Usability in Practice: Field Methods Evolution and Revolution

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Abstract

Field Methods are a collection of tools and techniques for conducting studies of users, their tasks, and their work environments in the actual context of those environments. The promise of such methods is that they help teams design products that are both useful and usable by providing data about what people really do. Participants in this forum will address:

- the origins and framework of Contextual Design

- the application of field methods to task analysis

- a review of ways to adapt these methods to practical constraints

- a discount approach to field studies

Keywords
Field research methods, contextual inquiry, contextual design, user interface design, iterative design, user-centered design, consensus building.

INTRODUCTION
Field research methods differ from usability tests and heuristic reviews in two fundamental ways. First, they do not require that a design or prototype be produced before data can be collected. This means that they can influence de- sign in its early stages and avoid the "scrap and rework" approach of iterative testing. Second, they offer ways to gather and analyze data about user work as it is currently done so that both the functionality and look and feel of a product or tool can be based on actual user needs and knowledge. Although field methods are relatively widely practiced [1, 4, 17, 18] it's probably safe to say that they are not used as frequently as usability tests.

In this forum, four experienced teams of field researchers offer their views on the practice and challenge of applying field methods to product design. First, Karen Holzblatt and Hugh Beyer offer an overview of contextual design and its application. JoAnn Hackos discusses field methods in relation to task analysis and its application to system design and testing. Stephanie Rosenbaum draws on her experience to suggest some ways to streamline field studies. Colleen Page and Sari and Karri-Pekka Laakso offer a discount user observation method (DUO) to help make field studies efficient and timely.

CONTEXTUAL DESIGN: AN OVERVIEW
Karen Holtzblatt

Contextual Inquiry has been practiced in the industry for many years [16] and has been developed into a comprehensive approach to system design called Contextual Design [2, 10]. Contextual Design's elements include

- Contextual Inquiry to gather data

- work modeling to analyze data for a deep understanding of the user's work

- consolidation of models to produce a coherent and integrated view of the population and for sharing with a wider team
- Creation of a work redesign vision to better understand how to support the users' work, the details of which are worked out in scenarios that are story boarded
- User Environment Design to represent and integrate the entire system
- mocking up with paper prototypes to test the design

In addition, Holtzblatt and Beyer [10] suggest that teams create vision statements to drive design and marketing activities and scenarios and story boards to facilitate user testing.

Contextual Design and its data gathering component Contextual Inquiry have been extensively documented [2, 3] and have been widely practiced. While its full process may appear daunting to the uninitiated, Beyer and Holtzblatt [10] offer quick and simple ways to match the methods to resources and needs. For example, they suggest that if your team has limited resources and time, you might simply perform a Contextual Inquiry with a limited number of users. They imply that resources should match the question at hand. For example a quick check of a design direction might only require 4-6 users and limited analysis while a project to develop a new entirely new product might involve 15 to 20 users and require the development of work models, visions and the rest of the process. They also draw links between the various Contextual Design models and the questions that arise in a design process; for example, to answer the question "how do users do task A," you would construct a sequence model. These models are then used to produce paper prototypes of a new system.

It's important to point out some of the ways in which Contextual Inquiry and Contextual Design both make strong assumptions and differ from other approaches.

First, there is an assumption that the intent behind user work can be discovered only by dialog with users as they work. Observations alone or out-of-context interviews are insufficient because the intent of work and its link to tools is often tacit. In other words, only users know why they do what they do and this information can be uncovered only through dialog. This assumption or belief serves two practical ends—it generates understanding more quickly than traditional ethnographic methods and it validates these understandings with end users at the time they are generated.

Second, Contextual Design differs from many other usability methods in that it is directed at generating new requirements, designs, and products. Thus it is a discovery method rather then an evaluation method. The implicit argument here is that the greatest risk to as successful design is not meeting the user's needs rather than producing an inadequate UI design. This latter assumption places Contextual Design squarely as an alterative to other methods of requirements gathering and analysis and accounts for its rather broad sweep and large scope. Other approaches have taken the less ambitious or more focused approach of solving a subpart of the problem of successful product design and tend to integrate themselves with other existing methods, techniques and approaches.

Field Methods for Task Analysis
JoAnn Hackos

Hackos and Redish [9] offer a comprehensive overview of user and task analysis and their application to interface design. Focusing primarily on their approach to field methods, they offer a practical and in-depth approach, from theorizing about users, their work and its context, to planning and conducting site visits, to analyzing the data from site visits.

Hackos and Redish point out that users, their tasks, and their working environments need to be considered together. They suggest such simple and practical steps as creating a user-task matrix to systematically relate users to the tasks they do. They point out that there are several different classes of users: primary, secondary and surrogate users; also, users may be part of user communities and may differ from buyers.

In considering user tasks, they suggest a number of approaches such as work flow analysis (what is done when and by whom), job analysis (what is done, how important is it, how much time does it take), developing task inventories, and procedural analyses. When understanding user environments, they consider the physical environment, the social environment, and the cultural environment, and they suggest a set of characteristics to look for in each. Thus they offer a comprehensive overview of both factors to consider and methods to use in studying users, tasks, and environments.

Since field work is often a new activity for design teams, Hackos and Redish also offer techniques for justifying its use in a business environment. They offer a number of simple and convincing examples where designers' lack of knowledge about users led to unusable and unacceptable designs. They also offer a set of counter-arguments to the typical concerns that design teams raise. Finally they offer an example of how to calculate the costs of doing a task analysis.

The core field activity is the site visit itself, which involves observation, interviewing, and note-taking. As with other stages of field work, the planning and organization of the site visit are essential, and Hackos and Redish suggest a number of techniques for effective observation and interviewing. They point out that effective observation and interviewing can be quite challenging since many people confuse observations with inferences and fail to look for

information that may contradict or challenge assumptions. The task is made more difficult by the fact that users may assume that the observers already know what they know.

A well-conducted field study yields immense amounts of data. However, the analysis and presentation of this data can be broken down into variety methods and techniques of varying complexity and depth. Simple methods such posting photographs of user work environments, brief narratives about users and their work, or simple lists of insights and issues can provide design teams with valuable direction. More complex issues in design require more complex techniques such as affinity diagramming, user-task matrices, flowcharts, scenarios, artifact analysis, and others. Each of these methods addresses a different question or concern in the design process. For example, user-task matrices map out the relationship between users and tasks independent of task interrelationships such as order. In contrast, sometimes user tasks can be well understood by analyzing user artifacts in depth; appointment and address books are good examples. Capturing the detail of user entries can yield rich task descriptions.

In conclusion, Hackos and Redish link task analysis to usability-testing and design techniques and offer ways to carry user data into product design.

STEAMLINING FIELD METHODS
Stephanie Rosenbaum

For a number of years Tec-Ed [13] has successfully been using adaptations of contextual inquiry and ethnographic interview methodology for short-term user research projects in our consulting practice. Although these methods have been described in detail in HCI literature, few examples or case studies of their adaptation for use on a day-to-day basis in commercial product development have been published.

Traditionally, field studies are mostly conducted within large organizations that can invest in research for long-term product design improvements. In contrast, usability testing methods are regularly used in short-term data collection projects. The literature on "discount usability" [12] and many other published case histories describe the successful application of usability testing to achieve immediate commercial goals. Usability testing—especially iterative usability testing—is easy to justify and highly productive.

However, there are potential problems of restricting usability programs to such discount versions of heuristic evaluation and usability testing:

- They may not evaluate different audience groups: most small-sample usability tests assume a fairly homogenous audience
- They don't observe users in their context of work

- They don't address longitudinal issues; most observations focus on ease of learning and the "out of box" experience

To avoid the pitfall of restricting our usability efforts in industrial settings to discount usability tests and heuristics, we have learned how to adapt and streamline field methods, in effect creating discount versions of them as well.

For contextual inquiries, by using a tighter, more constrained focus on key issues, we are able to observe and collect extensive behavioral and perception data in shorter sessions with the participants, usually two hours. Although we work closely with the development team to analyze with them the implications of what we observed (before moving on to our recommendations or redesign), our data-analysis discussions with engineering and marketing staff usually take place during informal debriefings after the sessions, rather than in the structured group data-analysis sessions that the literature describes. Sometimes we can schedule a more formal discussion after the final participant session.

In our adaptation of classic ethnographic interviews, we apply the team approach used in contextual inquiry, with separate interviewers and note-takers. This approach enables us to collect extensive data in short participant sessions. Often we have only an hour to spend with each participant; the maximum time we spend is two hours. Our two-person usability teams share the three key activities of interviewing, note-taking, and photographing or collecting artifacts; for example, while the note-taker takes photographs, the interviewer takes notes.

Overall, our adaptations of these two field methods are focused on obtaining the richest possible qualitative information in a limited time. We retain what we believe are the key elements of these methods—an exploration of users' behavior in the context of their own work, for contextual inquiry; and intensive observation of users' settings and artifacts during ethnographic interviews. We recognize that we miss learning some behavior and data that longer observations or interviews would yield, although working in teams of usability specialists enables us to cover more ground that a single practitioner could cover in the limited time.

DISCOUNT USER OBSERVATIONS (DUO)
Colleen Page

Applying field methods effectively in a product development cycle often involves striking the right balance between data collection and analysis and the development schedule. Laakso, Laakso and Page offer a discount user observation method (DUO) for collecting, recording, and analyzing field observations quickly while at the same time preserving the detailed data so that additional insights are not lost and the information can be analyzed further at a

later point in time. The method easily integrates with several usability and system design techniques, uses common tools, and is similar to some other field methods.

Field methods often take a lot of time and effort and produce an overwhelming amount of data. As a result, there is significant interest in reducing the relative cost of these methods. It's a significant challenge to reduce the cost of these methods while preserving their essential strength— the capture of a detailed and unprejudiced record of user work. The importance of a complete and accurate record can scarcely be overestimated. Without such a record any subsequent analysis is flawed and many insights which could produce new products and features are lost.

Discount User Observations seek to meet the goals of a quick, detailed, and accurate record of user work in the following ways:

- collecting observations in detailed notes while the work is occurring
- asking minimal clarifying questions during the data collection
- recording detailed information about context by using a digital still camera
- reviewing the data from each session immediately after it is collected
- separating the data collection into two distinct roles— note-taker and recorder
- focusing on recording user activities and events in sequence
- marking clearly ambiguous data as it is collected so that the data can be clarified during collection

Overall the result of such careful work is a detailed and reliable record of what users did and when they did it as they did the tasks they were working on. Since no videotapes or audiotapes are produced, no transcription is necessary and the 3-4 hours of data collection can be turned into a reliable and detailed time line in 4-5 hours.

The time line of activities is then grouped by higher-order tasks. Pictures are inserted to provide context and background; higher-order tasks are indicated by adding a "negative" of a photo associated with the task. The entire record is produced using PowerPoint. These records represent user scenarios that are grounded in direct observation of user work and not produced through out-of-context interviews [6, 8]

Such a detailed record can be used in multiple ways:

- to create initial designs that are grounded in user work-
- to generate task scenarios for walkthroughs of existing designs
- to develop tasks and goals for usability tests

- to construct object-oriented CRC scenarios (class, responsibilities, collaborates) [16]
- to capture specific requirements
- to produce documentation
- to develop more heavily processed analyses such as affinity diagrams or task hierarchies

In relation to other methods, the DUO method is most like the sequence diagrams of Contextual Inquiry [3] and Cooper's [6, 8] key path scenarios. In comparison to sequence diagrams, DUO integrates digital photos to preserve context and puts more emphasis on initial data checking. In comparison to the key path scenarios, DUO sequences are based on user work and not interviews

SUMMARY

What conclusions can be drawn from our panelists' work? First there is widespread agreement on several points:

- The potential of field data to produce useful and usable product designs
- The need to recognize and work to avoid the possible pitfalls in planning and conducting a field research project. The importance of choosing methods for organizing and presenting data to design teams based on the issues that design team is attempting to address
- The need to adapt and streamline field methods to the time scale of development projects (even those that run on "web" time)

In doing so, they implicitly (or explicitly) acknowledge the following beliefs:

- Field methods are scalable. Even limited field data is better than no data — provided it is collected from relevant customers and users and the methods used preserve the experience of users and customers
- The primary contribution of field methods rests in their ability to bring user and customer experience to design teams; in applying such methods its important not to let analysis get in the way of teams understanding of user experience. Field methods are fundamentally different from and an important complement to evaluative usability techniques in that they provide data that can generate both requirements and initial designs

The rate at which field methods are adopted and applied broadly in software design will depend both on the creativity and flexibility of the practitioners who choose to adopt and apply them in commercial environments. There are a number of areas in which more work needs to be done and more case histories need to be published. We conclude by mentioning only a few:

- Data mining and other techniques for asking new questions of data collected from field studies

- Smart implementations of field methods—refinements of and variations on known methods in response to specific restraints imposed by design processes
- Smart responses to designer needs—answering the real questions that designers have and representing data in clear, compelling formats
- to share the observation log among remote members of a collaborative research team

We invite others to share their insights on these issues and to expand this short list with other issues on which fruitful research can be done.

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