

# TEACHING ADVANCED RESEARCH HELPING STUDENTS NAVIGATE COMPLEX TERRAIN

**Katherine Bennett**  
Art Center College of Design  
kbennett@artcenter.edu



Design students desire to practice research at an advanced level, which means becoming familiar with the variety of methods in current use. Benchmarking existing techniques, however, reveals at least sixty—too many for beginners to effectively understand. In addition, there is no fixed set of methods for studying all design problems. Certain methods work best to uncover certain types of knowledge. How will students know which tools are appropriate for their project? We help students navigate this complexity by familiarizing them with a selection of generative tools that best reflects the range of current practice. From that point, students can explore the rest and begin to create their own.

## **LEARNING BY DOING**

Students gain experience with a wide variety of methods by engaging in in-class exercises, playing the part of research subjects and learning from the point of view of the participant. Afterward, they learn how the methods work in practice. After carefully framing and focusing the research goals for a project, they select an approach based on the knowledge sought.

## **LADDERING**

The laddering interview technique provides the foundation for all research sessions. This systematic way of asking questions uncovers tacit and latent issues—attitudes, biases, motivations, and values—that lie under the surface. Properly done, this method is so effective that a single, well-aimed starting question

will yield a twenty-minute deep dive into the issues resident in that area. For this reason, we limit ourselves to three categories of knowledge per one-hour interview. This is a key characteristic that differentiates our research method from many practitioners'. We do not arrive with a long list of unrelated questions to ask. We focus our investigation to explore three key aspects of knowledge about our topic.

The laddering technique can be simply described as asking a question about the participant's previous answer. The interviewer asks an open-ended question to begin an investigation of a topic, listens carefully to the participant's answer, and then asks a question about an important aspect of that answer.

A simplified version, The Five Whys, was developed by Sakichi Toyoda as part of a problem-solving method for the Toyota Production System: "The basis of Toyota's scientific approach is to ask why five times whenever we find a problem.... By repeating why five times, the nature of the problem as well as its solution becomes clear." (Ohno 1988)

The Five Whys technique was useful for root-cause analysis with employees and engineers at Toyota. When used in a research interview however, the participant can become alienated by the relentless quality of the repeated "Why?" questions. It is necessary to employ diplomacy in the interview and ask the question in a variety of ways.

Laddering has been used in clinical psychology since the 1960s, and was adopted by market research to uncover links between product attributes and consumer values and behavior. Underlying its effectiveness in this arena is Means-End Chain Theory (Gutman 1982), which assumes a hierarchy of consumer perceptions and product knowledge that ranges from attributes to consumption consequences to personal values, as follows:

- *Attributes*: At the top level of this hierarchy, attributes are most recognizable by individuals. Individuals recognize the attributes of a product or system easily. For example, "I like this car, because it is a convertible."
- *Consequences*: In turn, the attributes have consequences for the individual. For example, the convertible makes its driver feel young and free. Each attribute may have one or more consequences for any given individual.
- *Core values*: Finally, each consequence is linked to a core value of the person's life. For example, the sense of youth makes that driver feel attractive. (Hawley 2009)

A more sophisticated method is outlined in John Zeisel's classic text, *Inquiry by Design*. Although Zeisel is writing for students in the environment behavior specialty of sociology, the chapter on focused interviews describes six probes, or questions, that can be used in an interview:

- *Addition probes* encourage respondents to keep talking—to keep the flow of the interview moving.
- *Reflecting probes* determine in a non-directed way which of the analyzed topics in the interview guide are significant to the respondent and which new ones should be added because they were overlooked.
- *Transitional probes* ensure that the respondent discusses a broad range of salient topics.
- *Situational probes* stimulate the respondent to specify which parts of a situation prompted the responses.

- *Emotion probes* encourage in-depth discussion of how the respondent feels about each specified part of the situation.
- *Personal probes* get respondents to describe how the context of their lives influenced their reactions. (Zeisel 2006, 230-243)

Zeisel expands these categories into a complete list of seventeen types of questions or non-verbal cues, giving examples and descriptions of each. We make this reference available to those who wish to expand their knowledge to this level, but in our course we start with three basic tactics:

- *Laddering questions* that ask a question about the previous answer, using phrases like, “How come?” (always better than the confrontational “Why?”), “That’s interesting—tell me more...”, “What benefit do you get from that?” ... and so on.
- *Mirroring techniques* that reflect what the participant has just said, so that they continue talking. This is similar to Zeisel’s addition probes and includes repeating the end of the sentence or key words used, attentive body language or silence, and other tactics.
- *Summarizing techniques* that either ask participant to summarize what they’ve said, or summarizing key ideas for them and asking whether the list is complete (and whether they’d like to add anything).

We demonstrate the tactics in class, first showing a video demonstration of an expert interviewer using the method, and then conducting a workshop in which students practice with each other.



Students practice the laddering technique interviewing one another using a mapping tool.

## THE RESEARCH TOOL SET

Many practitioners use the laddering interview alone, along with observation. However, our students (and some design practitioners) are new to the art of interviewing, have a limited time to interview, or they may not want to build specialized competence to this level. For these reasons, we employ a number of tools to help us get beneath the surface.

## OBSERVATIONAL TECHNIQUES

These are familiar to most designers and include **shadowing** (or “stalking with permission” (Chipchase 2010)), **static observation** (the researcher stays in one place while observing and documenting), and **participant observation** (the researcher plays the part of the participant, doing the action themselves and observing while doing). Observations can include **framed behavior** (researchers direct the participant to “go through the motions” of an activity so that it could be observed) and **process narration** (researchers ask participants to narrate while they engage in an observed activity).

## **BUILDING EXERCISES**

### **VELCRO MODELING**

Developed at Fitch Richardson Smith in the early 90s, this co-design method asks participants to model an idea using a kit of velcro-covered elements.

### **LEGO MODELING**

This method was developed by Lego for internal studies and organizational transformation. They were using the imaginative play quality of their own product to spark ideas within the company. Later, Lego Serious Play™ was developed to engage in this sort of work with other enterprises. This method has now become open source, but there are still licensed practitioners who specialize in using it. There are four steps to the process:

1) The researcher poses a carefully-crafted question. 2) Participants build a model using Lego that represents their answer to the question. 3) Participants tell the story about their model. 4) The researcher asks laddering questions and eventually summarizes key insights from the discussion. (O'Connor 2012)  
Legos put participants in a play state where they can give voice to issues and ideas that would normally remain beyond conscious recall, i.e., tacit knowledge.



### **TRADEOFF EXERCISE**

Also called a “forced choice exercise,” this is a game board with sets of colored tiles representing six aspects of a topic. The sizes of the tiles represent value or scarcity, and participants have a limited game board area on which to place the tiles. This inevitably forces a choice between components, and researchers can observe the participants trading off one aspect for another. This tool is especially effective in revealing the internal wrestling match that accompanies decision making.





This tradeoff exercise was designed to explore a participant's value system for online dating.

## IMAGE-BASED EXERCISES



The surreal quality of the illustrations on the Dixit decks makes them useful for some projects.

### IMAGE DECKS

This is a general category of methods using cards with images on them. They can be made by the researchers or purchased from a variety of sources. In general, images help participants to put ideas into words. Many of the images are metaphors that represent what they are trying to say. These decks are in many ways similar to a collage exercise, but

are quicker and easier to implement. They are useful in environments where there is limited space or where other factors might prevent the use of more elaborate kits (in the stands at a little-league game). However, they have the disadvantage of not being as rich a tool as the collage, which allows us to provide a larger selection of images, symbols, and materials.

Image decks should be carefully chosen by the research team. The images should be a mix of literal and abstract, and interestingly, in her 2008 visit with my students, Elizabeth Sanders shared that the images should also not be too "perfect" or "designed." She maintained that designers often choose photographs that are too high quality. We speculate that these are less effective because they might be a bit off-putting

—that average-quality images, similar to those participants might take themselves, might be more accessible. The number of image cards in the deck also needs careful consideration. Some decks are similar to playing cards and are easy to manipulate and search through. Others are larger, less slippery, or perhaps require more time to consider, and a large number of cards might prove daunting to a participant.

There are a number of ways these decks can be used. The framing of the exercise—especially the instructions given to the participants—needs to be thoroughly planned. One way of using a deck is to have participants pick a card that best represents an idea or an experience that we want to explore. A variant is to ask them to pick a card that tells a story that represents the idea or experience.

### **COLLAGE**

This tool provides an opportunity for rich exploration of ideas. Especially effective are “before” and “after” collages that show transformation by an experience. Other uses would be collages that best express how participants feel about an idea or an experience. This is not a method we’d use during an interview with a single participant being watched by two or three researchers. It is good to use with groups, however, since the “play state” engenders enthusiasm. For single participants, we use the collage as homework done before the interview that primes them to talk about the topic.

### **PHOTO JOURNALING**

This assignment is an excellent way to understand the research topic from the participant’s point of view. Participants are given instructions or a list of photos to take. Disposable cameras have been historically used and sometimes still are, but now we are including tools like Tumblr, asking participants to create online versions of the photo journal with comments. We also can use text messaging as a low-tech variant of Reed Larson and Mihalyi Csikszentmihalyi’s Experience Sampling Method, using a text message to prompt an answer and a photograph at selected times of day. This provides a “snapshot” of user experience. (Larson and Csikszentmihalyi 1983; Hektner, Schmidt and Csikszentmihalyi 2007)

### **DRAWING EXERCISES**

There are a number of methods that use drawing as a generative tool. We provide a kit of crayons, colored markers or pencils, and create stickers with images and stick-figure drawings for this activity. Stickers help with participants who are reluctant to draw.

Our experience tells us that using pictures, symbols, and color in addition to language helps tacit and latent knowledge become available to the conscious mind, and for this reason we advise researchers to work with these sorts of kits in their interviews. There are a number of ways that drawing can be used, from simply putting a piece of paper in front of the participant to providing prompts or suggestions of diagrams for them to complete. Here are some examples:

#### **DRAW THE EXPERIENCE**

This method asks participants to make a drawing of an experience. As mentioned above, some are intimidated by the request, but when they are willing, this tool can help explore tacit and latent issues quite effectively.

## **MAPPING**

Maps enable researchers to understand someone's relationship to ideas or experiences. We provide the beginnings of a diagram along with markers, stickers and other visual elements. This example from Art Center student Lindsay Nevard is a series of concentric circles (with the participant at the center), asking farmers market shoppers to describe their world of shopping for food and health.

## **COMPLETE THE CARTOON**

Sometimes we can learn what people are experiencing or thinking by asking them to fill in thought or speech bubbles or write captions for cartoon-like illustrations of an activity. One student researcher, interested in knowing how video gamers thought they were viewed by others, created a cartoon of a man playing a video game while two women observed from a distance. He placed thought bubbles over the heads of the women characters and asked participants (male video gamers) to fill in the bubbles.

## **TIME LINE**

When we want to understand a process or experience that happens over time, we can provide a large sheet of paper with a time line bisecting it horizontally, asking participants to represent the experience from start to finish. We ask that positive emotions go above the line and negative ones below.

## **SUMMARY OF THE PROCESS**

Designing and framing the study (four weeks)

- framing the research topic
- choosing which three aspects of knowledge about that topic we wish to understand
- choosing which generative tool will best investigate each of those aspects
- building and testing the generative tool kits
- designing the prompt (instructions) we will use to start each of the generative exercises

Conducting the field interviews (five weeks)

- interviewing in context, not in our studios or labs
- investigating each aspect of the knowledge deeply using the laddering technique
- documenting the session with video and still photography
- debriefing immediately after each interview
- coding each interview video, producing a "highlight reel" of key findings

Analyzing the findings

- displaying and clustering all findings using the KJ exercise (one week)
- studying the results using a set of seven frameworks (four weeks)
- deriving insights which lead to viable design opportunities
- presenting results

We have been developing this methodology over the past seven years and it continues to evolve. Our experience has been that with this robust and systematic planning, fieldwork and analysis our students are learning to conduct design research at the level of current professional practice.

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