

Designing Design Research

Investigations at Art Center College of Design

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Bad research is everywhere. Good research is difficult. How can we prepare designers to gather insights that are beyond the obvious, that lead to opportunities for breakthrough design? We need to accurately determine what people want, need, and experience, to understand the constraints of the problem. The quality of the research determines the caliber of the knowledge, and ultimately, the excellence of the design solution.

This overview presents a framework for understanding effective qualitative research methodologies, making the bewildering array of approaches understandable and accessible to product designers.

Good research not about finding the newest “cool” methodology; we peel back the glossy surface of many a hyped “new” approach and find a version of something we’ve seen used for years. It’s not about the methodology after all—it’s about how effective designers are in using it. That said, this work is all about the methodology, and how to enable designers to be smart in its application.

Initial thoughts

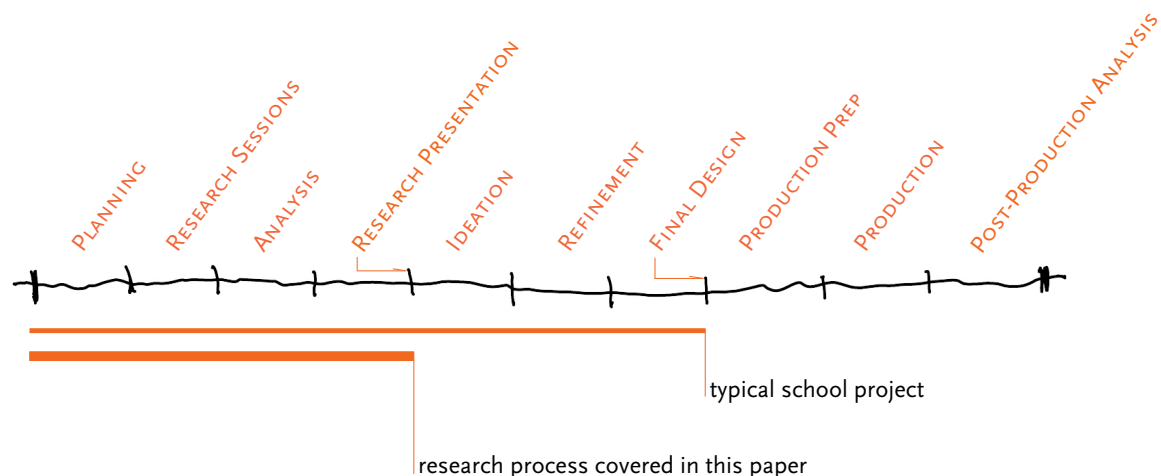
As currently taught (and sometimes practiced), design research is often treated as a constant set of tools and as a result, students tend to think that it’s a standard process. The larger field of design research is evolving, however, and good design practice stays abreast of these developments.

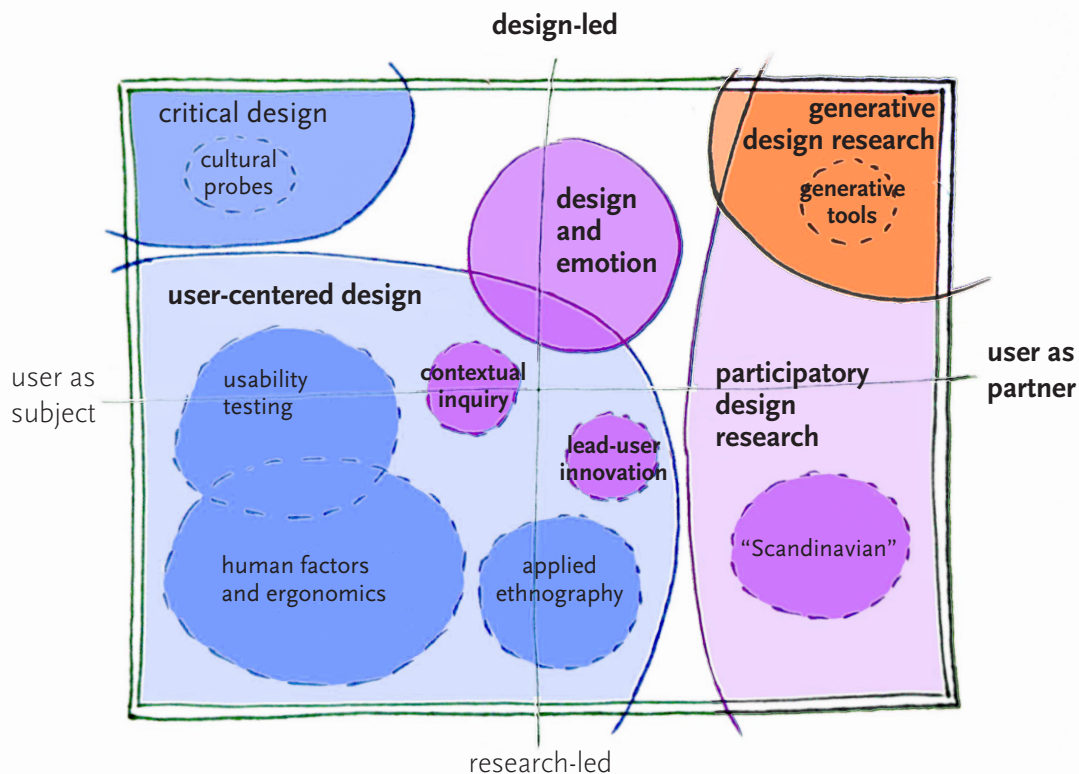
Design research is systematic. There are decisions to be made at the start of the design process, and points along the way where research is interjected. Our content analysis to date has found 61 techniques for research and 21 for analysis, and the list is growing. Faced with this complexity, it is difficult for those new to this subject to understand which approach should be used for a particular project, and why.

Also, design research can be its own career path, and students should have a robust foundation of knowledge in this area should they want to pursue these opportunities.

Approach and mindset

At Art Center, like many schools, 14-week projects cover the product development process from initial planning through delineation of the final design. This paper discusses an expanded research process that occurs prior to that, in a 14-week research-only term.





The current landscape of human-centered design research. (Sanders & Stappers 2008)

In 2008 Elizabeth Sanders and P. J. Stappers provided an overview of design research in the comprehensive map shown above (emphasis, via colored tints and bold-face type, is mine). They divide the research landscape roughly by two axes: the horizontal regarding the expert v. participatory mindset, with the user as either a subject to be studied or a collaborator to partner with, and the vertical axis regarding approach, either from a design or from an academic / scientific point of view.

On this landscape, the processes covered in this paper would lie in the purple and especially, red, areas: most of our approach lies in generative research; there is some overlap with design and emotion, contextual inquiry, and lead-user innovation, and we have a participatory-design mindset. We are designers by training, and approach our subject from that point of view, rather than as an anthropologist, a human factors engineer, or a social scientist. We have learned from those disciplines, but we don't pretend to be them. Although we approach our subject from the design-led end of the map, we do not approach as an expert (the upper left-hand quadrant). We view the users as our partners, rather than ones to be studied. For this reason, we refer to them as *participants*, rather than *respondents*.

We also remind designers that research methodology is not a simple a kit of tools to be used without discretion. It is more accurately described as an *approach*—one that holds the highest regard for design's responsibility to the user: we are their advocate. We learn about them in order to see their world from their point of view, rather than to understand merely how to sell the client's products to them. We do our best work when we can balance the point of view of all stakeholders—customer, client, society, ecosystem—but at the heart of it, we are entrusted with the obligation to look out for the end-user's well-being. We do use the term *tools*, though, in a tribute to our industrial design audience's eagerness to embrace new ones.

The threefold goal

In order to help designers break out of a narrow approach to design research and yet negotiate the complexity of the myriad methods in practice today, our first goal is to acquaint them with a comprehensive yet manageable set of methods. Second, we need to equip them to understand why, and in which situations, a particular approach would be effective. Armed with this understanding, designers will be quicker to adopt a robust and multivariate approach to design research and begin to evolve and tailor methods for their own purposes.

In present practice, research approaches are often chosen by those with expertise and experience. In the classroom or in the design studio, the choice of a research approach is often overseen by a senior researcher who brings years of understanding to bear on the decision. How can we enable beginners to more quickly gain the experience necessary to know which approach is best for a given problem?

Our last goal is to strengthen the analysis of field data to produce intelligent conclusions that extend far beyond predictable outcomes, actionable conclusions that connect directly to viable design opportunities. Too often we see two problems after the research is done: thin analysis that results in obvious conclusions, and final designs that bear no resemblance to the insights gained by the research. We needed to find a way to beef up the analysis of the research findings and help designers to identify opportunities that are strong enough to fuel the design process all the way to the final result.

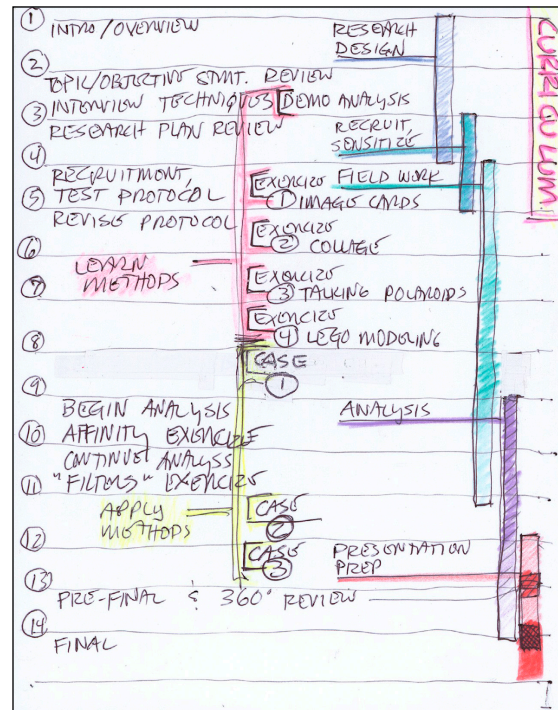
Design Investigations

The Design Investigations course (rough sketch, right) allows students to spend 14 weeks conducting and analyzing fieldwork, using one set of methods, for a project of their choosing. In addition, however, it provides the opportunity to learn the wider set of possible approaches, and the rationale behind the choice of one over another.

To start, students choose the topic for the term-long research. The decision regarding research methodology is guided by faculty in the traditional way described above. Once that project is underway, however, a series of exercises engage the students in learning other methods in the tool set. Students learn these first-hand, by acting as participants. The course TA runs the exercises, leading the students through the series throughout the first half of the term. We have found that lecturing about the methods is not effective; *telling* isn't *teaching*. We learn by doing: our students learn the design process by repeating it in their project classes, why couldn't they learn the research planning process the same way? Engaging in the tools first-hand gives them the familiarity they need.

The next step is to teach the rationale behind choosing one method over another for a given design problem. We do this in two ways: first, with a guided decision process we have come to call the *tool picker*, and second, by iterating this decision process rapidly in different instances by the tested way for teaching judgement: case study. (Christensen & Garvin 1991)

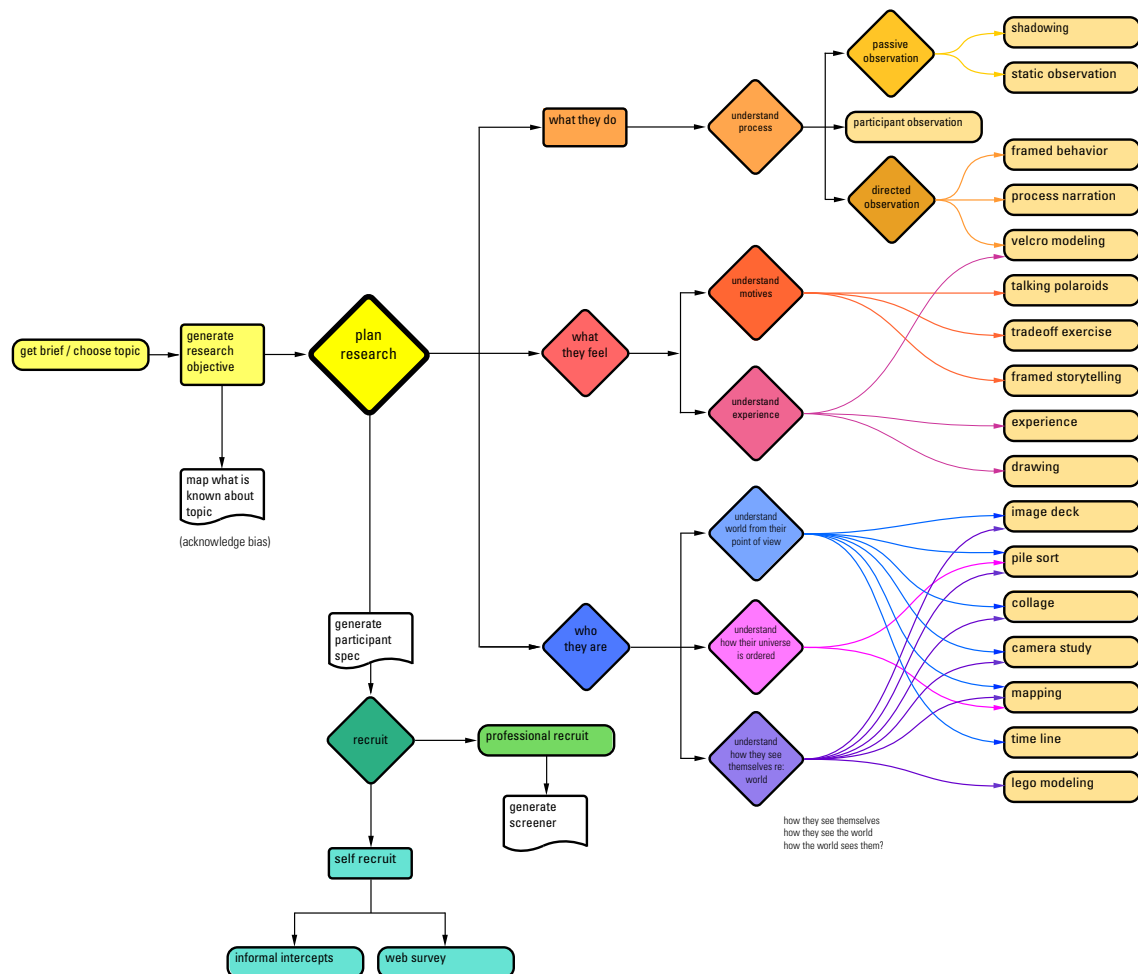
At this point, we use a set of mini-cases in the same way that the Harvard Business School does: as a way to iterate through a series of decisions. Cases written for other programs such as law or management won't do, nor will a simple description of how a particular design was done. Research teaching cases are purpose-written to lay out the circumstances (the elements of



a problem to be studied), leading up to the decision of which research approach to use to study that problem. The cases are crafted to provide an opportunity to teach axioms that are basic building blocks of research design theory. Because no cases have been written with these aims in mind, we are writing them ourselves. Our plan for the future is to flesh this series into a more robust set designed to present a variety of research-design opportunities.

The tool picker

Our content analysis discovered over sixty different approaches and methods used by researchers today; this is too complex a set for beginners to navigate—we have distilled them to a set of eighteen. We guide students through the decision process by asking a series of questions about the type of knowledge they seek for a given topic. The process is shown here:



Starting at the left-hand side with a careful choice of topic, students are asked to generate a research objective statement. We discuss issues of ethics, scope, appropriateness, and so forth, and to get an explicit view of the researchers' bias, we ask them to create a map of everything they know about the topic.

Moving on to the research plan, students concurrently specify which sorts of participants they will need (generating the materials for and engaging in recruitment) as well as begin to consider the type of knowledge they need to seek. We consider three general areas of knowledge about the user: what they do, what they feel, and who they are. From there, we move into finer levels of discrimination. Considering the subtle shades of difference between these areas of

understanding allows the designers to consider, with precision, exactly what sort of understanding they seek to find.

Choosing an area of understanding leads the students to a set of recommended tools. Each tool has a detailed description that explains the rationale for choosing it, directions for using it, examples of its use, advantages and limitations, along with citations that will lead the students to papers and other resources written by those who are using that approach.

For example, students doing research for Herman Miller on the topic of how Generation Y will affect the workplace chose, as their participants, college students who had not as yet entered the workplace. They wanted to understand **process** (how they would work in an office environment), and so they used a framed behavior exercise (asked them to imagine working in an office in the future and had them use a scale model to help narrate their answers). They wanted to understand the **motives** behind their choice of office environment, so they had them engage in a tradeoff exercise to peel apart what they would choose, and if forced to choose, why they would make the decision they did. They wanted to understand their **experience** of work, so they had them “draw the experience” of their ideal office and talk about it. They wanted to understand **how they saw themselves** re: the world, so they did a pile sort using brand and style references as a tool for that conversation.

Another team studied the staff who teach in Art Center’s workshops. They understood the overall work process with static observation of the staff at work; they gained understanding of their world (their day) from their point of view by asking each person to create a timeline using collage and drawing techniques. They gained understanding of how their universe (the shop) is ordered by asking them to draw a cognitive map of the shop.

Testing the diagram by overlaying successful past research projects proved that it could be used as a means of deciding which tool to use. Working backward, however, gave us a moment of consternation: an expert researcher could use most of the tools in the right-hand column to gain understanding of most of the areas in the center columns. Though we were stymied by this at first glance, we gained reassurance by reminding ourselves that the “tool picker” is a decision tree that helps beginners and widens their view beyond a limited single-thread process. The tool is designed to lead them to the most appropriate choice, by no means the only choice possible. When they use this decision tree for a few projects, they will begin to gain knowledge of a wider set of approaches and begin see how the different methods work in different cases. Once they begin to see that the tools actually can be tailored to many purposes, they are right where we want them: imbued with a robust working knowledge of the multivariate research process.

The analysis deck

When the field work is under way, the real work begins. Our research is worthless unless it fuels the design process. We noticed that after they look at their findings, students need additional tools to help them make sense of what they’ve got. We have been using a variant of the KJ Method (similar to an Affinity Diagram) (Kawakita 1991) for years in Design Investigations, but recently we’ve assembled a deck of analytical aids to help guide students’ thinking into areas they might not automatically consider.

In professional practice, designers always work in a multidisciplinary team and research findings are interpreted by a number of different specialists: designers, human factors engineers, anthropologists—the list varies according to the needs of the project. In student work and also in small design firms, those multiple viewpoints may not exist. We have developed a deck of cards containing lists of questions that we can “ask” the data—questions that an anthropologist might ask, or a social scientist, or an engineer, or a management consultant. Our students stand in front of the wall of data and work their way through the deck, each card acting as a lens through which they view the data.



The deck is in two parts: an *insight* deck and an *opportunity* deck. The first deck helps reveal important insights that might fuel design opportunities. Students are asked to work through the deck slowly and methodologically, making an effort to find—even force—a connection between the questions and the data, almost the same way as a brainstorming exercise, to see what insights result. The insights are listed, mapped, or arranged in diagrams, as needed.



The second deck is used to create and validate the design opportunities represented by each insight. This analysis process takes at least two weeks. At the end, we link the insights to opportunities for design intervention, seeking quantity, quality, depth and range: products, experiences, and business models from near-term to blue-sky, mild to wild. Our aim is to present our clients with a robust set of *insight : opportunity pairs*. By hooking each design opportunity to the insight that inspired it, we not only fire the imagination of our clients, we provide a vision that sustains all stakeholders through the duration of the design process.

Next steps

We have used the iterative design process to develop this research approach, evolving it three times per year over the past year and a half, and are reassured by our results. Before, students stuck to one or two known research methods and their presentations ended in a conclusion slide bearing three or four thin and obvious bullet points containing nothing new. We now see them engage in multi-modal generative research that yields ample fuel for deep analysis, leading to a robust number of insight : opportunity pairs.

The decision tree “tool picker” will be developed into an on-line aid that leads students through the series of questions and directs them to a manageable set of recommended approaches determined by the type of knowledge they seek. The tool descriptions will expand and there is the possibility of developing the aid into an in-house wiki, available for contributions by a growing community of students and alumni engaged in serious design research, and perhaps in time to the larger community. This will be tested in-house and developed into a tool for use on future projects, enabling designers to learn new methods and to gain their “sea legs” in navigating the voyage of discovery research.

The analysis deck will continue to be refined, most likely into basic and advanced sets appropriate for undergrad and graduate levels.

Finally, we will be revisiting how research is integrated into the entire ID curriculum at Art Center. We’ve taught design research since 1991 and it’s been changed, updated, and added to along the way, but it’s time to take a wholesale, methodical look, collaborating with our growing group of dedicated research specialists who form the cadre of faculty teaching this material throughout the curriculum, to bring a systematic approach that supports best practices.

Sources

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