Part III: Research Methods

As stated in Part I, research has different interpretations and connotations for different people. To sort these out, consider the goals of research as building truths, which may be tested, but must stand up over time. The work of researchers occurs through research methods, the means by which a person gives order to answering questions and testing responses. Research methods lie along a continuum from formal to informal.

There are many formal systematic methods. These methods are common among researchers and can be explained or replicated by another researcher. It is similar to having a method that you use in your design process that you could share with another designer, who could apply your method in the same way on a different project. At the other end of the research method continuum is informal inquiry that brings understanding of a problem often brought together from precedent. You are not exactly aware of what you did to come up with the reality, you “just know.” The understanding wouldn’t necessarily be based upon theory or conceptual frameworks of others, nor could you easily explain your process for someone else to be able to repeat it.

Another comparison that helps articulate research methods is seeing methods along a continuum of scientific to artistic/humanistic based strategies. Scientific methods, long thought to be the only valid research approach, have an assumption of “proof” that explains a phenomenon. Often these methods are mathematical and statistical in nature. Social science methods grow from this root, while focusing on social issues. At the other end of the continuum are humanistic-based methods (again having a long history that you might find in history, cultural studies, and philosophy). There still is a systematic approach that could be explained and used by another researcher, but the underlying questions and understandings grow from the experiential, using analysis and philosophical argument to reach theoretical and conceptual explanations.

Some might ask, “Isn’t the difference along this continuum a matter of using quantitative methods and analysis or using qualitative methods and analysis?” Keep in mind that design researchers might use both, and in fact might use multiple methods for one project. The key issue is the research question. Are you asking a numbers/quantity question (how many, how much, who does most-least, etc.)? Or, are you asking about the quality or even variations of the experience.

In a quantitative approach, you test a relationship by determining how many/how much of one variable is related to another, often ending in the ability to “support” or “disprove” the relationship. In qualitative research, your questions might relate to people’s meanings, attitudes, values, beliefs, or an exploration of a situation where the researcher would then build a better understanding and complete quantitative inquiries later. Qualitative research is often used to explore an issue and gain a better understanding of it, rather than to test or “support” a relationship.

When you read research reports, the
more important questions to ask are:

- Can I depend upon this research, whether quantitative or qualitative methods have been used? Does the research speak “true” to me?
- Is there a good fit of the nature of the topic, the questions asked, and the methods used to seek answers that may be interpreted in some way to help me solve a design problem?
- Will the research help me predict from these findings to something else? How reliable are the methods?

These questions have to do with the strategies or processes for finding out answers to your inquiry (the research questions) and evaluation of those strategies or processes. Additionally, how does interior design research fit into this? What methods are most useful for interior design practice?

Interior design is by nature interdisciplinary, that is, designers use several disciplinary perspectives when solving a design problem. Sociology, psychology, design, history, business, building science, anthropology, material culture studies, ergonomics, architecture, etc. are needed to determine your perspective at the time you are setting up your research.

- Is it holistic? Is it about social/psychological factors and environments?
- Is it about ergonomics and technical/physical needs?
- Is it about market trends? Is it about historical precedence and meaning?
- Is it about the politics of groups in a place?

Your perspective gives clues to the types of questions that you ask and the accepted methods to get explanations.

In this InformeDesign tutorial, we are dedicated to human-environment perspectives of design for practice. The central issue is about humans interacting with their interior environments, and what we know about different issues of environment/behavior relationships. Some issues may be spatial, technical, physical and sensory (visual, auditory, tactile), social, cultural, or psychological. Some issues may be focused on skill, on humans and human groups, on artifacts, or on environment, yet we assume that humans and settings are always involved. This is the basis of an environment and human behavior (E & B) perspective.

In taking this view, we know that design firms have similar interests, and they might use a combination of methods to discover new information for design projects—both quantitative and qualitative methods. They have added research services to better predict long-term solutions and to improve the process by which work is completed. Equally, designers need to be able to read about a research study conducted by the industry or by a university and know that the method is solid and the results from it are objective, valid, unbiased.

An overview of the common methods used in design research and practice—using an E & B perspective and the previous vocabulary, will help you evaluate research findings and use them to benefit your design project.

In Part III of this tutorial, we present several research methods. Since this is an introduction and a primer on research, we caution against the expectation that you will have a full, detailed coverage of the many research methods used today.
Simply think about the research method as being a strategy that you will use to collect data related to design issues that you face. More importantly, think about these research methods as you read InformeDesign’s Research Summaries and consider the validity of a particular study and its results. Once you have a better idea of what drives these methods, you can begin to question or confirm the results of research studies, making you an informed consumer of research.

Many books have been written that offer detailed strategies about the scope of many research methods, and you may want to search them out later. One of the best references on research methods that relate to design practitioners is A Practical Guide to Behavioral Research by B. Sommer and R. Sommer (2001). It has excellent examples that are tied to design. All the methods cited are useful in design practice and are often used in human behavior research. The five methods being reviewed are:

A. Observation
D. Survey
C. Experiment or Quasi-Experiment
D. Case Study
E. Visual and Content Analysis

The various strategies offered by these methods present opportunities for different types questions and ways of gathering of information. They also present differences that relate to analyzing the information gathered. Design researchers might use statistical analysis, descriptive analysis, linguistic-content analysis, or other techniques to build conceptual understandings that may be used for your design situation and practice.

Don’t stop now—it’s easier than it sounds, and more importantly, it makes sense! You already use several of these methods in your daily practice, but we’re going to take a closer look at each one and view an example of how each method is used in design research and practice.

Research Method A: Observation
Observation occurs when an observer (usually the researcher or trained observers) systematically plans and implements viewing of people and their behaviors or viewing how an environment is used.

Observation is:
• Looking and watching in a systematic way.
• Non-verbal. Little, if any, verbal interaction occurs between the observer and the observed.
• Inexpensive in material cost (there are not hundreds of questionnaires to print and mail), but expensive in time cost (the observer spends many hours observing).
• Used to determine what people do (their activities, behaviors) in public places or how an environment is actually being used.
• Often used in conjunction with other methods, such as a follow-up to a survey of office employees or prior to a survey to locate critical areas that then serve as points of questioning users of the spaces (Sommer & Sommer, 2001).

Observation can answer these kinds of questions:
• How do environments create opportunities or obstacles for people such as a place to informally talk, view entertainment together, or prohibit communication?
• How do people manipulate or change
their surroundings to meet their needs?
• What takes place in particular settings?

There are three approaches used when observing:
  a). Behavioral Observation  
  b). Behavioral Mapping  
  c). Trace Observation

a). Behavioral Observation
There are three types of behavioral observation:
• **Casual Observation** occurs without predetermined categories or a systematic scoring system; it is a quick visual inspection of activities or the space. For example, you might go to visit a friend in the hospital and have difficulty finding an elevator to take you to the right floor. After several attempts, you go back to the information desk to ask for better directions. This could build into your future research or could be used for developing good questions for a more systematic approach. Attending and listening to your first impressions can help to develop systematic observation categories in future work.

• **Systematic Observation** answers a specific research question by systematically planning the observation and recording of data. It can be repeated by other researchers. A scoring system must be developed, usually by casual observation. Several observers can be used but they must be trained to understand the behaviors in the same way. This increases the reliability (agreement) of the observers.

• **Participant Observation** occurs when the observer becomes part of the environment and people being studied. There are risks to this type of observation such as the observer can become biased by accidental involvement in people’s activities. This can change people’s behaviors, so it is done infrequently.

(For example in Part II; Case 2 of this tutorial, participant observations were completed and compared to literature to arrive at the most critical areas of the facilities that needed to be studied further and to build the interview questionnaire for the staff.)

b). Behavioral Mapping
The second type of observation is Behavioral Mapping. To use behavioral mapping, think about taking a set of plans with you to a site, sitting down, and noting on the plans people, their activities, and the location or where these activities occur. The plan becomes your map, an actual chart of an area on which people’s locations and activities are indicated. Notations are made during observations or later from notes made while observing. This map shows how people actually use the space, which could be different from the original intent, what is actually seen and is evident; occurring over several days and many times of the day.

Behavioral maps can be place-centered or person-centered.
• **place-centered maps** refer to how people use a specific space. This type of mapping can be unobtrusive and is good for public spaces. Observers watch the actions in a particular behavior setting and record them on diagrams or plans.

• **person-centered maps** are drawn to study people’s tasks, activities, and
movement throughout the space. The goal is to learn about a group of individuals whose activities are charted throughout the day. It is done on only a few individuals at a time. It can be obtrusive.

An example comes from Case 2 of Part II of the tutorial, where students were hired to go to the assisted-living facility at different times during the day and record “neighborly” activity in different places, counting numbers of people, and interior/architectural features.

c). Trace Observation

The third type of observation involves observing physical traces. This means you systematically look at interior environments for evidence of earlier activity or other indicators that people were there and interacted with one another or with the environment. This method is used to see how people actually use a space. This type of research is critical to the designer because it gives you an opportunity to know what often goes unsaid by clients and users. There are two types of traces that are measured, erosion and accretion.

- **Erosion traces** are shown by deterioration or wear that provides a look at the usage pattern. The physical environment has been worn down such as an indentation on a step where everyone has put their foot over time, or the upholstery on only one chair in a seating arrangement is badly worn and you realize that that chair is the only one with a view to the outdoors. Both situations beg the question, what does this mean?

- **Acretion traces** are a build-up of a residue or an interaction. These traces are added to the environment and show how the user has changed an environment (Sommer & Sommer, 2001). For example, people may move chairs closer together in a study area so they can interact as a group, or may leave trash on the floor if there are no waste cans.

Use of trace measures has several advantages:

- There is no observer when the people use the space so it’s unobtrusive.
- The observer can look at the space anytime and over many days.
- The observer can return to the space to see the trace again or to show others.
- The trace can be documented through photographs or video.
- It is an inexpensive and easy method to yield interesting information.
- It is a good way to explore a research problem (Sommer & Sommer, 2001).

Use of trace measures also has several disadvantages:

- The researcher can read too much into a trace. One visit may see a one-time-only occurrence; therefore, the visit must be repeated to confirm the use initiating the trace.
- It yields a tremendous amount of data, which can delay you in your quest for answers.

An example of this type of research is often seen when an architect/designer is working with wayfinding issues in a facility. When you see handmade, taped-up signs directing people to a spot, you know there is a problem with signage. Equally you know how the workers in the space view circulation and the best way to find something/someplace from their viewpoint. Another example might be when you hear from the CEO about the firm’s organizational structure being...
“open,” but you see personnel barricaded in their work spaces. The barricades provide a physical trace suggesting you need to continue to gather information. You might ask about the concept of territoriality and whether it might be an explanation rather than the organizational hierarchy and leadership.

Research Method B: Survey
Survey research is a systematic method for studying behavior that cannot be observed or experimented on directly. Data are gathered about people’s beliefs, attitudes, values, and behaviors. Surveys usually require larger numbers to give accurate meaning to the results. There are two instruments frequently used to collect these data, the interview and the questionnaire (Sommer & Sommer, 2001).

An interview is like having a conversation or discussion based on questions you want answered. It is used to assess emotions, attitudes, beliefs, opinions, and characteristics of the person(s) being interviewed. It reveals both direct and indirect data. Direct data are responses that subjects provide to direct questions, they are spoken responses. Indirect data are the less obvious or hidden information conveyed by gestures, body language, or a lack of eye contact. In an interview, interviewers can follow-up on half-answered questions; they can probe for deeper responses. An interview can be used to develop objective questions or closed-ended questions for a questionnaire.

There are two types of interview formats followed. A structured (focused) interview means that the questions are developed ahead of time with some opportunity to ask pre-planned, open-ended, probing questions. This way, there are few variations, and the questions are asked in a specific order. As with observers, the interviewers are trained on how to ask the questions, and how to probe the subject for depth (Sommer & Sommer, 2001).

An unstructured interview can be used to explore alternative opinions, attitudes, or beliefs. It can help to identify new types of information and define areas of importance that might not have been thought of ahead of time. It allows the subject to contribute more.

A questionnaire is a series of written questions on a topic about which the subjects’ opinions are sought (Sommer & Sommer, 2001). It can be self-administered, that is, when people answer a questionnaire they have received in the mail or at some event. Or, it can be an interviewer-administered questionnaire, which occurs when people are asked questions by an interviewer and people answer the questions openly. The most difficult aspect about a questionnaire is its construction and the interpretation of the results.

To develop a questionnaire, you must know the content of the questions and what format the questions should take. The content contains questions that address what you really want to know. Questions can be formatted in two different ways, or a combination of both ways, open-ended questions and closed-ended questions.
Open-ended questions are used when all possible answers to a question are not known. They can help to identify possible answers for a closed-ended questionnaire. This way, the researchers avoid suggesting answers and instead get the answers in the subject’s own words. However, the range of possible answers can be broad and the data collected are unwieldy. Responses can be categorized for ease of analysis (Sommer & Sommer, 2001).

Close-ended questions are used when the possible responses are known, and when the sample is large. Often these responses can be computer scored and responses from several groups of individuals can be compared.

In Part II, Case 1 of this tutorial, written questionnaires were mailed to participants in the study to determine their knowledge levels of Southwestern design. In Case 2, interviews were conducted with staff of the assisted-living facilities to provide answers to questions about residents’ patterns of social interaction in certain places in the facility.

Research Method C: Experiment
Experiments are used to test hypotheses. The purpose is to determine the effect of the independent variable upon the dependent variable. All other influential variables must be either eliminated or their effect controlled.

One well-known type of experiment is the pre-test/treatment/post-test. In this experiment, the base knowledge of the subject is tested or documented in a pre-test prior to the experiment or treatment. Next, the treatment is performed and the knowledge is documented/tested again using the same instrument (test). This is used to test the effect the treatment (independent variable) has on the knowledge learned (dependent variable). If all other variables are controlled, the difference between the pre-test responses and post-test responses is due to the treatment.

An example that you might find interesting relates to your days in higher education. You walked into your color class the first day and immediately were handed a “test” about color definitions, color theory, and color application. You were told to simply take the test, it would not be part of your course grade. Then, you and your classmates were divided into two groups for the duration of the course.

Each group had the same teacher, but one group (Control Group) was presented lecture material only with many visual images of color, theory, and application (Treatment 1). The other group (Treatment Group) was presented the same lecture material and visual images (Treatment 1) and had many small assignments (Treatment 2) that related to the course content. At the end of the course, all subjects (students) in both groups took the same test that all of you took on the first day of class. Your score on the second test was then compared to your score on the first test. Assuming the second score was higher, your learning could be attributed to the treatment, i.e., presentation of course content.

It would be hypothesized that the scores will be higher for both groups after Treatment 1 and that the scores of the Treatment Group, who also received Treatment 2, would be higher than those of the Control Group. The point was to determine the influence of the assignments.
Research Method D: Case Study

The case study is an in-depth investigation of a single instance involving an individual, group, or entire community. Case study method emphasizes the individuality and uniqueness of the participants and the setting. Comparative case studies can also be conducted, where the researcher looks for variables or characteristics in common between the two cases versus those that are different (Sommer & Sommer, 2001).

As you are aware, Part II, Case 2 was a comparative case study. In Case 2 (assisted living), the researcher collected information on the sites’ residential and institutional characteristics, use of key public areas, the residents’ neighborly activities, timing of activities related to area, and the staff’s answers to questions. The researcher then developed a template and coding method to analyze and relate the data collected to draw conclusions related to theories and design directives.

A case study method might also be useful if a firm wants to do a Post-Occupancy Evaluation (POE). Interviews, surveys, and observations are strategies that might be used within a case study. Further, given the objectives and research that went into the project, the same could be used to assess the effectiveness of the design. There are many design researchers who advocate this type of practice to better inform the design process and future projects, by bringing the knowledge gained during previous work quickly back to the firm.

Research Method E: Visual and Content Analysis

Visual and content analysis systematically describes the form and content of written, visual, or spoken material (Sommer & Sommer, 2001). The intent of these methods and analyses are to find patterns that may be based in written or visual language. The content that appears in documents, television, records, and periodicals can be quantified for analysis of trends, issues of concern, or other purposes. It also has been used with architectural documents from sets of historical type buildings. Researchers identify the categories that they are searching for, i.e., what words, phrases, or visual images appear in print, repeatedly. An example would be for designers to review the Board of Education’s meeting minutes to determine how often safety and security are mentioned. This could give you insight into a real concern that may be mentioned by the client but not expressed to the degree appropriate to the rest of the clients and users.

Content or visual analysis are often found in material culture studies of our field or in studies where researchers are seeking to document trends or examine environmental conditions of a group. For example, photographic studies in the early 20th-century documented children laborers in manufacturing and industrial settings. The content analysis provided categories of work conditions that were interpreted for the public. The specificity of conditions became the basis for policy changes and laws for the protection of children.
Conclusion
You have just completed an introduction and overview of research vocabulary and methods that are used in design research and design practice. Consider how research can contribute to each phase of your design process. In InformeDesign's Research Summaries, you can use the Key Concepts to add to your knowledge on a subject and strengthen the programming phase of your projects. You can use evidence-based design criteria to improve the quality of your design solutions. Now, you can read InformeDesign's Research Summaries and easily understand the Research Methods section of each Research Summary. Note the sample size, the demographics of the subjects—are the subjects representative of the whole population? Identify the methods used to collect the data; did the method used answer the research question? Look at the limitations that the author identified; can you identify some additional ones? See the commentary by InformeDesign staff for further discussion of the attributes of the research.

You'll enjoy reading about research and using research as a truly informed consumer of research. As you continue your quest about research and continue your design practice, keep the vocabulary and the methods in mind. Through your practice, you too can contribute new knowledge to our profession and help build the body of knowledge.

Additional Sources:


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The Mission
The Mission of InformeDesign is to facilitate interior designers’ use of current, research-based information as a decision-making tool in the design process, thereby integrating research and practice.