

# Ways of Knowing in HCI



Judith S. Olson • Wendy A. Kellogg  
Editors

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 Springer

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Judith S. Olson  
Donald Bren Professor of Information  
and Computer Sciences  
University of California, Irvine  
Irvine, CA, USA

Wendy A. Kellogg  
IBM T.J. Watson Research Center  
Yorktown Heights, NY, USA

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*We dedicate this book to Gary Olson and John Thomas, who are not only colleagues who know a lot about many of these methods but also partners and supporters in the academic life. We appreciate your input, patience, and encouragement.*

### **Special Dedication**

*During the last year before publication, one of our valued colleagues and authors, John Reidl, continued to work, laugh, and be friends while enduring the scourge of melanoma. We lost John, Date is July 15, 2013. He will be sorely missed.*



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# Prologue

The field of HCI grew from the field of human factors applied to computing, with strong roots in cognitive psychology. The seminal book by Card, Moran, and Newell, *The Psychology of Human Computer Interaction*, (1983) gathered what was known from cognitive psychology to apply to the design of computer interfaces—aspects of motor movement with Fitts’ law, perception with gestalt laws, the differences between recall and recognition guiding the preference of menus over command lines, etc. Studies involving experiments and surveys dominated.

But the field has grown since then. The roots from psychology are still relevant: aspects of perception and motor movement and memory still guide the rationale behind designs of mobile computing, Google Glass, and embedded computing. But the focus is wider. We study not only the design of the interface but also the setting in which computing is embedded, the needs of people in various contexts, and the activities they engage in while using various forms of computing. In 1987, Lucy Suchman introduced ethnographic methods of knowing how people navigate their lives in her seminal book *Plans and Situated Action*. Later came the advent of design as a way of knowing in which designers would push the boundaries of what is introduced in the world in order to find out more about the world. All along technology researchers were building amazing new capabilities to meet people’s needs or making it easier for other developers to build things by giving them toolkits.

With the variety of research methods came challenges to the field. Reviewers as well as readers asked, “What counts as good research? How do we know whether the advance is done well? Can we trust the findings? Do we know more now than we did?”

This book grew from this challenge. From discussions among the attendees of the 2010 Human Computer Interaction Consortium (HCIC), we decided to hold a number of tutorials on the variety of methods that researchers use in HCIC, not with the goal of becoming expert in each, but to be tutored to a level where, in reading a paper, we could tell whether the method was done well and what the contribution was. We wanted to become able reviewers of a variety of methods well beyond those we were formally trained in. The success of the tutorials, run for 2 years

because the first year was so well received, generated the idea of making this knowledge, these sensibilities, more widely available. Thus came this book: *Ways of Knowing in HCI*.

The chapters in this book are remarkably diverse. There are chapters on ethnography, grounded theory method, and action research. Three chapters focus on system building: technical research, building an experimental online community, and field deployments. Two chapters focus on design research, one contrasting design research with science and one explicating what is involved in research through design. There are two chapters covering experiments and surveys, with an additional chapter showing how crowdsourcing can help both. Three chapters address new sources of digital data: sensory systems, eye tracking, and log analysis. Following these are three newer analysis techniques in HCI: retrospective analysis, agent-based modeling, and social network analysis. Because many of these methods extend to the world of online activity, there are new ethical challenges, described and discussed in a new chapter on ethics.

Though this collection represents a remarkably broad set of methods, or as we prefer, “ways of knowing,” it is not complete. We have no explicit chapter on how to conduct and analyze interviews from the field; ethnography has more stringent requirements on the researcher in that the interviewer/observer is a player in the activities and attempts to understand the experience of the people, not just their activities. For those interested in learning more about interviewing we point them to the Sage publication, “Doing Interviews,” by Steinar Kvale.

Similarly, we do not have a chapter on Contextual Inquiry, the method of examining a complex situation in order to generate ideas on how to make the situation better in one way or the other. We point readers to Beyer and Holtzblatt (both books).

We also are lacking in a chapter building on the roots of cognitive modeling, the work that grew direction from *The Psychology of Human Computer Interaction*, used in designing interactions, especially for people doing a task all-day-every-day in operations. And, there are ways of knowing over longer periods of time under the rubric of historical research, recently exemplified in Edwards on global warming, and maybe Bowker and Starr on medical categorization.

In spite of these omissions, we believe this collection of chapters to be highly useful, and, for some, enlightening *in the whole*. We have had the privilege of reading them all, and in close proximity, giving us a perspective on how the methods compare, how they might be used in conjunction, etc. We recommend such a reading, and suggest that in reading in the whole that the following aspects of the methods be called out:

- What is the situation in which the data are collected?
- What do the data consist of?
- What kind(s) of analyses are performed on the data to generate “knowing?”
- What kinds of questions can this method answer (and what not)?

In the epilogue, we will attempt to point out some comparisons on these and other relevant dimensions, helping the readers to see a bigger picture of the methods in our field, and where these might be going in the future.

The 34 authors of these chapters were asked to provide not a tutorial, per se, but advice on what is entailed in doing this kind of research, what cautions to attend to, and what kinds of things to report in publications so reviewers as well as readers could judge the work for trustworthiness and value. All authors were asked to cover the following topics, not as a template, but to provide some consistent coverage from chapter to chapter:

- A short description of the essence of the method
- Its history or intellectual tradition, and evolution
- What questions the method can and cannot answer
- How to do it: What constitutes good work

One of the most valuable resources in this book is the reference list. To make it a bit more useful yet, we asked authors to indicate which references would help a reader become more expert in the method, if such references exist, and to indicate somewhere in the paper some examples of where this method was used well in HCI. In addition, we asked authors to say something about what attracted them to this particular approach to knowing in HCI; a bit of history of them doing this kind of work.

Irvine, CA, USA  
Yorktown Heights, NY, USA

Judith S. Olson  
Wendy A. Kellogg