

Inclusive Design-Theory: How to take advantage of diversity in Information Systems Design

Panel

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Abstract

The theme of ICIS 2013 in Milan is “*Reshaping Society through Information Systems*” (<http://icis2013.aisnet.org/>). One aspect of reshaping society that has been recently discussed in central Europe is that of social inclusion (<http://ec.europa.eu/social/main.jsp?catId=750&langId=en>). Yet, after decades of research and ambitious political programs, we still observe an imbalanced treatment toward groups of different gender, age, race, ethnicity, sexual orientation, religion, disability, and social background. Such an issue raises questions about the degree to which information systems can help to overcome such imbalance; for instance, if design principles can be formalized in order to reshape the information systems design into a different, more-inclusive direction. We contend that IS falls short in tackling this issue. In this panel, Shirley Gregor, Fred Niederman, Eileen Trauth, and Cathy Urquhart reflect on the multiple aspects of social inclusion in the design and the resulting shape of Information Systems. This panel intends to deliver more in-depth results than merely advocating a stance for more diversity in the IS workforce. Building on the principles of Design Science, we believe that our discipline can help reshape the digital economy. As a key takeaway, the panel provides guidance on the impact of gender in IS theorizing as a demonstration example, and reflect on the trend towards Social Design in the IS research community.

Keywords: Design Theory, Social Design, diversity, social inclusion, gender

Introduction: The value of diverse teams

“Our problems are man-made, therefore they may be solved by man. And man can be as big as he wants. No problem of human destiny is beyond human beings.”

(John F. Kennedy 1963)

Formal organizations face an increasingly diverse community both among their employees internally and customers externally. This panel is framed on the assumed consensus that diversity in organizations, societies, and any formed groups is to be recognized as something worth pursuing on all organizational levels (Kochan et al. 2002; Yu, 2002; van Knippenberg and Schippers, 2007). In economic terms, this means that organizations are increasingly drawing on the best talent from around the world in order to remain competitive (Gibson and Gibbs 2006; Lee et al. 2006), and are trying to profit as much as possible from the resulting diversity (Salomon and Schork, 2003; Foldy, 2004; Levina and Vaast, 2008; Daniel et. al. 2013). In order to leverage diversity's positive impacts, additional management skills are required to avoid conflicts and steer groups toward common goals (Bazile-Jones, 1996; Broome et. al. 2002; Reichenberg 2001).

It is naïve to assume that the same management techniques are applicable to all regardless of how diverse its membership may be. Yet, sophisticated management skills are costly and hard to implement effectively in, for instance, geographically separated projects (e.g., open source software (OSS)) or within a distributed group of end users (e.g., Wikipedia). This raises questions about the degree to which Strategic Workforce Management (SWM) initiatives and managing techniques that steer diverse and distributed teams can be supported – or even replaced – by inclusive Information System Design. In the following section, we present the example of female involvement in Wikipedia edits as a starting point of the discussion.

The example: A Design problem?

More than half of all college students in the US, about 57 percent in 2012, are female (NCES 2012). As of January 2013, women are no longer barred from combat positions in the United States military. Some statistics suggest that the male-female income gap is narrowing (BLS 2011). Women hold about 20 percent of the seats in both the U.S. Senate and the House of Representatives – the highest proportion ever. Three of the last five Secretaries of State were women. One of them, Condoleezza Rice, just became one of the first female members of Augusta National Golf Club, one of the oldest and most traditional “good old boy” clubs in America. In the European Union this year, the issue of women's representation in business picked up speed again, too. After major companies failed to meet negotiated agreements for a 20% female ratio in their executive boards, the European Parliament is considering if mandatory regulation is the answer (EP 2010). While achieving certain goals by law and regulation is arguably controversial, some other companies have already met goals for women's representation. For instance, Deutsche Telekom AG, one of Europe's largest information and communication technology companies, was proud to announce that it meet a 30% share of women in management positions in 2011.

Equality of the sexes has long been a goal of modern, liberal, and enlightened societies. As the previous paragraph suggests, there has been huge progress during the last decade. However, the disparity between men and women is still significant in some dimensions, particularly in the design arena. For instance, women file only about 7.5 percent of all patents in the United States of America. We must examine the ways in which subtle barriers hinder women from taking their fair share in society, and whether simple design principles that might help to alleviate such barriers have been neglected. Considering the impact of information systems research, we need to reflect on the numbers of women engaged in our own field. We also need to take a different perspective on our design principles if our discipline intends to help reshape society and close the digital divide.

Our illustrative example for the panel is Wikipedia, by far the largest encyclopedia in history. It contains more than 24 million articles in 275 languages. Launched in 2001, it's run by volunteers who call themselves Wikipedians. A 2011 New York Times article by Noam Cohen points out that only 1 in 6 Wikipedia editors were women (Cohen 2011). This number is rather surprising given the open platform

concept of Wikipedia, and the 50 percent share of women among Internet users. The proportions were even more skewed in terms of the number of female contributions to Wikipedia edits, which comprised approximately 9 percent of the total edits performed (Shyong 2011). These statistics suggest that Wikipedia is an information system that was not designed to appeal equally to men and women. The game industry is another prominent example of an arena in which with a male engagement is disproportionately higher than female engagement – at least when it comes to expenditures for gaming and involvement in game development (Smith 2013). Yet, there are design principles that have successfully been implemented in order to draw female users to online games (<http://www.frauen-spiele.com/>) and the game industry (<http://www.womeningamesjobs.com>).

In many ways, our world is moving toward even-handedness in providing opportunities for individuals regardless of gender, race, class, religion, age and so on. As design scientists (Simon 1996), we shape artifacts so that they fulfill their direct purposes (e.g., providing encyclopedia type information) and have the potential to conduct that design in ways that reinforce opportunities to extend rather than constrict participation. This panel reflects on our design practice through the lens of inclusion. First we consider the context in which such divergent participation is likely to be observed; second, we discuss design patterns, and how initiators of new artifacts can incorporate design that promote inclusiveness.

Controversial Issues

1. To what extent does the designer's gender and background consciously or unconsciously affect how welcome participants of different genders and background feel?
2. How can we develop design knowledge that will cause women to contribute and participate more on open online platforms or open source software? Can the disproportionately small representation of females in online platforms and OSS-projects be traced to particular design elements (both technical and social)?
3. Are there more-general design principles and incentives (both technical and social) that would be likely to lead to more inclusiveness?

To our best knowledge, the issue of disproportionate representation of men relative to women in certain areas of society and information systems in particular is well documented and widely discussed. There exists consensus about the overall value of diverse teams. However, we do not observe corresponding design patterns aimed at insuring gathering requirements or building products that ensure usability for diverse set of clients. To shade light on this issue and to draft a way toward a corresponding research agenda, we propose to discuss these issues in a distinct panel.

The panelists positions

Eileen will base her comments on the research she has conducted on the underrepresentation of women in the IT workforce, on her theorizing of the issues, barriers, and facilitators affecting gender and IS, and on the graduate and undergraduate courses on gender and IT that she has taught. She will draw on her research findings, theorizing, and teaching to discuss some issues with the way that gender and IT is currently conceptualized in the IS field. Her position is that these issues might help to explain the continued under representation of women in the IS field (Howcroft and Trauth, 2008; Kvasny, Trauth and Morgan, 2009; Quesenberry and Trauth, 2012; Trauth, 2006, 2011; Trauth, Kvasny and Greenhill, 2007; Trauth, Quesenberry and Huang, 2008, 2009; Trauth, Quesenberry and Yeo, 2008; Von Hellens, Trauth and Fisher, 2012).

- Issue: the assumption that women constitute a homogeneous group and that all women everywhere possess the same thoughts, feelings, and expectations about technology and technological professions
- Issue: the assumption that the barriers to women in the IT profession are the same for all women
- Issue: the assumption that something such as a “woman-friendly” design could exist

- Issue: much of the gender and IS research that is published in peer-reviewed IS journals is a-theoretical in the way that no theory of gender is used to guide the research design or the interpretation of results.
- Issue: much of the gender and IS research does not build on the existing base of research knowledge about gender and IS. Hence, the IS field has not acquired cumulative knowledge about this topic.

Fred will discuss some counter examples from the game industry, in particular ARGs (Augmented Reality Games) where there are instances of both relatively even participation by gender and some heuristics used by designers to encourage this arrangement (e.g. Bonsignore, et al. 2013; Hansen, et al., 2012). He will outline a three element model – designer attributes; design practices; and diversity indexed usefulness. This will focus attention on the relationship between the characteristics of the design team relative to the usability across a range of diverse clients as moderated by inclusive design principles. Such a model generates questions such as: is there a direct relationship between designer attributes and usability for diverse user groups? And what principles of design can aid in usability for diverse clients regardless of the composition of the design group? He will raise questions regarding how the lessons from ARGs might be applied to social networks, in particular Wikipedia, and to application relative to other types of diversity than gender, such as physical handicap and ethnicity.

Cathy will build on her work in the areas of information and communication technologies (ICTs) and social inclusion. ICTs are increasingly seen as a means for social inclusion (e.g., Urquhart, Liyanage and Kah, 2008). She will discuss how, in other fields of design, women have been excluded from designs that are critical to their well being, such as car airbags and voice recognition systems (Margolis and Fishers 2002). In a world where we assume that everyone is accessing the Internet in the same way, the design of a website may not fit all communities and can exclude people as well as include them. These issues of design can cover gender (Slyke et al 2010), language (Diaz and Urquhart 2009), and cultural and visual aspects (Ornelas and Gregory 2009, Tan, et al 2006). She will also discuss how the design of some mainstream websites such as Facebook might shape social interactions, and make assumptions about their users, who are in fact extremely varied. She will also reflect on how ideas of social-materiality can add a useful perspective to the challenge of inclusive design

Shirley will consider female participation in online communities as an example of a diversity in design problem. That is, more design knowledge and theory is needed to guide the design of online platforms to increase female participation (Gregor and Jones 2007). The size of the problem is illustrated by the very low proportion of female contributors to Wikipedia (Cohen 2011; Glott et al., 2010). Even the topics where female interest is expected to be higher, such as friendship bracelets for teenage girls and the fashion designers Manolo Blahnik and Jimmy Choo, have shorter entries compared to similar topics for males. This problem is not a new one. The gender breakdown of contributors to “public thought-leadership forums” outside the virtual world is roughly 85-15% men to women (Cohen 2011). Early research on computer-mediated communication found that participation was much lower for women than men (Ferris 1996). Women are more likely to avoid aggression and to be subject to more overt and covert censorship. Differences are explained in terms of the socialization of men and women and different communication styles (Herring, 1993; Truong 1993) as well as different motivations (Ferris 1996) and gender stereotyping (Matheson 1991). However, many models of drivers of participation in online communities or the use of enterprise systems ignore gender completely. The literature on how designs can be enhanced to encourage more female participation is sparse to non-existent. Shirley will give suggestions on how work on this design problem can proceed.

Sebastian, who will facilitate the panel, has a background in organizational theory and Human Resources (HR). Most recently, he has worked in Information System Design to support Strategic Workforce Management (SWM) programs for some of Germany’s top-listed enterprises. His work includes the operational HR-software as well as Human Capital Analytics and planning. To his surprise, the given consensus about the value of diverse groups and the differences among / within the groups, although well known, are not investigated in a way that lead to more applicable outcomes for Information System Design. Sebastian is engaged in a research program that addresses the demographic change in Western Europe and the expected effects on the active workforce. The question he seeks to answer is how and to what degree the management task of engaging and managing diverse groups can be supported by Information Systems.

Structure of the panel

The ability to promote an idea to a broad audience is one of the key strength of a panel. Given the rising interest in shaping the society by technical design, we believe that a panel is ideally suited to allow aspiring IS researchers to tap into this debate and better understand some of the controversial methodological issues.

We intend for the panel to have four distinct phases. The major one relies on the participation of the audience. The guiding principles for this procedure are to:

- (1) Draw on the panelist's expertise and experience to provide some initial principles and issues on the topic, and
- (2) Fully engage participants in advancing these.

For the first phase, the facilitator will present the topic with a few slides featuring a few key figures and an introducing example. Next, the panelists are introduced and their position in the discussion framed. The first phase will take 10 minutes (including introductions)

In the second phase, the panelists will have the opportunity to further elaborate on their position and the role in the discussion. Their argumentation will be based on their previous work and experience in the field and on the topic. Each panelist will have between three and five minutes to elaborate her/his position. As such, this phase will take about 12-20 minutes.

The third phase of the panel time will be done in concert with the audience and is organized as an open, yet facilitated, discussion. Since this is the main part of the panel, we plan it to last for about 50 minutes. In this phase, the goal is to begin identifying common positions and to identify areas of distinct differences regarding social design principles and current issues. In contrast to discussing the concept of social design on an abstract level, we intend to focus the discussion on our discipline and the consequences we draw on to shape the future of our discipline.

The fourth phase will last about 10 minutes and will summarize the results and key positions of the discussion. Following the panel, a full summary of the discussion, responses, and points will be posted to either the conference website (if permitted) or to a panelist's website so that participants can have access to the material they helped to co-create.

The Panelists' (short) Biographies

All of the panelists have made a commitment to attend the conference and to serve on the panel.

Shirley Gregor is the foundation Professor of Information Systems at the Australian National University, Canberra, where she is a Director of the National Centre for Information Systems Research. Professor Gregor's current research interests include the adoption and strategic use of information and communications technologies, intelligent systems and human-computer interface issues, and the theoretical foundations of information systems. Dr Gregor has led several large applied research projects funded by the Meat Research Corporation, the Department of Communications, Information Technology and the Arts, the Australian Research Council and AusAID. Professor Gregor spent a number of years in the computing industry in Australia and the United Kingdom before beginning an academic career. She obtained her Ph.D. in Information Systems from the University of Queensland.

Dr Gregor's publications include 4 edited books, 15 book chapters and over 100 papers in conferences and journals such as MIS Quarterly, Journal of the Association of Information Systems (JAIS), International Journal of Electronic Commerce, International Journal of Human Computer Studies, European Journal of Information Systems and Information Technology & People. Professor Gregor was inaugural President of the Australasian Association of Information Systems 2002-2003 and was Region 3 (Asia/Pacific) Councillor for the Association of Information Systems 2007-2009. She was a Senior Editor for MIS Quarterly 2008-2010 and is now Editor-in-Chief of the JAIS. Professor Gregor was made an Officer of the Order of Australia in the Queen's Birthday Honour's list in June 2005 for services as an educator and researcher in the field of information systems and in the development of applications for electronic

commerce in the agribusiness sector. In 2005 she was elected as a Fellow of the Australian Computer Society and in 2010 she became a Fellow of the Association for Information Systems.

Fred Niederman serves as the Shaughnessy Endowed Professor of MIS at Saint Louis University. His PhD is from the University of Minnesota in 1990. His research interests include global information management, MIS personnel, and using MIS to support teams and groups. Recently he has been investigating the integration of MIS functions after corporate mergers and acquisitions. He is a proponent of grounded theory and theory building as a way to enrich the MIS discipline and build intellectual content customized specifically to our field of practice. He has published more than one hundred articles in leading research journals and refereed conference proceedings. He serves on editorial boards for TMIS, JAIS, CAIS, Human Resource Management, Journal of International Management, IEEE Transactions on Engineering Management and the Journal of Global Information Management. He has edited or co-edited special issues for CACM, DATABASE, Journal of Global Information Management, Journal of Organizational Computing and E-Commerce and Human Resource Management. Currently he is co-editing a special issue on emerging ideas for CAIS. He recently served as co-program chair for the 2010 ICIS conference in St. Louis, Missouri, is an active member in the MIS “senior scholars and is proud to be counted as a member of the “circle of compadres” for the PhD Project.

Eileen M. Trauth is Professor of Information Sciences & Technology and Women’s Studies at the Pennsylvania State University. Dr. Trauth’s research is concerned with societal, cultural and organizational influences on information technology and the information technology professions with a special focus on gender diversity and social inclusion. She is particularly interested in the linkages between diversity, social inclusion and economic development. Dr. Trauth has lectured about and investigated issues of gender under representation in the information technology professions in Austria, Australia, Finland, Greece, Ireland, New Zealand, Romania, South Africa, Spain, the UK and the United States. She has conducted over 200 life history interviews with women working in the information technology field where she has collected stories of barriers and support. Her current work is focused on the intersectionality of gender and other identity characteristics such as race, ethnicity, socio-economic class, sexuality and nationality. Dr. Trauth has written extensively on the topic of gender diversity and social inclusion. She is editor of the *Encyclopedia of Gender and Information Technology*, two conference proceedings on the topic of diversity and social inclusion, and special issues on gender diversity for *Information Systems Journal* and *The Database for Advances in Information Systems*. During 2008 she held the Universität Klagenfurt (Austria) – Fulbright Distinguished Chair in Gender Studies. With funding from the National Science Foundation, she has written a play, *iDream* (iDreamThePlay.com) based on her interviews with women IT professionals as a way to communicate to the general public about gender barriers in the scientific and technological professions. Dr. Trauth also teaches courses on diversity and gender in the global information technology sector at Penn State University. Her research has been supported by grants from the Fulbright Foundation, the National Science Foundation, the Australian Research Council and Science Foundation Ireland. She is currently co-editor-in-chief of *Information Systems Journal*, and has published 9 books and over 150 scholarly papers on her work on gender and social inclusion, the information economy, qualitative research methods, critical theory, global informatics, information policy, information management, telecommunications policy and information systems skills.

Cathy Urquhart is Head of Research at Manchester Metropolitan University and Professor of Digital and Sustainable Enterprise at the Manchester Metropolitan University Business School. She is a past Senior Editor for MIS Quarterly, and an Associate Editor for Information Technology and Development as well as an Editorial Board member for Business Information Systems Engineering. She is past Vice President for Special Interest Groups and Member Services of the Association for Information Systems (AIS), which is the premier organization for IS academics. Professor Urquhart is a member of the AIS Special Interest Groups for Global Development (SIGGLOBDEV), Grounded Theory Method (SIGGTM) and of the IFIP 9.4 Working Group on the Social Implications of Computers in Developing Countries and IFIP 8.2 Working Group on Information Systems and Organizations. She is a co-coordinator of the ICIS Women’s Breakfast. She is author of ‘Grounded Theory for Qualitative Research: A Practical Guide, published by Sage in 2013.

References

- Bazile-Jones, R. (1996). "Diversity in the Workplace: Why We Should Care." *CMA*, 70(5), 9-12.
- Benkler, Y., and Nissenbaum, H. (2006). "Commons-based Peer Production and Virtue", *The Journal of Political Philosophy*, 14 (4).
- Boland, R.J., (1987). "The in-formation of information systems." In R.J. Boland and R. A. Hirschheim (eds.), *Critical Issues in IS Research*. New York, NY: John Wiley.
- Bonsignore, E., Hansen, D., Kraus, K., Visconti, A., Ahn, J., and Druin, A. (2013), "Playing for Real: Designing Alternate Reality Games for Teenagers in Learning Contexts", *Interaction Design and Children (IDC)* June New York, NY, USA, p. 237-246.
- Broome, B., DeTurk,S., Kristjansdottir,E., Kanata, T., and Ganesan, P. (2002). "Giving Voice to Diversity: An Interactive Approach to Conflict Management and Decision-Making in Culturally Diverse Work Environments." *Journal of Business and Management*, 8(3), 239-264.
- Bureau of Labor Statistics, BLS (2011). "Women in the Labor", Force U.S. Department of Labor, *U.S. Bureau of Labor Statistics: A Databook*, December 2011 Report 1034 (accessed 4 April 2012).
- Cohen, Noam (2011). „Define Gender Gap? Look Up Wikipedia’s Contributor”, *List New York Times*, Published: January 30, 2011.
- Daniel S., Agarwal R.; Stewart K. (2013). *Information Systems Research*, Vol. 24, No. 2, pp. 312–333.
- Diaz Andrade, A. Urquhart, C., (2009). " ICTs as a Tool for Cultural Dominance: Prospects for a Two-way Street", *Electronic Journal of Information Systems in Developing Countries*, 15, 2, pp 108-132
- European Parliament (2011). "Strategy for equality between women and men 2010-2015", http://europa.eu/legislation_summaries/employment_and_social_policy/equality_between_men_and_women/em0037_en.htm (accessed: 1 May 2013).
- Ferris, S. (1996). "Women on-line: Cultural and relational aspects of women’s communication in on-line discussion groups." *Interpersonal Computing and Technology*, 4, 29-40.
- Foldy, E. (2004). "Learning from Diversity: A Theoretical Exploration." *Public Administration Review*, 64(5), 529-538.
- Gibson C, Gibbs J (2006). "Unpacking the concept of virtuality: The effects of geographic dispersion, electronic dependence, dynamic structure, and national diversity on team innovation." *Admin. Sci. Quart.* 51(3):451–495.
- Gregor, S. and Jones, D. (2007). "The anatomy of a design theory." *Journal of the Association of Information Systems*, 8, 5, Article 19, 312-335.
- Glott, R., Schmidt, R., and Ghosh, R. (2010). "Wikipedia survey – overview of results", *United Nations University*.
- Hansen, D., Bonsignore, E., ruppel, M., Visconti, A., and Kraus, K. (2012). "Designing Reusable Alternate Reality Games", High Tech Computer Interaction Lab Report, University of Maryland, <http://www.cs.umd.edu/hcil/pubs/tech-reports.shtml>, accessed September 2013.
- Hedberg, B. (1975). "Computer systems to support industrial democracy". In E. Mumford and H. Sackman (eds.), *Human choice and computers*. New York, NY: North Holland.
- Herring, S. (1993). "Gender and democracy in computer-mediated communication", *Electronic Journal of Communication*, 3 (2).
- Howcroft, D. and Trauth, E.M. 2008. "The Implications of a Critical Agenda in Gender and IS Research," *Information Systems Journal Special Issue: Exploring the Critical Agenda in IS Research*. Volume 18, Number 2: 185-202.

- Iivari, J., Hirschheim, R., and Klein, H.K. (1998). "A paradigmatic analysis contrasting IS development approaches and methodologies", *Information Systems Research*, 9 (2).
- Klein, H.K., and Hirschheim, R (1987). „Social change and the future of IS development.” In R.J. Boland and R. A. Hirschheim (eds.), *Critical Issues in IS Research*. New York, NY: John Wiley.
- Kochan, T., Bezrukova, K., Ely, R., Jackson, S., Josni, A., Jehn, K., Leonard, J., Levine, D. & Thomas, D. (2002). "The Effect of Diversity on Business Performance: Report of the Diversity Research Network." *Human Resource Management*, 42(1). 3-21.
- Kvasny, L., Trauth, E.M. and Morgan, A. 2009. "Power Relations in IT Education and Work: The Intersectionality of Gender, Race and Class", *Journal of Information, Communication and Ethics in Society Special Issue on ICTs and Social Inclusion*. Volume 7, Number 2/3: 96-118.
- Lamb, R. and R. Kling (2003). "Reconceptualizing Users as Social Actors in Information Systems Research." *MIS Quarterly*, 27(2): 197-235.
- Lee D, Banerjee P, Lim KH, Kumar K, van Hillegersberg J, Wei KK (2006) "Aligning IT components to achieve agility in globally distributed system development". *Comm. ACM* 49(10):48–54.
- Light, B. (2007). "Introducing Masculinity Studies to Information Systems Research: the Case of Gaydar." *European Journal of Information Systems*, 16(5): 658-665.
- Light, B., G. Fletcher, et al. (2008). "Gay men, Gaydar and the commodification of difference." *Information Technology and People*, 21(3): 300-314.
- Matheson, K. (1991). "Social cues in computer-mediated communication: Gender makes a difference," *Computers in Human Behavior*, 7, 137-145.
- Margolis, J., and Fisher, A. 2002. "Unlocking the Clubhouse: Women in Computing", *MIT Press*, Cambridge, MA.
- National Center for Education Statistics (NCES), U.S. Department of Education (2012). "Digest of Education Statistics", (NCES 2012-001), Chapter 3.
- Niederman, F. and Tan, F.B., (2011). "Managing Global IT Teams: Considering Cultural Dynamics," *Communications of ACM*.
- Niederman, F. and Sumner, M. (2004). "Effects of Tasks, Salaries and Shocks on Job Satisfaction among MIS Professionals," with, *Information Resources Management Journal*.
- Niederman, F. (2004). "IT Personnel Prospects for 2004: A Mixed Bag," *IEEE Computer*, January 2004.
- Niederman, F. and Sumner, M. (2004). "The Impact of Gender Differences on Job Satisfaction, Job Turnover, and Career Experiences of Information Systems Professionals," *Journal of Computer Information Systems*.
- Ornelas, Y. and Gregory, J. (2009) "Design for Social Inclusion and Social Sustainability", Special Session Organizers. In: *Proceedings of IASDR 2009: Design Rigor & Relevance*, October 18-22, 2009, Coex, Seoul, Korea. Sponsored by Korea Advanced Institute of Science and Technology (KAIST), Seoul: IASDR.
- Quesenberry, J. and Trauth, E.M., (2012). "The (Dis)Placement of Women in the IT Workforce: An Investigation of Individual Career Values and Organizational Interventions," *Information Systems Journal*, 22, 6, 457-473.
- Reichenberg, N. (2001). "Best practices in Diversity Management." *United Nations Expert Group Meeting on Managing Diversity in the Civil Service*.
- Salomon, F. and Schork, J. (2003). "Turn Diversity to your Advantage." *Research Technology Management*, 46(4), 37.
- Scott, S.V. and Orlikowski, W.J., (2013). Sociomateriality – taking the wrong turning? A response to Mutch. *Information and Organization*, forthcoming.
<http://dx.doi.org/10.1016/j.infoandorg.2013.02.003>

- Shyong (Tony) K. Lam, Anuradha Uduwage, Zhenhua Dong, Shilad Sen, David R. Musicant, Loren Terveen, and John Riedl. "Wp:clubhouse?: An exploration of wikipedia's gender imbalance." In *Proceedings of the 7th International Symposium on Wikis and Open Collaboration, WikiSym '11*, ACM, pages 1-10, New York, NY, USA, 2011.
- Simon, H.A. *The Sciences of the Artificial*, 3rd Edition, *The MIT Press*, Cambridge, MA, 1996.
- Smith, D. (2013) "Quo Vadis: Spieleindustrie leidet unter Frauendiskriminierung", Heise Online <http://www.heise.de/newsticker/meldung/Quo-Vadis-Spieleindustrie-leidet-unter-Frauendiskriminierung-1850430.html> (accessed 2013-08-13), News, 2013, KW 17.
- Trauth, E.M., Quesenberry, J.L. and Huang, H. (2009). "Factors Influencing Career Choice for Women in the Global Information Technology Workforce," in *Technological Advancement in Developed and Developing Countries: Discoveries in Global Information Management*. G. Hunter and F. Tan (Eds.), Hershey, PA: IGI Global.
- Trauth, E.M., Quesenberry, J. and Huang, H. (2010). "Der Einfluss von Arbeitsräumen auf Geschlechterasymmetrien im IT-Bereich," *Internationale Arbeitsräume. Unsicherheiten und Herausforderungen* ("The Effect of Workplace Factors on the IT Gender Imbalance in the United States" in *International IT Workspaces: Uncertainties and Challenges*.) E. Ruiz Ben (Ed.), Freiburg, Germany: Centaurus Verlag, pp. 153-187.
- Trauth, E.M. (Ed.) (2006). „Encyclopedia of Gender and IT.” Hershey, PA: Idea Group Publishing.
- Trauth, E.M., Quesenberry, J.L. and Huang, H. (2009). "Retaining Women in the U.S. IT Workforce: Theorizing the Influence of Organizational Factors," *European Journal of Information Systems*, Special Issue on Meeting the Renewed Demand for IT Workers, 18, 476-497.
- Trauth, E.M., Quesenberry, J. and Huang, H. (2008). "A Multicultural Analysis of Factors Influencing Career Choice for Women in the Information Technology Workforce," *Journal of Global Information Management*. Volume 16, Number 4: 1-23. Recipient of Outstanding Published Journal Award by IGI Global Excellence in Information Technology Research Journal Award Program.
- Trauth, E.M., Quesenberry, J. and Yeo, B. (2008). "Environmental Influences on Gender in the IT Workforce," *The Data Base for Advances in Information Systems*. Volume 39, Number 1: 8-32.
- Trauth, E.M. (2011). "Rethinking Gender and MIS for the Twenty-first Century," in *The Oxford Handbook on MIS*. R. Galliers and W. Currie (Eds.), Oxford, UK: Oxford University Press.
- Trauth, E.M., Kvasny, L., and Greenhill, A. (2007). "Conducting Feminist Gender Research in the Information Systems Field," in *Issues and Trends in Technology and Human Interaction*. B. Carsten Stahl (Ed.), Hershey, PA: IRM Press: 1-24.
- Truong, H-A. (1993). "Gender issues in online communication", Paper presented at a meeting of the Bay Area Women in Telecommunications.
- Urquhart, C., Liyanage, S. and Kah, M. (2008) "ICTs and Poverty Reduction: A Social Capital and Knowledge Perspective", *Journal of Information Technology*, 23(3), 203-213.
- van Knippenberg D, Schippers M (2007) "Work group diversity", *Annual. Rev. Psych.* 58(1):515-541.
- Van Slyke, C, Belanger, F., Johnson, R.D. and Hightower, R. (2010). "Gender-based differences in consumer e-commerce adoption", *Communications of the Association for Information Systems*, Vol. 26, pp.17-34.
- Von Hellens, L., Trauth, E.M. and Fisher, J. (Eds.) (2012). "Increasing the Representation of Women in the Information Technology Professions: Research on Interventions", *Information Systems Journal*, Special Issue - 22, 5.
- Yu, L. (2002). "Does Diversity Drive Productivity?" *MIT Sloan Management Review*, 43(2), 17.