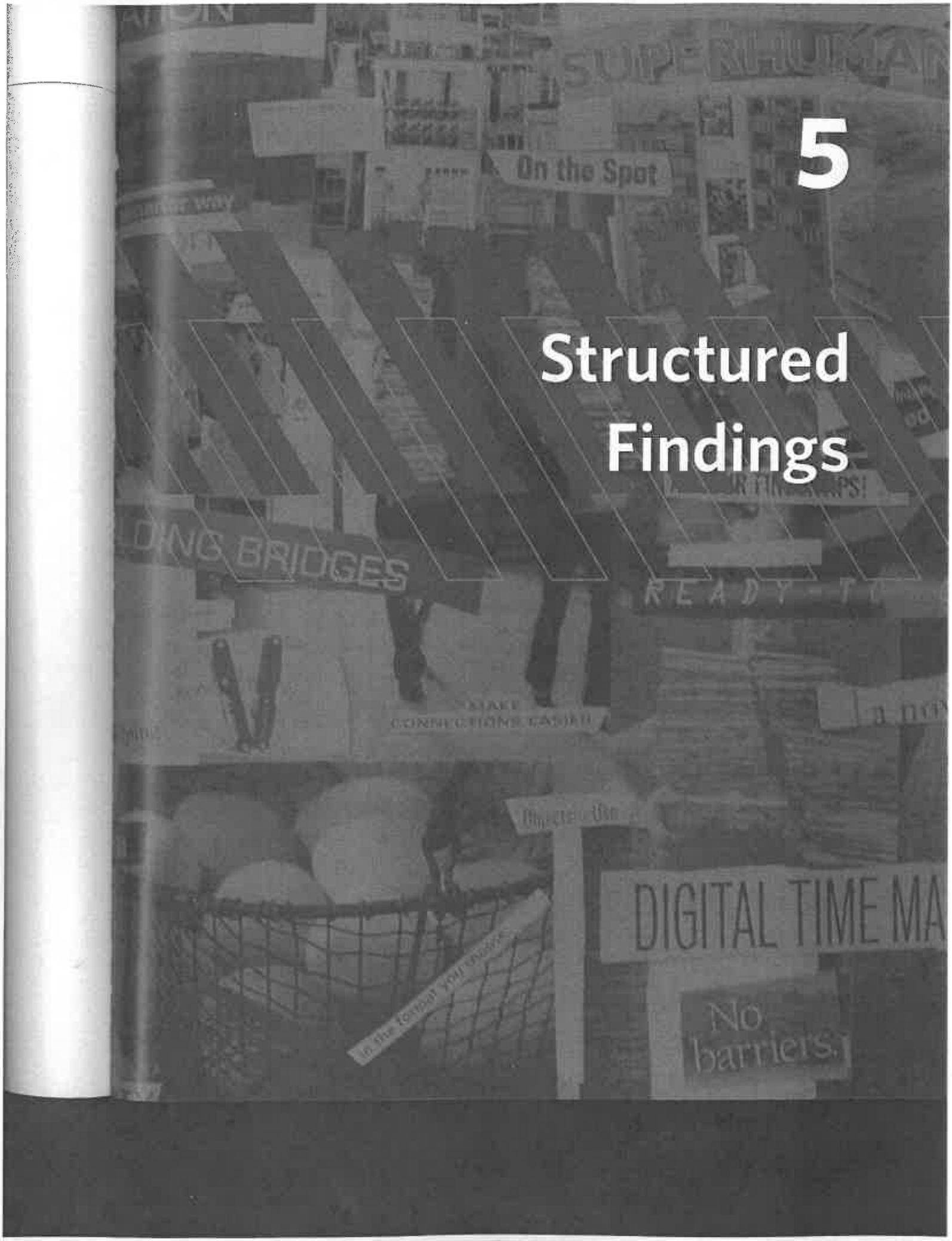
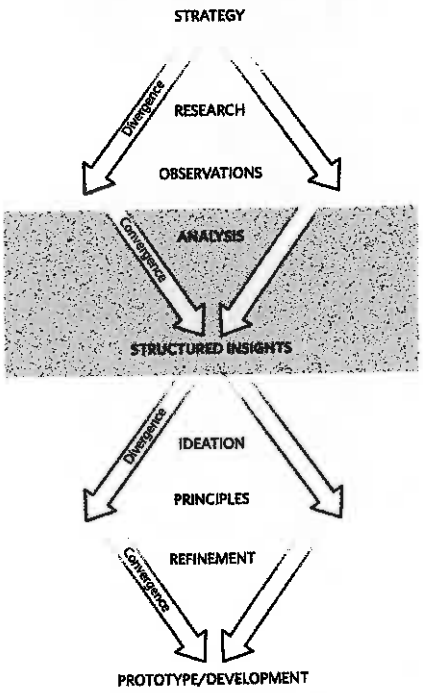


5

Structured Findings



Notes. Pictures. Audio and video recordings. Impressions. Observations. These are the types of data that designers are typically left with after doing design research. Data like this can be worse than useless; it can be overwhelming and confusing. It needs to be turned into something that designers—and indeed, the whole product team and stakeholders—can understand and use. The unstructured mass of data needs to become **structured findings.**

Structured findings are research data put into a form that can be easily understood. They can be stories, models, visualizations, personas—anything that makes the unfiltered data into something helpful and actionable.

All the design research in the world is useless if it does not make its way into the hearts, minds, and hands of the design team and into the product itself. For that, analyzing the research in order to make structured findings is essential. It's astounding how often this crucial step is overlooked.

Preparing the Data

Before your research data can make sense, it needs to be analyzed. The first task of analysis is to see what you have.

Make the Data Physical

Usually, the research data will be fragmented and will exist in any number of places (laptops, notebooks, cameras, and so on), in a variety of formats, from scrawled analog notes and drawings to hours of videotape. All that data needs to be collected and put into some sort of format so that the essential parts of it can be found, examined, and evaluated. The best way to do this is to make the data physical and visual. Print out photos and stills from video. Put important quotes on sticky notes (**Figure 5.1**).

Figure 5.1
After gathering data, the next step is to make the data physical by putting important quotes, pictures, and sketches up on walls.

Pull out key moments from transcripts and print those out large enough to be read from across the room.

The purpose of making everything visual and physical is to be able to draw connections across various pieces of data, and that can be hard to do unless you see the data, and can in some way physically manipulate it. If everything is printed out or put on sticky notes, it is an easy task to put pictures together, or to combine quotes and sketches. It removes the artificial barrier created by the disparate formats, applications, and locations of the initial data.

Making the data physical also allows you to unconsciously process the data while doing other tasks. Working while surrounded by images and quotes can lead to unexpected insights and connections.

Putting data up on the walls creates another powerful byproduct in the asynchronous conversation that takes place among the various viewers of the data. As people sit in the room or walk by, they too can make connections, even if they aren't part of the project!

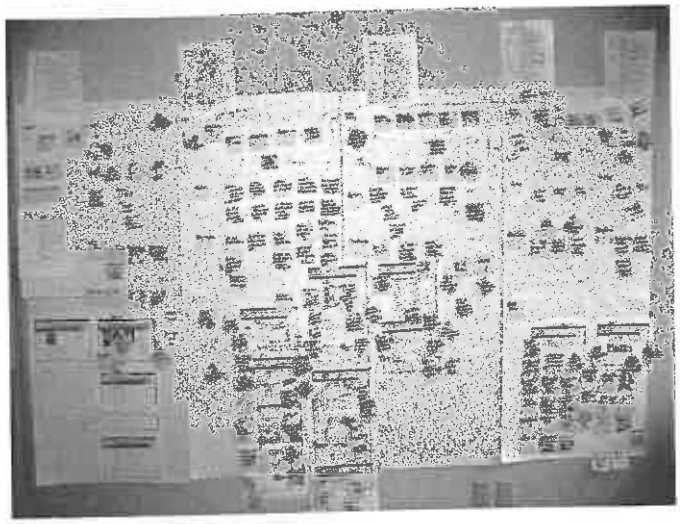
It helps to have a permanent space for the research analysis work, where the data can be posted for a reasonable period of time—and perhaps even until the project concludes. If you don't have a physical space (sometimes called a project room, or project war room), you can post the data on large sheets of cardboard or foamcore so that they can be moved from room to room and stored when not in use.

Manipulating the Data

Once the data is visual and physical, it's time to play with it. Manipulating the data involves:

- Clustering similar pieces of data
- Combining/collapsing redundant pieces of data (**aggregation**)
- Juxtaposing related pieces of data
- Naming the resulting data clusters
- Juxtaposing *unrelated* pieces of data

This last activity is important, yet often overlooked. Putting two unlike items together forces the mind to find a connection between them—a story, a framework, a metaphor—and that connection can spark an insight. See **Figure 5.2**.



COURTESY PETE WENDEL AND GEONETRIC

Figure 5.2
Manipulating data for a hospital registration process. Note the connections being made between the clusters via simple marker.

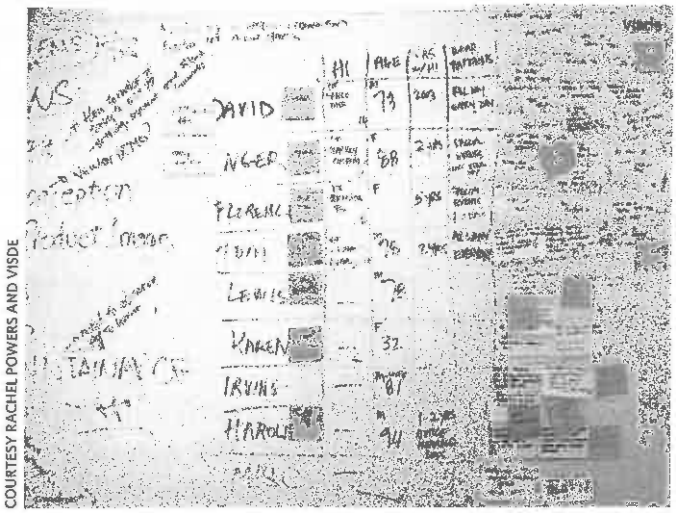
As with research itself, when manipulating the data, you are mainly looking for patterns. Pieces of data that seem related can form a pattern, and patterns are ultimately what structured findings are comprised of.

Sorting Data

Some standard ways of organizing data are:

- Alphabetical
- Numerical
- Chronological
- By frequency
- By subject (**Figure 5.3**)

Information designer Richard Saul Wurman laid out, in his 1989 book *Information Anxiety*, a set of categories to help organize data: Location, Alphabetical, Time, Category, Hierarchy—also known by their acronym LATCH or as the "Five Hat Racks" for hanging data onto. Location can be physical locations, or other kinds of socio-psychological spaces (for example, "Meditating"). Alphabetical is good for large pools of data of the same type, such as books or names. Time works well for any activities done in a sequence or over time. Categories refer to sorting by similar objects/types. Hierarchy is for when you want to assign value to the data: common to uncommon; big to small; expensive to cheap; important to inessential, and so on.



COURTESY RACHEL POWERS AND VISDE

Figure 5.3
Research on hearing aids, sorted by subject.

Another common mnemonic device for sorting data is AEIOU: Actions, Environment, Interactions, Objects, Users.

As you begin making structured findings, the data will continue to be manipulated in space, creating what will likely become conceptual models by the end of the analysis process.

Analyzing the Data

It's now time to begin the actual process of data analysis. There are four major ways to go about analyzing the data:

- Analysis
- Summation
- Extrapolation
- Abstraction

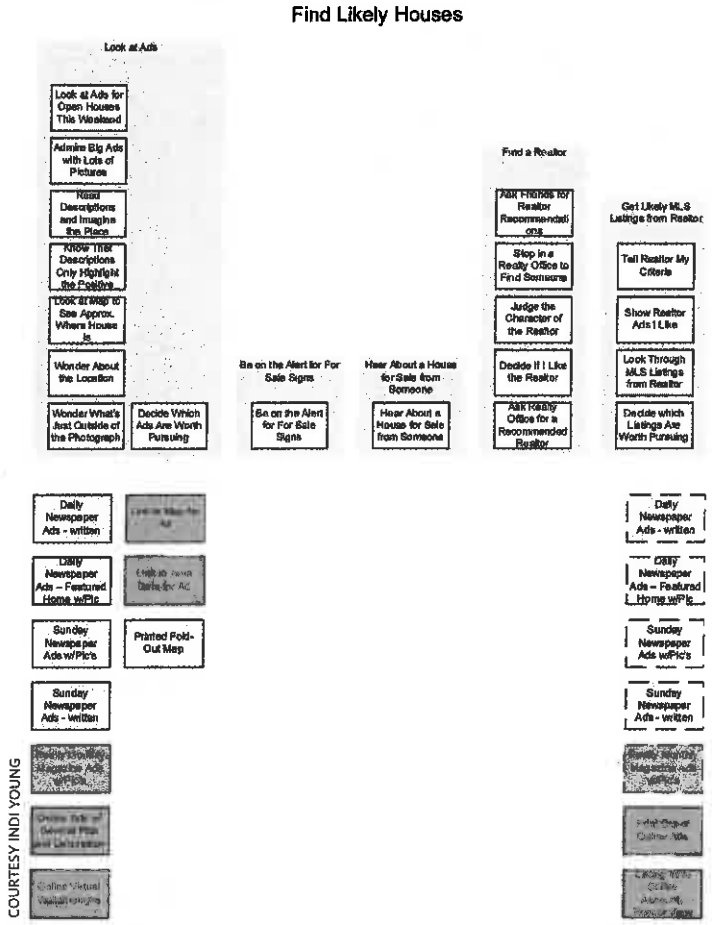
Each takes the data and transforms it in some way, either breaking it down into pieces (analysis), summarizing it, or creating something new with it (extrapolation, abstraction).

Remember that the end goal is not the research analysis itself, but rather the structured findings you can use to explain what the research discovered and why it's important.

Analysis

Analysis, a term for the general process, can also apply to how you examine the data. Analysis is the deconstruction of a whole process, activity, object, or environment into its component parts (which themselves can be deconstructed into their component parts). Each part can then be examined in order to discover its properties and characteristics.

Analysis tends to generate models such as flows and timelines that break a whole process down into its moments.



COURTESY INDI YOUNG

Figure 5.4

A small piece of a 70"-long alignment diagram (also known as "mental models") for buying a house. The activities are on the top of the diagram, while the tools to aid the activities are shown below.

Alignment Diagram

One model that can come from analysis is an **alignment diagram** (**Figure 5.4**). An alignment diagram breaks a process down into its discrete steps, then indicates the problems and issues with each step, as well as the tools available to help users complete that stage of the activity.

Alignment diagrams are excellent for breaking down complex tasks and figuring out where the problems and opportunities lie within the process. Alignment diagrams make it easy to see where users have crucial decisions or activities, but no tool to help them perform it. These unsupported moments can be excellent design opportunities.

Touchpoint List

Another type of analysis is a list of all the touchpoints. In services, **touchpoints** are the raw materials designers have to work with or need to create. For example, when checking in at an airport, the touchpoints include the human agent, the kiosk, the ticket itself, the ticket sleeve, and the counter.

These touchpoints can include (and certainly aren't limited to) any of the following:

- Physical locations
- Specific parts of locations
- Hardware
- Software
- Signage
- Objects
- Web sites
- Mailings (e-mail and regular)
- Spoken communication
- Printed communications (receipts, maps, tickets, and so on)
- Applications
- Machinery
- Customer service
- Partners

Do these exist already or do they need to be created? Are they well designed or are they trouble spots? A touchpoint map can show all the pieces of a service.

Process Map

Similar to an alignment diagram is a **process map** (**Figure 5.5**). A process map shows a high-level view of a service, its discrete steps, and, importantly, which part of the overall service is being worked on. A process map shows the boundaries of the project; it can also show the surrounding steps that are not going to be designed, or that might be affected by changes made during the course of a project. For instance, designing a check-in ser-

vice at the airport might affect baggage claims, customer service, online reservations, and so on.

Process maps should also indicate the touchpoints at each stage of the process.

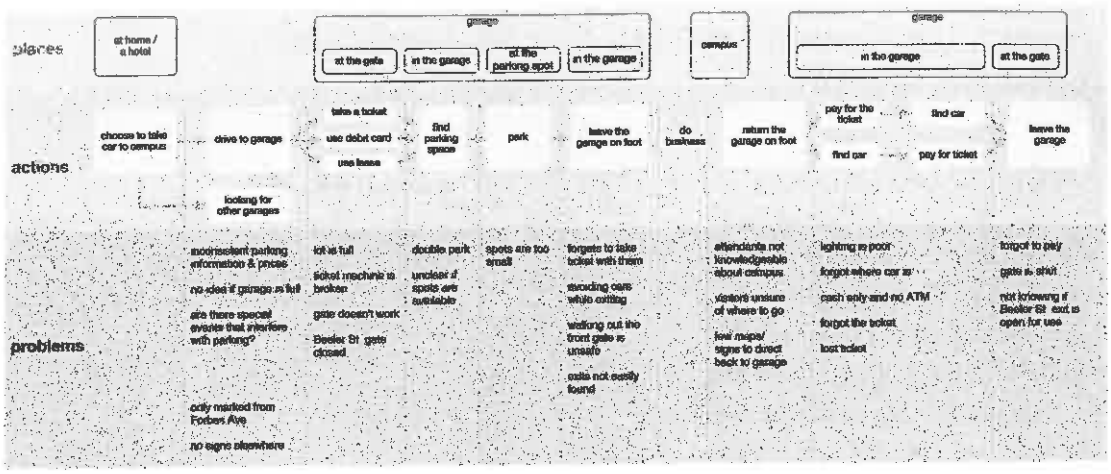


Figure 5.5

Process maps provide an overview of what parts of a service are to be designed and can indicate problem areas in an existing service.

Task Analysis

Another standard model that can be derived from research analysis is a task analysis. A **task analysis** is a raw list of activities that the final design will have to support. For example, imagine designing a new Web browser. Users will need to be able to:

- Go to pages by manually entering an address.
- Go to pages via a bookmark.
- Add a bookmark.
- Delete a bookmark.
- Organize bookmarks into folders.
- Print pages.
- Refresh a page.
- Return to the previous page.
- And so on, all the way down to rare and obscure tasks (for most users), such as viewing page source code and opening a JavaScript console.

Task analyses can be documented in spreadsheets or Word documents. They can also be mapped to wireframes (see Chapter 7) to indicate what tasks are being performed on each page. Tasks can be categorized by function, level of access required (basic user tasks, registered user tasks, administrator tasks, and so on), or even by persona (see later in this chapter) performing the task.

Task analysis is especially useful later in the design process as a check to see whether the design supports all the tasks required. Rare but important tasks often get overlooked, but with a task analysis, the designer can make sure the design meets all the requirements.

Summation

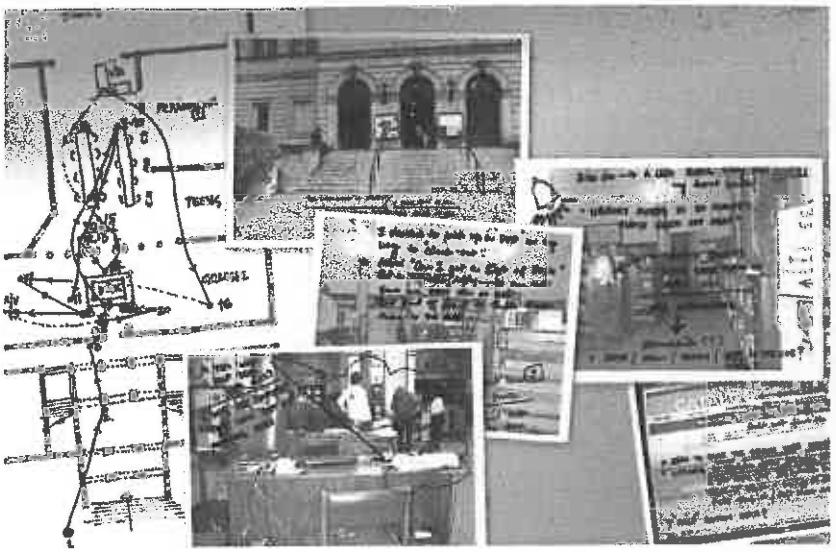
Taking pieces of data and making them add up to a conclusion is called **summation**. By summarizing, you create a more succinct piece of data that encapsulates a larger set of raw data in some way, and, importantly, characterizes it in some way, not just aggregates it.

Summation can be done on a micro level, such as describing a video tape ("Subject tries to use the kiosk and gives up") or at a macro level ("Every person we spoke to hated using this product").

Summation is also a good place to mix in quantitative data (numbers). For example, noting that 75 percent of research subjects did a particular activity can be a powerful piece of persuasion to demonstrate the need to support that activity.

Environment Description

Summations don't necessarily have to be in words and numbers alone. Maps, screenshots, diagrams, and even videos can be used for summation as well. Especially before starting the design of a service, designers need to know as much as they can about where the service will be located (or is located already). An **environment description** attempts to detail the location as much as possible. Photographs with annotations (**Figure 5.6**) are excellent for environment descriptions that summarize data.



COURTESY MAYA

Figure 5.6
Annotated photographs from a project done with the Carnegie Library of Pittsburgh by MAYA.

Extrapolation

Related to summation but taking it one step further, extrapolation is the creation of something new that can be suggested by (but is not a summary of) existing pieces of data. **Extrapolation** is the opposite technique of analysis: analysis seeks to break a whole into its parts; extrapolation seeks to make a new, different whole from disparate parts. In a sense, all design based on research is an extrapolation; the designer extrapolates a product from what she knows about the users.

The most likely structured finding from extrapolation is a story or narrative. The story can take pieces of data and make them into either something nearly-known like a Day In The Life-type narrative, which "fills in the blanks" between pieces of data to give a snapshot of a user's day, or the designer can make a future story about how the product is going to fit into what's now known about users' lives. Since the details of the product aren't yet defined (see Chapter 7), this scenario will likely be broad, less focused on the product itself and more on how it might affect the lives of users.

Abstraction

The fourth major way of analyzing data is by abstracting it so that it can be better understood. Abstraction involves removing data until only the most relevant data points remain. Those data points can be visualized as conceptual models.

By abstracting data, you not only remove a lot of noise caused by all the details data typically has, but you can then create a visual representation of the remaining data, which can be a powerful tool. Much like the strategic visualization discussed in Chapter 3, research visualizations can be shown to stakeholders and team members in order to educate, persuade, and validate the design and research.

With abstraction, there is always a fear of distorting the data, or even making it harder to comprehend through poor visuals, so designers need to make the data set as small as possible, and the resulting visuals as clear and uncluttered as possible.

Conceptual Models

The outcome of abstraction is usually a **conceptual model**. Conceptual models, in the words of Rick E. Robinson, are "things to think with." They are visual tools that allow the most relevant pieces of data to be surfaced and considered in a new light. They are ways of visualizing data so that, as in extrapolation, the sum of the parts adds up to something new. See **Figure 5.7**.

Figure 5.7
Perhaps the most famous conceptual model of all time is James Watson and Francis Crick's DNA model.

Conceptual models shouldn't be lists or bullet points. Instead, they should be visually appealing pieces of graphic design, memorable by themselves, that can then be examined, understood, and internalized.

Conceptual models make excellent **boundary objects.**[1] A boundary object is an item that exists in multiple communities at once, so that there is

1 For more on boundary objects see *Sorting Things Out: Classification and Its Consequences* by Geoffrey C. Bowker and Susan Leigh Star

common understanding between them of a particular subject. Conceptual models, done well, can do that between various internal departments and between designers and clients.

The best models of design research show (either implicitly or explicitly) three things:

- **Pain points.** Where are there difficulties in the process? What don't users like? What is creating unnecessary effort? What is inefficient or unpleasant?
- **Opportunities.** What are the opportunities for improvement? Where is a tool missing that might help users? What areas have been neglected that could be improved?
- **Calls to action.** What needs to be done in order to ameliorate the pain points and capitalize on the opportunities? What are the big design tasks that need to be done?

For example, **Figure 5.8** was created from data collected by talking to users of an intranet. The data revealed that much of the intranet, even features that users said they wanted, wasn't being used. Part of the reason these features were unused was because users didn't know they existed—they were buried in the system. The calls to action were clear: move the lines, so that more of the system was known and liked.

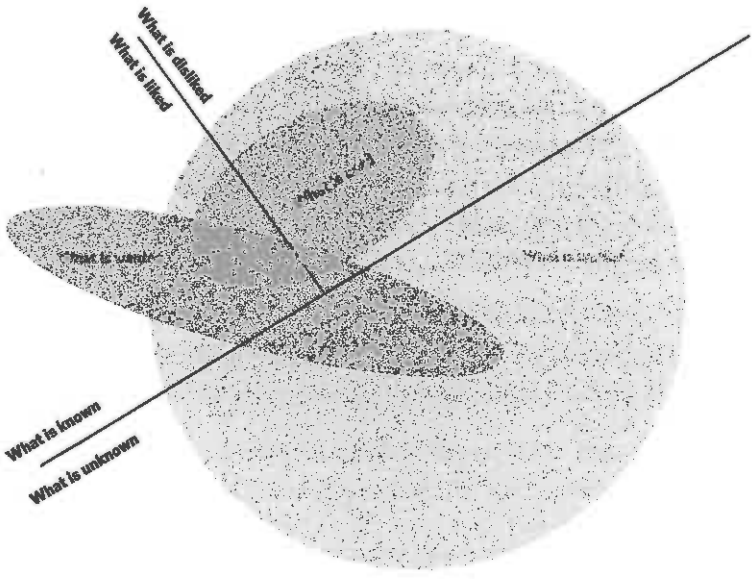


Figure 5.8

An example of a model derived from research. The designers discovered that most of the features of an intranet were unknown and unused, and those that were known and used were mostly disliked.

All of this information could, of course, be explained in words, as in the preceding paragraph, or shown in a statistical table. But neither of these would have the same impact as the model. Models become design tools, to be referred to repeatedly throughout a project. In this example, the designers could easily see and demonstrate to the client that a key problem is that the users can't find the features they want to use, even when the features already exist in the system.

These are the most common tools for representing research data:

- **Linear flow.** Shows how a process unfolds over time (**Figure 5.9**). Linear flows are good for showing designers where problems exist in a process.
- **Circular flow.** Shows how a process repeats itself in a loop (**Figure 5.10**). Circular flow is similar to a linear flow, except the process (or points in the process) repeat themselves.
- **Spider diagram.** Shows connections between data points. A piece of data is placed in the center of a diagram, and other data radiates out from it (**Figure 5.11**).
- **Sets.** Shows relationships between data points. (**Figure 5.12**).

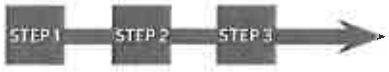


Figure 5.9

Linear process flow.

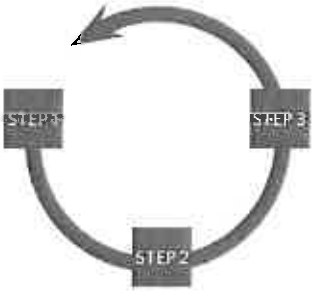


Figure 5.10

Circular process flow.

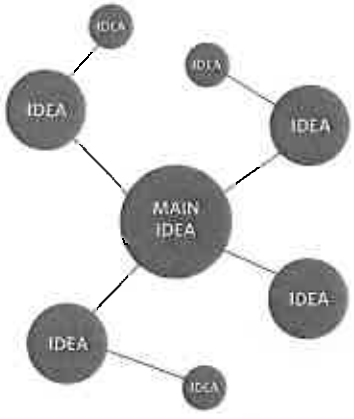


Figure 5.11

Spider diagram.

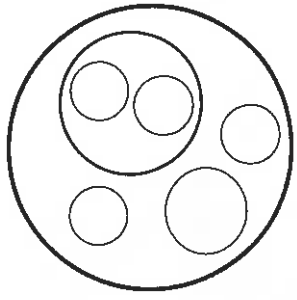


Figure 5.12

Sets diagram.

- **Venn diagram.** Similar to sets, uses overlapping circles to show connected relationships (**Figure 5.13**). Figure 5.8 is also a Venn diagram.
- **2x2 matrix.** Shows the relationship between data based on where the data points fall on two axes. These two axes separate data into four quadrants based on two simple variables (**Figure 5.14**).
- **Map.** Shows spatial relationships (**Figure 5.15**).

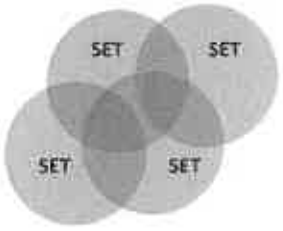


Figure 5.13
Venn diagram.

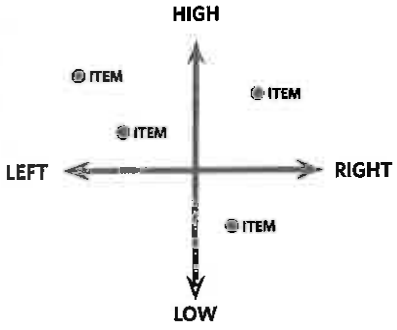


Figure 5.14
2x2 matrix.

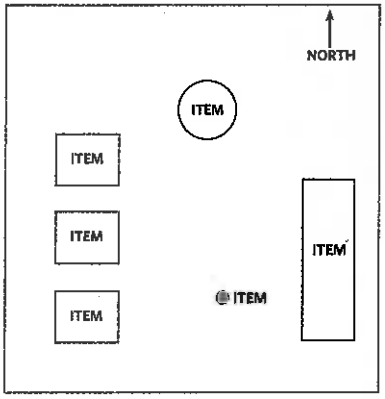


Figure 5.15
Map.

Usually, the data itself suggests the correct way to display it. If, for example, the designer observes a step-by-step process that repeats, a circular flow makes sense to use.

Personas

A **persona** is a particular type of conceptual model, used for demarcating users by behavior, motivations, and expectations. Personas (**Figure 5.16**) are a documented set of archetypal people who are involved with a product or service. They're supposed to give designers a sense that they are designing for specific people, not just "the users," who, if ill-defined, can be twisted to serve any purpose. ("Of course the users will want to enter a password on every page!")

Dave
the information jockey
***primary** persona*

information usage
info Names, Phone Numbers, Ideas
paper Notebook, Post-Its
info access 3-5x/day
# of locations/day 5
% mobile 35
mobile locations Subway, Street

"If I'm not connected, I feel like I'm missing something."

demographics
age 29
occupation Lawyer
location New York City
marital status Single
children None
income $135,000
education Graduated Law School
hobbies Working Out, Cooking

device usage
computer Sony VIAO Laptop
cell phone Sony Ericcson
pda CLIE
other Network Walkman
primary device Laptop
comfort Comfortable
web 50 hours/week
phone 10 hours/week
programs Email, Word, Excel, IE

Figure 5.16
A sample persona. Personas turn "the users" into identifiable human beings.

Designers devise personas from observing and talking to users. Personas are typically amalgams of multiple people who share similar goals, motivations, and behaviors. The differences between each persona must be based on these deep characteristics: what people do (actions and behaviors), what their expectations are, and what their reasons are (goals and motivations).

What personas shouldn't be are users who share common demographics. Focusing on demographics will provide market segments, not personas. The only time demographics really matter for personas is when those demographics directly affect user behavior. A 13-year-old will probably use a product differently than an 83-year-old. A rural peat farmer in Ireland might use a product differently than a Korean financial analyst in Seoul. But maybe not —demographics may not matter at all. In fact, using demographics could limit and hinder the usefulness of the personas. For products with millions of users, for example, a designer could end up with hundreds of personas, and such a large set is essentially useless.

To create a persona, designers find a common set of behaviors or motivations among the people they have researched. This becomes the basis for the persona, which should be given a name, a picture, and a veneer of demographic data to make the persona seem like a real person.

For example, consider a design project related to airline travel. Designers have observed three types of travelers: those flying frequently for business, those flying occasionally for pleasure, and those flying habitually every fall and spring (the snow bird phenomenon). Each of these overall behaviors is tied to specific detailed behaviors, expectations, and motivations while traveling. These characteristic become the basis for three personas: Bob, the frequent flier; Susan, the vacationer; and Wilma, the snow bird.

Quotes pulled from the research are helpful for distinguishing and identifying personas ("I fly at least once a week"), as are simple titles ("The Frequent Flier"). The persona documents should clearly note the behaviors, motivations, and goals that differentiate one persona from another. Bob cares deeply about getting to his meeting or hotel on time, while Wilma is more relaxed about what happens after the flight.

For most projects, the number of personas should be small—anywhere from one to nine. After about 10 personas, remembering and distinguishing them becomes difficult. Most important, it becomes difficult to design for such a large group. Imagine creating a mobile phone that will satisfy a dozen very different people. The "debate" that would go on among the personas would make it difficult for the designer to accomplish anything. Unless you are designing for millions of users, you should consolidate personas to fewer than 10. While both designer and client will usually want the product or service to work for the largest possible group, nine personas should be enough to cover 95 percent of the users. A product or service that is being designed to accommodate more personas likely isn't focused enough.

Once you have a set of personas, find a face for each. Pictures, more than anything else, will humanize personas and make them memorable. As long as the personas won't be made public, an online dating service like Yahoo Personals is an excellent place to find persona pictures. Personals contain (mostly) flattering pictures that can be browsed by any combination of gender, location, age, ethnicity, and other factors.

Personas by themselves are fairly useless. They become useful only when the designer sets up scenarios and uses the personas to test features for appropriateness and utility. Designers can then ask themselves: Would this persona do this task? Could this persona do this task as it is designed?

Designers (and, indeed, businesses) can also use personas to set priorities. The persona that represents a majority of a product's users may not be the

user that the organization values the most; other personas may make the organization more money, be more involved, use more features, and so on. Organizations can and should use personas to make strategic decisions.

While many find personas helpful, some designers don't care for them. For these designers, personas form an artificial barrier between the product and its users. Some projects, especially smaller ones, may not warrant a full set of personas. But for most, if they are based on research and focused on the right characteristics (behaviors, motivations, and expectations), personas are a valuable tool.

Robert Reimann on Personas

Robert Reimann is an associate creative director at frog design and was the first president of the Interaction Design Association. He helped write the book on interaction design—literally, with Alan Cooper and David Cronin: About Face 3: The Essentials of Interaction Design.

How did the idea of personas come about?

The idea of personas, or tools like them, has been around for a long time. Many design, marketing, and usability professionals in the '80s and '90s made use of "user profiles" to help them visualize who their customers were, and to help them imagine what kind of needs and desires they might have in relation to products and services.

Alan Cooper, who coined the term "persona" for this type of tool, first did so in 1983, while designing and developing a software package called SuperProject for Computer Associates, and later did so for what eventually became Microsoft's Visual Basic.

Cooper's early personas were primitive, in that they were based on loose, personal observations of a small number of individuals in particular roles. However, Cooper's fundamental insight was that these representative characters had goals and behaviors that could be served by products. By enumerating the most critical goals and including them as part of the persona description, Cooper developed a powerful design method: meet the persona's top goals with the product by designing for their behaviors, and the design is much more likely to be successful.

Robert Reimann on Personas *(continued)*

My own contribution to Cooper's persona methodology was to introduce more formal ethnographic field research as the data-gathering method for the information used to construct personas, and to (with Kim Goodwin) refine the persona goals into three types. *experience goals*, which describe how users wish to feel (or not to feel) when using a product; *end goals*, which describe what users actually want or need to accomplish with a product to meet their expectations, and *life goals*, which describe the broader aspirations of the persona in relation to the product, and thus help describe what the product *means* to the persona. It's this focus on goals and behavior patterns, combined with a scenario-based method of translating these requirements into design solutions, that makes Cooper's personas so unique and powerful.

What are personas good for?

Personas are terrific tools for understanding and communicating user behaviors, needs, desires, and contexts. They are extremely useful for:

1. Directing the product design. Persona goals and behaviors inform both the structure and behavior of a product and its interface.

2. Communicating design solutions to stakeholders. Using personas in storyboards and scenarios is a very effective way to tell the story of the product and helps highlight why design decisions were made as they were.

3. Building consensus and commitment around the design. Having a common language around which the team can communicate regarding priorities and features and tying each decision specifically to user benefits/consequences helps rally a team to work together to make the best possible product for its target users.

4. Measuring the design's effectiveness. Design choices can be tested against persona behaviors, contexts, and expectations while they are still on the whiteboard, far in advance of testing on prototypes or final products. The result is better quality earlier in the design process, which makes later refinements more manageable.

5. Contributing to nondevelopment efforts. The information captured in personas and storyboards can be of great interest and use to marketing, advertising, sales, and even strategic planning activities within companies.

Robert Reimann on Personas *(continued)*

What are the essential components of any persona?

The most important elements of any persona are the behavior patterns gathered via ethnographic research and analysis, and the goals that derive from them. Furthermore, it is important to understand the persona's importance: for example, is it a primary persona (main design target), a secondary persona (served by an interface directed at the primary persona, but with some special additional requirements), or a persona that is not served by the product at all? In addition to these components, a representative name, a picture, and a small amount of additional demographic information helps make the persona seem real and engages stakeholder empathy. Personas must seem like credible, real people to maximize their effectiveness as design and development tools.

Summary

Designer Joan Vermette said, "My personal creative process is to construct a big, tall scaffold of theory and evidence, and then once that is built I get on my hang-glider-of-intuition and jump off the top of the scaffold. I seem to need to do a lot of thinking and testing before I let myself fly. But fly I do, eventually. And the scaffold is about the flying, actually."[2]

The last three chapters have been about building the scaffold, about making sure the product meets the needs of the organization and of the users. The next three chapters show how the product itself is conceived, refined, prototyped, and developed.

For Further Reading

Visual Explanations: Images and Quantities, Evidence and Narrative, Edward R. Tufte

The Visual Display of Quantitative Information, 2nd edition, Edward R. Tufte

Visualizing Data, William S. Cleveland

How to Lie with Statistics, Darrell Huff

2 On the Interaction Design Association mailing list. Quote can be viewed here: http://lists.whatwg.org/pipermail/discuss-interactiondesigners.com/2007-August/019765.html

Information Dashboard Design: The Effective Visual Communication of Data, Stephen Few

Designing for the Digital Age: How to Create Human-Centered Products and Services, Kim Goodwin, Alan Cooper

The Inmates are Running the Asylum: Why High Tech Products Drive Us Crazy and How to Restore the Sanity, Alan Cooper

About Face 3: The Essentials of Interaction Design, Alan Cooper, Robert Reimann, David Cronin

The User Is Always Right: A Practical Guide to Creating and Using Personas for the Web, Steve Mulder and Ziv Yaar

The Persona Lifecycle: Keeping People in Mind Throughout Product Design, John Pruitt and Tamara Adlin