CHAPTER

Usage Research Data Elicitation 7

Highlights

- The concepts of work, work practice, and work domain.
- Data elicitation goals and our approach.
- Before the visit:
  - How to prepare for undertaking usage research activities.
  - How to get ready to conduct usage research by meeting with customers and potential users to gather usage research data.
- During the visit: How to collect data during the usage research field visit.
- Kinds of information to look for.
- Writing good raw data notes.

7.1 INTRODUCTION

7.1.1 You Are Here

We begin each process chapter with a "you are here" picture of the chapter topic in the context of The Wheel, the overall UX design lifecycle template (Fig. 7-1). Within the Understand Needs lifecycle activity, this chapter is about the data elicitation subactivity, in which you observe and interview the client and users to meet the goal of understanding user needs by acquiring a thorough knowledge of user work practice (or play practice) using an existing product or system.

A work activity is a set of jobs or tasks comprised of sensory, cognitive, and physical actions made by users to meet a goal in the course of carrying out the work practice. Data elicitation is an *empirical* process to gather real user work activity data. Data analysis in Chapter 8 is an *inductive* (bottom-up) process to organize, consolidate, and interpret the user work activity data. Chapter 9 is about the *synthesis* of various design-informing models (e.g., task descriptions, scenarios, user personas) and Chapter 10 is about a *deductive* analytic process for organizing and representing user stories, needs, and requirements.

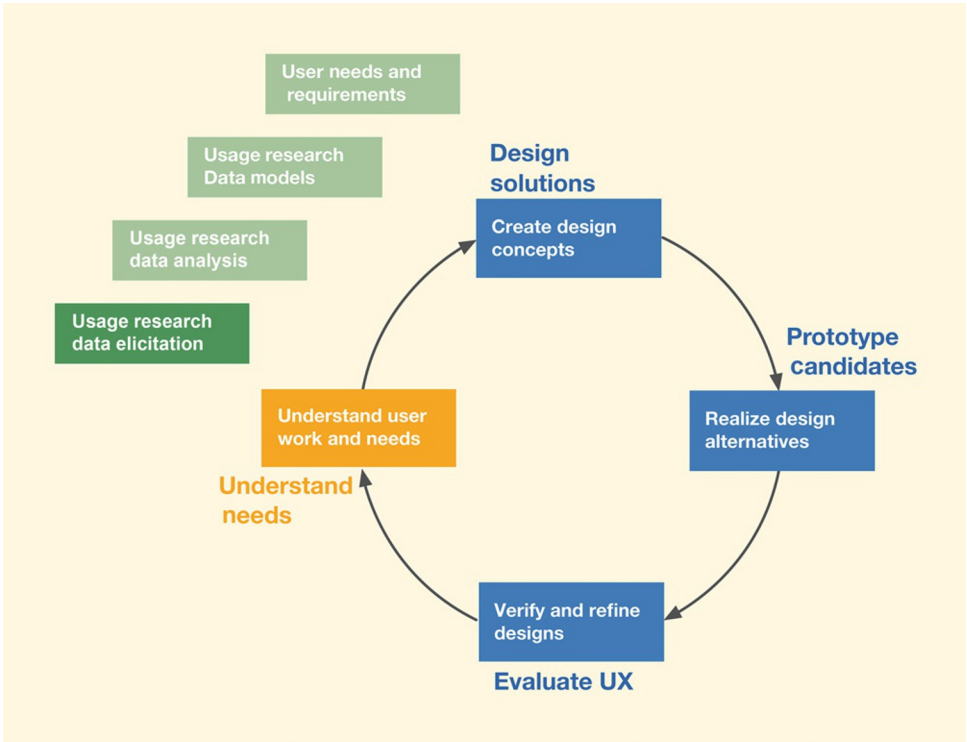

Fig. 7-1

You are here in the usage research data elicitation subactivity chapter within the Understand Needs lifecycle activity, in the context of the Wheel, the overall lifecycle process.

7.1.2 Usage Research Isn't about Asking Users What They Want

There has been some criticism of usage research, saying it is a flawed way to drive design because users often don't know what they want or need. Users are not designers.

This criticism is not just unfair; it's wrong. It's based on the incorrect perception of what usage research is. Usage research is not about asking users what they want in the design. Rather, usage research is about understanding user work practice and work activities in that context. It's your job as a UX team member to deduce their design needs.

For an anecdote about encountering usage data in the wild, in this case involving an elderly woman in a voting booth, see Section 11.2.

As we said in Section 2.5.2, each process chapter provides a variety of methods and techniques to match the needs of your project. Your job is to sort out the parts most applicable for your project based on perspective, scope, and the need for rigor.

For information about the history and roots of contextual inquiry and usage research, see Section 11.3.

Scope (of delivery)

Describes how the target system or product is "chunked" (broken into what size pieces) in each iteration or sprint for delivery to the client and users for feedback and to the software engineering team for agile implementation (Section 3.3).

7.2 SOME BASIC CONCEPTS OF USAGE RESEARCH DATA ELICITATION

7.2.1 The Concepts of Work, Work Practice, and Work Domain

User work. We use the term "work" (or "play") to refer to what needs to be done, or user goals within a given "problem" domain. In most cases, the term "work" will be obvious. An example is using a CAD/CAM application to design an automobile.

User work practice. "Work practice" is *how* people do their work. Work practice includes all activities, procedures, traditions, customs, and protocols associated with doing the work, usually as a result of the organizational goals, user skills, knowledge, and social interaction on the job.

If we are talking about the context of using a consumer product, such as a personal device or software product, then the work practice includes all user activities involved in using that product. If the product is, say, a word processor, it is easy to see its usage to compose, share, and edit a document as part of the work practice.

Work domain. The *work domain* is the complete context of the work practice, including the usage context of an associated system or product. In practice, we use "work domain" to include an entire industry (e.g., healthcare, cloud technology, or finance). In other words, a work domain is the broader context of an industry and includes multiple organizations (each a different work context) where the work is performed.

If the work context spans an organization such as a business, the project has an enterprise system perspective. If the work context is that of a product, such as a mobile mp3 music player, the problem domain is the work/play milieu of that product and the project has a commercial product perspective.

Enterprise system perspective

A design viewpoint in which the design target is a large organizational information system (Section 3.4.1).

Product perspective

A design viewpoint in which the design target is a personal object (a consumer product), such as a device or software app, that a user buys for private use. The product perspective is a consumer perspective (Section 3.4.1).

7.2.2 Understanding Other People's Work Practice

- ***A prerequisite to understanding needs.*** Understanding user work practice is a necessary means on the path to understanding their needs.

- ***A prelude for requirements.*** This is not about requirements yet, but it's about understanding how users do their work. This will lead to insights about what it would take in a system design to support and improve the effectiveness of that work.
- ***UX designers should make the effort.*** Designers might think they know what is needed in a design to fit user needs. In a typical project without usage research, though, designers often waste time in arguments, discussions, and opinions.
- ***It takes determination to learn about other people's work.*** Often, details that drive the work are hidden beneath the surface: the intentions, strategies, motivations, and policies. People creatively solve and work around their problems, making their barriers and problems less visible to them and to outsiders studying the work.

Participant

A participant, or user participant, is a user, potential, or user surrogate who helps evaluate UX designs for usability and user experience. These are the people who perform tasks and give feedback while we observe and measure. Because we wish to invite these volunteers to join our team and help us evaluate designs (i.e., we want them to participate), we use the term "participant" instead of "subject" (Section 21.1.3).

7.2.3 Protecting Your Sources

Except for unusual circumstances, it is essential in your entire usage research process to maintain participant confidentiality and anonymity. This is especially important in cases where you have observed, synthesized, deduced, or were given insights that were about problems and breakdowns arising due to social and political issues in the work practice.

Talking about situations involving breakdowns due to bad management or flawed work practices (modeled in social models) is especially dangerous for your participants if there is a chance the sources will be revealed. Make this your unbreakable rule: *When you take data and models back to anyone, users or management, everything must be anonymous.* Otherwise, participants will be reticent about coming forward with valuable insights.

7.2.4 Not the Same as Task Analysis or a Marketing Survey

Your client might say, "We already do that. We do task analysis and marketing surveys." How should you respond to that? The simple answer is that they are not the same.

Task analysis is a systematic human factors technique of examining user tasks by studying the structure of tasks and task steps. This doesn't give enough insight into situations where tasks are interwoven or where users need to move seamlessly from one task to another within the work context.

Similarly, you cannot substitute market research for usage research. Marketing data are about sales and can identify the kinds of products and even features customers want, but do not lead to enough understanding about how people work or how to design for them. They are just two different kinds of analysis and you may need both.

7.2.5 Are We Studying an Existing Product/System or a New One?

At the end of the day, the answer might be "both." Analysts, designers, and users can be strongly biased toward thinking ahead to the new system, but almost everything we do in usage research *starts* with the existing system and work practice.

And for almost any new product or system, there is almost always *some* kind of existing practice. As an example, consider the Apple iPod (below).

Example: Innovative iPod Still Follows an "Existing" System

Many people considered the iPod to be a unique innovation at its conception. But, thinking about its usage context, it is basically a personal music-playing device (and much more) that still follows a history of existing products, going back to before we had electronic music players.

Looking at work activities and not devices, we see that people have been playing music for a long time. The iPod is another in a series of progressively sophisticated devices for doing that "work" activity, starting with the phonograph invented by Thomas Edison, or even possibly earlier ways to reproduce "recorded" sound.

If no one had ever recorded sound in any way prior to the first phonograph, then maybe you could say there was no "existing system" on which to conduct user research inquiry. But this kind of invention is extremely rare, a pure innovative moment. And you still might learn something about how people listen to live music. In any case, anything that happens in sound reproduction after that can be considered follow-on development and its use can be studied in user research inquiry.

7.3 DATA ELICITATION GOALS AND OUR APPROACH

Overarching goal: *Understand the work practice through the lens of existing users by visiting their work context and learning about them, how they do work, and what their work practice entails, including the challenges or hurdles they face and any workarounds they employ.*

7.3.1 Eliciting Data to Synthesize a Broad Overall Picture

Each such investigation (of a user) provides a different perspective into the work practice. This is like the perspective each blind person has while feeling an elephant (Section 8.9) in that famous parable where each blind person "sees" the

elephant as something different. It is up to the usage researchers to gather the different perspectives and put them together to synthesize the elephant in the room.

7.3.2 It Requires Real Detective Work

In the field, researchers need to play Sherlock Holmes and do real detective work to tease out clues about the work practice with the goal of later constructing this complete picture of the work. The real story of how users actually do the work is often not in the surface observables. It may be easier to perceive how they are supposed to do it or even how they say they do it. If you ask users to describe how they do something, they tend to describe a sanitized or "canonical" flow and omit important details and workarounds outside the idealized or prescribed practice. This is because, with practice, such details about work get incorporated and internalized into routines. This is further aggravated by the fact that humans have a tendency to selectively recall and sometimes distort aspects of events after the fact.

Example: Discovering the Whole Area of Inventory by Following Leads

As an example of following leads, this is a real story told by a team doing a project for one of our classes. The client was in retail sales and the conversation part of the interview had centered on that concept, including serving their customers, making the sale transaction, and recording it.

However, during this conversation, the word "inventory" was mentioned once, in the context of point-of-sale data capture. No one had asked about inventory, so no one had mentioned it until now.

Our good ethnographic detectives, recognizing a clue revealing another area of work activities, pounced on that word and pursued a new train of thought. What about inventory? What role does it play in your point-of-sale data capture? Where does it go from there? How is it used and for what? How do you use inventory data to keep from running out of stock on items in demand? Who orders new stock and how? Once an order is sent, how do you keep track of it so it does not fall through the cracks? What happens when the new stock is delivered? How do you know when it arrives? Who works in receiving and what do they do? How do you handle partial shipments? How do you handle returns?

7.3.3 Tactical Goals

Understanding the work practice ecology: It is important to understand the broader connections among the work practice that are perhaps not the focus of the design team. Examples include outside systems that users of the target system rely

on to get their job done. For example, do they use external news sources, data feeds from other services, third-party payroll systems? How do those systems interface with their immediate system in getting work done?

Understanding the information hierarchies and work flows: This has to do with mapping out key work flows in current work practice. For the enterprise system perspective, ask for screenshots of key screens and samples of reports or other work artifacts (ask to print them while on the visit and take notes on those artifacts). Ask to show how they would do such and such activity, including infrequent ones.

Understanding market forces and trends: In order to be truly innovative, the UX team must understand the client's market perspective, what the broader trends are, who the leading players are, where their domain is going, and the client's thoughts on the competition. What they like, what is better in their system, how they are different. For example, if the design brief is to design an automobile, it is important to understand broader trends such as self-driving cars and the shift away from fossil fuels. Users provide a unique perspective compared to other sources of marketing data because they live in this and know of friends or have experiences from previous jobs.

Here is a preview of the steps of data elicitation:

- Prepare for field visits.
- Conduct field visits to the customer and to where people will use the product or system:
  - Observe and interview people while they use the existing product or system (or a similar one, if the target product or system doesn't exist).
  - As you encounter usage research data points, write raw usage research data notes.
  - Gather any artifacts associated with the work practice.
  - As time permits, make sketches, diagrams, and/or photos of the product or system usage in its physical environment.

7.3.3.1 Using usage research data rather than opinion

Most of the time these days, early funnel UX work goes smoothly. But sometimes when you get into the late funnel and a larger team is involved, design ideas can be challenged. This is when you need usage research data in hand as a neutral arbiter of design disputes. This can be especially useful when you are being perceived as getting off course with your "innovation" and it's a battle against changing the status quo.

Sometimes we need a way to be sure design discussions/arguments don't come down to just a difference of two equal opinions but, rather, having the weight of usage research data on your side. "Yes, that is how we have done it in the past, but users say it's not the best way."

Artifact

An artifact (work artifact) is an object, usually tangible, that plays a role in the work flow of a system or enterprise—for example, a printed receipt in a restaurant (Section 9.8).

Early funnel

The part of the funnel (agile UX model) for large-scope activity, usually for conceptual design, before syncing with software engineering (Section 4.4.4).

7.4 BEFORE THE VISIT: PREPARE FOR DATA ELICITATION

Goal: *Learn everything you can about the client, the company, the business, the domain, and the product or system to be prepared and productive during the field visits.*

7.4.1 Learn about the Subject Domain

Do your homework. Start by learning everything you can about the subject domain of the product or system. While designing for complex and esoteric domains, working first with the client and subject matter experts helps shorten usage research data elicitation by giving you a deeper understanding of the domain. Data elicitation can now include validating this understanding with users.

- Learn about the culture of the work domain in general—for example, the precise and conservative financial domain versus the laid-back art domain.
- Know and understand the vocabulary, technical terms, acronyms, or slang of the product or system work domain.

Going on a field visit without first having a basic understanding of the domain can be supremely unproductive. This point is most important in esoteric domains where the jargon and concepts encode a great deal of meaning and nuance. When the users realize you don't know the basics about the domain, they will spend most of their time explaining the general concepts and giving you an off-the-cuff "tutorial" on the domain instead of discussing how they navigate its nuances. It will be an inefficient use of your time and of theirs.

7.4.2 Learn about the Client Company/Organization

- Identify client business goals.
- Get a feel for the customer's organizational policies and ethos by looking at their online presence (e.g., their website and their participation in social networks, user group sites, and related blogs).
- Learn about the competition.
- Learn the related best practices in this domain, this industry, and this company.
- Learn about any existing legacy systems.

Legacy system

An old process, technology, computer system, or application program, of, relating to, or being a previous or outdated computer system with maintenance problems that date back possibly many years (Section 3.2.4).

7.4.3 Learn about the Proposed Product or System

- Check the initial product or system conceptualization documents (Section 5.6) for early statements about system functionality and structure and even the system architecture.

- Look at the history of the company's existing and previous products. If they are software products or systems, download trial versions to get familiar with existing design themes and capabilities.
- Seek third-party reviews of the existing product or system. Look for branding, reputation, and competition in this product market segment.

7.4.4 Decide on Your Data Sources

The first choice of a data source for understanding user work practice and needs is often users who actually use the current product or system in the field.

But, depending on your project and its needs, the need for rigor, the cost of observing and interviewing users, and the availability of users as participants, you can consider supplemental or alternative data sources, including:

- Subject-matter expert (SME) interviews.
- Focus groups.
- User surveys.
- Competitive analysis.
- Domain expertise through education.
- Be your own domain expert.

7.4.4.1 Interview subject-matter experts (SMEs)

A subject-matter expert (SME) is someone with a deep understanding of a specific work domain and the range of work practice within that domain. Interviewing SMEs instead of users is definitely a faster technique to consider. And, although users can probably give you the best usage data information (e.g., unpredictable problems that crop up in real usage), SMEs can give other important kinds of information, such as an inside view of how a system should work. They can also provide deeper insights into variations of the work practice across that domain. For example, what are the differences between trading on the "buy-side" and "sell-side" desks on Wall Street? Further, they can provide insights into how the same type of activity is practiced at different sites. For example, how are sell-side traders at investment bank A different from those at B? How is the supply chain at purely online retailers such as Amazon different from combination brick and mortar plus online ones such as Walmart? Further, how is Walmart's supply chain different from the supply chain at Target? The idea is that they have insights into the philosophies and strengths of different businesses and organizations in the domain. Although these issues aren't the same as the actual work practice details where the rubber hits the road, they can have a profound influence on work practice.

Even when you do plan to interview users, working with subject matter experts before you talk to users can help shorten the activity by giving you a deeper understanding of the domain from the start.

7.4.4.2 Use dual experts

Sometimes, you are fortunate enough to recruit what they call "dual experts," experts in UX and the work domain. An example is a designer of Adobe Lightroom (a high-functionality software application for managing and processing large collections of images and photographs) who is also deeply involved in photography as a personal hobby. Another example is a designer of a GPS who is a truck driver or who travels extensively in an RV.

Emotional impact

An affective component of user experience that influences user feelings. Includes such effects as enjoyment, pleasure, fun, satisfaction, aesthetics, coolness, engagement, and novelty and can involve deeper emotional factors such as self-expression, self-identity, a feeling of contribution to the world, and pride of ownership (Section 1.4.4).

7.4.4.3 Listen to focus groups

A focus group (Krueger & Casey, 2008) is a technique wherein a small group of representative users or stakeholders discuss responses to broad questions and themes introduced by a moderator. Focus groups can be useful in eliciting a revealing conversation about more complex issues. Focus groups are good at identifying broad themes and issues in a work practice. They help unearth contrasting opinions and rationale for those opinions. They are good for getting at emotional impact issues, such as what participants like, dislike, love, or hate about the work practice. They are *not* good at identifying how-to details because the focus group is usually located away from actual work and work artifacts. The usual cautions about group dynamics apply. For example, you need to watch for dominant participants drowning out quieter ones.

Focus group (in UX practice)

A small discussion group of representative users or stakeholders aimed at identifying broad themes and issues in a work practice (Section 7.4.4.3).

7.4.4.4 Employ user surveys

User surveys are great for prioritizing themes. You can list different aspects of the work domain and ask users to rank or comment on their importance. You can ask for open-ended feedback, too, but these questions usually suffer from poor or selective recall. They can also suffer from vocal minority biases: respondents may have an axe to grind because of a bad experience and a desire to vent. There may be other biases; for example, certain types of users may be more prone to take time to participate in surveys and they may not be representative of the user population.

7.4.4.5 Do competitive analysis

An analysis based on comparison with market competitors can expose strengths and weaknesses and can help identify capability gaps and shortcomings. However, competitive analysis does not provide insight into usage. Even if a product has many features, all those features may not be used by the user

population. This kind of analysis is more of a marketing tool for making feature matrix comparisons than it is for usage related data.

7.4.4.6 Acquire domain knowledge through education

Sometimes you can prepare for usage research by educating yourself, learning through classes and other training about the core concepts, technologies, business practices, and trends in the subject matter of the work domain.

7.4.4.7 Be your own domain expert

Sometimes, if you are in fact a user (especially of a product or device), you can rely on your own experience and insights to understand users and their needs. For example, Apple designers are also Apple device users. And that has sometimes been the sole basis for design at Apple. Generally, though, being your own expert as an exclusive approach to data elicitation is recommended only as a fallback in case talking with users or SMEs is not possible, feasible, or affordable.

7.4.5 Choose Visit Parameters

The data elicitation method we describe in the bulk of this chapter is a mix of some rigor and some obvious ways to be efficient. This is not a fully rigorous method but rigorous enough for 99% of the projects out there, especially in agile environments.

However, you still have choices among the parameters of how you do data elicitation. If you choose to do your data elicitation with users in the field, this is the time to choose parameters.

Depending on the nature of your project, whether it is in the commercial product perspective or the enterprise system perspective, the need for rigor versus speed, and so forth, you need to decide as a team on:

- How many visits you can or should make?
- How many users you can or should interview per visit?
- What kind of user roles and users to involve?

The answers are usually found in what it takes to meet your goals, subject to constraints of budget and schedule. For example, simply make as many visits as necessary to meet the goal of understanding work. Decide on the most effective length for each session based on what you need to take home from each session.

Less rigorous data elicitation. When budget and schedule constraints require you to be even more rapid in data elicitation, be economical in your parameter choices and take short cuts:

- Interview and observe fewer users:
  - Choose fewer numbers of more experienced users; you will learn to squeeze out a great deal of useful information from a small number of users.
- Use fewer observation and interview sessions per user:
  - Just one day's worth of talking to users about their work practice can make a big difference in your understanding of the work domain to inform the design.
- Be smart in capturing data; abstract your notes down to the clean and uncluttered essence (as you gain in experience, you will get very good at filtering inputs on the fly).

These shortcuts increase efficiency, usually without much of a downside from reduced thoroughness and loss of data accuracy.

More rigorous data elicitation. Very large enterprise systems, such as a new air traffic control system, are truly outliers and won't be seen by most UX professionals. In those projects, a high level of rigor may be mandated and, if so, steps to achieve it will be prescribed. In such extreme cases, you might have to use additional rigor in maintaining the traceability of each data item you collect during the elicitation phase. This often involves assigning unique IDs to each user and tagging each usage research data item with the source ID. This allows you to maintain a record of all subsequent insights derived from that source. We call this tagging your usage research data with metadata.

Scope (of delivery)

Describes how the target system or product is "chunked" (broken into what size pieces) in each iteration or sprint for delivery to the client and users for feedback and to the software engineering team for agile implementation (Section 3.3).

7.4.6 Data Elicitation Goals Based on Scope

In agile UX, you may end up doing usage research in both the large-scope early funnel (Section 4.4.4) and the small-scope late funnel (Section 4.4.3). These two passes at usage research will generally be two different kinds of usage research occurring in two different parts of the overall UX lifecycle process.

Early funnel

The part of the funnel (agile UX model) for large-scope activity, usually for conceptual design, before syncing with software engineering (Section 4.4.4).

In the early funnel, you will conduct high-level usage research to obtain a general overview to establish an overview of system structure and build up inputs to the broad conceptual design. You will focus on high-level task structure and all the user stories, user needs, and requirements.

Late funnel

The part of the funnel (agile UX model) for small-scope activity, for syncing with agile software engineering sprints (Section 4.4.3).

In the late funnel, you will focus on one (or a few) user stories to obtain detailed inputs to drive low-level interaction design for task sequencing and navigation. You'll be gathering supplementary information to refine your models, answer questions, and fill in gaps.

7.4.7 Organize Your Data Elicitation Team

Goal: *Pick a team with the skills appropriate for this client and domain to be effective in, and capable of, understanding this work practice.* For example, choose people with a background in that domain, possibly including subject matter experts (SMEs).

- Decide how many people to send on the visits and how many visits to make. Two or three is often enough, but this varies widely depending on the nature of the system. Set your own limits, depending on your budget and schedule.
- Decide on the kinds of people (i.e., their skills) who should go on each visit (e.g., user experience people, other team members, subject matter experts, and other people familiar with the product domain). A multidisciplinary mix is always best.
- Plan the interview and observation strategy and the team roles.

Tip from the field: Don't send an inexperienced UX person or someone without domain knowledge. We learned from experience one time when we were all busy and sent an intern who was trained but lacked experience. This can turn off your valuable resources and you can lose access to cooperative users.

Style guide

A document fashioned and maintained by designers to capture and describe details of visual and other general design decisions, especially about screen designs, font choices, iconography, and color usage, which can be applied in multiple places. A style guide helps with consistency and reuse of design decisions (Section 17.6.1).

7.4.8 Recruit Participants

If you decide on users as your data elicitation information source:

Rely on the client to help. Get help from your client in selecting and contacting a broad range of participants from the potential user population.

Recruit locally for users of consumer products. For lots of consumer products, such as shrinkwrap word processor software, users abound and you can recruit users to interview, for example, via:

- Email lists.
- Your website or the client's website.
- Social media.
- Client's customer base.
- Local advertising outlets, such as Craigslist.

Plan to see multiple users in the enterprise system perspective. Each user may have a different take on how the broader work domain functions. Include:

- All work roles in that work practice.
- Grand-customers (customers of the customer, if any) outside the user's organization.
- Indirect users who need direct users to interact for them (for example, ticket sellers at a cinema are direct users of the ticketing software where the moviegoers are the indirect users).
- Managers.

User work role

Not a person but a work assignment, defined and distinguished by a corresponding job title or work responsibilities. A work role usually involves system usage, but some work roles can be external to the organization being studied (Section 7.5.4.1).

Make every effort to get access to important but "unavailable" people. For projects in some domains, you might be told that users are scarce and generally unavailable.

For example, management might resist giving access to key people because they are busy and "bothering" them would cost the organization time and money.

- Make the case for meeting at least some of these users to develop an understanding of their work activities and the potential cost of not including their work in the new design.
- Ask for just a couple of hours with key users. Persevere.

7.4.9 Identify Settings in Which to Study Usage

Usage context is essential. In the enterprise system perspective, the setting is the business organization that is using the system. In the commercial product perspective, the setting is wherever the product is used. For example, if the product is a camera, the work happens pretty much anywhere.

7.4.10 Establish Need to Observe Users in Their Work Context

Especially for the enterprise system perspective, the environment, the people, and the context of the interview should be as close a match as possible to the usual working location and working conditions. Don't be led to a conference room, for example, because "it is much quieter and less distracting there."

One approach to avoid users describing mandated policy instead of actual practice is to ask them to demonstrate what they did yesterday (after confirming yesterday was a typical day), then make it easy for them to walk through the steps (leveraging doing versus recalling).

For an example of how the Social Security Administration established an extensive ecological environment for doing usage research and evaluation, see Section 11.4.

7.4.11 Establish Management Understanding of Need to Keep Pressure Off Interviewees and Give Them Freedom to Comment Honestly

Make sure that the observations and interviews are conducted without undue political and managerial influences. Users must feel comfortable in telling the "real" story of the everyday work practice, with guaranteed anonymity.

7.4.12 Prepare Your Initial Questions

Just as football quarterbacks sometimes script their initial series of plays, we recommend that you script your initial interview questions to get you off to a good start. There is no real secret to the questions; you ask them to tell you and to show you how they do their work. What actions do they take, with whom do they

interact, and with what do they interact? Ask them to demonstrate what they do and to narrate it with stories of what works, what does not work, how things can go wrong, and so on. For product perspective, for example a digital camera, the following questions can be starting points: What are the things users do when taking a photograph? With whom do they interact? What do they think about? What concerns and challenges do they have while taking pictures? Does it work well in low light situations?

7.5 DURING THE VISIT: COLLECT USAGE DATA

7.5.1 Set the Stage Upfront

- Get off to a good start by establishing rapport with the client.
- Explain the purpose of the visit, to learn about how people use, or will use, their product or system and that it's to inform design.
- Explain your approach.
- If necessary or appropriate, promise personal and corporate confidentiality.

7.5.2 Interviewing versus Observing: What They Say versus What They Do

Observation can be necessary. Observation (a basic UX technique, Section 2.4.1) can help you see work activity with an independent eye. It is not always easy for users to consciously describe what they do, especially in work that has been internalized. Humans are notoriously unreliable about this. Simonsen and Kensing (1997) explain why interviews as an exclusive data-elicitation technique are insufficient: "A major point in ethnographically inspired approaches is that work is a socially organized activity where the actual behavior differs from how it is described by those who do it."

Interviewing can be necessary. Narration by the user can augment your observations with information about motivation, feelings, and other "hidden" aspects. Get your participants to demonstrate all the ways they use the product or system and have them "think aloud."

Using observation alone, you can miss some important points. For example, an important problem or issue simply might not come up during any given period of observation (Dearden & Wright, 1997). For example, some payroll tasks happen only at the end of the month. Unless there is an opportunity to do a visit during that time, the only way is to ask them to walk though how a typical payroll task happens by pretending it's the end of the month now.

Think-aloud technique

A qualitative empirical data collection technique in which participants verbally express thoughts about the interaction experience, including their motives, rationale, and perceptions of UX problems, especially to identify UX problems (Section 24.2.3).

7.5.3 Hints for Successful Data Elicitation

Listen to what the user says is needed. Even though it is the job of your team to deduce needs and requirements from the usage research data, users will suggest things they would like to see in the system, too. Make raw data notes of any design suggestions and ask for reasons underlying those suggestions that come from users. In usage research analysis, these notes will be essential as inputs to user stories as requirements.

Partner with users. Help the participants understand that you have to deeply understand their usage. Get them to tell specific stories about their usage and how they feel about the product or system.

Be a good listener and a good detective. Let the users talk and probe with specific questions.

- Don't expect every user to have the same view of the work domain and the work; ask questions about the differences and find ways to combine their views to get the "truth."
- Capture the details as they occur; don't wait and try to remember it later.
- Be an effective data ferret or detective; follow leads and discover, deviate from the script, extract, "tease out," and collect "clues."
- Be ready to adapt, modify, explore, and branch out.

Avoid interjecting your own views. Don't offer your opinions about what users might need. Don't lead the user or introduce your own perspectives. Follow your leads with questions, not hypotheses for the user to confirm. For example, consider this user comment: "I want privacy when I am buying tickets." You might be tempted to say: "You mean, when you are looking for events and buying tickets, you do not want other people in line to know what you are doing?" To which the user might respond: "Yes, that is what I mean." A better way to handle the user's comment here would have been with a follow-up question, such as "Can you elaborate what you mean by wanting privacy?"

User work role

Not a person but a work assignment, defined and distinguished by a corresponding job title or work responsibilities. A work role usually involves system usage, but some work roles can be external to the organization being studied (Section 7.5.4.1).

7.5.4 Kinds of Information to Look for

7.5.4.1 Specific Information to Look for

As you interview and observe to elicit data, you should keep an eye out for specific kinds of usage research data:

- User work roles (Section 9.3.1).
- User personas (Section 9.4).
- Inputs to user stories and requirements (Section 8.3.1).

- Work practice artifacts (Section 9.8).
- Flow of information and artifacts (Section 9.5).
- User tasks (Sections 9.6 and 9.7).
- Physical work environment (Section 9.9).
- Information architecture (Section 9.10).
- Photo ops.

Each of these will be briefly explained in the subsections that follow.

User work roles. What work roles—the jobs users perform as defined by the set of tasks they are responsible for—do users assume as they use the system to do work? What are the characteristics of people in these roles? What do people in each role do? How do different people in those roles work together? Capture as a simple list of annotated work roles.

User persona information. A user persona is a UX design artifact to guide design to meet the needs of a variety of different kinds of users. User personas help designers focus on specific user characteristics rather than trying to design for all users or even for the "average" user. Data elicitation is a good time to seek out information for building user personas. While you may pick up bits and pieces of such information as you perform other kinds of data elicitation, you may have to conduct a brief interview to get all the details.

Example: How Lana and Cory View and Use Entertainment in Their Lives

Following is an edited excerpt from such an interview for creating a persona with respect to the design for the Ticket Kiosk System. It demonstrates a question and answer approach to data elicitation, with the specific learning objectives for building personas.

> Cory: We take time out a couple of times a week to do something different, to get away from our routine. That can range from going to see a movie, to visiting a museum, to going out with friends, to traveling in the immediate area.
> We have seasonal activities like hiking or swimming at the beach. So it would be great for us to have information on a kiosk about good places to go hiking, with information about nature for viewing and degrees of difficulty on various trails.
> One of our main interests is in keeping informed about events that are going on in town. We hear about many things through word of mouth and we always wonder how many other events are there that we don't hear about. Many of these events we do attend and we have fun in doing so, but we often have to seek that information out by asking our friends. It would be nice to have a resource that would give us that information reliably without having to seek it ourselves. If there was a kiosk at bus stops, for example, we would definitely see them and see what is going

on more currently. It's like the New York City taxi system; they have a computer in the back seat and you can peruse information about the weather, interesting news, and entertainment information.

Lana: I often use the bus and I usually have to wait for it at least a little while. In that time, it would be nice to have access to information about town activities, such as festivals, especially weekend activities, both local and in nearby areas.

Q: Would it bother you to have strangers looking over your shoulder and seeing what you are looking at?

Lana: No, that is not a concern. We do lots of other things, like using ATMs in public and that usually isn't a problem. If you bought tickets at the kiosk, you would want to be sure that the financial aspects were safe and secure.

Cory: Having multiple minikiosks would give everyone equal access and no one would have to look over anyone's shoulders.

At a bus stop, the people are all there for the same purpose, so there is a small amount of shared goals and a little bit of camaraderie while waiting for a bus to come. So there is a common bond but it is also nice for everyone to have their own personal space and, if you give them something to focus on, it could be the basis for common conversations and even discussion about events and entertainment-related issues. On one hand, it can be a social facilitator and an interesting diversion as you wait. Someone might ask if anyone has seen such-and-such a movie and some might respond with varying opinions of the movie, leading to a general discussion.

But in the end, we would get the most value out of a resource through which we can just passively receive event information.

Cory: Kiosks at bus stops and train stations would also be very valuable for out-of-town visitors.

Q: What kind of things would you want or expect in such a kiosk?

Both: There is one more thing we would like to see in a kiosk at a bus stop: public service announcements. Among those, we'd like to see reminders of "bus etiquette," covering such topics as loud boisterous behavior, imposing use of cellphones, etc. Good designers could package these announcements in an entertaining way, so they weren't just blown off by the bus riders.

Lana: I'm thinking also about the case where I see something on the kiosk that I think is interesting and I want to show it to Cory when I get home. Like maybe this weekend there is going to be a jazz festival at a certain sculpture garden and I want Cory to know about it. It would be nice to have a button to touch to cause some kind of link or download to my iPhone or iPod. But there could be problems with security, viruses, etc., if you opened up your personal devices to receive downloads from public machines. Maybe you could offer possibly free "subscriptions" to the kiosk system service so you can send yourself information safely. Another, perhaps safer, way to do this is to provide various "keywords" associated with each different screen. You could jot down the keyword for the screen you want to share and the other person could search on that keyword at another kiosk at a later time.

Another interesting option in a public kiosk for entertainment information is a feature to see movie reviews from popular sites like rottentomatoes.com and for anyone in the public to post reviews of the entertainment events. Suppose, for example, that I could leave a review of a movie I really didn't like, along the lines of the way people give reviews for items on amazon.com. That review would become part of the total information about that movie for all subsequent kiosk viewers. To keep a balance and offset "information vandals," people could also review or refute other reviews, as they often do on Amazon.

Lana: As a balance to the routine of our jobs, we both crave opportunities for learning and personal growth, so we seek entertainment that is more sophisticated and more interesting, entertainment that challenges us intellectually. So we would want the spectrum of entertainment events to include the symphony, the ballet, museums, modern dance performances, and operas.

At the other end of the spectrum, there are some days I know that my mind needs a rest and I seek something more like mindless entertainment, often something that will make me laugh.

Inputs to user stories. A user story is a short narrative describing a feature or capability needed by a user in a specific work role and a rationale for why it is needed. A user story is employed as an agile UX design "requirement." One of the most important things to look for in data elicitation is the basis for writing user stories. As you observe users and as users talk about their work practice, try to identify situations that will make good user stories that later can drive agile UX design. These include statements about what features are wanted or needed and information about things that need to be done by people in various user work roles. Look for very specific, low-level user wants or needs that reflect specific problems or opportunities, along with motivations and potential payoffs.

What capabilities do users want and why? You can even ask specific questions to draw out information specific to desired features or subfeatures. In practice, data elicitation for user story inputs has expanded to include most information about requirements and desired features, regardless of whether they came explicitly from a user's mouth. See Section 10.2.1 about the evolved role of user stories in design requirements.

Artifacts of the work practice and how they are used. What artifacts do users employ, manipulate, and share as part of their work practice? Artifacts gathered in usage research data elicitation provide a rich source of understanding of work practice and are essential to immersion by the team. These artifacts are also great conversational props within data elicitation as we interview the different roles that use them.

Immersion

A form of deep thought and analysis of the problem at hand—to "live" within the context of a problem and to make connections among the different aspects of it. Section 2.4.7.

An artifact model shows how tangible elements (paper, other physical or electronic objects) are used and structured in the business process flow of doing the work. For example, guest checks, receipts, and menus are common artifacts associated with the work practice in a restaurant for ordering, preparing, delivering, and charging for food. They provide avenues for discussion given the fact that almost every restaurant uses these artifacts over and over again.

What are things that work with this kind of artifact for order taking? What are some breakdowns? How does a person's handwriting impact this part of the work activity? What is the interaction like between the wait staff and the restaurant's guests? And the interaction between the wait staff and the kitchen staff?

The usage research data elicitation team must pay close attention to, and take notes on, how work practice artifacts are created, communicated, and used. Ask questions to elicit information about the roles of artifacts. What are those notes scribbled on those forms? Why are some fields in this form left blank? Why is there a sticky note on this form? Perhaps a signature is required for approval on

other kinds of documents. This model is one reason why observers and interviewers must collect as many artifacts as possible during their usage research data elicitation field visits to users.

In addition to physical artifacts, don't forget to ask about electronic objects that are part of the work practice flow. Think about printouts of emails, input forms in software, screenshots, and so on.

Flow of information and artifacts. In the context of usage research, an artifact is an object important to the work practice being studied. For example, it could be a receipt in a restaurant or a car key in an auto repair shop. How do information and artifacts flow through the system as work gets done? If you have time, it's helpful to capture flow data in a simple sketch (e.g., a flow diagram). If you have even more time (which we said you probably wouldn't), check your flow diagram with users to see if they agree.

User tasks. Capture data about task structure in a simple hierarchical (indented) list of tasks and subtasks. Capture data about how to do a given task as a list of a few ordered steps, possibly interspersed with system feedback.

Physical work environment. What is the physical layout of the workspace and how does it impact work practice?

Information architecture

Design of information structures for organizing, storing, retrieving, displaying, manipulating, and sharing. Information architecture also includes designs for labeling, searching, and navigating information. Section 12.4.3.

Information architecture. What information do users access, manipulate, share, output, or archive as part of their work and how is it structured for storage, retrieval, display, and manipulation?

Photo ops. Where possible, take photos of the work practice in action to supplement your usage research data. Especially look for opportunities to take photos of the physical work environment and artifacts being used.

7.5.4.2 General information to look for

Surprises—the interesting and the unusual, the good, the bad, and the ugly. In addition to the normal expected things, keep an eye out for the unusual—surprises, interesting episodes, excitement, and joy—things to emphasize in the design. By the same token, watch out for negative surprises, disappointments, and breakdowns—things to avoid or fix in the design.

Emotional and social aspects and meaningfulness in work/play practice. In the domain of commercial products, especially personal products such as a camera, mobile phone, or music player, emotional impact can play a central role in usage and design for the user experience. What evidence is there of joy,

aesthetics, and fun in usage? What opportunities are there to design for more of the same?

You might have to dig deeper to see evidence of emotional impact in the enterprise system perspective. You may find that customers and users are less likely to mention emotional aspects of their work practice because they think that is about personal feelings. They might think that is inappropriate in the context of technology and functional requirements. So you must try harder to uncover an understanding about emotional and social aspects of work practice. For example, where and when are people having fun? What are they doing when they have fun? Where do people need to have fun when they are not?

In the enterprise system perspective, emotional impact and meaningfulness can also occur in a negative form. Look for ways to fight job boredom. Does anyone hint, even obliquely, that they would like their job to be less boring? What about the work is boring?

Where is there stress and pressure? Where can job stress be relived with aesthetics and fun? But also be aware of work situations where it would be distracting, dangerous, or otherwise inappropriate to try to inject fun or surprise.

Meaningfulness in the long term. Meaningfulness is a long-term phenomenon usually associated with the product perspective, but it can occur in the system perspective as well. What are the long-term emotional aspects of usage? What parts of usage are learned over longer times? Where is it appropriate for users to give the system or product "presence" in their lives?

Consider a product such as a digital camera, which is not something a user interacts with in the moment and then forgets. Personal products like this can develop into objects of emotional acceptance into one's life and lifestyle. The more people carry a camera with them everywhere they go, the stronger these emotional ties. This behavior is not something you can observe if you just visit once and ask some questions. That means you may have to look at long-term usage patterns, where people evolve new ways of usage over time (see section on shadowing below).

And meaningfulness goes beyond immediate usage. For example, what does a camera's *brand* mean to people who carry it? What does a personal product say about its owner? How about the style and form of the device and how it intersects with the user's personality? Does the user associate the camera with good times and vacations, being out taking photos with all his or her worries left behind?

Shadowing and the user journey. Data elicitation for meaningfulness can benefit from a special technique called shadowing. Shadowing is a technique for user observation in which the UX person follows a user around, taking notes about typical usage within the daily routine. Usually this technique is pure observation in which the observer does not ask questions or make comments or try to influence user behavior. If the different kinds of usage entail moving among multiple locations, the observer follows and documents what is sometimes called the "user journey."

Shadowing can be useful in the enterprise system perspective, too. As an example, a visit to the hospital can involve a user experience journey through a multitude of settings, starting with the drive to even find the hospital. Arrival can present an overload of signage and difficulty in finding a parking spot. Then finding the right entrance out of a dozen possibilities, finding the receptionist, and getting to the appropriate clinic. Checking in is followed by entertaining yourself while you wait and finally getting to see the physician. After that, you have to make a follow-up appointment, which means consulting your calendar, stopping at the pharmacy to pick up a prescription from the doctor, and getting back to find your car.

Example: The SnakeLight: Understanding Work Practice in a Customer Journey

The example we used in Section 1.5.3 also shows why it helps to understand how your users do their activities and how they use products and systems. This example of the effectiveness of in situ user research inquiry comes to us from the seemingly mundane arena of consumer flashlights. In the mid-1990s, Black and Decker was considering getting into handheld lighting devices, but did not want to join the crowded field of ordinary consumer flashlights.

So, to get new ideas, some designers followed real flashlight users around and documented their customer journey. They observed people using flashlights in real usage situations and discovered the need for a feature that was never mentioned during the usual brainstorming among engineers and designers or in focus groups of consumers. More than half the people they observed during actual usage under car hoods, under kitchen sinks, and in closets and attics said that some kind of hands-free usage would be desirable.

They made a flashlight that could be bent and formed and that can stand up by itself. Overnight, the "SnakeLight" was the product with the largest production volume in Black and Decker history, despite being larger, heavier, and more expensive than other flashlights on the market (Giesecke et al., 2018).

Activity-based interaction data and the broader ecology. An activity is a set of related task threads that work together to reach a higher-level goal. Usually, activities involve sequences of multiple overlapping tasks that go together in a broader ecology than just the context of a given task.

As we said in Section 1.6.2, Norman (2005) gives this as an example of an activity-based approach to smartphones: "Mobile phones that combine appointment books, diaries and calendars, note-taking facilities, text messaging, and cameras—can do a good job of supporting communication activities. This one single device integrates several tasks: looking up numbers, dialing, talking, note taking, checking one's diary or calendar, and exchanging photographs, text messages, and emails."

Find usage data that support activity-based interaction. And, where possible, try to organize usage research data in terms of activities rather than just individual tasks.

7.5.5 Capture the Data

"Stream of occurrence" notes. Clients and users are very busy, so you won't usually have much time with them. During the visit, especially if the work domain is unfamiliar, you usually won't have time for much except taking notes. We call it "stream of occurrence" note taking, because you take notes about whatever is occurring at the time it happens and just add it to the set of notes you have, without any time to try and interpret or organize them in the field.

If the domain is familiar and observations aren't going too fast, you might do some sketching to represent work flow and other important characteristics.

Handwritten note taking. In our experience, the most popular way to take notes is by long-hand writing in a notebook. Handwriting has the advantage of being the least distracting to the data elicitation process. Furthermore, it is the most flexible with respect to being able to do quick sketches and annotations to notes or any work artifacts.

Typing notes in a laptop. Some prefer typing in a laptop. This can work if you are good at typing and if having a laptop in the data elicitation environment can be inconspicuous. You must be able to type notes without:

- Being distracted from your focus.
- Seeming intrusive to users.
- Giving the impression that what users say will be captured "on the record."

With capturing data in a laptop comes the advantage of electronic sharing of notes.

Rarely make audio recordings. If you are unfamiliar with the domain and much of what is said in the field doesn't make much sense to you, you might consider making audio recordings of what they say. But:

- This is not efficient use of data elicitation.
- Don't forget that everything you record will also have to be transcribed.

So, in almost all cases, we do not recommend audio or video recording for data capture in the field. There usually isn't time for it, it's often too complicated, and you rarely get much in return.

7.5.6 For High Rigor, Maintain Connections to Data Sources

In cases requiring high rigor and traceability of usage research data and model components to original sources, you can tag raw data notes with "data source IDs," IDs of the people from whom the notes were elicited. To protect anonymity, use an ID number and not the person's name. Keep the list of names and IDs in a secure place.

Source IDs will allow you to go back to the original sources of the raw data if questions, disagreements, or interpretations of the data become an issue later in the process. Most projects do not require this kind of rigor.

Example: Tagging a Raw Data Note with Source ID

Below is an example of a raw data note that describes a barrier in the workflow model of the ticket buyer. It has been tagged with an "8," the ID of the person from whom the data was elicited:

> *It is too difficult to get enough information about events from a ticket seller at the ticket window. I would like to be able to find my own events and not depend on the ticket seller to do all the browsing and searching. [8]*

7.5.7 Writing Good Raw Data Notes

- Be concise:
  - Abstract out all but the salient points.
  - Avoid verbatim quotes.
  - Eliminate rambling narration.
- Make your raw data notes as modular as possible:
  - Paraphrase and synthesize.
  - Make each work activity note:

- A simple declarative point.
- Easily read.
- Understood at a glance.
- Containing just one concept, idea, or fact.

Work activity note

A brief, clear, concise, and elemental (relating to exactly one concept, idea, fact, or topic) statement used to document a single point about the work practice as synthesized from raw usage research data (Section 8.1.2).

Exercise 7-1: Usage Research Data Elicitation for the Product or System of Your Choice

Goal: Get practice in performing usage research data elicitation

Activities: The best conditions for this exercise are to work as a team and have a real client.

If you are working with a team but do not have a real client, divide your team members into users and interviewers and do a role-playing exercise. If you are working alone, invite some friends over for one of your famous pizza-and-beer-and-usage-research parties and have them play a user role while you interview them. We have found that you get the best results if you follow this order: eat the pizza, do the exercise, drink the beer.

Do your best to suspend disbelief and pretend that you and your users are in a real situation within the context of your domain of investigation. Interviewers each take their own transcripts of raw data notes as you ask questions and listen to users talk about their work activities in this domain.

Deliverables: At least a few pages of raw usage research data notes, handwritten or typed. Include a few interesting examples (something unexpected or unique) from your notes to share.

Schedule: Assuming a relatively simple domain, we expect this exercise to take about 1–2 hours.

7.5.8 Getting the Most Out of Data Elicitation

In summary, getting the most value from the investment in usage research data elicitation (yours and the user's investment) involves being prepared by doing your homework upfront and by being a keen observer.

Unfamiliar domains. If you, the UX professional, don't know much about the work and problem domain, you may find data elicitation to not be as productive as you need. You are likely to get just a skin-deep tutorial on the domain and not learn much about the subtleties of the work practice. This is usually not a good way to use time in the field with participants.

In such situations, in practice, most of the conversation during an elicitation visit is focused on designers trying to understand everything that is thrown at them in the form of jargon, concepts, and terminology. The users don't have time

to educate the designers because they are busy and their time is valuable. This is perhaps the main reason why elicitation visits under these conditions are not the most informative. Because you and the users can't get past the barriers of unfamiliar terminology and esoteric knowledge of the work practice to get at the understanding of user needs that you require, these sessions end up being education for the designers at a surface level.

Understanding the elephant. The goal of usage research is to piece together different perspectives into a cohesive picture. This is like the blind men feeling different parts of the elephant and coming away with a different understanding of what an elephant is (credit not ours; source unknown). So the researchers should be on constant lookout for variations, breakdowns, and workarounds. They need to seek out contradictions and opposing perspectives espoused by the users.