
Best Practices in Longitudinal Research

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Abstract

This SIG will help to identify best practices for longitudinal research through a collaborative discussion of methods and metrics for collecting and analyzing user data over time. This is the fifth event in an ongoing effort by the facilitators to enhance our current body of knowledge about longitudinal research.

ACM Classification Keywords

H5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Keywords

Longitudinal data, longitudinal research, comparative analysis, user research, study design

General Terms

Human Factors, Theory

Introduction

As user experience issues become more central to HCI, the value of longitudinal research—collecting user data over time—is increasingly recognized. Design researchers understand the importance of observing extended use of products and systems, and seek to improve methodology and develop best practices for longitudinal research.

Traditional user research and evaluation methods tend to focus on ‘first-time’ experiences with products [3], which trends the results more towards discoverability or learnability problems, rather than usability concerns that may persist over time. This SIG seeks to extend current thinking by providing a forum for discussion of methods and metrics that have proven effective for longitudinal data collection.

Previous related work leading to this SIG

The SIG facilitators are conducting a series of events to build a body of knowledge about longitudinal research practice, after which we will publish the results. This SIG is a follow-on to our original CHI 2007 SIG on longitudinal usability [4], where over 60 attendees participated in an active dialogue.

After the CHI 2007 SIG, we established a wiki on longitudinal research [6]. The goals of the wiki are to share best practices, case studies, and lessons learned about longitudinal data collection and analysis.

At CHI 2008 [5], the authors organized a panel where researchers from industry and academia gave their viewpoints and case studies. Then, to provide a better venue for in-depth discussion, we conducted a workshop at CHI 2009 [2], where participants discussed the open issues raised at the SIG and panel, as well as their individual goals for longitudinal research.

Prior to the CHI 2009 workshop, the facilitators also conducted a workshop at the 2008 Usability Professionals’ Association conference [1]. We generated alternative definitions of “longitudinal research,” prioritized over 30 questions of interest, and began developing best practices. Although the UPA

workshop yielded valuable insight from practitioners, we needed more in-depth exploration with experienced professionals from both academia and industry before promulgating best practices for longitudinal research. The CHI workshop was a suitable venue for such exploration, where we gained a blended viewpoint as well as more research-based case histories.

Goals for the SIG

The goal of this SIG is to help participants gain a better understanding of the longitudinal user experience research taking place in both industry and academia. The desired SIG outcomes are:

- Collaborative discussion of key issues, both appropriate methodology and research questions that lend themselves to longitudinal study (refer to the section on “Issues and Questions to be Addressed”)
- Sharing and capturing detailed experiences of longitudinal research to fulfill the immediate need for use cases
- Publishing in the longitudinal research wiki the information supplied by participants

Emerging definition of longitudinal research

The key findings from the previous events include an emerging definition of longitudinal research. Since there seems to be no consensus on the definition of longitudinal research either in literature or among researchers, we are attempting to evolve one.

So far, session participants have agreed that the goal of this research is to look beyond the initial user experience. No specific method is required—in fact, usage of multiple methods, often both qualitative and quantitative, is beneficial. Panel design (same subjects throughout) and/or trend study (rotating subjects) are

both used. The length of study can vary; participants described case histories as short as three weeks and as long as three years. A study can be considered longitudinal if at least one dimension—e.g. users, design, research questions—is compared over a time period. Data analysis and conclusions are generally more productive if more dimensions remain constant.

Issues and Questions to be Addressed

The previous activities—especially the workshops—yielded more than 30 issues and questions suggested by the organizers and participants, of which several were judged worthy of further exploration. The following paragraphs summarize the ongoing discussion prior to the CHI 2010 SIG, during which we'll continue to investigate these topics and consider others as well.

Methods for longitudinal research

We found that diary studies (qualitative) and usage logs (quantitative) were the most often used methods, but no method was excluded. The “longitudinal” nature of the study does not itself determine the methods, rather the research questions do.

Techniques to leverage organizational support

Involving stakeholders, publishing ongoing results periodically during the study, engaging motivated teams, and promoting success stories will all help garner business support. Also, “longitudinal research” can be an intimidating name; consider using terms such as Research panel, Pilot study, Value research.

Iterative design/testing is not typically longitudinal

First, the goal of most iterative design research tends to be focused on initial experience. Secondly, few if any dimensions remain constant in iterative testing. For

longitudinal research, there has to be a comparison over a time period by keeping some dimension constant (e.g. tasks, people, measures).

Risks associated with longitudinal research

Since longitudinal research results in a large set of data which can become overwhelming, careful scoping of the study is important. Participant drop-out can be addressed by over-recruiting appropriate candidates and providing incremental incentives. Stakeholder interference and/or indifference can be handled by obtaining buy-in before starting the study.

Questions that longitudinal research can help answer

Longitudinal research is ideal for studying how and when users transition from novice to expert, as well as addressing issues such as abandonment or adoption rates, learnability, comfort with technology, productivity, and evolution of user perceptions.

Techniques/tools for qualitative data analysis

While there are a number of statistical techniques to compare quantitative data over time periods, techniques and tools for analyzing and comparing qualitative data need to be improved. Most frequently used methods are mental modeling, content analysis, affinity diagrams, classification (tagging/coding), activity diagrams, flow charts, and frameworks/models.

Facilitators' Backgrounds

Jhilmil Jain is a Senior User Experience Research Lead in the Intelligent Information Management Lab at Hewlett-Packard Labs. Dr. Jain received her doctorate in Computer Science with a specialization in Human Computer Interaction from Auburn University. During her graduate studies, she also worked on projects in

the areas of multimodal interaction and semantic web modeling at HP Labs and IBM Almaden Research Center. She has several publications and patents in information visualization, user research, multimodal interaction modeling, personal information management systems, and experimental evaluation. She has served on the program committees of various conferences such as CHI, HCII, CHIMIT, and UPA; on the editorial board for the International Journal of Handheld Computing Research; on the review boards for two books "Handheld Computing for Mobile Commerce: Applications, Concepts and Technologies" and "The Psychology of Facebook"; and is currently serving as the Program Chair of the CHIMIT 2009 conference.

Stephanie Rosenbaum is CEO of Tec-Ed, Inc., a 15-person user experience consultancy. Tec-Ed clients include Cisco Systems, eBay, Nokia, the IEEE, Yahoo!, and Google. She recently contributed an invited chapter on "The Future of Usability Evaluation" to a volume on *Maturing Usability* (Springer HCI Series, 2008) by the European COST294-MAUSE usability research community. Stephanie has presented (panels, workshops, tutorials, papers, and/or SIGs) at every CHI conference since 1990; she was co-chair of the CHI 2006 Usability Community. A member of HFES and the UPA, Stephanie is also a past vice-chair of ACM SIGDOC. Her research background includes anthropology studies at Columbia University and experimental psychology research for the University of California at Berkeley, from which she received an MA in the philosophy of language.

Catherine Courage is VP of Product Design at Citrix. In this role she leads a world-class user experience

team. Her team is responsible for delivering exceptional user interface designs; providing user experience thought leadership; and driving user interface standardization across all product lines within Citrix. Prior to joining Citrix, Catherine was in User Experience roles at salesforce.com and Oracle. She co-authored the book *Understanding Your Users* and is an active member in the Human-Computer Interaction. She holds a Masters of Applied Sciences specializing in Human Factors from the University of Toronto.

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