About Face

3

The Essentials of Interaction Design

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Part

I

Understanding Goal-Directed Design

4

Understanding Users: Qualitative Research

The outcome of any design effort must ultimately be judged by how successfully it meets the needs of both the product user and the organization that commissioned it. No matter how skillful and creative the designer, if she does not have clear and detailed knowledge of the users she is designing for, the constraints of the problem, and the business or organizational goals that are driving design activities, she will have little chance of success.

Real insight into these topics can't be achieved by digging through the piles of numbers that come from a quantitative study like a market survey (though these can be critical for answering other kinds of questions). Rather, this kind of deep knowledge can only be achieved by *qualitative* research techniques. There are many types of qualitative research, each of which can play an important role in understanding the design landscape of a product. In this chapter, we focus on specific qualitative research techniques that support the design methods described in subsequent chapters. At the end of the chapter, we briefly discuss how quantitative research can, and cannot, be used to help support this effort.

Qualitative versus Quantitative Research

Research is a word that most people associate with science and objectivity. This association isn't incorrect, but it biases many people towards the notion that the only valid sort of research is the kind that yields the supposed ultimate in objectivity: quantitative data. It is a common perspective in business and engineering that numbers represent truth, even though we all know that numbers — especially statistics describing human activities — are subject to interpretation and can be manipulated at least as dramatically as words.

Data gathered by the hard sciences like physics are simply different from that gathered on human activities: Electrons don't have moods that vary from minute to minute, and the tight controls physicists place on their experiments to isolate observed behaviors are impossible in the social sciences. Any attempt to reduce human behavior to statistics is likely to overlook important nuances, which can make an enormous difference to the design of products. Quantitative research can only answer questions about "how much" or "how many" along a few reductive axes. Qualitative research can tell you about what, how, and why in rich detail that is reflective of the actual complexities of real human situations.

Social scientists have long realized that human behaviors are too complex and subject to too many variables to rely solely on quantitative data to understand them. Design and usability practitioners, borrowing techniques from anthropology and other social sciences, have developed many qualitative methods for gathering useful data on user behaviors to a more pragmatic end: to help create products that better serve user needs.

The value of qualitative research

Qualitative research helps us understand the domain, context, and constraints of a product in different, more useful ways than quantitative research does. It also helps us identify patterns of behavior among users and potential users of a product much more quickly and easily than would be possible with quantitative approaches. In particular, qualitative research helps us understand:

- ▶ Behaviors, attitudes, and aptitudes of potential product users
- ▶ Technical, business, and environmental contexts — the **domain** — of the product to be designed

▸ Vocabulary and other social aspects of the domain in question

▸ How existing products are used

Qualitative research can also help the progress of design projects by:

▸ Providing credibility and authority to the design team, because design decisions can be traced to research results

▸ Uniting the team with a common understanding of domain issues and user concerns

▸ Empowering management to make more informed decisions about product design issues that would otherwise be based on guesswork or personal preference

It's our experience that in comparison, qualitative methods tend to be faster, less expensive, and more likely to provide useful answers to important questions that lead to superior design:

▸ How does the product fit into the broader context of people's lives?

▸ What goals motivate people to use the product, and what basic tasks help people accomplish these goals?

▸ What experiences do people find compelling? How do these relate to the product being designed?

▸ What problems do people encounter with their current ways of doing things?

The value of qualitative studies is not limited to helping support the design process. In our experience, spending the time to understand the user population as human beings can provide valuable business insights that are not revealed through traditional market research.

In one particularly illustrative example, we were asked by a client to perform a user study for an entry-level consumer video-editing product for Windows users. An established developer of video-editing and -authoring software, the client had used traditional market research techniques to identify a significant business opportunity in developing a product for people who owned a digital video camera and a computer but hadn't connected the two yet.

In the field, we conducted interviews with a dozen users in the target market. Our first discovery was not surprising — that the people who did the most taping and had the strongest desire to share edited versions of their videos were parents. The second discovery, however, was quite startling. Of the 12 people whose homes we visited, only one person had successfully connected his video camera to his computer, and he had relied on the IT guy at work to set it up for him. One of the

necessary preconditions of the success of the product was that people could actually get video onto their computers to edit, but at the time it was extremely difficult to get a FireWire or video capture card functioning properly on an Intel-based PC.

As a result of four days of research, we were able to help our client make a decision to put a hold on the product, which likely ended up saving them a considerable investment.

Types of qualitative research

Social science and usability texts are full of methods and techniques for conducting qualitative research, and readers are encouraged to explore this literature. In this chapter, we will focus specifically on techniques that have been proven effective in our practice over the last decade, occasionally drawing attention to similar techniques practiced in the design and usability fields at large. We will also try to avoid getting bogged down in theory, and instead will present these techniques from a pragmatic perspective. The qualitative research activities we have found to be most useful in our practice are:

- ▶ Stakeholder interviews
- ▶ Subject matter expert (SME) interviews
- ▶ User and customer interviews
- ▶ User observation/ethnographic field studies
- ▶ Literature review
- ▶ Product/prototype and competitive audits

Stakeholder interviews

Research for any new product design should start by understanding the business and technical context surrounding the product. In almost all cases, the reason a product is being designed (or redesigned) is to achieve one or several specific business outcomes (most commonly, to make money). It is the designers' obligation to develop solutions without ever losing sight of these business goals, and it is therefore critical that the design team begin its work by understanding the opportunities and constraints that are behind the design brief.

As Donald Schön so aptly puts it, "design is a conversation with materials"[1] This means that for a designer to craft an appropriate solution, he must understand the capabilities and limitations of the "materials" that will be used to construct the product, whether they be lines of code or extruded plastic.

Generally speaking, a **stakeholder** is anyone with authority and/or responsibility for the product being designed. More specifically, stakeholders are key members of the organization commissioning the design work, and typically include executives, managers, and representative contributors from development, sales, product management, marketing, customer support, design, and usability. They may also include similar people from other organizations in business partnership with the commissioning organization.

Interviews with stakeholders should occur before any user research begins because these discussions often inform how user research is conducted. Also, it is usually most effective to interview each stakeholder in isolation, rather than in a larger, cross-departmental group. A one-on-one setting promotes candor on the part of the stakeholder, and ensures that individual views are not lost in a crowd. (One of the most interesting things that can be discovered in such interviews is the extent to which everyone in a product team shares — or doesn't share — a common vision.) Interviews need not last longer than about an hour, though follow-up meetings may be called for if a particular stakeholder is identified as an exceptionally valuable source of information.

The type of information that is important to gather from stakeholders includes:

- ▶ **Preliminary product vision** — As in the fable of the blind men and the elephant, you may find that each business department has a slightly different and slightly incomplete perspective on the product to be designed. Part of the design approach must therefore involve harmonizing these perspectives with those of users and customers.

- ▶ **Budget and schedule** — Discussions on this topic often provide a reality check on the scope of the design effort and provide a decision point for management if user research indicates a greater (or lesser) scope is required.

- ▶ **Technical constraints and opportunities** — Another important determinant of design scope is a firm understanding of what is technically feasible given budget, time, and technology constraints. It is also often the case that a product is being developed to capitalize on a new technology. Understanding the opportunities underlying this technology can help shape the product's direction.

- ▶ **Business drivers** — It is important for the design team to understand what the business is trying to accomplish. This again leads to a decision point, should user research indicate a conflict between business and user needs. The design must, as much as possible, create a win-win situation for users, customers, and providers of the product.

▶ **Stakeholders' perceptions of the user** — Stakeholders who have relationships with users (such as customer support representatives) may have important insights on users that will help you to formulate your user research plan. You may also find that there are significant disconnects between some stakeholders' perceptions of their users and what you discover in your research. This information can become an important discussion point with management later in the process.

Understanding these issues and their impact on design solutions helps you as a designer to better develop a successful product. Regardless of how desirable your designs are to customers and users, without considering the viability and feasibility of the proposed solution there is no chance that the product will thrive.

Discussing these topics is also important to developing a common language and understanding among the design team, management, and engineering teams. As a designer, your job is to develop a vision that the entire team believes in. Without taking the time to understand everyone's perspective, it is unlikely that they will feel that proposed solutions reflect their priorities. Because these people have the responsibility and authority to deliver the product to the real world, they are guaranteed to have important knowledge and opinions. If you don't ask for it upfront, it is likely to be forced upon you later, often in the form of a critique of your proposed solutions.

Subject matter expert (SME) interviews

Early in a design project, it is often invaluable to identify and meet with several **subject matter experts** (SMEs) — experts on the domain within which the product will operate. Many SMEs were users of the product or its predecessors at one time and may now be trainers, managers, or consultants. Often they are experts hired by stakeholders, rather than stakeholders themselves. Similar to stakeholders, SMEs can provide valuable perspectives on a product and its users, but designers should be careful to recognize that SMEs represent a somewhat skewed perspective. Some points to consider about using SMEs are:

▶ **SMEs are often expert users.** Their long experience with a product or its domain means that they may have grown accustomed to current interactions. They may also lean towards expert controls rather than interactions designed for perpetual intermediates. SMEs are often not current users of the product and may have more of a management perspective.

▶ **SMEs are knowledgeable, but they aren't designers.** They may have many ideas on how to improve a product. Some of these may be valid and valuable, but the most useful pieces of information to glean from these suggestions are the causative *problems* that lead to their proposed solutions. As with users, when you encounter a proposed solution, ask "how would that help you or the user?"

▶ **SMEs are necessary in complex or specialized domains.** If you are designing for a technical domain such as medical, scientific, or financial services, you will likely need some guidance from SMEs, unless you are one yourself. Use SMEs to get information on industry best practices and complex regulations. SME knowledge of user roles and characteristics is critical for planning user research in complex domains.

▶ **You will want access to SMEs throughout the design process.** If your product domain requires use of SMEs, you should be able to bring them in at different stages of the design to help perform reality checks on design details. Make sure that you secure this access in your early interviews.

Customer interviews

It is easy to confuse users with customers. For consumer products, customers are often the same as users, but in corporate or technical domains, users and customers rarely describe the same sets of people. Although both groups should be interviewed, each has its own perspective on the product that needs to be factored quite differently into an eventual design.

Customers of a product are those people who make the decision to purchase it. For consumer products, customers are frequently users of the product; although for products aimed at children or teens, the customers are parents or other adult supervisors of children. In the case of most enterprise, medical, or technical products, the customer is someone very different from the user — often an executive or IT manager — with distinct goals and needs. It's important to understand customers and satisfy their goals in order to make a product *viable*. It is also important to realize that customers seldom actually use the product themselves, and when they do, they use it quite differently from the way their users do.

When interviewing customers, you will want to understand:

▶ Their goals in purchasing the product

▶ Their frustrations with current solutions

▶ Their decision process for purchasing a product of the type you're designing

▶ Their role in installation, maintenance, and management of the product

▶ Domain-related issues and vocabulary

Like SMEs, customers may have many opinions about how to improve the design of the product. It is important to analyze these suggestions, as in the case of SMEs, to determine what issues or problems underlie the ideas offered, because better, more integrated solutions may become evident later in the design process.

User Interviews

Users of a product should be the main focus of the design effort. They are the people who are personally utilizing the product to accomplish a goal (not their managers or support team). If you are redesigning or refining an existing product, it is important to speak to both current and **potential users**, that is, people who do not currently use the product but who are good candidates for using it in the future because they have needs that can be met with the product and are in the target market for the product. Interviewing both current and potential users illuminates the effect that experience with the current version of a product may have on how the user behaves and thinks about things.

Information we are interested in learning from users includes:

- ▶ The context of how the product (or analogous system, if no current product exists) fits into their lives or workflow: when, why, and how the product is or will be used

- ▶ Domain knowledge from a user perspective: What do users need to know to do their jobs?

- ▶ Current tasks and activities: both those the current product is required to accomplish and those it doesn't support

- ▶ Goals and motivations for using their product

- ▶ Mental model: how users think about their jobs and activities, as well as what expectations users have about the product

- ▶ Problems and frustrations with current products (or an analogous system if no current product exists)

User observation

Most people are incapable of accurately assessing their own behaviors,[2] especially when they are removed from the context of their activities. It is also true that out of fear of seeming dumb, incompetent, or impolite, many people may avoid talking about software behaviors that they find problematic or incomprehensible.

It then follows that interviews performed outside the context of the situations the designer hopes to understand will yield less-complete and less-accurate data. You can talk to users about how they think they behave, or you can observe their behavior first-hand. The latter route provides superior results.

Perhaps the most effective technique for gathering qualitative user data combines interviewing and observation, allowing the designers to ask clarifying questions and direct inquiries about situations and behaviors they observe in real time.

Many usability professionals make use of technological aides such as audio or video recorders to capture what users say and do. Interviewers must take care not to make these technologies too obtrusive; otherwise, the users will be distracted and behave differently than they would off-tape. In our practice, we've found that a notebook and a camera allow us to capture everything we need without compromising the honest exchange of information. Typically, we won't bring out the camera until we feel that we've established a good rapport with the interview subject, and then we use it to capture things about the environment that are difficult to jot in our notes. However, video, when used with care, can sometimes provide a powerful rhetorical tool for achieving stakeholder buy-in to contentious or surprising research results. Video may also prove useful in situations where note taking is difficult, such as in a moving car.

Literature review

In parallel with stakeholder interviews, the design team should review any literature pertaining to the product or its domain. This can and should include product marketing plans, brand strategy, market research, user surveys, technology specifications and white papers, business and technical journal articles, competitive studies, Web searches for related and competing products and news, usability study results and metrics, and customer support data such as call center statistics.

The design team should collect this literature, use it as a basis for developing questions to ask stakeholders and SMEs, and later use it to supply additional domain knowledge and vocabulary, and to check against compiled user data.

Product and competitive audits

Also in parallel to stakeholder and SME interviews, it is often quite helpful for the design team to examine any existing version or prototype of the product, as well as its chief competitors. Doing so gives the design team a sense of the state of the art, and provides fuel for questions during the interviews. The design team, ideally, should engage in an informal **heuristic** or **expert review** of both the current and competitive interfaces, comparing each against interaction and visual design principles (such as those found later in this book). This procedure both familiarizes the team with the strengths and limitations of what is currently available to users, and provides a general idea of the current functional scope of the product.

Ethnographic Interviews: Interviewing and Observing Users

Drawing on years of design research in practice, we believe that a combination of observation and one-on-one interviews is the most effective and efficient tool in a designer's arsenal for gathering qualitative data about users and their goals. The technique of **ethnographic interviews** is a combination of immersive observation and directed interview techniques.

Hugh Beyer and Karen Holtzblatt have pioneered an ethnographic interviewing technique that they call **contextual inquiry**. Their method has, for good reason, rapidly gained traction in the industry, and provides a sound basis for qualitative user research. It is described in detail in the first four chapters of their book, *Contextual Design*. Contextual inquiry methods closely parallel the methods described here, but with some subtle and important differences.

Contextual inquiry

Contextual inquiry, according to Beyer and Holtzblatt, is based on a **master-apprentice model** of learning: observing and asking questions of the user as if she is the master craftsman, and the interviewer the new apprentice. Beyer and Holtzblatt also enumerate four basic principles for engaging in ethnographic interviews:

▶ **Context** — Rather than interviewing the user in a clean white room, it is important to interact with and observe the user in her normal work environment, or whatever physical context is appropriate for the product. Observing users as they perform activities and questioning them in their own environments, filled with the artifacts they use each day, can bring the all-important details of their behaviors to light.

▶ **Partnership** — The interview and observation should take the tone of a collaborative exploration with the user, alternating between observation of work and discussion of its structure and details.

▶ **Interpretation** — Much of the work of the designer is reading between the lines of facts gathered about users' behaviors, their environment, and what they say. These facts must be taken together as a whole and analyzed by the designer to uncover the design implications. Interviewers must be careful, however, to avoid assumptions based on their own interpretation of the facts without verifying these assumptions with users.

▶ **Focus** — Rather than coming to interviews with a set questionnaire or letting the interview wander aimlessly, the designer needs to subtly direct the interview so as to capture data relevant to design issues.

Improving on contextual inquiry

Contextual inquiry forms a solid theoretical foundation for qualitative research, but as a specific method it has some limitations and inefficiencies. The following process improvements, in our experience, result in a more highly leveraged research phase that better sets the stage for successful design:

▶ **Shorten the interview process** — Contextual inquiry assumes full-day interviews with users. The authors have found that interviews as short as one hour can be sufficient to gather the necessary user data, provided that a sufficient number of interviews (about six well-selected users for each hypothesized role or type) are scheduled. It is much easier and more effective to find a diverse set of users who will consent to an hour with a designer than it is to find users who will agree to spend an entire day.

▶ **Use smaller design teams** — Contextual inquiry assumes a large design team that conducts multiple interviews in parallel, followed by debriefing sessions in which the full team participates. We've found that it is more effective to conduct interviews sequentially with the same designers in each interview. This allows the design team to remain small (two or three designers), but even more important, it means that the entire team interacts with all interviewed users directly, allowing the members to most effectively analyze and synthesize the user data.

▶ **Identify goals first** — Contextual inquiry, as described by Beyer and Holtzblatt, feeds a design process that is fundamentally task focused. We propose that ethnographic interviews first identify and prioritize user goals before determining the tasks that relate to these goals.

▶ **Looking beyond business contexts** — The vocabulary of contextual inquiry assumes a business product and a corporate environment. Ethnographic interviews are also possible in consumer domains, though the focus of questioning is somewhat different, as we describe later in this chapter.

The remainder of this chapter provides general methods and tips for preparing for and conducting ethnographic interviews.

Preparing for ethnographic interviews

Ethnography is a term borrowed from anthropology, meaning the systematic and immersive study of human cultures. In anthropology, ethnographic researchers

spend years living immersed in the cultures they study and record. Ethnographic interviews take the spirit of this type of research and apply it on a micro level. Rather than trying to understand behaviors and social rituals of an entire culture, the goal is to understand the behaviors and rituals of people interacting with individual products.

Identifying candidates

Because the designers must capture an entire range of user behaviors regarding a product, it is critical that the designers identify an appropriately diverse sample of users and user types when planning a series of interviews. Based on information gleaned from stakeholders, SMEs, and literature reviews, designers need to create a hypothesis that serves as a starting point in determining what sorts of users and potential users to interview.

The persona hypothesis

We label this starting point the **persona hypothesis**, because it is the first step towards identifying and synthesizing personas, the user archetypes we will discuss in detail in the next chapter. The persona hypothesis should be based on likely behavior patterns and the factors that differentiate these patterns, not purely on demographics. It is often the case with consumer products that demographics are used as screening criteria to select interview subjects, but even in this case, they should be serving as a proxy for a hypothesized behavior pattern.

The nature of a product's domain makes a significant difference in how a persona hypothesis is constructed. Business users are often quite different from consumer users in their behavior patterns and motivations, and different techniques are used to build the persona hypothesis in each case.

The persona hypothesis is a first cut at defining the different kinds of users (and sometimes customers) for a product. The hypothesis serves as the basis for initial interview planning; as interviews proceed, new interviews may be required if the data indicates the existence of user types not originally identified.

The persona hypothesis attempts to address, at a high level, these three questions:

▶ What different sorts of people might use this product?

▶ How might their needs and behaviors vary?

▶ What ranges of behavior and types of environments need to be explored?

Roles in business and consumer domains

For business products, **roles** — common sets of tasks and information needs related to distinct classes of users — provide an important initial organizing principle. For example, for an office phone system, we might find these rough roles:

- ▶ People who make and receive calls from their desks
- ▶ People who travel a lot and need to access the phone system remotely
- ▶ Receptionists who answer the phone for many people
- ▶ People who technically administer the phone system

In business and technical contexts, roles often map roughly to job descriptions, so it is relatively easy to get a reasonable first cut of user types to interview by understanding the kind of jobs held by users (or potential users) of the system.

Unlike business users, consumers don't have concrete job descriptions, and their use of products may cross multiple contexts. Therefore, it often isn't meaningful to use roles as an organizing principle for the persona hypothesis for a consumer product. Rather, it is often the case that you will see the most significant patterns emerge from users' attitudes and aptitudes, as manifest in their behaviors.

Behavioral and demographic variables

In addition to roles, a persona hypothesis should be based on variables that help differentiate between different kinds of users based on their needs and behaviors. This is often the most useful way to distinguish between different types of users (and forms the basis for the persona-creation process described in the next chapter). Despite the fact that these variables can be difficult to fully anticipate without research, they often become the basis of the persona hypothesis for consumer products. For example, for an online store, there are several ranges of behavior concerning shopping that we might identify:

- ▶ Frequency of shopping (from frequent to infrequent)
- ▶ Desire to shop (from loves to shop to hates to shop)
- ▶ Motivation to shop (from bargain hunting to searching for just the right item)

Although consumer user types can often be roughly defined by the combination of behavioral variables they map to, behavioral variables are also important for identifying types of business and technical users. People within a single business-role definition may have different needs and motivations. Behavioral variables can capture this, although often not until user data has been gathered.

Given the difficulty in accurately anticipating behavioral variables before user data is gathered, another helpful approach in building a persona hypothesis is making use of *demographic variables*. When planning your interviews, you can use market research to identify ages, locations, gender, and incomes of the target markets for the product. Interviewees should be distributed across these demographic ranges in the hope of interviewing a sufficiently diverse group of people to identify the significant behavior patterns.

Domain expertise versus technical expertise

One important type of behavioral distinction is the difference between technical expertise (knowledge of digital technology) and domain expertise (knowledge of a specialized subject area pertaining to a product). Different users will have varying amounts of technical expertise; similarly, some users of a product may be less expert in their knowledge of the product's domain (for example, accounting knowledge in the case of a general ledger application). Thus, depending on who the design target of the product is, domain support may be a necessary part of the product's design, as well as technical ease of use. A relatively naive user will likely never be able to use more than a small subset of a domain-specific product's functions without domain support provided in the interface. If naive users are part of the target market for a domain-specific product, care must be taken to support domain-naive behaviors.

Environmental considerations

A final consideration, especially in the case of business products, is the cultural differences between organizations in which the users are employed. At small companies, for example, workers tend to have a broader set of responsibilities and more interpersonal contact; at huge companies, workers tend to be highly specialized and there are often multiple layers of bureaucracy. Examples of these environmental variables include:

> ▸ Company size (from small to multinational)

> ▸ Company location (North America, Europe, Asia, and so on)

> ▸ Industry/sector (electronics manufacturing, consumer packaged goods, and so on)

> ▸ IT presence (from ad hoc to draconian)

> ▸ Security level (from lax to tight)

Like behavioral variables, these may be difficult to identify without some domain research, because patterns do vary significantly by industry and geographic region.

Putting a plan together

After you have created a persona hypothesis, complete with potential roles and behavioral, demographic, and environmental variables, you then need to create an interview plan that can be communicated to the person in charge of coordinating and scheduling the interviews.

In our practice, we've observed that each presumed behavioral pattern requires about a half-dozen interviews to verify or refute (sometimes more if a domain is particularly complex). What this means in practice is that each identified role, behavioral variable, demographic variable, and environmental variable identified in the persona hypothesis should be explored in four to six interviews (sometimes more if a domain is particularly complex).

However, these interviews can overlap. If we believe that use of an enterprise product may differ, for example, by geographic location, industry, and company size, then research at a single small electronics manufacturer in Taiwan would allow us to cover several variables at once. By being clever about mapping variables to interviewee-screening profiles, you can keep the number of interviews to a manageable number.

Conducting ethnographic interviews

After the persona hypothesis has been formulated and an interview plan has been derived from it, you are ready to interview — assuming you get access to interviewees! While formulating the interview plan, designers should work closely with project stakeholders who have access to users. Stakeholder involvement is generally the best way to make interviews happen, especially for business and technical products.

If stakeholders can't help you get in touch with users, you can contact a market or usability research firm that specializes in finding people for surveys and focus groups. These firms are useful for reaching consumers with diverse demographics. The difficulty with this approach is that it can sometimes be challenging to get interviewees who will permit you to interview them in their homes or places of work.

As a last alternative for consumer products, designers can recruit friends and relatives. This makes it easier to observe the interviewees in a natural environment but also is quite limiting as far as diversity of demographic and behavioral variables are concerned.

Interview teams and timing

The authors favor a team of two designers per interview, one to drive the interview and take light notes, and the other to take detailed notes (these roles can switch halfway through the interview). One hour per user interviewed is often sufficient, except in the case of highly complex domains such as medical, scientific, and financial services that may require more time to fully understand what the user is trying to accomplish. Be sure to budget travel time between interview sites, especially for consumer interviews in residential neighborhoods, or interviews that involve "shadowing" users as they interact with a (usually mobile) product while moving from place to place. Teams should try to limit interviews to six per day, so that there is adequate time for debriefing and strategizing between interviews, and so that the interviewers do not get fatigued.

Phases of ethnographic interviews

A complete set of ethnographic interviews for a project can be grouped into three distinct, chronological phases. The approach of the interviews in each successive phase is subtly different from the previous one, reflecting the growing knowledge of user behaviors that results from each additional interview. Focus tends to be broad at the start, aimed at gross structural and goal-oriented issues, and more narrow for interviews at the end of the cycle, zooming in on specific functions and task-oriented issues.

> ▶ **Early interviews** are exploratory in nature, and focused on gathering domain knowledge from the point of view of the user. Broad, open-ended questions are common, with a lesser degree of drill-down into details.

> ▶ **Middle interviews** are where designers begin to see patterns of use and ask open-ended and clarifying questions to help connect the dots. Questions in general are more focused on domain specifics, now that the designers have absorbed the basic rules, structures, and vocabularies of the domain.

> ▶ **Later interviews** confirm previously observed patterns, further clarifying user roles and behaviors and making fine adjustments to assumptions about task and information needs. Closed-ended questions are used in greater number, tying up loose ends in the data.

After you have an idea who your actual interviewees will be, it can be useful to work with stakeholders to schedule individuals most appropriate for each phase in the interview cycle. For example, in a complex, technical domain it is often a good idea to perform early interviews with the more patient and articulate interview subjects. In some cases, you may also want to loop back and interview this particularly knowledgeable and articulate subject again at the end of the interview cycle to address any topics that you weren't aware of during your initial interview.

Basic methods

The basic methods of ethnographic interviewing are simple, straightforward, and very low tech. Although the nuances of interviewing subjects takes some time to master, any practitioner should, if they follow the suggestions below, be rewarded with a wealth of useful qualitative data:

- ▶ Interview where the interaction happens
- ▶ Avoid a fixed set of questions
- ▶ Focus on goals first, tasks second
- ▶ Avoid making the user a designer
- ▶ Avoid discussions of technology
- ▶ Encourage storytelling
- ▶ Ask for a show and tell
- ▶ Avoid leading questions

We describe each of these methods in more detail in the following sections.

Interview where the interaction happens

Following the first principle of contextual inquiry, it is of critical importance that subjects be interviewed in the places where they actually use the products. Not only does this give the interviewers the opportunity to witness the product being used, but it also gives the interview team access to the environment in which the interaction occurs. This can give tremendous insight into product constraints and user needs and goals.

Observe the environment closely: It is likely to be crawling with clues about tasks the interviewee might not have mentioned. Notice, for example, the kind of information they need (papers on desks or adhesive notes on screen borders), inadequate systems (cheat sheets and user manuals), the frequency and priority of tasks (inbox and outbox); and the kind of workflows they follow (memos, charts, calendars). Don't snoop without permission, but if you see something that looks interesting, ask your interviewee to discuss it.

Avoid a fixed set of questions

If you approach ethnographic interviews with a fixed questionnaire, you not only run the risk of alienating the interview subject but can also cause the interviewers to miss out on a wealth of valuable user data. The entire premise of ethnographic interviews (and contextual inquiry) is that we as interviewers don't know enough about the domain to presuppose the questions that need asking: We must learn what is important from the people we talk to. This said, it's certainly useful to have

types of questions in mind. Depending on the domain, it may also be useful to have a standardized set of *topics* that you want to make sure you cover in the course of your interview. This list of topics may evolve over the course of your interviews, but this will help you make sure that you get enough detail from each interview so that you are able to recognize the significant behavior patterns.

Here are some **goal-oriented questions** to consider:

- ▶ **Goals** — What makes a good day? A bad day?
- ▶ **Opportunity** — What activities currently waste your time?
- ▶ **Priorities** — What is most important to you?
- ▶ **Information** — What helps you make decisions?

Another useful type of question is the **system-oriented question**:

- ▶ **Function** — What are the most common things you do with the product?
- ▶ **Frequency** — What parts of the product do you use most?
- ▶ **Preference** — What are your favorite aspects of the product? What drives you crazy?
- ▶ **Failure** — How do you work around problems?
- ▶ **Expertise** — What shortcuts do you employ?

For business products, **workflow-oriented questions** can be helpful:

- ▶ **Process** — What did you do when you first came in today? And after that?
- ▶ **Occurrence and recurrence** — How often do you do this? What things do you do weekly or monthly, but not every day?
- ▶ **Exception** — What constitutes a typical day? What would be an unusual event?

To better understand user motivations, you can employ **attitude-oriented questions**:

- ▶ **Aspiration** — What do you see yourself doing five years from now?
- ▶ **Avoidance** — What would you prefer not to do? What do you procrastinate on?
- ▶ **Motivation** — What do you enjoy most about your job (or lifestyle)? What do you always tackle first?

Focus on goals first, tasks second

Unlike contextual inquiry and the majority of other qualitative research methods, the first priority of ethnographic interviewing is understanding the *why* of users — what

motivates the behaviors of individuals in different roles, and *how* they hope to ulti-mately accomplish this goal — not the *what* of the tasks they perform. Understand-ing the tasks is important, and the tasks must be diligently recorded. But these tasks will ultimately be restructured to better match user goals in the final design.

Avoid making the user a designer

Guide the interviewee towards examining problems and away from expressing solutions. Most of the time, those solutions reflect the interview subject's personal priorities, and while they sound good to *him*, they tend to be shortsighted, idiosyn-cratic, and lack the balance and refinement that an interaction designer can bring to a solution based upon adequate research and years of experience. That said, a proposed design solution can be a useful jumping off point to discuss a user's goals and the problems they encounter with current systems. If a user blurts out an inter-esting idea, ask "What problem would that solve for you?" or "Why would that be a good solution?"

Avoid discussions of technology

Just as you don't want to treat the user as a designer, you also don't want to treat him as a programmer or engineer. Discussion of technology is meaningless without first understanding the purpose underlying any technical decisions. In the case of technical or scientific products, where technology is always an issue, distinguish between domain-related technology and product-related technology, and steer away from the latter. If an interview subject is particularly insistent on talking about how the product should be implemented, bring the subject back to his goals and motivations by asking "How would that help you?"

Encourage storytelling

Far more useful than asking users for design advice is encouraging them to tell spe-cific stories about their experiences with a product (whether an old version of the one you're redesigning, or an analogous product or process): how they use it, what they think of it, who else they interact with when using it, where they go with it, and so forth. Detailed stories of this kind are usually the best way to understand how users relate to and interact with products. Encourage stories that deal with typical cases and also more exceptional ones.

Ask for a show and tell

After you have a good idea of the flow and structure of a user's activities and inter-actions and you have exhausted other questions, it is often useful to ask the inter-viewee for a show and tell or **grand tour** of artifacts related to the design problem. These can be domain-related artifacts, software interfaces, paper systems, tours of the work environment, or ideally all the above. Be careful to not only record the

artifacts themselves (digital or video cameras are very handy at this stage) but also pay attention to *how* the interviewee describes them. Be sure to ask plenty of clarifying questions as well.

Avoid leading questions

One important thing to avoid in interviews is the use of *leading questions*. Just as in a courtroom, where lawyers can, by virtue of their authority, bias witnesses by suggesting answers to them, designers can inadvertently bias interview subjects by implicitly (or explicitly) suggesting solutions or opinions about behaviors. Examples of leading questions include:

- ▸ Would feature X help you?
- ▸ You like X, don't you?
- ▸ Do you think you'd use X if it were available?

After the interviews

After each interview, teams compare notes and discuss any particularly interesting trends observed or specific points brought up in the most recent interview. If they have the time, they should also look back at old notes to see whether unanswered questions from other interviews and research have been properly answered. This information should be used to strategize about the approach to take in subsequent interviews.

After the interview process is finished, it is useful to once again make a pass through all the notes, marking or highlighting trends and patterns in the data. This is very useful for the next step of creating personas from the cumulative research. If it is helpful, the team can create a binder of the notes, review any videotapes, and print out artifact images to place in the binder or on a public surface, such as a wall, where they are all visible simultaneously. This will be useful in later design phases.

Other Types of Research

This chapter has focused on qualitative research aimed at gathering user data that will later be used to construct robust user and domain models that form the key tools in the Goal-Directed Design methodology described in the next chapter. A wide variety of other forms of research are used by design and usability professionals, ranging from detailed task analysis activities to focus groups and usability tests. While many of these activities have the potential to contribute to the creation of useful and desirable products, we have found the qualitative approach described in this chapter to provide the most value to digital product design. Put simply, the

qualitative approach helps answer questions about the product at both the big-picture and functional-detail level with a relatively small amount of effort and expense. No other research technique can claim this.

Mike Kuniavsky's book *Observing the User Experience* is an excellent resource that describes a wide range of user research methods for use at many points in the design and development process. In the remainder of this chapter, we discuss just a few of the more prominent research methods and how they fit into the overall development effort.

Focus groups

Marketing organizations are particularly fond of gathering user data via **focus groups**, in which representative users, usually chosen to match previously identified demographic segments of the target market, are gathered together in a room and asked a structured set of questions and provided a structured set of choices. Often, the meeting is recorded on audio or video media for later reference. Focus groups are a standard technique in traditional product marketing. They are useful for gauging initial reactions to the *form* of a product, its visual appearance, or industrial design. Focus groups can also gather reactions to a product that the respondents have been using for some time.

Although focus groups may appear to provide the requisite user contact, the method is in many ways not appropriate as a design tool. Focus groups excel at eliciting information about products that people own or are willing (or unwilling) to purchase but are weak at gathering data about what people actually do with those products, or how and why they do it. Also, because they are a group activity, focus groups tend to drive to consensus. The majority or loudest opinion often becomes the group opinion. This is anathema to the design process, where designers must understand all the different patterns of behavior a product must address. Focus groups tend to stifle exactly the diversity of behavior and opinion that designers must accommodate.

Market demographics and market segments

The marketing profession has taken much of the guesswork out of determining what motivates people to buy. One of the most powerful tools for doing so is market segmentation, which typically uses data from focus groups and market surveys to group potential customers by demographic criteria (such as age, gender, educational level, and home zip code) to determine what types of consumers will be most receptive to a particular product or marketing message. More sophisticated

consumer data also include psychographics and behavioral variables, including attitudes, lifestyle, values, ideology, risk aversion, and decision-making patterns. Classification systems such as SRI's VALS segmentation and Jonathan Robbin's geodemographic PRIZM clusters can add greater clarity to the data by predicting consumers' purchasing power, motivation, self-orientation, and resources.

These market-modeling techniques are able to accurately forecast marketplace acceptance of products and services. They are an invaluable tool in assessing the *viability* of a product. They can also be powerful tools for convincing executives to build a product. After all, if you know X people might buy a product or service for Y dollars, it is easy to evaluate the potential return on investment.

However, understanding whether somebody wants to buy something is not the same thing as actually defining the product. Market segmentation is a great tool for identifying and quantifying a market opportunity, but an ineffective tool for defining a product that will capitalize on that opportunity.

It turns out, however, that data gathered via market research and that gathered via qualitative user research complement each other quite well. Because market research can help identify an opportunity, it is often the necessary starting point for a design initiative. Without assessing the opportunity, you will be hard pressed to convince a businessperson to fund the design. Also, as already discussed, ethnographic interviewers should use market research to help them select interview targets, and finally, as the video-editing story earlier in this chapter illustrates, qualitative research can shed critical light on the results of quantitative studies. We will discuss the differences between segmentation models and user models in more detail in Chapter 5.

Usability and user testing

Usability testing (also known, somewhat unfortunately, as "user testing") is a collection of techniques used to measure characteristics of a user's interaction with a product, usually with the goal of assessing the usability of that product. Typically, usability testing is focused on measuring how well users can complete specific, standardized tasks, as well as what problems they encounter in doing so. Results often reveal areas where users have problems understanding and utilizing the product, as well as places where users are more likely to be successful.

Usability testing requires a fairly complete and coherent design artifact to test against. Whether you are testing production software, a clickable prototype, or even a paper prototype, the point of the test is to validate a product design. This means that the appropriate place for usability testing is quite late in the design cycle, after

there is a coherent concept and sufficient detail to generate such prototypes. We discuss evaluative usability testing as part of design refinement in Chapter 7.

A case could certainly be made for the appropriateness of usability testing at the beginning of a redesign effort, and the technique is certainly capable of finding opportunities for improvement in such a project. However, we find that we are able to assess major inadequacies of a product through our qualitative studies, and if the budget is limited so as to allow usability testing only once in a product design initiative, we find much more value in performing the tests after we have a candidate solution, as a means of testing the specific elements of the new design.

Because the findings of user testing are generally measurable and quantitative, usability research is especially useful in comparing specific design variants to choose the most effective solution. Customer feedback gathered from usability testing is most useful when you need to validate or refine particular interaction mechanisms or the form and expression of specific design elements.

Usability testing is especially effective at determining:

- ▶ **Naming** — Do section/button labels make sense? Do certain words resonate better than others do?

- ▶ **Organization** — Is information grouped into meaningful categories? Are items located in the places customers might look for them?

- ▶ **First-time use and discoverability** — Are common items easy for new users to find? Are instructions clear? Are instructions necessary?

- ▶ **Effectiveness** — Can customers efficiently complete specific tasks? Are they making missteps? Where? How often?

As suggested previously, it is also worth noting that usability testing is predominantly focused on assessing the first-time use of a product. It is often quite difficult (and always laborious) to measure how effective a solution is on its 50th use — in other words, for the most common target: the perpetual intermediate user. This is quite a conundrum when one is optimizing a design for intermediate or expert users. One technique for accomplishing this is the use of a *diary study*, in which subjects keep diaries detailing their interactions with the product. Again, Mike Kuniavsky provides a good explanation of this technique in *Observing the User Experience*.

Finally, when usability testing, be sure that what you are testing is actually measurable, that the test is administered correctly, that the results will be useful in correcting design issues, and that the resources necessary to fix the problems observed in a usability study are available. Jakob Nielsen's *Usability Engineering* is the classic volume on usability and provides excellent guidance on the subject.

Card sorting

Popularized by information architects, card sorting is a technique to understand how users organize information and concepts. While there are a number of variations on the technique, it is typically performed by asking users to sort a deck of cards, each containing a piece of functionality or information related to the product or Web site. The tricky part is analyzing the results, either by looking for trends or using statistical analysis to uncover patterns and correlations.

While this can undoubtedly be a valuable tool to uncover one aspect of a user's mental model, the technique assumes that the subject has refined organizational skills, and that the way that they sort a group of abstract topics will correlate to the way they will end up wanting to use your product. This is clearly not always the case. One way to overcome these potential challenges is to ask the users to sequence the cards based upon the completion of tasks that the product is being designed to support. Another way to enhance the value of a card sort study is to debrief the subject afterwards to understand any organizational principles they have employed in their sort (again, attempting to understand their mental model).

Ultimately, we believe that properly conducted open-ended interviews are quite capable of exploring these aspects of the user's mental model. By asking the right questions and paying close attention to how a subject explains his activities and the domain, you can decipher how he mentally associates different bits of functionality and information.

Task analysis

Task analysis refers to a number of techniques that involve using either questionnaires or open-ended interviews to develop a detailed understanding of how people currently perform specific tasks. Of concern to such a study is:

- ▶ Why the user is performing the task (that is, the underlying goal)
- ▶ Frequency and importance of the task
- ▶ Cues — what initiates or prompts the execution of the task
- ▶ Dependencies — what must be in place to perform the task, as well as what is dependent on the completion of the task
- ▶ People who are involved and their roles and responsibilities
- ▶ Specific actions that are performed
- ▶ Decisions that are made

- ▶ Information that is used to support decisions
- ▶ What goes wrong — errors and exception cases
- ▶ How errors and exceptions are corrected

Once the questionnaires are compiled or the interviews are completed, tasks are formally decomposed and analyzed, typically into a flow chart or similar diagram that communicates the relationships between actions and often the relationships between people and processes.

We've found that this type of inquiry should be incorporated into ethnographic user interviews. Further, as we'll discuss in the next chapter, the analysis activities are a useful part of our modeling activities. It should be noted, though, that while task analysis is a critical way of understanding the way users currently do something, as well as a way of identifying pain points and opportunities for improvement, we want to reiterate the importance of focusing first and foremost on the users' goals. The way people do things today is often merely the product of the obsolete systems and organizations they are forced to interact with, and typically bear little resemblance to the way they would like to do things or the way they would be most effective.

User research is the critical foundation upon which your designs are built. Take the time to plan your user research and match the appropriate technique to the appropriate place in your development cycle. Your product will benefit, and you'll avoid wasting time and resources. Putting a product to the test in a lab to see whether it passes or fails may provide a lot of data, but not necessarily a lot of value. Using ethnographic interviews at the beginning of the process allows you, as a designer, to truly understand your users, their needs, and their motivations. Once you have a solid design concept based on qualitative user research and the models that research feeds, your usability testing will become an even more efficient tool for judging the effectiveness of design choices you have made. Qualitative research allows you to do the heavy lifting up front in the process.

Notes

1. Schön, D., and Bennett, J., 1996
2. Pinker, 1999

5

Modeling Users: Personas and Goals

Having gone out into the wide world to understand your users' lives, motivations, and environs, a big question arises: How do you use this research data to come up with a design that will result in a successful product? You have notebooks full of conversations and observations, and it is likely that each person you spoke to was slightly different from the others. It is difficult to imagine digging through hundreds of pages of notes every time you have to make a design decision, and even if you had the time to do this, it isn't entirely obvious how these notes should inform your thinking.

We solve this problem by applying the powerful concept of a **model**. Models are used in the natural and social sciences to represent complex phenomena with a useful abstraction. Much as economists create models to describe the behavior of markets, and physicists create models to describe the behavior of particles, we have found that using our research to create descriptive models of our users is a uniquely powerful tool for interaction design. We call these user models **personas**.

Personas provide us with a precise way of thinking and communicating about how users behave, how they think, what they wish to accomplish, and why. Personas are not real people, but they are based on the behaviors and motivations of real people we have observed and represent them throughout the design process. They are

composite archetypes based on behavioral data gathered from the many actual users encountered in ethnographic interviews. Personas are based upon *behavior patterns we observe* during the course of the Research phase, which we then formalize in the Modeling phase. By using personas, we can develop an understanding of our users' goals in specific contexts — a critical tool for using user research to inform and justify our designs.

Personas, like many powerful tools, are simple in concept but must be applied with considerable sophistication. It is not enough to whip up a couple of user profiles based upon stereotypes and generalizations, nor is it particularly useful to attach a stock photograph to a job title and call it a "persona." For personas to be effective tools for design, considerable rigor and finesse must be applied to the process of identifying the significant and meaningful patterns in user behavior and turning these into archetypes that represent a broad cross-section of users.

While there are other useful models that can serve as tools for the interaction designer, such as workflow models and physical models, we've found that personas are the strongest, and it is possible to incorporate the best from other modeling techniques into a persona. This chapter focuses on personas and their goals. Other models are considered briefly at the end of the chapter.

Why Model?

Models are used extensively in design, development, and the sciences. They are powerful tools for representing complex structures and relationships for the purpose of better understanding, discussing, or visualizing them. Without models, we are left to make sense of unstructured, raw data, without the benefit of any organizing principle. Good models emphasize the salient features of the structures and relationships they represent and de-emphasize the less significant details.

Because we are designing for users, it is important that we can understand and visualize the salient aspects of their relationships with each other, with their social and physical environments, and of course, with the products we hope to design.

Just as physicists have created models of the atom based on observed data and intuitive synthesis of the patterns in their data, so must designers create models of users based on observed behaviors and intuitive synthesis of the patterns in the data. Only after we formalize such patterns can we hope to systematically construct patterns of interaction that smoothly match the behavior patterns, mental models, and goals of users. Personas provide this formalization.

Personas

To create a product that must satisfy a diverse audience of users, logic might tell you to make it as broad in its functionality as possible to accommodate the most people. *This logic, however, is flawed.* The best way to successfully accommodate a variety of users is to design for *specific types of individuals with specific needs.*

When you broadly and arbitrarily extend a product's functionality to include many constituencies, you increase the cognitive load and navigational overhead for all users. Facilities that may please some users will likely interfere with the satisfaction of others (see Figure 5-1).
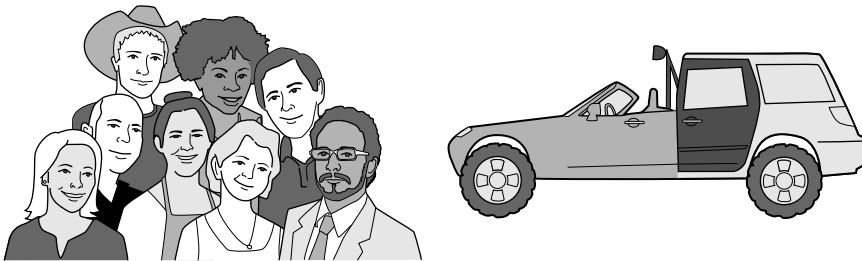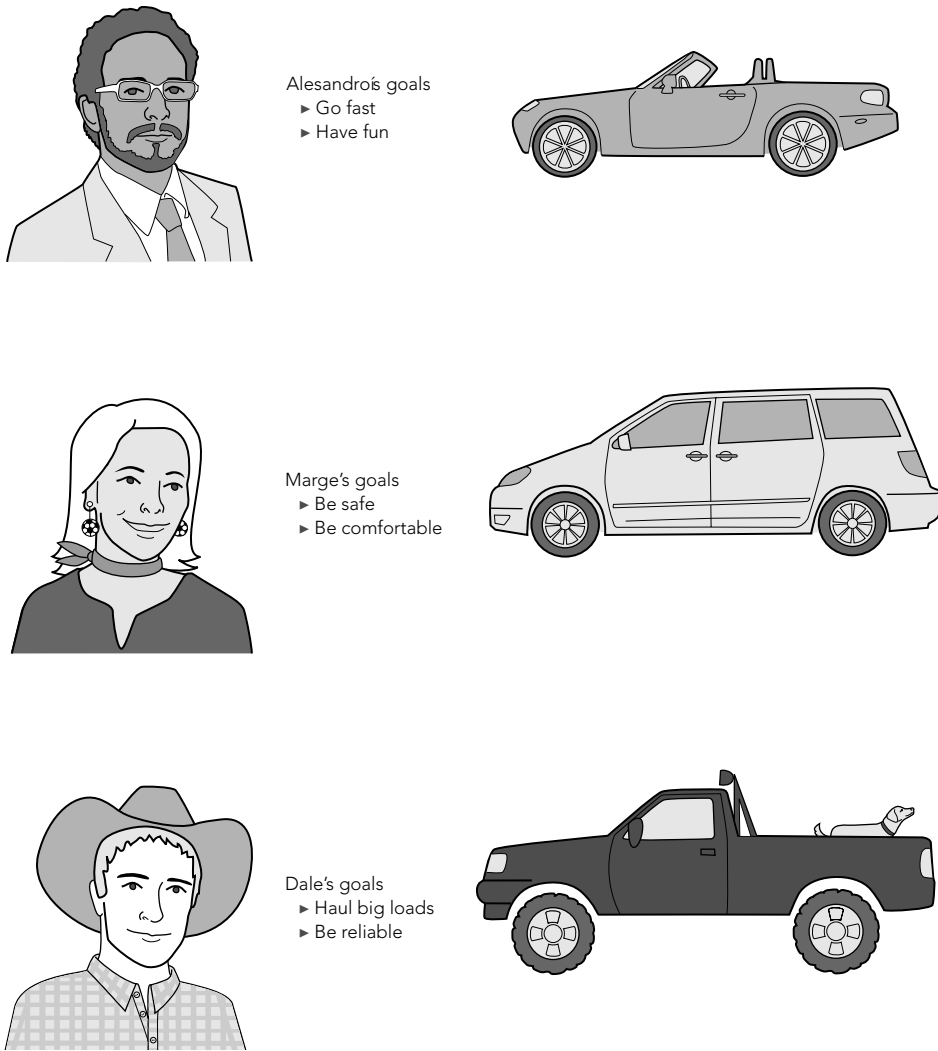

Figure 5-1 A simplified example of how personas are useful. If you try to design an automobile that pleases every possible driver, you end up with a car with every possible feature, but that pleases nobody. Software today is too often designed to please too many users, resulting in low user satisfaction. Figure 5-2 provides an alternative approach.

The key to this approach is first to choose the right individuals to design for — those users whose needs best represent the needs of a larger set of key constituents (see Figure 5-2) — and then to prioritize these individuals so that the needs of the most important users are met without compromising our ability to meet the needs of secondary users. Personas provide a powerful tool for communicating about different types of users and their needs, then deciding which users are the most important to target in the design of form and behavior.

Since they were introduced as a tool for user modeling in *The Inmates are Running The Asylum*,[1] personas have gained great popularity in the user experience community, but they have also been the subject of some misunderstandings. We'd like to clarify and explain in more depth some of the concepts and the rationale behind personas.

Alesandro's goals
► Go fast
► Have fun

Marge's goals
► Be safe
► Be comfortable

Dale's goals
► Haul big loads
► Be reliable

Figure 5-2 A simplified example of how personas are useful. By designing different cars for different people with different specific goals, we are able to create designs that other people with similar needs to our target drivers also find satisfying. The same holds true for the design of digital products and software.

Strengths of personas as a design tool

The persona is a powerful, multipurpose design tool that helps overcome several problems that currently plague the development of digital products. Personas help designers:

▶ **Determine** what a product should do and how it should behave. Persona goals and tasks provide the foundation for the design effort.

▶ **Communicate** with stakeholders, developers, and other designers. Personas provide a common language for discussing design decisions and also help keep the design centered on users at every step in the process.

▶ **Build consensus and commitment** to the design. With a common language comes a common understanding. Personas reduce the need for elaborate diagrammatic models; it's easier to understand the many nuances of user behavior through the narrative structures that personas employ. Put simply, because personas resemble real people, they're easier to relate to than feature lists and flowcharts.

▶ **Measure** the design's effectiveness. Design choices can be tested on a persona in the same way that they can be shown to a real user during the formative process. Although this doesn't replace the need to test with real users, it provides a powerful reality-check tool for designers trying to solve design problems. This allows design iteration to occur rapidly and inexpensively at the whiteboard, and it results in a far stronger design baseline when the time comes to test with actual people.

▶ **Contribute** to other product-related efforts such as marketing and sales plans. The authors have seen their clients repurpose personas across their organization, informing marketing campaigns, organizational structure, and other strategic planning activities. Business units outside of product development desire sophisticated knowledge of a product's users and typically view personas with great interest.

Personas also can resolve three design issues that arise during product development:

▶ The elastic user

▶ Self-referential design

▶ Edge cases

We discuss each of these briefly in the following sections.

The elastic user

Although satisfying the users of our products is our goal, the term *user* causes trouble when applied to specific design problems and contexts. Its imprecision makes it dangerous as a design tool — every person on a product team has his own conceptions of who the user is and what the user needs. When it comes time to make product decisions, this "user" becomes *elastic*, conveniently bending and stretching to fit the opinions and presuppositions of whoever's talking.

If the product development team finds it convenient to use a confusing tree control containing nested, hierarchical folders to provide access to information, they might

define the user as a computer-literate "power user." Other times, when it is more convenient to step through a difficult process with a wizard, they define the user as an unsophisticated first-time user. Designing for the elastic user gives a product-development team license to build what it pleases, while still apparently serving "the user." Of course, our goal should be to design products that appropriately meet the needs of *real* users. Real users — and the personas representing them — are not elastic, but rather have specific requirements based on their goals, capabilities, and contexts.

Even focusing on user roles or job titles rather than specific archetypes can introduce unproductive elasticity to the focus of design activities. For example, in designing clinical products, it might be tempting to lump together all nurses as having similar needs. However, if you have any experience in a hospital, you know that trauma nurses, pediatric intensive-care nurses, and operating room nurses are quite different from each other, each with their own attitudes, aptitudes, needs, and motivations. A lack of precision about the user can lead to a lack of clarity about how the product should behave.

Self-referential design

Self-referential design occurs when designers or developers project their own goals, motivations, skills, and mental models onto a product's design. Many "cool" product designs fall into this category. The audience doesn't extend beyond people like the designer, which is fine for a narrow range of products and completely inappropriate for most others. Similarly, programmers apply self-referential design when they create implementation-model products. *They* understand perfectly how the data is structured and how software works and are comfortable with such products. Few nonprogrammers would concur.

Edge cases

Another syndrome that personas help prevent is designing for edge cases — those situations that might possibly happen, but usually won't for the target personas. Typically, edge cases must be designed and programmed for, but they should never be the design *focus*. Personas provide a reality check for the design. We can ask, "Will Julie want to perform this operation very often? Will she ever?" With this knowledge, we can prioritize functions with great clarity.

Personas are based on research

Personas, like any models, must be based on real-world observation. As discussed in the preceding chapter, the primary source of data used to synthesize personas should be in-context interviews borrowing from ethnographic techniques, contextual

inquiry, or other similar dialogues with and observation of actual and potential users. The quality of the data gathered following the process (outlined in Chapter 4) directly impacts the efficacy of personas in clarifying and directing design activities. Other data that can support and supplement the creation of personas include (in rough order of effectiveness):

- ▶ Interviews with users outside of their use contexts
- ▶ Information about users supplied by stakeholders and subject matter experts (SMEs)
- ▶ Market research data such as focus groups and surveys
- ▶ Market-segmentation models
- ▶ Data gathered from literature reviews and previous studies

However, none of this supplemental data can take the place of direct user interviews and observation. Almost every aspect of a well-developed persona can be traced back to a user statement or behavior.

Personas are represented as individual people

Personas are user models that are represented as specific, individual human beings. They are not actual people but are synthesized directly from observations of real people. One of the key elements that allow personas to be successful as user models is that they are *personifications*.[2] This is appropriate and effective because of the unique aspects of personas as user models: They engage the *empathy* of the design and development towards the human target of the design.

Empathy is critical for the designers, who will be making their decisions for design frameworks and details based on both the cognitive *and* emotional dimensions of the persona, as typified by the persona's goals. (We will discuss the important connections between goals, behaviors, and personas later in this chapter.) However, the power of empathy should not be quickly discounted for other team members. Not only do personas help make our design solutions better at serving real user needs, but they also make these solutions more compelling to stakeholders. When personas have been carefully and appropriately crafted, stakeholders and engineers begin to think about them as if they are real human beings and become much more interested in creating a product that will give this person a satisfying experience.

We're all aware of the power of fictional characters in books, movies, and television programs to engage viewers. Jonathan Grudin and John Pruitt have discussed how this can relate to interaction design.[3] They note, as well, the power of **method**

acting as a tool that actors use to understand and portray realistic characters. In fact, the process of creating personas from user observation, and then imagining and developing scenarios from the perspective of these personas, is, in many ways, analogous to method acting. (We've even heard our Goal-Directed use of personas referred to as the Stanislavsky Method of interaction design.)

Personas represent groups of users

Although personas are depicted as specific individuals, because they function as archetypes, they *represent* a class or type of user of a *specific* interactive product. A persona encapsulates a distinct set of **behavior patterns** regarding the use of a particular product (or analogous activities if a product does not yet exist), which are identified through the analysis of interview data, and supported by supplemental quantitative data as appropriate. These patterns, along with specific motivations or goals, define our personas. Personas are also sometimes referred to as **composite user archetypes** because personas are in a sense composites assembled by grouping related usage patterns observed across individuals in similar roles during the Research phase.[4]

Personas and reuse

Organizations with more than one product often want to reuse the same personas. However, to be effective, personas must be context specific — they should be focused on the behaviors and goals related to the specific domain of a particular product. Personas, because they are constructed from specific observations of users interacting in specific contexts, cannot easily be reused across products even when those products form a closely linked suite.[5]

For a set of personas to be an effective design tool for multiple products, the personas must be based upon research concerning the usage contexts for all of these products. In addition to broadening the scope of the research, an even larger challenge is to identify manageable and coherent sets of behavior patterns across all of the contexts. Clearly, it is a fallacy to believe that just because two users exhibit similar behaviors in regard to one product, that those two users would behave similarly with respect to a different product. Thus, as focus expands to encompass more and more products, it becomes increasingly difficult to create a concise and coherent set of personas that represents the diversity of real-world users. We've found that, in most cases, personas should be researched and developed individually for different products.

Archetypes versus stereotypes

Don't confuse persona archetypes with **stereotypes**. Stereotypes are, in most respects, the antithesis of well-developed personas. Stereotypes represent designer

or researcher biases and assumptions, rather than factual data. Personas developed by drawing on inadequate research (or synthesized with insufficient empathy and sensitivity to interview subjects) run the risk of degrading to stereotypical caricatures. Personas must be developed and treated with dignity and respect for the people whom they represent. If the designer doesn't respect his personas, nobody else will either.

Personas also bring issues of social and political consciousness to the forefront.[6] Because personas provide a precise design target and also serve as a communication tool to the development team, the designer much choose particular demographic characteristics with care. Ideally, persona demographics should be a composite reflection of what researchers have observed in the interview population, modulated by broad market research. Personas should be *typical* and believable, but not stereotypical. If the data is not conclusive or the characteristic is not important to the design or its acceptance, we prefer to err on the side of gender, ethnic, age, and geographic diversity.

Personas explore ranges of behavior

The target market for a product describes demographics as well as lifestyles and sometimes job roles. What it does not describe are the ranges of different behaviors exhibited by members of that target market regarding the product and related situations. Ranges are distinct from *averages*: Personas do not seek to establish an average user, but rather to express *exemplary* or definitive behaviors within these identified ranges.

Because products must accommodate *ranges* of user behavior, attitudes and aptitudes, designers must identify a **persona set** associated with any given product. Multiple personas carve up ranges of behavior into discrete clusters. Different personas represent different correlated behavior patterns. These correlations are arrived at through analyzing research data. This process of identifying behaviors is discussed in greater detail later in this chapter.

Personas must have motivations

All humans have motivations that drive their behaviors; some are obvious, and many are subtle. It is critical that personas capture these motivations in the form of goals. The goals we enumerate for our personas (discussed at length later in this chapter) are shorthand notation for motivations that not only point at specific usage patterns but also provide a reason why those behaviors exist. Understanding

why a user performs certain tasks gives designers great power to improve or even eliminate those tasks yet still accomplish the same goals.

Personas can also represent nonusers

While the users and potential users of a product should always be an interaction designer's primary concern, it is sometimes useful to represent the needs and goals of people who do not use the product but nevertheless must be considered in the design process. For example, it is commonly the case with enterprise software (and children's toys) that the person who purchases the product is not the same person who uses it. In these cases, it may be useful to create one or more **customer personas**, distinct from the set of user personas. Of course, these should also be based upon behavior patterns observed through ethnographic research, just as user personas are.

Similarly, for many medical products, patients do not directly interact with the user interface, but they have motivations and objectives that may be very different than the clinician using the product. Creating a **served persona** to represent patients' needs can be useful in these cases. We discuss served and customer personas in greater depth later in this chapter.

Personas and other user models

There a number of other user models commonly employed in the design of inter-active products, including user roles, user profiles, and market segments. These are similar to personas in that they seek to describe users and their relationship to a product. However, personas and the methods by which they are created and employed as a design tool differ significantly from these in several key aspects.

User roles

A user role or role model, as defined by Larry Constantine, is an *abstraction*, a defined relationship between a class of users and their problems, including needs, interests, expectations, and patterns of behavior.[7] As abstractions (generally taking the form of a list of attributes), they are not imagined as people, and do not typi-cally attempt to convey broader human motivations and contexts.

Holtzblatt and Beyer's use of roles in consolidated flow, cultural, physical, and sequence models is similar in that it attempts to abstract various attributes and relationships abstracted from the people possessing them.[8]

We find these methods limiting for several reasons:

- ▶ It is more difficult to clearly communicate human behaviors and relationships in the abstract, isolated from people who possess them. The human power of empathy cannot easily be brought to bear on abstract classes of people.

- ▶ Both methods focus on *tasks* almost exclusively and neglect the use of goals as an organizing principle for design thinking and synthesis.

- ▶ Holtzblatt and Beyer's consolidated models, although useful and encyclopedic in scope, are difficult to bring together as a coherent tool for developing, communicating, and measuring design decisions.

Personas address each of these problems. Well-developed personas describe the same type of behaviors and relationships that user roles do, but express them in terms of goals and examples in narrative. This makes it possible for designers and stakeholders to understand the implications of design decisions in human terms. Describing a persona's goals provides context and structure for tasks, incorporating how culture and workflow influence behavior.

In addition, focusing on user roles rather than on more complex behavior patterns can oversimplify important distinctions and similarities between users. It is possible to create a persona that represents the needs of several user roles (for example, in designing a mobile phone, a traveling salesperson might also represent the needs of a busy executive who's always on the road), and it is also possible that there are several people in the same role who think and act differently (perhaps a procurement planner in the chemical industry thinks about her job very differently from a procurement planner in the consumer electronics industry). In consumer domains, roles are next to useless. If you're designing a Web site for a car company, "car buyer" is meaningless as a design tool — different people approach the task in very different manners.

In general, personas provide a more holistic model of users and their contexts, where many other models seek to be more reductive. Personas can certainly be used in combination with these other modeling techniques, and as we'll discuss at the end of the chapter, some other models make extremely useful complements to personas.

Personas versus user profiles

Many usability practitioners use the terms **persona** and **user profile** synonymously. There is no problem with this if the profile is truly generated from ethnographic data and encapsulates the depth of information the authors have described. Unfortunately, all too often, the authors have seen user profiles that reflect Webster's definition of **profile** as a "brief biographical sketch." In other words, user profiles often consist of a name and a picture attached to a brief, mostly demographic

description, along with a short, *fictional* paragraph describing the kind of car this person drives, how many kids he has, where he lives, and what he does for a living. This kind of user profile is likely to be based on a stereotype and is not useful as a design tool. Although we give our personas names, and sometimes even cars and family members, these are employed sparingly as narrative tools to help better communicate the real underlying data. Supporting fictional detail plays only the most minor part in persona creation and is used just enough to make the persona come to life in the minds of the designers and the product team.
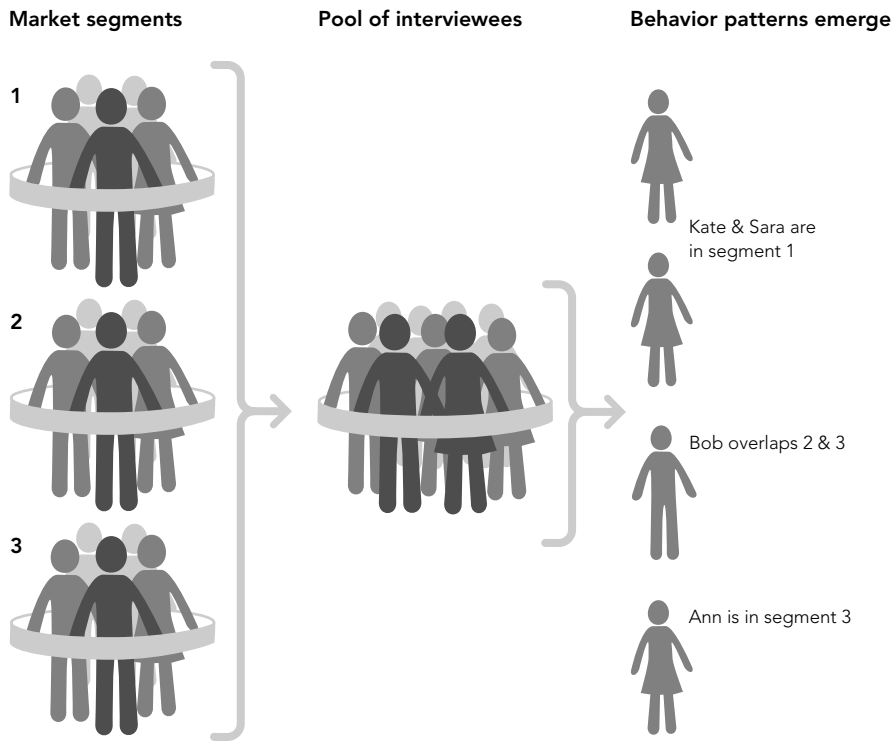
Personas versus market segments

Marketing professionals may be familiar with a process similar to persona development because it shares some process similarities with market definition. The main difference between market segments and design personas is that the former are based on demographics, distribution channels, and purchasing behavior, whereas the latter are based on usage behavior and motivations. The two are not the same and don't serve the same purpose. Marketing personas shed light on the sales process, whereas design personas shed light on the product definition and development process.

However, market segments play a role in persona development. They can help determine the demographic range within which to frame the persona hypothesis (see Chapter 4). Personas are segmented along ranges of usage behavior, not demographics or buying behavior, so there is seldom a one-to-one mapping of market segments to personas. Rather, market segments can act as an initial filter to limit the scope of interviews to people within target markets (see Figure 5-3). Also, we typically use the prioritization of personas as a way to make strategic product definition decisions (see the discussion of persona types later in this chapter). These decisions should incorporate market intelligence; an understanding of the relationship between user personas and market segments can be an important consideration here.

When rigorous personas aren't possible: Provisional personas

Although it is highly desirable that personas be based upon detailed qualitative data, there are some occasions when there simply is not enough time, resources, or corporate buy-in to perform the necessary fieldwork. In these cases, *provisional* personas (or, as Don Norman refers to them, "ad hoc" personas) can be useful rhetorical tools to clearly communicate assumptions about who the important users are and what they need, and to enforce rigorous thinking about serving specific user needs (even if these needs are not validated).

Market segments	Pool of interviewees	Behavior patterns emerge

Figure 5-3 Personas versus market segments. Market segments can be used in the Research phase to limit the range of personas to target markets. However, there is seldom a one-to-one mapping between market segments and personas.

Provisional personas are structured similarly to real personas but rely on available data and designer best guesses about behaviors, motivations, and goals. They are typically based on a combination of stakeholder and subject matter expert knowledge of users (when available), as well as what is understood about users from existing market data. Provisional personas are, in fact, a more fleshed-out persona hypothesis (as described in Chapter 4).

Our experience is that, regardless of a lack of research, using provisional personas yields better results than no user models at all. Like real personas, provisional personas can help focus the product team and build consensus around product features and behaviors. There are, however, caveats: Provisional personas are called this because they should be recognized as stand-ins for personas based on definitive qualitative data. While provisional personas may help focus your design and product team, if you do not have data to back up your assumptions you may:

► Focus on the wrong design target

► Focus on the right target, but miss key behaviors that could differentiate your product

▶ Have a difficult time getting buy-in from individuals and groups who did not participate in their creation

▶ Discredit the value of personas, causing your organization to reject the use of personas in the long term

If you are using provisional personas, it's important to:

▶ Clearly label and explain them as such

▶ Represent them visually with sketches, not photos, to reinforce their provisional nature

▶ Try to make use of as much existing data as possible (market surveys, domain research, subject matter experts, field studies, or personas for similar products)

▶ Document what data was used and what assumptions were made

▶ Steer clear of stereotypes (more difficult to do without field data)

▶ Focus on behaviors and motivations, not demographics

Goals

If personas provide the context for sets of observed behaviors, **goals** are the drivers behind those behaviors. A persona without goals can still serve as a useful communication tool, but it lacks utility as a design tool. User goals serve as a lens through which designers must consider the functions of a product. The function and behavior of the product must address goals via tasks — typically, as few tasks as absolutely necessary. Remember, tasks are only a means to an end; goals are that end.

Goals motivate usage patterns

People's or personas' goals motivate them to behave the way they do. Thus, goals not only provide an answer to why and how personas desire to use a product but also can serve as a shorthand in the designer's mind for the sometimes complex behaviors in which a persona engages and, therefore, for their tasks as well.

Goals should be inferred from qualitative data

You usually can't ask a person what his goals are directly. Either he won't be able to articulate them, or he won't be accurate or even perfectly honest. People simply aren't well prepared to answer such questions accurately. Therefore, designers and researchers need to carefully reconstruct goals from observed behaviors, answers to

other questions, nonverbal cues, and clues from the environment such as the titles of books on shelves. One of the most critical tasks in the modeling of personas is identifying goals and expressing them succinctly: Each goal should be expressed as a simple sentence.

User goals and cognitive processing

Don Norman's book *Emotional Design* introduced the idea that product design should address three different levels of cognitive and emotional processing, which he has called visceral, behavioral, and reflective. Norman's ideas, based on years of cognitive research, provide an articulated structure for modeling user responses to product and brand and a rational context for many intuitions long held by professional designers.

Norman's three levels of cognitive processing are:

- ▶ **Visceral** — The most immediate level of processing, in which we react to visual and other sensory aspects of a product that we can perceive before significant interaction occurs. Visceral processing helps us make rapid decisions about what is good, bad, safe, or dangerous. This is one of the most exciting types of human behavior, and one of the most challenging to effectively support with digital products. Malcolm Gladwell explores this level of cognitive processing in his book *Blink*. For even more in-depth study of intuitive decision making, see Gary Klein's *Sources of Power* or *Hare Brain, Tortoise Mind* by Guy Claxton.

- ▶ **Behavioral** — The middle level of processing that lets us manage simple, everyday behaviors, which according to Norman, constitute the majority of human activity. Norman states — and rightly so — that historically, interaction design and usability practices have nearly exclusively addressed this level of cognitive processing. Behavioral processing can *enhance* or *inhibit* both lower-level visceral reactions and higher-level reflective responses, and conversely, both visceral and reflective processing can enhance or inhibit behavioral processing.

- ▶ **Reflective** — The least immediate level of processing, which involves conscious consideration and reflection on past experiences. Reflective processing can enhance or inhibit behavioral processing but has no direct access to visceral reactions. This level of cognitive processing is accessible only via memory, not through direct interaction or perception. The most interesting aspect of reflective processing as it relates to design is that, through reflection, we are able to integrate our experiences with designed artifacts into our broader life experiences and, over time, associate meaning and value with the artifacts themselves.

Designing for Visceral Responses

Designing for the visceral level means designing what the senses initially perceive, before any deeper involvement with a product or artifact occurs. For most of us, that means designing visual appearance and motion, though sound can also play a role — think of the distinctive Mac power-up chord. Those of us designing devices may design for tactile sensations as well.

A misconception often arises when discussing visceral-level design: that designing for visceral response is about designing *beautiful* things. Battlefield software and radiation-therapy systems are just two examples where designing for beauty may not be the proper focus. Visceral design is actually about designing for affect — that is, eliciting the appropriate psychological or emotional response for a particular context — rather than for aesthetics alone. Beauty — and the feelings of transcendence and pleasure it evokes — is really only a small part of the possible affective design palette. For example, an MP3 player and an online banking system require very different affects. We can learn a great deal about affect from architecture, the cinema and stage, and industrial design.

However, in the world of consumer products and services, attractive user interfaces *are* typically appropriate. Interestingly, usability researchers have demonstrated that users initially judge attractive interfaces to be more usable, and that this belief often persists long after a user has gained sufficient experience with an interface to have direct evidence to the contrary.[9] Perhaps the reason for this is that users, encouraged by perceived ease of use, make a greater effort to learn what may be a challenging interface and are then unwilling to consider their investment ill spent. For the scrupulous designer, this means that, when a user interface promises ease of use at the visceral level — or whatever else the visceral promise of an interaction may be — it should then be sure to deliver on that promise at the behavioral level.

Designing for Behavior

Designing for the behavioral level means designing product behaviors that complement a user's own behaviors, implicit assumptions, and mental models. Of the three levels of design Norman contemplates, behavioral design is perhaps the most familiar to interaction designers and usability professionals.

One intriguing aspect of Norman's three-level model as it relates to design is his assertion that behavioral processing, uniquely among his three levels, has direct influence upon and is influenced directly by both of the other two levels of processing. This would seem to imply that the day-to-day behavioral aspects of interaction design should be the primary focus of our design efforts, with visceral and reflective considerations playing a supporting role. Getting design of behavior

right — assuming that we also pay adequate attention to the other levels — provides our greatest opportunity for positively influencing the way users construct their experience with products.

Not following this line of reasoning can lead to the problem of users' initial impressions being out of sync with reality. Also, it is difficult to imagine designing for reflective meaning in memory without a solid purpose and set of behaviors in place for the here and now. The user experience of a product or artifact, therefore, should ideally *harmonize elements of visceral design and reflective design with a focus on behavioral design.*

Designing for Reflection

Reflective processing — and, particularly, what it means for design — is perhaps the most challenging aspect of the three levels of processing that Norman discusses. What is clear is that designing for the reflective level means designing to build long-term product relationships. What isn't clear at all is the best way to ensure success — if that's even possible — at the reflective level. Is it chance that drives success here — being in the right place at the right time — or can premeditated design play a part in making it happen?

In describing reflective design, Norman uses several high-concept designs for commodity products as examples — such as impractically configured teapots and the striking Phillipe Starck juicer that graces the cover of his book. It is easy to see how such products — whose value and purpose are, in essence, the aesthetic statements they make — could appeal strongly to people's reflective desire for uniqueness or cultural sophistication that perhaps may come from an artistic or stylish self-image.

It is more difficult to see how products that also serve a truly useful purpose need to balance the stylistic and the elegant with the functional. The Apple iPod comes very close to achieving this balance. Although its click-wheel navigation scheme is perhaps less than optimal in some respects, users' visceral reaction to the product is tremendous, due to its elegant industrial design. Its reflective potential is also significant, because of the powerful emotional connection people experience with their music. It's a winning combination that no competitor has yet been able to challenge.

Few products become iconic in people's lives in the way that, say, the Sony Walkman or the iPod has. Clearly there are some products that stand little chance of ever becoming symbolic in peoples lives — like Ethernet routers, for instance — no matter how wonderful they look or how well they behave. However, when the design of a product or service addresses users' goals and motivations — possibly going beyond the product's primary purpose, yet somehow connected to it via personal or cultural associations — the opportunity for the creation of reflective meaning is greatly enhanced.

The three types of user goals

In *Emotional Design*, Norman presents his three-level theory of cognitive processing and discusses its potential importance to design. However, Norman does not suggest a method for systematically integrating his model of cognition and affect into the practice of design or user research. In our practice, we've found that the key to doing so lies in properly delineating and modeling three specific types of user goals as part of each persona's definition.[10]

Three types of user goals correspond to Norman's visceral, behavioral, and reflective processing levels:

- ► Experience goals
- ► End goals
- ► Life goals

We describe each of these in detail in the following sections.

Experience goals

Experience goals are simple, universal, and personal. Paradoxically, this makes them difficult for many people to talk about, especially in the context of impersonal business. Experience goals express how someone *wants to feel* while using a product or the quality of their interaction with the product. These goals provide focus for a product's visual and aural characteristics, its interactive feel — such as animated transitions, latency, and the snap ratio (clickiness) of a physical button — and its physical design by providing insights into persona motivations that express themselves at the visceral level. For example:

- ► Feel smart or in control
- ► Have fun
- ► Feel cool or hip or relaxed
- ► Remain focused and alert

When products make users feel stupid or uncomfortable, their self-esteem drops and their effectiveness plummets, regardless of their other goals. Their level of resentment also increases. Enough of this type of treatment and users will be primed to use any chance to subvert the system. Any product that egregiously violates experience goals will ultimately fail, regardless of how well it purports to achieve other goals.

Interaction, visual, and industrial designers must translate persona experience goals into form, behavior, motion, and auditory elements that communicate the proper feel, affect, emotion, and tone. Visual language studies, as well as mood or inspiration boards, which attempt to establish visual themes based on persona attitudes and behaviors, are a useful tool for defining the tonal expectations of personas.

End goals

End goals represent the user's motivation for performing the tasks associated with using a specific product. When you pick up a cell phone or open a document with a word processor, you likely have an outcome in mind. A product or service can help accomplish such goals directly or indirectly. These goals are the focus of a product's interaction design, information architecture, and the functional aspects of industrial design. Because behavioral processing influences both visceral and reflective responses, end goals should be among the most significant factors in determining the overall product experience. End goals must be met for users to think that a product is worth their time and money.

Examples of end goals include:

- ▶ Be aware of problems before they become critical
- ▶ Stay connected with friends and family
- ▶ Clear my to-do list by 5:00 every day
- ▶ Find music that I'll love
- ▶ Get the best deal

Interaction designers must use end goals as the foundation for a product's behaviors, tasks, look, and feel. Context or day-in-the-life scenarios and cognitive walkthroughs are effective tools for exploring users' goals and mental models, which, in turn, facilitate appropriate behavioral design.

Life goals

Life goals represent personal aspirations of the user that typically go beyond the context of the product being designed. These goals represent deep drives and motivations that help explain *why* the user is trying to accomplish the end goals he seeks to accomplish. Life goals describe a persona's long-term desires, motivations, and self-image attributes, which cause the persona to connect with a product. These goals form the focus for a product's overall design, strategy, and branding. For example:

- ▶ Live the good life
- ▶ Succeed in my ambitions to . . .

- ▶ Be a connoisseur of . . .

- ▶ Be attractive, popular, or respected by my peers

Interaction designers must translate life goals into high-level system capabilities, formal design concepts, and brand strategy. Mood boards and context scenarios can be helpful in exploring different aspects of product concepts, and broad ethnographic research and cultural modeling are critical for discovering users' behavior patterns and deeper motivations. Life goals rarely figure directly into the design of specific elements or behaviors of an interface. However, they are very much worth keeping in mind. A product that the user discovers will take him closer to his life goals, and not just his end goals, will win him over more decisively than any marketing campaign. Addressing life goals of users makes the difference (assuming that other goals are also met) between a satisfied user and a fanatically loyal user.

User goals are user motivations

In summary, it's important to remember that understanding personas is more about understanding motivations and goals than it is about understanding specific tasks or demographics. Linking up persona goals with Norman's model, top-level user motivations include:

- ▶ Experience goals, which are related to visceral processing: how a user wants to *feel*

- ▶ End goals, which are related to behavior: what a user wants to *do*

- ▶ Life goals, which are related to reflection: who a user wants to *be*

Using personas, goals, and scenarios (as you'll learn in upcoming chapters) provides the key to unlocking the power of visceral, behavioral, and reflective design, and bringing these together into a harmonious whole. While some of our best designers seem to understand and act upon these aspects of design almost intuitively, consciously designing for all levels of human cognition and emotion offers tremendous potential for creating more satisfying and delightful user experiences.

Types of goals

User goals are not the only type of goals that designers need to take into account. Customer goals, business goals, and technical goals are all nonuser goals. Typically, these goals must be acknowledged and considered, but they do not form the basis for the design direction. Although these goals do need to be addressed, they must not be addressed at the expense of the user.

Customer goals

Customers, as already discussed, have different goals than users. The exact nature of these goals varies quite a bit between consumer and enterprise products. Consumer customers are often parents, relatives, or friends who often have concerns about the safety and happiness of the persons for whom they are purchasing the product. Enterprise customers are typically IT managers, and they often have concerns about security, ease of maintenance, and ease of customization. Customer personas also may have their own life, experience, and especially end goals in relation to the product if they use it in any capacity. Customer goals should never trump end goals but need to be considered within the overall design.

Business and organizational goals

Businesses and other organizations have their own requirements for products, services, and systems, which should also be modeled and considered when devising design solutions. While the goals of businesses, where users and customers work, are typically captured in user and customer personas, it is often useful to define the business goals of the organization commissioning the design and developing and selling (or otherwise distributing) the product. Clearly, these organizations are hoping to accomplish something with the product (which is why they are willing to spend money and effort on design and development),

Business goals include the following:

- ▶ Increase profit
- ▶ Increase market share
- ▶ Retain customers
- ▶ Defeat the competition
- ▶ Use resources more efficiently
- ▶ Offer more products or services

You may find yourself designing on behalf of an organization that is not necessarily a business, such as a museum, nonprofit, or school (though all organizations are increasingly run as businesses these days). These organizations also have goals that must be considered, such as:

- ▶ Educate the public
- ▶ Raise enough money to cover overhead

Technical goals

Most of the software-based products we use everyday are created with technical goals in mind. Many of these goals ease the task of software creation, which is a programmer's goal. This is why they typically take precedence at the expense of the users' goals. Technical goals include:

- ▶ Run in a variety of browsers
- ▶ Safeguard data integrity
- ▶ Increase program execution efficiency
- ▶ Use a particular development language or library
- ▶ Maintain consistency across platforms

Technical goals in particular are very important to the development staff. It is important to stress early in the education process that these goals must ultimately serve user and business goals. Technical goals are not terribly meaningful to the success of a product unless they are derived from the need to meet other more human-oriented goals. It might be a software company's *task* to use new technology, but it is rarely a *user's goal* for them to do so. In most cases, users don't care if their job is accomplished with hierarchical databases, relational databases, object-oriented databases, flat-file systems, or black magic. What we care about is getting our job done swiftly, effectively, and with a modicum of ease and dignity.

Successful products meet user goals first

"Good design" has meaning only for a person using a product for some purpose. You cannot have purposes without people. The two are inseparable. This is why personas are such an important tool in the process of designing behavior; they represent specific people with specific purposes or goals.

The most important purposes or goals to consider when designing a product are those of the individuals who actually use it, not necessarily those of its purchaser. A real person, not a corporation or even an IT manager, interacts with your product, so you must regard her personal goals as more significant than those of the corporation who employs her or the IT manager who supports her. Your users will do their best to achieve their employer's business goals, while at the same time looking after their own personal goals. A user's most important goal is always to retain her human dignity: not to feel stupid.

We can reliably say that we make the user feel stupid if we let her make big mistakes, keep her from getting an adequate amount of work done, or bore her.

DESIGN
principle   Don't make the user feel stupid.

This is probably the most important interaction design guideline. In the course of this book, we examine numerous ways in which existing software makes the user feel stupid, and we explore ways to avoid that trap.

The essence of good interaction design is devising interactions that achieve the goals of the manufacturer or service provider and their partners without violating the goals of users.

Constructing Personas

As previously discussed, personas are derived from patterns observed during interviews with and observations of users and potential users (and sometimes customers) of a product. Gaps in this data are filled by supplemental research and data provided by SMEs, stakeholders, and available literature. Our goal in constructing a set of personas is to represent the diversity of observed motivations, behaviors, attitudes, aptitudes, mental models, work or activity flows, environments, and frustrations with current products or systems.

Creating believable and useful personas requires an equal measure of detailed analysis and creative synthesis. A standardized process aids both of these activities significantly. The process described in this section, developed by Robert Reimann, Kim Goodwin, and Lane Halley at Cooper, is the result of an evolution in practice over the span of hundreds of interaction design projects, and has been documented in several papers.[11] There are a number of effective methods for identifying behavior patterns in research and turning these into useful user archetypes, but we've found the transparency and rigor of this process to be an ideal way for designers new to personas to learn how to properly construct personas, and for experienced designers to stay focused on actual behavior patterns, especially in consumer domains. The principle steps are:

1. Identify behavioral variables.

2. Map interview subjects to behavioral variables.

3. Identify significant behavior patterns.

4. Synthesize characteristics and relevant goals.

5. Check for redundancy and completeness.

6. Expand description of attributes and behaviors.

7. Designate persona types.

We discuss each of these steps in detail in the following sections.

Step 1: Identify behavioral variables

After you have completed your research and performed a cursory organization of the data, list the distinct aspects of observed behavior as a set of **behavioral variables**. Demographic variables such as age or geographic location may also seem to affect behavior, but be wary of focusing on demographics because behavioral variables will be far more useful in developing effective user archetypes.

Generally, we see the most important distinction between behavior patterns emerge by focusing on the following types of variables:

- ▶ **Activities** — What the user does; frequency and volume
- ▶ **Attitudes** — How the user thinks about the product domain and technology
- ▶ **Aptitudes** — What education and training the user has; capability to learn
- ▶ **Motivations** — Why the user is engaged in the product domain
- ▶ **Skills** — User capabilities related to the product domain and technology

For enterprise applications, behavioral variables are often closely associated with job roles, and we suggest listing out the variables for each role separately. Although the number of variables will differ from project to project, it is typical to find 15 to 30 variables per role.

These variables may be very similar to those you identified as part of your persona hypothesis. Compare behaviors identified in the data to the assumptions made in the persona hypothesis. Were the possible roles that you identified truly distinct? Were the behavioral variables (see Chapter 4) you identified valid? Were there additional, unanticipated ones, or ones you anticipated that weren't supported by data?

List the complete set of behavioral variables observed. If your data is at variance with your assumptions, you need to add, subtract, or modify the roles and behaviors you anticipated. If the variance is significant enough, you may consider additional interviews to cover any gaps in the new behavioral ranges that you've discovered.

Step 2: Map interview subjects to behavioral variables

After you are satisfied that you have identified the set of significant behavioral variables exhibited by your interview subjects, the next step is to map each interviewee against each variable. Some of these variables will represent a continuous range of behavior (for instance, from a computer novice to a computer expert), and a few will represent multiple discrete choices (for example, uses a digital camera versus uses a film camera).

Mapping the interviewee to a precise point in the range isn't as critical as identifying the placement of interviewees in relationship to each other. In other words, it doesn't matter if an interviewee falls at precisely 45% or 50% on the scale. There's often no good way to measure this precisely; you must rely on your gut feeling based on your observations of the subject. The desired outcome of this step is to accurately represent the way multiple subjects cluster with respect to each significant variable (see Figure 5-4).
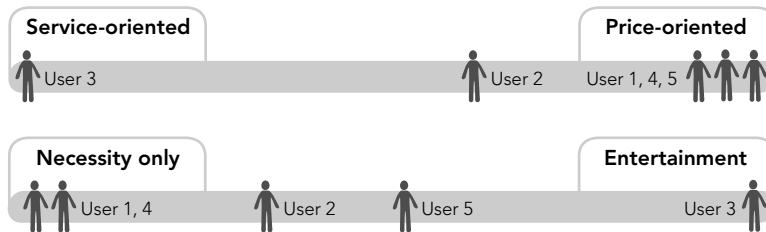
Figure 5-4 Mapping interview subjects to behavioral variables. This example is from an online store. Interview subjects are mapped across each behavioral axis. Precision of the absolute position of an individual subject on an axis is less important than its relative position to other subjects. Clusters of subjects across multiple axes indicate significant behavior patterns.

Step 3: Identify significant behavior patterns

After you have mapped your interview subjects, look for clusters of subjects that occur across multiple ranges or variables. A set of subjects who cluster in six to eight different variables will likely represent a significant **behavior pattern** that will form the basis of a persona. Some specialized roles may exhibit only one significant pattern, but typically you will find two or even three such patterns.

For a pattern to be valid there must be a logical or causative connection between the clustered behaviors, not just a spurious correlation. For example, there is clearly a logical connection if data shows that people who regularly purchase CDs also like to download MP3 files, but there is probably no logical connection if the data shows that interviewees who frequently purchase CDs online are also vegetarians.

Step 4: Synthesize characteristics and relevant goals

For each significant behavior pattern you identify, you must synthesize details from your data. Describe the potential use environment, typical workday (or other relevant context), current solutions and frustrations, and relevant relationships with others.

At this point, brief bullet points describing characteristics of the behavior are sufficient. Stick to observed behaviors as much as possible. A description or two that sharpens the personalities of your personas can help bring them to life. However, too much fictional, idiosyncratic biography is a distraction and makes your personas less credible. Remember that you are creating a design tool, not a character sketch for a novel. Only concrete data can support the design and business decisions your team will ultimately make.

One fictional detail at this stage *is* important: the personas' first and last names. The name should be evocative of the type of person the persona is, without tending toward caricature or stereotype. We use a baby name book as a reference tool in creating persona names. You can also, at this time, add in some demographic information such as age, geographic location, relative income (if appropriate), and job title. This information is primarily to help you visualize the persona better as you assemble the behavioral details. From this point on, you should refer to the persona by his or her name.

Synthesizing goals

Goals are the most critical detail to synthesize from your interviews and observations of behaviors. Goals are best derived from an analysis of the behavior patterns comprising each persona. By identifying the logical connections between each persona's behaviors, you can begin to infer the goals that lead to those behaviors. You can infer goals both by observing actions (what interview subjects in each persona cluster are trying to accomplish and why) and by analyzing subject responses to goal-oriented interview questions (see Chapter 4).

To be effective as design tools, goals must always directly relate, in some way, to the product being designed. Typically, the majority of useful goals for a persona are *end goals*. You can expect most personas to have three to five end goals associated with

them. Life goals are most useful for personas of consumer-oriented products, but they can also make sense for enterprise personas in transient job roles. Zero or one life goal is appropriate for most personas. General experience goals such as "don't feel stupid" and "don't waste time" can be taken as implicit for almost any persona. Occasionally, a specific domain may dictate the need for more specific experience goals; zero to two experience goals is appropriate for most personas.

Persona relationships

It sometimes makes sense for the set of personas for a product to be part of the same family or corporation and to have interpersonal or social relationships with each other. The typical case, however, is for individual personas to be completely unrelated to each other and often from completely different geographic locations and social groups.

When considering whether it makes sense for personas to have business or social relationships, think about:

1. Whether you observed any behavioral variations in your interview subjects related to variations in company size, industry, or family/social dynamic. (In this case, you'll want to make sure that your persona set represents this diversity by being situated in at least a couple of different businesses or social settings.)

2. If it is critical to illustrate workflow or social interactions between coworkers or members of a family or social group.

If you create personas that work for the same company or have social relationships with each other, you might run into difficulties if you need to express a significant goal that doesn't belong with the preestablished relationship. While a single social relationship between your set of personas is easier to define than several different, unrelated social relationships between individual personas and minor players outside the persona set, it can be much better to put the initial effort into development of diverse personas than to risk the temptation of bending more diverse scenarios to fit a single social dynamic.

Step 5: Check for completeness and redundancy

At this point, your personas should be starting to come to life. You should check your mappings and personas' characteristics and goals to see if there are any important gaps that need filling. This again may point to the need to perform additional research directed at finding particular behaviors missing from your behavioral axes. You might also want to check your notes to see if there are any political personas that you need to add to satisfy stakeholder assumptions or requests.

If you find that two personas seem to vary only by demographics, you may choose to eliminate one of the redundant personas or tweak the characteristics of your personas to make them more distinct. Each persona must vary from all others in at least one significant behavior. If you've done a good job of mapping, this shouldn't be an issue.

By making sure that your persona set is complete and that each persona is meaningfully distinct, you ensure that your personas sufficiently represent the diversity of behaviors and needs in the real world, and that you have as compact a design target as possible, which reduces work when you begin designing interactions.

Step 6: Expand description of attributes and behaviors

Your list of bullet point characteristics and goals arrived at in Step 4 points to the essence of complex behaviors, but leaves much implied. Third-person narrative is far more powerful at conveying the persona's attitudes, needs, and problems to other team members. It also deepens the designer/authors' connection to the personas and their motivations.

A typical persona description should be a synthesis of the most important details observed during research, relevant to this persona. This becomes a very effective communication tool. Ideally, the majority of your user research findings should be contained in your persona description. This will be the manner in which your research directly informs design activities (as you will see in the upcoming chapters).

This narrative should be no longer than one or two pages of prose. The persona narrative does not need to contain every observed detail because, ideally, the designers also performed the research, and most people outside the design team do not require more detail than this.

The narrative must, by nature, contain some fictional situations, but as previously discussed, it is not a short story. The best narrative quickly introduces the persona in terms of his job or lifestyle, and briefly sketches a day in his life, including peeves, concerns, and interests that have direct bearing on the product. Details should be an expansion of your list of characteristics, with additional data derived from your observations and interviews. The narrative should express what the persona is looking for in the product by way of a conclusion.

Be careful about the precision of detail in your descriptions. The detail should not exceed the depth of your research. In scientific disciplines, if you record a measurement of 35.421 meters, this implies that your measurements are accurate to .001 meters. A detailed persona description implies a similar level of observation in your research.

When you start developing your narrative, choose photographs of your personas. Photographs make them feel more real as you create the narrative and engage others on the team when you are finished. You should take great care in choosing a photograph. The best photos capture demographic information, hint at the environment (a persona for a nurse should be wearing a nurse's uniform and be in a clinical setting, perhaps with a patient), and capture the persona's general attitude (a photo for a clerk overwhelmed by paperwork might look harried). The authors keep several searchable databanks of stock photography available for finding the right persona pictures.

We have also found it useful to create photographic collages for each persona to convey more emotional and experiential forces that drive the persona (see Figure 5-5). Numerous small images juxtaposed have the potential to convey things that are difficult to describe in words. There are also times that we find it useful to create models of the personas' environments (for example, in the form of a floorplan). Again, this helps to make these environmental considerations more tangible.

When creating such communication aides, it's important to remember that personas are design and decision-making tools, not an end in themselves. While there can be a lot of power in creating a holistic image of a persona, too much embellishment and theatre can run the risk of making personas seem a fluffy waste of time. This can ultimately reduce their usefulness as user models.

Figure 5-5 Collages such as this, combined with carefully written narratives, are an effective way to convey the emotional and experiential aspects of a persona.

Step 7: Designate persona types

By now, your personas should feel very much like a set of real people whom you know. The final step in persona construction finishes the process of turning your qualitative research into a powerful set of design tools.

Design requires a target — the audience upon whom the design is focused. Typically, the more specific the target, the better. Trying to create a design solution that simultaneously serves the needs of even three or four personas can be quite an overwhelming task.

What we then must do is *prioritize* our personas to determine which should be the primary design target. The goal is to find a single persona from the set whose needs and goals can be completely and happily satisfied by a single interface without disenfranchising any of the other personas. We accomplish this through a process of designating **persona types**. There are six types of persona, and they are typically designated in roughly the order listed here:

- ▶ Primary
- ▶ Secondary
- ▶ Supplemental
- ▶ Customer
- ▶ Served
- ▶ Negative

We discuss each of these persona types and their significance from a design perspective in the following sections.

Primary personas

Primary personas represent the primary target for the design of an interface. There can be only one primary persona per *interface* for a product, but it is possible for some products (especially enterprise products) to have multiple distinct interfaces, each targeted at a distinct primary persona. For example, a health-care information system might have separate clinical and financial interfaces, each targeted at a different persona. It should be noted that we use the term *interface* in an abstract sense here. In some cases, two separate interfaces might be two separate applications that act on the same data; in other cases, the two interfaces might simply be two different sets of functionality served to two different users based upon their role or customization.

A primary persona will not be satisfied by a design targeted at any other persona in the set. However, if the primary persona is the target, all other personas will not, at least, be dissatisfied. (As you'll see below, we will then figure out how to satisfy these other personas without disturbing the primary.)

DESIGN principle   Focus the design for each interface on a single primary persona.

Choosing the primary persona is a process of elimination: Each persona must be tested by comparing the goals of that persona against goals of the others. If no clear primary persona is evident, it could mean one of two things: Either the product needs multiple interfaces, each with a suitable primary persona (often the case for enterprise and technical products), or the product is trying to accomplish too much. If a consumer product has multiple primary personas, the scope of the product may be too broad.

Secondary personas

A **secondary persona** is mostly satisfied with the primary persona's interface but has specific additional needs that can be accommodated without upsetting the product's ability to serve the primary persona. We do not always have a secondary persona, and more than three or four secondary personas can be a sign that the proposed product's scope may be too large and unfocused. As you work through solutions, your approach should be to first design for the primary, and then adjust the design to accommodate the secondary.

Supplemental personas

User personas that are not primary or secondary are **supplemental personas**. Their needs are completely represented by a combination of primary and secondary personas and are completely satisfied by the solution we devise for one of our primaries. There can be any number of supplemental personas associated with an interface. Often political personas — the ones added to the cast to address stakeholder assumptions — become supplemental personas.

Customer personas

Customer personas address the needs of customers, not end users, as discussed earlier in this chapter. Typically, customer personas are treated like secondary personas. However, in some enterprise environments, some customer personas may be primary personas for their own administrative interface.

Served personas

Served personas are somewhat different from the persona types already discussed. They are not users of the product at all; however, they are *directly affected by the use of the product*. A patient being treated by a radiation therapy machine is not a user of the machine's interface, but she is very much *served* by a good interface. Served personas provide a way to track second-order social and physical ramifications of products. These are treated like secondary personas.

Negative personas

Negative personas are used to communicate to stakeholders and product team members that there are specific types of users that the product is *not* being built to serve. Like served personas, they aren't users of the product. Their use is purely rhetorical: to help communicate to other members of the team that a persona should definitely *not* be the design target for the product. Good candidates for negative personas are often technology-savvy early adopter personas for consumer products and IT specialists for business-user enterprise products.

Other Models

Personas are extremely useful tools, but they are certainly not the only tool to help model users and their environment. Holtzblatt and Beyer's *Contextual Design* provides a wealth of information on the models briefly discussed here.

Workflow models

Workflow or **sequence models** are useful for capturing information flow and decision-making processes inside organizations and are usually expressed as flow charts or directed graphs that capture several phenomena:

- ▸ The goal or desired outcome of a process
- ▸ The frequency and importance of the process and each action
- ▸ What initiates or prompts the execution of the process and each action
- ▸ Dependencies — what must be in place to perform the process and each action, as well as what is dependent on the completion of the process and each action
- ▸ People who are involved and their roles and responsibilities
- ▸ Specific actions that are performed
- ▸ Decisions that are made

  ▶ Information that is used to support decisions

  ▶ What goes wrong — errors and exception cases

  ▶ How errors and exceptions are corrected

A well-developed persona should capture individual workflows, but workflow models are still necessary for capturing interpersonal and organizational workflows. Interaction design based primarily on workflow often fails in the same way as "implementation model" software whose interaction is based primarily on its internal technical structure. Because workflow is to business what structure is to programming, workflow-based design typically yields a kind of "business implementation model" that captures all of the functionality but little of the humanity.

Artifact models

Artifact models represent, as the name suggests, different artifacts that users employ in their tasks and workflows. Often these artifacts are online or paper forms. Artifact models typically capture commonalities and significant differences between similar artifacts for the purpose of extracting and replicating best practices in the eventual design. Artifact models can be useful later in the design process, with the caveat that direct translation of paper systems to digital systems, without a careful analysis of goals and application of design principles (especially those found in Part II of this book), usually leads to usability issues.

Physical models

Physical models, like artifact models, endeavor to capture elements of the user's environment. Physical models focus on capturing the layout of physical objects that comprise the user's workspace, which can provide insight into frequency of use issues and physical barriers to productivity. Good persona descriptions will incorporate some of this information, but it may be helpful in complex physical environments (such as hospital floors and assembly lines) to create discrete, detailed physical models (maps or floorplans) of the user environment.

Personas and other models make sense out of otherwise overwhelming and confusing user data. Now that you are empowered with sophisticated models as design tools, the next chapter will show you how to employ these tools to translate user goals and needs into workable design solutions.

Notes

1. Cooper, 1999

2. Constantine and Lockwood, 2002

3. Grudin and Pruitt, 2002

4. Mikkelson, N., and Lee, W. O., 2000

5. Grudin and Pruitt, 2002

6. Grudin and Pruitt, 2002

7. Constantine and Lockwood, 1999

8. Beyer and Holtzblatt, 1998

9. Dillon, 2001

10. Goodwin, 2001

11. Goodwin, 2002, 2002a