age Human-Computer Interface and Information Search Web-based Services: User Satisfaction, Acceptance and Loyalty User Acceptance of IT Web-based Retailing and Advertising (Web page design and impact) Improving Performance of Software Users/Teams User Satisfaction, Preferences & Performance (Info. Content vs. Structure)
ICIS (2000)	Sessions	Perspectives on IT Usage Trust and e-Commerce User Satisfaction, Preferences, and Performance Virtual Teams and Technology Appropriation Usage and Impacts on the Internet
ICIS (1999)	Sessions	Organizational and Social Influence on IT Trust in Electronic Commerce Web Site Quality (Information Quality of Web Sites)
ICIS (1997)	Sessions	Individual and Organizational Effectiveness Individual and Group Decision Making (Information Search and Usage) IS Professional Individual and Group Decision Making
ICIS (1996)	Sessions	IT Usage and Adoption Analyzing Fit between IT and Tasks Ethics and IT (Privacy Behavior and Intrusions) Examining Successful IT Usage Computer Self Efficacy and Use of IT

In summary, a community of scholars formed research interests in the broad MIS/HCI area over the past two decades. Thus we can call HCI studies in MIS a research program, to say the least.

III. WHAT ARE THE CHARACTERISTICS OF MIS/HCI RESEARCH?

Many so-called traditional HCI studies stemmed from Computer Science, Cognitive Psychology, Industry Engineering, Ergonomics, and several other disciplines. HCI studies also originated from MIS, Information Science, Communication, and Social Psychology disciplines, to name a few. For the sake of discussion, this tutorial considers published studies in the MIS field. By no means does it cover all studies produced by the sub-field.

The next section demonstrates some characteristics of MIS/HCI studies on the following aspects:

- research focus and scope/coverage,
- reference disciplines and theoretical support,
- research methodologies, and
- implications to theories, designs, and organizational practice.

RESEARCH FOCUS AND SCOPE/COVERAGE

A research study can be conducted to examine various issues at the levels of individuals, groups, organizations, and industries. Most MIS/HCI studies are performed at the individual level of analysis, although some are specifically designed for groups (CSCW, GDSS). Even though some studies focus on virtual communities, the emphasis is most likely on the individuals in a virtual community.

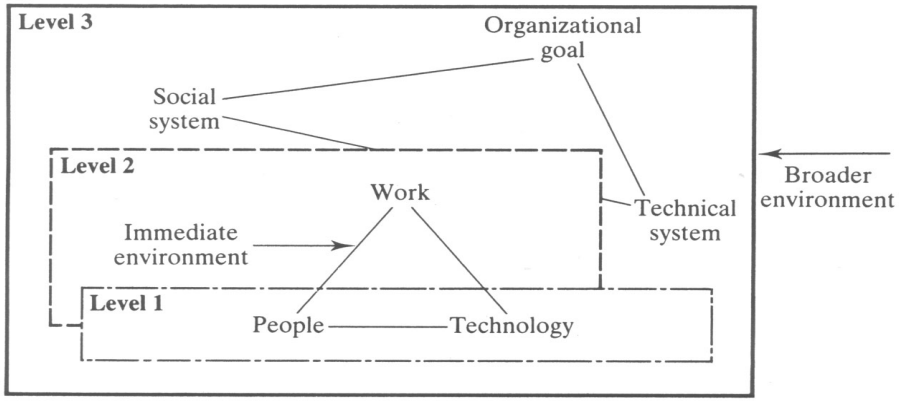
Figure 1 shows three levels of analysis that involve different components to be considered [Eason, 1991, in Preece et al., 1994].

- In this figure, *people* can mean one or more people;
- *work* can mean narrowly or broadly defined activities including tasks or more loosely defined activities;
- *environment* refers to the physical, organizational and social aspects of the environment; and
- *technology* can be any technological artifact including any kind of computer or workstation [Eason, 1991]

Some of these components can be further modified to include broader concepts to address modern issues in today's technology development and use. For example, technologies could include data and information, hardware and software, applications, procedures, as well as technical support staffs.

Most MIS/HCI studies strive for a balance between business, managerial, organizational, social, and technical/engineering perspectives [Baskerville and Myers, 2002], and they are organizational task-centric, or problem-centric. Specific studies on developing advanced technologies for organizational or managerial support (e.g., Krishnan et al., 2001; Zhang, 1998) are considered relevant in the MIS discipline because they include theoretical support for designs, as well as theoretical, managerial, or organizational implications. Many MIS/HCI studies, however, are about discovery or understanding by covering all three levels in Figure 1. Technologies are used as examples to discover user perceptions, attitudes, behavior, and performance (e.g. many studies on technology acceptance, computer self-efficacy, and IS usage.). Rather than focusing on simple or micro level task performance, MIS/HCI studies are concerned with individual tasks that are at a higher granularity - closely related to individuals' organizational work, which can directly support organizational goals. The usefulness of technology for accomplishing organizational tasks, and the fit between tasks at hand and

technologies to support the tasks [Goodhue, 1995] play an important role in the studies [Davis, 2002; Strong, 2002].



Source: [Preece et al., 1994]

Figure 1. Levels of Analysis in HCI

The majority of MIS/HCI focuses primarily on adult users in organizational or business contexts where individuals' work performance, job satisfaction, or organizational goals are primary concerns. Some studies focus on contexts other than organizational or business (e.g., Venkatesh and Brown, 2001). Few consider broader types of users (such as adults, children, mentally and/or physically challenged, and elderly) for broader types of purposes (such as for entertainment, museums, libraries, and even life-critical applications in medicine, defense, and cockpits and vehicle design).

It is believed that the study of human computer interaction (HCI) evolved from a focus on physical-ergonomic issues in the early 1970s to an integrated view of the use of computers within organizational, social and global contexts today [Carey, in Zhang, 2002]. Carey's HFIS series identified several themes of HCI/MIS studies in the early years: [Beard and Peterson, 1988; Carey, 1988, 1991, 1995, 1997]

- Human/Computer Interaction: ways in which the computer and user communicate
- Interface specification tools and design issues: detailed design techniques for the computer-user interface
- The IS professional
- Information presentation: how the data are displayed to the user (graphics, text, windowing, etc.)
- System/User documentation: documentation and communication procedures to assist the user in accomplishing tasks
- Organizational impacts
- End-user training and involvement: methods used to get users involved in such areas as system design, implementation, and use
- The end user

The newly formed AIS Special Interest Group on HCI intends to provide a forum for interested people to discuss, develop, and promote a range of issues related to the history, reference disciplines, theories, practice, methodologies and techniques, new development, and applications of the interaction between humans, tasks, information technologies, and contexts (organizational, cultural, etc.). Topics of interest include, but are not limited to, the following:

- The behavioral, cognitive, motivational, and affective aspects of human/technology interaction
- User task analysis and modeling
- Digital documents/genres and human information seeking behavior
- User interface design and evaluation for B2B, B2C, C2C e-commerce, m-commerce, e-marketplace and supply chain management, group collaboration, negotiation and auction, enterprise systems, Intranets, and Extranets
- Integrated and/or innovative approaches, guidelines, and standards for analysis, design, and development of interactive devices and systems
- Design of computer interfaces for single-user or collaborative decision support, including design of standard computer interfaces, as well as design for small-screen mobile devices and pervasive computing
- Development and applications of multi-dimensional information visualizations
- Usability engineering metrics and methods for user interface assessment and evaluation
- Usability studies for end-user computing in a work or non-work environment, especially in the Internet era
- Information technology acceptance and diffusion issues from cognitive, motivational, cultural, and user interface design perspectives
- The impact of interfaces/information technology on attitudes, behavior, performance, perception, and productivity
- Issues in software learning and training, including perceptual, cognitive, and motivational aspects of learning
- Gender and technology
- Issues related to the elderly, the young, and special needs populations, and
- Issues in teaching HCI courses

REFERENCE DISCIPLINES AND THEORETICAL SUPPORT

Reference disciplines or intellectual foundations can provide perspectives and many characteristics of a study program. The reference disciplines for MIS/HCI are computer science, engineering, management, management science, cognitive psychology, social psychology, organizational psychology, and most recently, consumer psychology and marketing.

MIS/HCI studies are mostly theoretically focused or involve strong theoretical perspectives. The MIS discipline places strong demands on the theoretical foundations of a study. Existing theories are expected to be justified for their appropriateness in addressing the problems at hand. In addition, existing theories are expected to be developed or advanced by a study either empirically or conceptually. Among several MIS/HCI research themes, the study of individual reactions to computing technology, as recognized by Compeau et al. [1999], is an important topic in recent information systems research. Many authors studied different aspects of the phenomenon from a variety of theoretical perspectives, including:

- Diffusion of Innovations (DOI) (e.g., Moore and Benbasat 1991),
- The Technology Acceptance Model (TAM) (e.g. Davis, 1989, Venkatesh and Davis 1996),
- The Theory of Planned Behavior (TPB) (e.g. Mathieson 1991; Taylor and Todd, 1995), and
- Social Cognitive Theory (SCT) (e.g. Compeau & Higgins 1995a, 1995b; Hill et al. 1986, 1987).

To obtain a rough picture for illustration purpose, one of the authors reviewed two most recent representative MIS conferences where MIS/HCI research studies were presented: the International Conference on Information Systems (ICIS, December, 2001) and the Americas

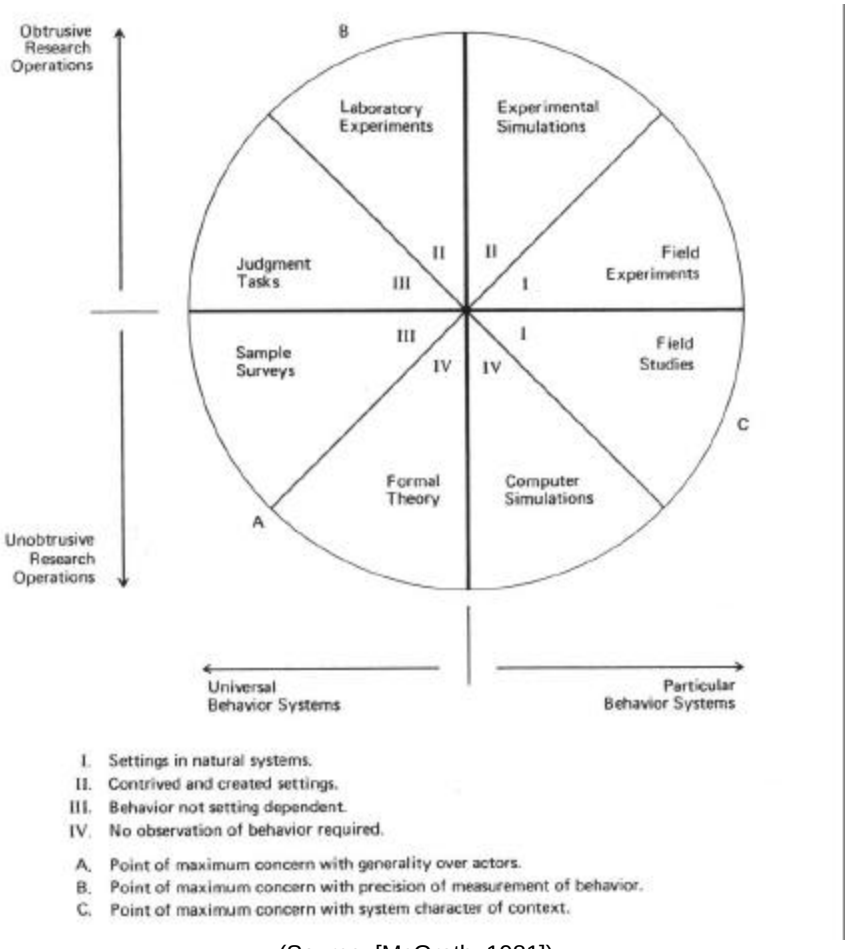
Conference on Information Systems (AMCIS, August, 2002). Two MIS conferences are presented because no single conference covers MIS/HCI research exclusively. At ICIS'01, 14 out of the 46 full papers address MIS/HCI issues, and 12 of the 14 papers (86%) contain theoretical components. At AMCIS'02, in the minitrack on HCI Studies in MIS, eight out of the 11 full papers (73%) were of a theoretical orientation.

RESEARCH METHODOLOGIES

Some studies follow the procedure of developing systems/interfaces (most are proof of concept prototypes), then evaluate or compare these interfaces to other alternatives, which is very similar to what is done in traditional HCI studies.

Many studies are oriented to the social sciences. Figure 2 shows research approaches or strategies for social sciences. Although two decades old, the figure still captures the major considerations researchers must face when conducting a research study. The eight identified strategies are classified in two dimensions [McGrath, 1981]:

- particular to universal, and
- obtrusive to unobtrusive.



(Source: [McGrath, 1981])

Figure 2. Research Strategies

These strategies vary in their ability to achieve the three conflicting goals of behavioral research:

- precision,
- generality, and
- concreteness or faithfulness to a real situation [Diesing, 1991].

It is perhaps impossible to maximize more than one of the three goals at a time. Thus any particular study would be making a trade-off to achieve a particular goal. It should be noted that a careful examination of these strategies might show some discrepancies with the classifications. Nevertheless, the classification scheme provides an overall understanding of the characteristics of the different strategies.

Using McGrath's taxonomy, Baecker et al. [1995, p81] summarize HCI research and evaluation methods into four major groups, as depicted in Table 4.

Table 4. HCI Research and Evaluation Strategies
(Source: [Baecker et al. 1995])

Field strategies	**Respondent strategies**
(Settings under conditions as natural as possible)	(Settings are muted or made moot)
Field studies	Judgment studies
Ethnography and interaction analysis Contextual inquiry	Usability inspection methods, e.g. heuristic evaluation
Field experiments	Sample surveys
Beta testing of products Studies of technological change	Questionnaires Interviews
Experimental strategies	**Theoretical strategies**
(Settings concocted for research purposes)	(No observation of behavior required)
Experimental stimulations	Formal theory
Usability testing Usability engineering	Design theory (e.g. Norman's 7 stages) Behavioral theory (e.g. color vision)
Laboratory experiments	Computer simulations
Controlled experiments	Human information processing theory

MIS/HCI studies were found that use formal theories or models, computer simulations, sample surveys, controlled experiments, field experiments, and field studies including case studies. The emphasis was to understand both universal and particular behaviors by both obtrusive and unobtrusive means. All three goals were attempted: precision (e.g. controlled experiments), generality (e.g. formal theories, and sample surveys), and concern for context.

It is notable that demand for achieving all three research goals is higher in the MIS discipline than in others. Even when a research study is conducted using a controlled experiment (which has the tendency of being less context based and less generalizable), the MIS community would be unlikely to accept it unless the context and generality issues are addressed carefully in the study.

IMPLICATIONS TO THEORIES, DESIGN, AND ORGANIZATIONAL PRACTICE

MIS/HCI research studies human attitudes, intentions, and behavior in (hopefully) real work place settings with current IT. In MIS/HCI, system building or interface implementation is mainly for proof of concepts. Usually there is a theoretical underpinning for the concepts, and thus eventually some theoretical implications. MIS/HCI research uses theoretical reasoning to analyze what works, what does not, and why, then provides suggestions for designing better or more effective IT, and provides suggestions for organizational practice.

Table 5 summarizes the characteristics of the subfield qualitatively. Note that asterisks are used to indicate the qualitative level visually. The asterisks represent the authors' opinion.

Table 5. Summary of MIS/HCI Research Characteristics

		MIS/HCI
Focus		Mostly individual level
Scope and coverage		Mostly adult users in organizational settings
Context Consideration		***
Level of Granularity of Analysis		Macro
Interdisciplinary		Yes
Reference Disciplines		
	Artificial Intelligence	*
	Computer Science	*
	Cognitive Psychology	***
	Social Psychology	***
	Organizational Psychology	***
	Consumer psychology/Marketing	**
	Management	**
	Management Science	*
System Development Orientation		*
Theory Orientation		***

Legend: *** heavy, a lot, many; ** some, medium; * light, little, a few

IV. DO MIS JOURNALS PUBLISH HCI RESEARCH?

The good news is that MIS journals do welcome HCI studies (broadly defined). Successful MIS/HCI studies published by MIS journals involve:

- research problems that are relevant. They synthesize MIS concerns and go beyond micro human-computer interaction,
- theoretical justifications and contributions, and
- implications to both research and practitioners [Davis, 2002; Galletta, 2002].

Successful HCI/MIS studies also demonstrate the use of solid methodologies. Some MIS/HCI studies fail because of problems in:

- system/interface failure,
- methodological problems, and
- focus of studies that were at too micro a level [Galletta, 2002].

MIS/HCI studies account for a considerable percentage of publications. To illustrate this point, two of the authors conducted a quick review for two time periods, 1990-1991 and 2000-2001 of three IS journals: MISQ, ISR, and JAIS. Table 6 indicates the total articles and the number and percentages of MIS/HCI-related articles published. Among the three journals, JAIS is the newest one (first published in March 2000). Although the data are limited in terms of journals and time periods, the percentage of MIS/HCI publications seem to be rather constant over time.

Table 6. HCI Publications of Three Leading Journals in Two Periods

	MISQ		ISR		JAIS
	1990-1991	2000-2001	1990-1991	2000-2001	2000-2001
Total articles published	57	40	32	47	18
MIS/HCI articles	14	13	10	12	7
MIS/HCI %	25%	33%	31%	26%	39%

V. WHAT DOES THE FUTURE HOLD FOR MIS/HCI RESEARCH?

The broadly defined HCI field is a strong research stream for MIS. Its future is bright because:

1. the number of interface developers is increasing,
2. more people face ever-more difficult to use systems [Galletta, 2002], and
3. more people are affected by the advancement of technology in their organizations, societies, and homes.

With a bright future, with "coming of age" [Carey, 2002], and a viable direction, the next question is: what are the themes for future MIS/HCI research? The following is a list of recommendations. Because a complete list for future research would be nearly impossible, the intent of the list is to encourage discussion and to discover interesting issues and research problems. The areas described are:

- Relationship building and management
- Task modeling and organizational fit
- User acceptance
- Enhancing HCI measurement
- Emphasizing the holistic experience of human interacting with technologies
- Emphasizing a broader range of users
- A new taxonomy of MIS/HCI

RELATIONSHIP BUILDING AND MANAGEMENT

The emphasis in MIS/HCI research should shift from a focus only on individuals interacting with a computer, to individuals communicating with each other and with organizations via the computer interface [Benbasat, 2002]. The key dependent variables studied in MIS/HCI research should include relationship building and relationship management rather than exclusive attention to efficiency and effectiveness that occupied a central role in prior research.

Relationship building and management constructs can play an important role in research on HCI associated with business-to-consumer interface designs. The goal is to design interfaces that reduce the distance between customers and entities with which they interact. Examples in the age of e-commerce include designs that (1) allow customers to experience products better via HCI, (2) enhance the social presence between the customer and a company that is only represented by a computer interface, such as a web page, (3) make it easier to use recommendation agents. e.g., search engines, that are needed to evaluate the vast number of product offerings on the Internet , and (4) simulate the interaction with salespeople in a physical store, such as the use of avatars for providing help [Benbasat, 2002].

TASK MODELING AND ORGANIZATIONAL FIT

Another lens for understanding the open issues in current and future MIS/HCI research is the task-technology fit (TTF) research stream in MIS, e.g., [Goodhue, 1995; Goodhue and Thompson, 1995; Dishaw and Strong, 1998]. From a TTF perspective, the variables in the core triangle in Figure 1 are labeled Technology, Task (rather than Work), and Individual Differences (rather than People). TTF models focus on the fit between Task and Technology, that is, the matching of the capabilities of the technology to the demands of a task [Goodhue, 1995]. A second focus is how individual differences, e.g., casual or frequent user, affect fit. For example, a user interface could provide good fit for a business task, but only for frequent users. Much of MIS research, including MIS/HCI research, is concerned with determining the dimensions of fit between selected information technologies and the needs of individual and organizational tasks, and then measuring the amount of misfit along these dimensions.

To make progress in MIS/HCI research, we need better models of organizational tasks. While we can run experiments to measure fit, the theoretical foundation for such experiments requires a model of the organization tasks used. For example, one study of the fit of maintenance-oriented CASE tools used a model of maintenance tasks developed through protocol analysis [Dishaw and Strong, 1998; Vessey, 1986]. Few organizational tasks, however, have such well-developed models of the activities involved, which limit our research progress.

A second area for future research is developing dimensions and measures for organizational fit. In MIS/HCI research, the context, typically an organizational task or process, is an important component of most studies. To date most TTF studies and MIS/HCI studies employed individual level analysis, although a few focused on groups and group support systems [Zigurs and Buckland, 1998]. As MIS research shifts from individual productivity tools to enterprise systems, we need to develop the dimensions and measures of organizational fit. For example, enterprise systems are touted as fostering integration and interdependence within organizations. We need to understand how to assess whether and how much these characteristics of enterprise systems fit or provide value to organizations.

USER ACCEPTANCE

The integration of user acceptance of IT with new technological development should be studied further [Davis, 2002]. It would be desirable to create unobtrusive computing that would

- manage user attention and
- exploit user intuition.

Skill acquisition and decision support through visualization and dynamic control are other directions that require research. In addition, virtual team support with knowledge collaboration becomes needed in the increasing virtualization and globalization of work teams [Davis, 2002].

ENHANCING HCI MEASUREMENT

Because the issues and problems noted in the research methodologies [Newsted et al. 1997] are not yet overcome, HCI measures still have a long way to go [Carey, 2002]. Table 7 shows HCI variables identified in the past. Related to the measurement issue is whether HCI studies face a methodological challenge. If so, what is the challenge? Should we reinvent or should we benefit from general social science studies on research methodologies?

Table7. HCI Variables [Carey, 2002]

<table>
<tr><th colspan="2">Independent</th><th>Dependent</th></tr>
<tr><th>User/Analyst</th><th>Interface Characteristics</th><th>Performance</th></tr>
<tr><td>1. Indirect
A. Aptitude
B. Attitude
C. Decision Style</td><td>1. Content</td><td>1. Decision effectiveness
A. Accuracy
B. Timeliness
C. Quality
D. Confidence</td></tr>
<tr><td>2. Direct
A. Training
B. Experience
C. Involvement</td><td>2. Form</td><td>2. Satisfaction</td></tr>
<tr><td rowspan="4">3. Decision Setting
A. Task
B. Management Level
C. Uncertainty
D. Timeliness
E. Structuredness
F. Context</td><td>3. Presentation</td><td>3. Learning
A. Ease
B. Time</td></tr>
<tr><td>4. Media</td><td>4. System Responsiveness</td></tr>
<tr><td rowspan="2">5. Context</td><td>5. Speed of Use</td></tr>
<tr><td>6. Error Rate</td></tr>
</table>

EMPHASIZING THE HOLISTIC EXPERIENCE OF HUMAN INTERACTING WITH TECHNOLOGIES

Historically, HCI studies were heavily focused on the cognitive aspect of human experience, such as in user modeling, task modeling, technology acceptance, computer self-efficacy, task technology fit, cognitive fit, expectation-confirmation models, and many others. In addition, many studies examined only work-related problems.

As non-rational human beings (as noted by Herbert Simon many years ago), we have a full range of opportunities to interact with technologies for different purposes in non-rational or bounded-rational ways. The holistic view of HCI should include cognitive, emotional, and affective aspects in all possible interactions humans have with technologies.

Several MIS/HCI studies already pay attention to more than just cognitive side of HCI. Examples include the studies on playfulness (e.g., Webster & Martocchio, 1992; Agarwal & Karahanna, 2000), flow experience (e.g., Trevino & Webster, 1992; Webster, et al. 1993; Ghani, 1995; Hoffman & Novak, 1996; Novak et al. 2002; Finneran & Zhang, 2000)], aesthetic and social needs (e.g., Tractinsky et al., 2000), emotion (Venkatesh, 2000), and a balance between action and relationship, cognition and affect (e.g., Te'eni, 2000).

In addition, with a full range of interacting with technologies in our lives for different purposes, we may examine the meaning of life again. We may go back to the basic question of what we want or need in our lives. We may revisit Maslow's or others' basic need models and then decide to use technologies to cater to humans' higher needs in the need hierarchy. This approach would open a whole new range of opportunities for future Human-Computer Interaction research.

EMPHASIZING A BROADER RANGE OF USERS

"Pushing human-computer interaction research to empower every citizen" [Shneiderman, 2000] seems a logical choice, yet it needs more attention. As discussed before, many MIS/HCI studies emphasize relatively normal adult users (either novice or expert) in organizational settings. Advancements in technology pushed this limit to reach a much broader range of users, such as those who are physically or mentally challenged, people in different age groups, people with different ethnical, culture, or language backgrounds, and people with low levels of education or motivation. Issues of universal usefulness, universal usability, universal acceptance and adoption have been addressed to some extent but much more needs to be done.

A NEW TAXONOMY OF MIS/HCI

We can make more progress after knowing where we are and what has been done. Because of the interdisciplinary nature of the MIS/HCI sub-field and the advancements in technology, a good taxonomy is much needed to illustrate current MIS/HCI studies and possible future directions. Existing taxonomies [Beard & Peterson, 1988; Killingsworth et al, 1997; Martin, 1997] need to be re-evaluated for appropriateness in today's situations. For example, decision-making was the major organizational task in some of these taxonomies. This focus changed significantly in the last several years (for example, online banking in Bhattacherjee [2001], general use of the World Wide Web in Agarwal and Karahanna [2000], and information seeking on the World Wide Web in Zhang [2000]). Whether this change affects the taxonomies is uncertain.

The existing taxonomies consider system analysts as one of the components and use the SDLC model. Little attention is paid to pre-, or post-SDLC stages, and/or the impact of finished systems or IT on individuals, teams, and organizations. These areas, however, gained significant attention in the MIS field recently, as evidenced by the development and maturity of several theoretical models (such as Technology Acceptance Model [Davis, 1989; Venkatesh and Davis, 1996], Task-Technology Fit model [Goodhue, 1995], cognitive fit model [Vessey, 1991; Vessey and Galletta, 1991]). Another limitation of these taxonomies is the heavy focus on cognitive influence and productivity, rather than the user's holistic and realistic experience while interacting with IT in the work or other environment. A new taxonomy should address these issues.

VI. CONCLUSIONS

This article is the first attempt to understand the uniqueness of the MIS/HCI sub-field facing today's technology advancement and organizational challenges. It is not intended to draw a comprehensive picture of the sub-field. Rather, the aim is to provide a starting point for further discussion and understanding.

It is exciting to see the overlaps of research interests between MIS/HCI research and more traditional HCI studies. For example, both realize the importance of supporting humans' social needs (e.g., Carroll, 2002; Tractinsky et al. 2000; Te'eni, 2001), supporting community building (e.g., Benbasat, 2002; Carroll, 2001a, b; Preece, 2000), and integrating computing with real environments (Carroll, 2002; Davis, 2002). To some extent, both realize that the future of HCI is about a broader or whole experience by individual users, for work, for creativity, and for personal life enrichment. For example, one of the three special areas in the upcoming CHI 2003 conference is emotion.

> *"Issues of emotion, affective response, and inclusive human concerns are exceedingly important in the HCI community. As people become more sensitive to dimensions of products that go beyond traditional aspects of usability, the need to understand and create emotional and aesthetic resonance between people and technology products increases. However, we have yet to discover a shared understanding and develop a shared language for emotion within the context of design."* [CHI, 2003]

Not surprisingly, the MIS Quarterly Year 2001 "best paper" winning article attempts a more accurate representation of actual behavior, and thus strives for a balance between cognition and affect, between action and relationship [Te'eni, 2001].

MIS/HCI researchers thus should put more effort to interact with other HCI related disciplines or associations to facilitate better exchanges of ideas, benefit from each other's research results, and promote the advancement of the entire Human-Computer Interaction field.

Winograd and Flores [1986] state that "All new technologies develop within the background of a tacit understanding of human nature and human work. The use of technology in turn leads to fundamental changes in what we do, and ultimately in what it is to be human." It is to this extent that the authors believe that MIS/HCI complements those studies that are done from a more technical, or "how," perspective that provides understandings of technology capabilities and potentials. MIS/HCI, from a more behavioral, or "so what," perspective, needs this understanding to study the impacts on users or the new way humans are within certain contexts. The results, in turn, should provide feedback and guidance for further and more advanced technological development in the next round. This continuation of iterative advancement promises the evolution of the human-centered technology development that enhances our work/job, our various needs, our organizations, our societies, and ourselves.

ACKNOWLEDGEMENT

The authors are very grateful to Kevin Crowston, Ben Shneiderman, Jenny Preece, and Gisela von Dran for their constructive comments on early drafts of this article.

Editor's note: This article is based on the authors' panel at AMCIS 2002 in Dallas, Texas. It was received on September 13, 2002 and was published on November 16, 2002 in a special issue of CAIS together with other articles from the panels and workshops. The special issue was under the editorship of Les Ball.

REFERENCES

EDITOR'S NOTE: The following reference list contains the address of World Wide Web pages. Readers who have the ability to access the Web directly from their computer or are reading the paper on the Web, can gain direct access to these references. Readers are warned, however, that

1. these links existed as of the date of publication but are not guaranteed to be working thereafter.
2. the contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. the authors of the Web pages, not CAIS, are responsible for the accuracy of their content.
4. the authors of this article, not CAIS, are responsible for the accuracy of the URL and version information.

Agarwal, R., and E. Karahanna, (2000) "Time Flies When You're Having Fun: Cognitive Absorption and Beliefs About Information Technology Usage," *MISQ* (24) 4, pp. 665-694

Baecker, R., J. Grudin, W. Buxton, and S. Greenberg (1995), *Readings in Human-Computer Interaction: Toward the Year 2000*, 2nd edition San Francisco, CA: Morgan Kaufmann Publishers, Inc.

Baskerville, R. and M. Myers, (2002) "Information Systems as a Reference Discipline," *MISQ*, (26) 1, pp. 1-14

Benbasat, I. (2002) "HCI Research in MIS: A Personal View," Panel presentation at AMCIS'02, http://melody.syr.edu/hci/amcis02_panel.cgi

Beard, J. and T. O. Peterson (1988) "A Taxonomy for the Study of Human Factors in Management Information Systems," in J. Carey (ed.) *Human Factors in Management Information Systems*, Greenwich, CT: Ablex Publishing Corporation, pp. 7-26

Bhattacherjee, A. (2001) "Understanding Information Systems Continuance: An Expectation-Confirmation Model," *MISQ* (25) 3, pp. 351-370

CHI (2003), The Annual Conference on Human Factors in Computing Systems, http://www.chi2003.org/

Carey, J. (2002) "Human Computer Interaction Research in the MIS Discipline," Panel presentation at AMCIS'02, http://melody.syr.edu/hci/amcis02_panel.cgi

Carey, J. (1997) *Human Factors in Information Systems: The Relationship Between User Interface Design and Human Performance*, Greenwich, CT: Ablex Publishing Corporation.

Carey, J. (1995) *Human Factors in Information Systems: Emerging Theoretical Bases,* Greenwich, CT: Ablex Publishing Corporation.

Carey, J. (1991) *Human Factors in Information Systems: An Organizational Perspective*, Greenwich, CT: Ablex Publishing Corporation

Carey, J. (1988) *Human Factors in Management Information Systems*, Greenwich, CT: Ablex Publishing Corporation.

Carroll, J. M. (2002) *Human-Computer Interaction in the New Millennium*, Addison-Wesley, Reading, Mass.

Carroll, J.M. (2001a) "Community Computing as Human-Computer Interaction," *Behaviour and Information Technology*, (20) 5 pp. 307-314.

Carroll, J.M. and M.B. Rosson (2001b) "Better Home Shopping or New Democracy? Evaluating Community Network Outcomes," *Proceedings of CHI 2001: Conference on Human Factors of Computing Systems*. (Seattle, WA; 31 March - 5 April). New York: ACM, pages 372-379. Also published as *CHI Letters,* (3) 1.

Compeau, D., C. Higgins, and S. Huff (1999) "Social Cognitive Theory and Individual Reactions to Computer Technology: A Longitudinal Study," *MISQ*, (23) 2, pp. 145-158

Compeau, D. and C. Higgins (1995a) "Application of Social Cognitive Theory to Training for Computer Skills," *Information Systems Research*, (6) 2, pp.118-143

Compeau, D. and C. Higgins (1995b) "Computer Self-Efficacy: Development of a Measure and Initial Test," *MISQ*, (19) 2, pp. 189-211

Culnan, M.J. (1986) "The Intellectual Development of MIS, 1972-1982: a Co-citation Analysis," *Management Science* (32), pp. 156-172

Davis, F. (2002) "Human Computer Interaction Research in the MIS Discipline," Panel Presentation at AMCIS'02, http://melody.syr.edu/hci/amcis02_panel.cgi

Davis, F. (1989) "Perceived Usefulness, Perceived Ease of Use, and User Acceptance of Information Technology," *MISQ*, (13) 3, pp 319-340

Dennis, A. R. and J. S. Valacich (2001) "Conducting Experimental Research in Information Systems," *Communications of the Association for Information Systems,* (7) 5.

Diesing, P. (1991) *How Does Social Science Work? Reflections on Practice*, Pittsburgh, PA: University of Pittsburgh Press.

Dishaw, M. T. and D. M. Strong (1998) "Supporting Software Maintenance with Software Engineering Tools: A Computed Task-Technology Fit Analysis," *Journal of Systems and Software,* 44 (2), pp. 107-120

Finneran, C. and P. Zhang, (2002) "The Challenges of Studying Flow within a Computer-Mediated Environment," *Proceedings of the Americas Conference on Information Systems*, Dallas, TX, pp. 1047-1054

Galletta, D. (2002) HCI Research in MIS: A Personal View, Panel Presentation at AMCIS'02, http://melody.syr.edu/hci/amcis02_panel.cgi

Gefen, D. and D. W. Straub (1997) "Gender Differences in the Perception and Use of E-Mail: An Extension to the Technology Acceptance Model," *MISQ* (21) 4, pp. 389-400

Ghani, J. (1995) "Flow in Human Computer Interactions: Test of a Model," In J. Carey (Ed.), *Human Factors in Information Systems: Emerging Theoretical Bases*.Norwood,NJ: Ablex Publishing Corp

Goodhue, D. (1995) "Task-Technology Fit and Individual Performance, "*MISQ* (19) 2, pp.213-236

Goodhue, D. (1995) "Understanding User Evaluations of Information Systems," *Management Science,* 41 (12), pp. 1827-1844.

Goodhue, D. and R. Thompson (1995) "Task-Technology Fit and Individual Performance," *MISQ,* 19 (2), pp. 213-236

Hewett, T., R. Baecker, S. Card, T. Carey, J. Gasen, M. Mantei, G. Perlman, G. Strong, and W. Verplank (1992) *ACM SIHCHI Curricula for Human-Computer Interaction*, New York, NY: Association for Computing Machinery

Hill, T., N. Smith, and M. Mann (1986) "Communicating Innovations: Convincing Computer Phobics to Adopt Innovative Technologies," in R. J. Lutz (ed.), *Advances in Consumer Research* (Volume 13), Provo, UT: Association for Consumer Research, pp. 419-422

Hill, T., N. Smith, N., and M. Mann, "Role of Efficacy Expectations in Predicting the Decision to User Advanced Technologies: The Case of Computers," *Journal of Applied Psychology*, (72) 2, pp. 307-313

Hoffman, D. And T. P. Novak (1996) "Marketing in Hypermedia Computer-Mediated Environments: Conceptual Foundations," *Journal of Marketing*, (80) 4, pp. 50-68

Killingsworth, B., M. Kletke, J. Mackay, J. Trumbly, and J. Carey, J. (1995) "Human Factors in Information Systems: A Position Treatise," in J. Carey (ed.) *Human Factors in Information Systems: Emerging Theoretical Bases*, Norwood, NJ:Ablex Publishing Corporation, pp.1-25

Krishnan, R., X. Li, D. Steier, and L. Zhao (2001) "On Heterogeneous Database Retrieval: A Cognitively Guided Approach," *Information Systems Research* (12) 3, pp. 286-301

Mathieson, K. (1991) "Predicting User Intentions: Comparing the Technology Acceptance Model with the Theory of Planned Behavior," *Information Systems Research*, (2) 3, pp. 173-191

McGrath, J. (1981) "Dilemmatics: The Study of Research Choices and Dilemmas," *American Behavioral Scientist*, (25) 2, pp. 179-210

Martin, M. (1995) "Human Factors in Information Systems: A Taxonomy," in J. Carey (ed.) *Human Factors in Information Systems: Emerging Theoretical Bases*, Norwood, NJ: Ablex Publishing Corporation, pp. 27-41

Moore, G. and I. Benbasat (1991) "Development of an Instrument to Measure the Perceptions of Adopting an Information Technology Innovation," *Information Systems Research,* (2) 3, pp. 192-222

Newsted, P., D. Salisbury, P. Todd, and R. Zmud (1997) "Measurement Issues in the Study of Human Factors in Management Information Systems," in J. Carey (ed.) *Human Factors in Information Systems: The Relationship between User Interface Design and Human Performance*, Greenwich, CT: Ablex Publishing Corporation, pp. 211-241

Norman, D. and S. Diaper (1986) *User Centered System Design – New perspectives on Human-Computer Interaction*, Hillsdale, NJ: Lawrence Erlbaum Associates

Novak, T. P., D.L. Hoffman, and A. Duhachek, A. (2002) "The Influence of Goal-Directed and Experiential Activities on Online Flow Experiences," *Journal of Consumer Psychology*, (13) 1/2

Preece, J. (2000) *Online Communities: Designing Usability, Supporting Sociability*, New York, NY: John Wiley & Sons.

Preece, J., Y. Rogers, H. Sharp, D. Benyon, S. Holland, and T. Carey (1994) *Human-Computer Interaction*, Reading, MA: Addison-Wesley.

Shneiderman, B. (2000) "Universal Usability," *Communications of the ACM*, (43) 5, pp. 84-91

Shneiderman, B. (1997) *Designing the User Interface – Strategies for Effective Human-Computer Interaction*, 3rd edition, Reading, MA: Addison Wesley,.

Strong, D. (2002) "Human Computer Interaction Research in the MIS Discipline," Panel Presentation at AMCIS'02, http://melody.syr.edu/hci/amcis02_panel.cgi

Taylor, S. and P. Todd (1995) "Understanding Information Technology Usage: A Test of Competing Models," *Information Systems Research*, (6) 2, pp. 144-176

Te'eni, D. (2001) "A Cognitive-Affective Model of Organizational Communication for Designing IT," *MISQ*, (25) 2, pp. 251-312

Tractinsky, N., A. Shoval-Katz, and D. Ikar 2000) "What is Beautiful is Usable," *Interacting with Computers*, (3) 2, pp. 127-145

Trevino, L. K., and J. Webster (1992) "Flow in Computer-Mediated Communication," *Communication Research,* (19) 5, pp. 539-573

Venkatesh, V. and S. A. Brown (2001) "A Longitudinal Investigation of Personal Computers in Homes: Adoption Determinants and Emerging Challenges," *MISQ,* (25) 1, pp. 71-102

Venkatesh, V. (2000) "Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model," *Information Systems Research* (11) 4, pp. 342-365

Venkatesh, V. and F. Davis (1996) "A Model of the Antecedents of Perceived Ease of Use: Development and Test," *Decision Sciences*, (27) 3, pp. 451-482

Vessey, I. (1991) "Cognitive Fit: A Theory-Based Analysis of the Graphs Versus Tables Literature," *Decision Sciences*, (22) 2, pp. 219-240

Vessey, I., and D. Galletta (1991) "Cognitive Fit: An Empirical Study of Information Acquisition," *Information Systems Research*, (2) 1, pp. 63-84.

Vessey, I. (1986) "Expertise in Debugging Computer Programs: An Analysis of the Content of Verbal Protocols," *IEEE Transactions on Systems, Man, and Cybernetics,* 16 (5), pp. 621-637

Webster, J., and J. J. Martocchio (1992) "Microcomputer Playfulness: Development of a Measure with Workplace Implications," *MISQ*, (16) 2, pp. 201-226

Webster, J., L. Trevino, and L. Ryan (1993) "The Dimensionality and Correlates of Flow in Human-Computer Interaction," *Computers in Human Behavior,* (9) 2/3, pp. 411-426

Winograd, T., and F. Flores (1986) *Understanding Computer and Cognition – A New Foundation for Design*, Norwood, NJ: Ablex Publishing Corp.

Zhang, P. (2002) "The Role of HCI Research in the MIS Discipline," *Proceedings of the Americas Conference on Information Systems*, August, Dallas, TX. pp. 2452-2453. Also online at

http://melody.syr.edu/hci/amcis02_panel/Zhang_HCI_Panel_Description_071502.pdf

Zhang, P. (2000) “The Effects of Animation on Information Seeking Performance on the World Wide Web: Securing Attention or Interfering with Primary Tasks”, *Journal of Association for Information Systems (JAIS)*, (1) 1

Zhang, P. (1998) “Image Construction Method for Visualizing Managerial Data,” *Decision Support Systems* (23) 4, pp. 371-387

Zigurs, I. and B. Buckland (1998) “A Theory of Task/Technology Fit and Group Support Systems Effectiveness,” *MISQ*, 22 (3), pp. 313-334

APPENDIX I. HCI INTERESTS SHOWN IN ISWORLD FACULTY DIRECTORY

Themes	Keywords Used in Query	Hits
Attitude, behavior, perception, motivation		**26**
	Individual behavior	2
	Information seeking	6
	Motivation	7
	Perception	7
	User attitude	3
	User behavior	1
Cognitive		**128**
	Cognition	39
	Cognitive	62
	Human information processing	7
	Psychological	7
	Psychology	13
End User Computing		**90**
	End User Computing	35
	End-User Computing	55
Ergonomics	Ergonomic	**12**
Gender Issues in IT		**32**
	Gender	19
	Women in computing	2
	Women in Information Systems	1
	Women in IT	7
	Women in Technology	3
Human-Computer Interaction		**192**
	HCI	31
	Human computer interaction	60
	Human/computer interaction	3
	Human/computer/task interaction	1
	Human-Computer Interaction	93
	Human-machine interaction	1
	Human-system interaction	2
	Human-technology interaction	1
Human factor		**55**
	Human factor	46
	Human side of IS	1
	Human side of IT	1
	Individual differences	3
	Individual factors	1
	User modeling	3
Impact of IT		**29**
	Impact of IT on individual	3
	Individual performance	1
	Individual reaction to IT	2
	Personal Productivity	6
	User performance	2
	User productivity	1
	User satisfaction	14

Themes	Keywords Used in Query	Hits
Information architecture		**9**
	Information architecture	7
	Information design	2
Information presentation and visualization		**36**
	Information presentation	3
	Visualization	33
Interactive system design and evaluation		**97**
	Interface design	46
	Interactive system design	1
	Interface evaluation	1
	Usability	44
	User centered	2
	User evaluation	3
IS Professional		**127**
	Ethics	100
	IS Professional	21
	IT Professional	6
IT acceptance and use		**194**
	Adoption	140
	Interface acceptance	1
	IS acceptance	1
	IS success	12
	IS usage	3
	IT usage	1
	IT use	14
	Technology acceptance	15
	User acceptance	7
User Interface		**110**
	Computer interface	36
	Human computer interface	10
	Human/computer interface	1
	Human-computer interface	21
	Man machine interface	1
	Man/machine interface	1
	User interface	40
Training & Learning		**18**
	Computer learning	2
	Computer self-efficacy	2
	Computer training	2
	End user learning	1
	End user training	1
	End-user training	6
	System training	2
	User competence	2

Queried on 10/28/2002

ABOUT THE AUTHORS

Ping Zhang is Associate Professor at the School of Information Studies, Syracuse University. Dr. Zhang earned her Ph.D. in Information Systems from The University of Texas at Austin, and M.Sc. and B.Sc. in Computer Science from Peking University, Beijing, China. She teaches Human-Computer Interaction, Systems Analysis and Design, Database Management Systems, and other IT related topics. Her research appears in journals such as *Journal of Association for Information Systems, Decision Support Systems*, *International Journal of Electronic Commerce*, *Journal of American Society for Information Science and Technology, e-Service Journal, Simulation*, *IEEE Computer Graphics and Applications*, *Journal of Education for MIS*, and *Journal of Research on Computing in Education*. Dr. Zhang received the Best Paper awards at the Americas Conference on Information Systems (2001) and the International Academy for Information Management (1997), and an Excellence in Teaching award from the University of Texas at Austin (1994).

Izak Benbasat is Professor, Canada Research Chair in Information Technology Management, and Associate Dean at the Faculty of Commerce and Business Administration, University of British Columbia. Dr. Benbasat received his Ph.D. in MIS from the University of Minnesota. He is Senior Editor of the *Journal of Association for Information Systems*, and serves on the editorial board of *Journal of Management Information Systems* and *Information Systems Journal*, and advisory board of *e-Service Journal* and *Information Technology and Management*. He is the past editor-in-chief of *Information Systems Research*. He also served as Senior Editor or Associate Editor of several other journals including *Management Science*, *MIS Quarterly*, and *International Journal of Man-Machine Studies*. The general theme that links his areas of research interest is improving the communication between IT, management, and users of technology. This communication exists at different levels and has different facets.

Jane Carey is Associate Professor of Information Systems at Arizona State University West. Prior to joining the ASU West faculty in 1988, Dr. Carey taught at Texas A&M University. She received her PhD from the University of Mississippi in 1984 in Business Administration with a major in Organizational Behavior and a minor in Computer Science. Dr. Carey is a pioneer in the Human Computer Interaction area within the MIS discipline. She founded and hosted a series of symposia from 1986 to 1993 on Human Factors in Information Systems. Four HCI books resulted from these symposia and are frequently cited in the HCI literature. Dr. Carey spent the academic year 1994-95 in China teaching and conducting research. In addition to her research interests in the area of HCI, Dr. Carey studies computer access issues and the consequences of the "digital divide".

Fred Davis is Professor, David D. Glass Chair in Information Systems, and Chair of the Information Systems Department at the Sam M. Walton College of Business at the University of Arkansas. Dr. Davis earned his Ph.D. at MIT's Sloan School of Management, and served on the business school faculties at The University of Michigan, the University of Minnesota, and the University of Maryland. Dr. Davis was Associate Editor for *Management Science*, *MIS Quarterly*, and *Information Systems Research*. He publishes extensively on user acceptance of IT in the workplace and IT-assisted decision making. Current research interests include IT training and skill acquisition, management of emerging IT, distributed teams, and technology-mediated learning.

Dennis Galletta is Associate Professor of business administration at the Katz Graduate School of Business, University of Pittsburgh. He obtained his doctorate from the University of Minnesota with a major in MIS and a minor in psychology. His research most frequently involves user attitudes, behavior, and performance. His articles appear or are scheduled to appear in such journals as *Management Science*, *Information Systems Research*, *Decision Sciences*, *Journal of*

MIS, *Communications of the ACM*, *Communications of the AIS*, *Data Base*, *Information and Management*, and *Accounting, Management and Information Technologies*. He served on the editorial boards of several journals, including the *MIS Quarterly* and *Data Base*. He recently became AIS Fellow and, in the past, served the field in many capacities (including AIS VP of Member Services, ICIS Treasurer, and chair of the Inaugural AMCIS Conference in 1995). He is the program co-chair for AMCIS 2003.

Diane M. Strong is Associate Professor in the Management Department at Worcester Polytechnic Institute. She received her Ph.D. in Information Systems from Carnegie Mellon University. Dr. Strong's research centers on data and information quality, task-technology fit models, and MIS application systems, especially ERP systems. Her publications appeared in such journals as *Communications of the ACM, ACM Transactions on Information Systems*, *Journal of Systems and Software, Journal of Management Information Systems*, and *Information & Management*. She was program co-chair for AMCIS 2001, and is currently serving as an AIS Council representing the Americas region. She is a member of AIS, ACM, and INFORMS.

Communications of the Association for Information Systems

ISSN: 1529-3181