BIG IDEAS: A HISTORY OF FIELD RESEARCH IN INDUSTRIAL DESIGN IN THE UNITED STATES

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Since the beginnings of the industrial design profession designers have had the option of conducting their own field research and have been influenced by other professions such as: marketing, human factors, and the social sciences. Until recently, a minority of industrial designers have been conducting field research as part of the design process. This paper, condensed from a larger study, describes how field research has been conducted since 1955 in the United States and is of benefit to those in practice and academic settings. Comprehensive historical accounts of this subject, until now, were nonexistent. The conclusions of this paper reveal four significant issues. First, field research was practiced through several distinct eras. Second, field research has grown from obscurity into a sophisticated and standardized practice, and it continues to grow in popularity for business and user benefit reasons. Third, barriers exist that prevent adoption of field research methods. Fourth, a shift from art/intuitive based design to research based design is occurring; representing a growth area for industrial design practice and education.

Field research is a general term that can be used to describe many different kinds of research activity that bring the designer (or design team members) into direct contact with the customer. Many disciplines, including industrial design, refer to field research as ethnography. However, because the term ethnography traditionally came from the social sciences and because disciplines like anthropology and sociology define ethnography in specific ways, field research has also become known as: customer inquiry, design ethnography, discovery research, and empathic design. The principle of prolonged cultural immersion (sometimes requiring months or years) commonly used in anthropology is typically skipped when ethnographic methods are used in design. The above terms serve to imply that the methodology or method has been customized to suit the purposes of product development. Product development time cycles and finances typically do not allow for extended periods of research. For the purposes of this paper, field research is defined as: activities during the product development process where the designer gathers information about the user while in the user's environment – which can then be used to influence product design. This may include methods similar to methods used in ethnography and cultural anthropology. Paul Rothstein (1999) has designated the following attributes of field research as follows: field research is about studying culture and human behavior, field research is part art and science, and field research involves a method. This method is composed of phases, including: research design, data collection, analysis, and reporting. Arnold Wasserman contends that field research based design tends to foster better solutions to design problems and reduces risk of the product failing on the market. It also helps justify the high cost (sometimes in the millions of dollars) of development that a company must invest in order to proceed with product development (personal interview, December 29, 2004).

Most designers and design teams throughout history did not conduct field research as a part of the design process. At times, this may have been due to the nature of the products that designers were called upon to design. For example, existing products are redesigned to incorporate a new feature, technology, or updated styling for the upcoming year. These may not need extensive field research to proceed with design work. Research also costs somebody a substantial amount of money. While a company may be willing to spend money on extensive research to reduce risk and maximize potential for innovation, many companies (without deep understanding of how to conduct cost effective and actionable field research) may feel the expense is unnecessary. When

design consultancies mention the costs of conducting research, many uninformed clients may not be willing to pay for it. Because of time and cost, the client company may ask that the research be dropped from the project. However, as a method used in product design, field research is increasing in popularity at a rapid rate.

Seven leaders in design research participated in this study, including: Jane Fulton Suri, Darrel Rhea, Liz Sanders, Brenda Laurel, Patricia Moore, Arnold Wasserman, and Steve Wilcox. Each has expert familiarity with field research in the product development process and was interviewed late in 2004. Magazines, journals, and books were also reviewed. Much of the information was gained from International Design magazine (formerly known as Industrial Design magazine) and Innovation, the professional journal of the Industrial Designers Society of America. Each issue was thoroughly scanned for information, articles, and reference to field research in product design where industrial designers had a part. 50 years and approximately 500 issues were reviewed. Analysis produced ways to understand the history of field research through the designation of distinct eras including: Era I, Beginnings, 1955-1964; Era II, Progress, 1965-1975; Era III, Convergence and Development, 1976-1989; and Era IV, Application and Standardization, 1990-2005. Within each era, the following topics guided the collection of data: people who talked about field research, disciplines involved in field research, products designed using field research, and methods of field research.

Era I, Beginnings, 1955-1964

This era of was marked with limited formal integration of field research into the design process. Some design was conducted using field research methods, but most was not. The kind of field research conducted by industrial designers was probably less formal, less structured, and not as well articulated as research conducted by more scientific research professionals. Other fields which seemed to influence the activity included human factors and marketing research. There was also some interesting dialogue that questioned the usefulness of conducting research; and whether or not designers should rely on the findings of research.

Some industrial designers included human factors research in the design process. This activity included field work and in-house user testing. This kind of field research mainly served to inform the designers on anthropometric issues and fitting the product to the user. Not only were physical dimensions of product use investigated; but the psychological and perceptual aspects of design were researched as well (Moss, 1959). Henry Dreyfuss was at the forefront of doing this type of research in the industrial design community and his firm's work continues to guide human factors in product design today (Dreyfuss, 1955; Tilley, 1993).

It also appears that industrial design has had close ties with marketing research. Industrial designers both relied on research provided by marketing researchers and conducted what was termed, "marketing research" themselves (Fleishman, 1958, January; Fleishman, 1958, February). Marketing research was viewed as a controversial topic to some industrial designers. In 1958, American corporations were spending between $150,000,000 and $250,000,000 on market studies and analysis (Fleishman, 1958, January), and there were many new research firms making information available that could be used to direct or influence product or packaging design. Fleishman (1958, January) described how some in the industrial design community felt that research constituted a "strait-jacket" on their creativity (p. 27) and that traditional research tended to break problems down into testable elements while the designer's approach was to form a synthesis from diverse elements and view points. Research was also viewed as "a fancy way of

telling him [the designer] something he already knows through long experience." (1958, February, p. 35).

Despite the negative view toward market research some industrial designers seemed to acknowledge the value of research. Industrial designers also used marketing research provided by outside firms, internal staff researchers, and even conducted it themselves through an informal approach that allowed for creativity. When conducting research by themselves they used simple methods, such as: consulting literature, visiting the location where the product would be used or sold, asking customers questions, and consulting experts in the field of inquiry.

Some movements within the market research community suggest that social science methods of understanding customer perception were being employed in order to determine how design could influence those perceptions (Mayer, 1958; Darrel Rhea, personal interview, November 9, 2004) Additionally, during this era, at least one design educator (Jay Doblin at the Institute of Design at the Illinois Institute of Technology) was calling for the integration of social sciences such as: psychology, sociology, and anthropology into design education (Latham, Tyler, & Jensen, 1956). The more formal integration of social science professionals and methods into design work will be further described in Era III, below.

Era II, Progress, 1965-1975

Era II shows progress as some industrial designers continued to incorporate and/or accept field research into the design process. However, the feeling among some industrial designers persisted that the use of rigorous scientific methods of research may limit a designer's creativity and intuitive responses to design problems; and that industrial designers should allow subjective feelings to override research (Bowen, 1964; Burridge, 1972). An idea was also developing that research was being conducted more frequently by industrial designers in professional practice; and designers and educators needed to be more aware of this shift because of the problems being presented in practice and education. Koncelik (1972), a design educator at Cornell University, discussed the problem of extracting useful information from research professionals and that designers had been increasingly engaged in field research in order to apply research to real-world design problems. This "art vs. science" conflict and the differing goals of researchers and designers persisted and spurred criticisms from some social science researchers. They suggested that many designers did not recognize the importance of human, social, and psychological aspects of products; and that designers lacked credible methods of dealing with research data.

There was a call during this era for more integration of the social sciences in design research. William Capitman (1971), a leader in market research, called for it by saying, "The designer is desperately in need of serious social science study… (p. 48). Walter Schaer (1975), a design educator at Auburn University, also called for industrial designers to be concerned with behavioral and psychological areas of study. Niels Diffrient (1973), a partner at Henry Dreyfuss Associates, promoted designer involvement in research "…in an organized and scientific sense" through participation in multi-disciplinary teams (p. 56). Some of this dialogue may have influenced the acceptance and convergence of different disciplines involved in product development during Era III.

Era III, Convergence and Development, 1976-1989

This Era is marked by an increased awareness, on the part of some product developers, that other professions were needed in the design process. A strong convergence of interdisciplinary activity, with regard to field research, occurred during this time. Additionally, the sophistication of field research methodologies employed by design teams developed significantly. This was an era where a new, research based, design methodology began to impact large companies like NCR and Xerox.

Fulton Suri, Laurel, and Wasserman indicated that a line of thinking in companies began to develop in the mid 1980s that asked questions about: How will the product be used? What are people going to think? What context will the product be used in? And what other things are people are going to be using when they use the product? Some leading firms that thought this way were IDEO (formerly ID2), Richardson Smith (later to become Fitch), and Herbst Lazar Bell. Wasserman explained that there was what he termed "cross fertilization" among disciplines where effective practices were developed and applied in a more collaborative way. For example, when Richardson Smith collaborated on the NCR and Xerox corporate design strategy projects, field data was not only gathered, but was analyzed using methods commonly used in the social sciences, such as anthropology. Field research also advanced as the human factors discipline became more concerned with user psychological issues. The addition of research methods used in the newly established discipline of computer interface and computer game design contributed as well.

At this time of convergence and development, business professionals and leaders were taking more of a lead in promoting field research methods in product design than in previous eras. However, many industrial designers were still not aware of the value of field research. Moore and Rhea pointed out that during the early 1980s conducting field research was still an unpopular approach with many industrial designers, although they promoted and conducted it in their own practice. (Moore, personal interview, November 22, 2004; Rhea, personal interview, November 9, 2004).

Era IV, Application and Standardization, 1990- 2005

During this era, many companies and firms incorporated field research methodologies into the design process. Field research became more popular, and there was a significant growth in IDEA gold winners that had used field research as part of the development process. For example, in 1989, two such products received the IDEA gold award; and in 2004 seven out of fourteen IDEA gold awarded products were designed using field research methods. This is one indication that field research, conducted by industrial designers, has become more standardized.

Sanders pointed out that a large growth area for field research in product design, where industrial designers can play a part, is during the beginning stage of the product development process where project scope and specification may be unclear (personal interview, November 11, 2004). Mike Landgraf (1992), industrial design manager at Hewlett Packard, said, "The solution is user-centered design where ease-of-use and user needs drive the product…By focusing on the users early in the product life cycle, design teams can create products that will solve real market needs." (p. 18).

This new standard in design methodology can be what Wasserman terms “new design.” New design is research based design – whereas “old design” is a more artistic or intuitive based approach. Art/intuitive based design has been the traditional approach in industrial design, partially because of its close ties with art education which relies on individual intuitive responses to design problems (Arnold Wasserman, personal interview, December 29, 2004; Darrel Rhea, personal interview, November 9, 2004). In Era IV, research based industrial design has become a standard practice with many industrial designers.

Figure 1 below shows instances of people, disciplines, products, and methods involved in field research where industrial designers were involved. The data represents what was found through literature review and interviews.

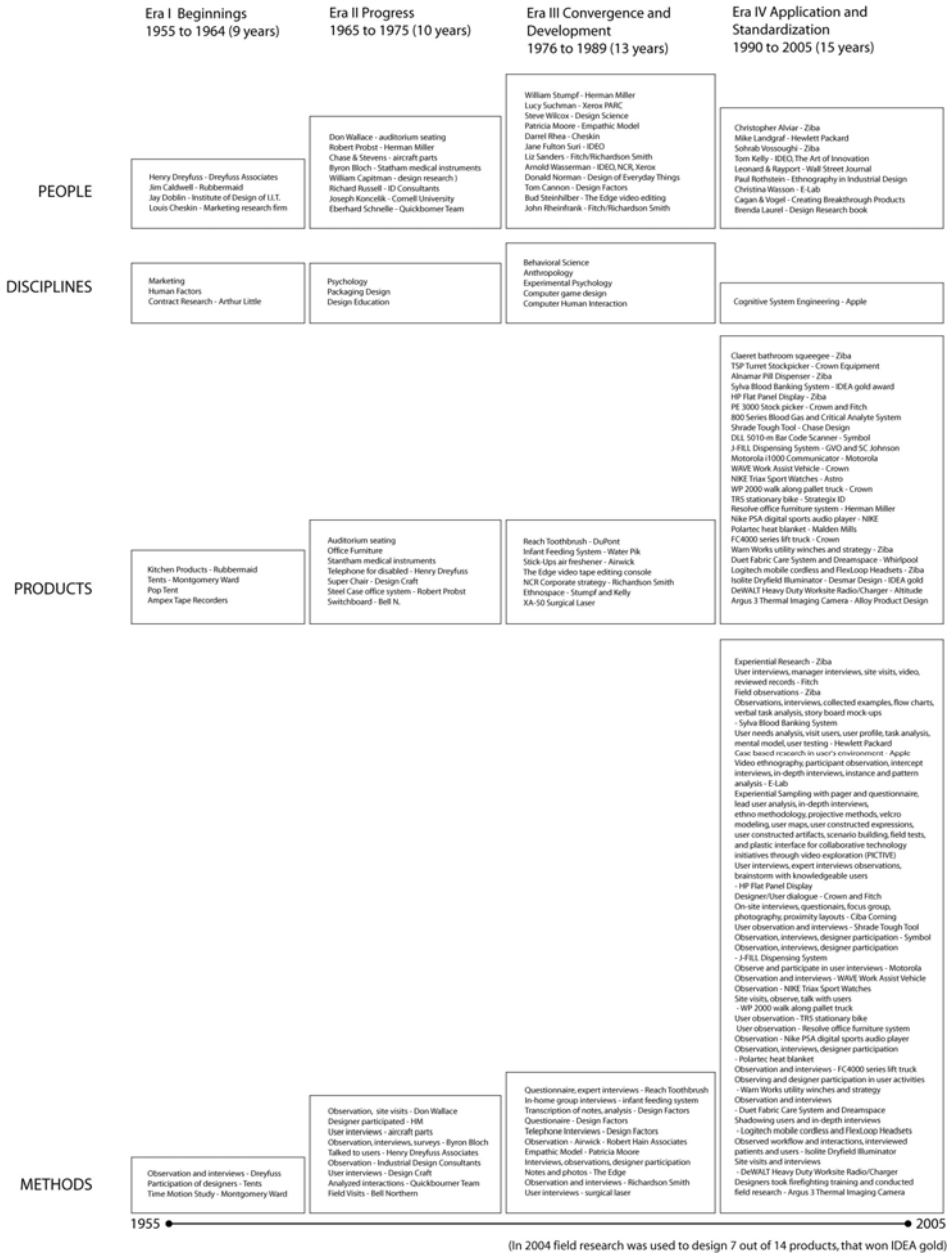

FIGURE 1. Era analysis

Barriers

While incorporating field research into the design process can be beneficial for a variety of reasons, it seems natural that there would be resistance to incorporating new methods, such as field research, where the benefits are not always easily seen or tangible. Field research inherently produces ideas, words, indications of feelings and attitudes – rather than concrete artifacts that are simpler to manipulate and more readily understood. In product development, time is a critical factor of success. The quick supply of usable information that can serve as guidelines for design is necessary. Yet it often requires much work and time to get useful information about users and present it in a way that can be applied. In 1988, The Design of Everyday Things by Donald Norman was published. In Fulton Suri's view, this influential book erroneously implied that designers actually didn't care about people. She felt that designers usually didn't have information available, and that they would use it if it was available when they made decisions – in a format that they could apply. Her experience working with designers led her to believe that designers would not resist using information if it was available (personal interview, November 2, 2004). A lack of knowledge and experience in translating research findings into actionable design guidelines can be a barrier to conducting field research. Designers are not typically trained in research methodology and should be either trained or collaborate with trained professionals in multi-disciplinary teams – if realizing the full potential of field research is desired. Additionally, the interview participants of this study unanimously agreed that direct designer involvement in data collection and analysis was preferable, as opposed to relying on research conducted exclusively by researchers.

Another need during the design process is information regarding people's attitudes, beliefs, the context of use, and unmet needs. Traditional anthropological research approaches address these issues well. Sanders describes this type of information and research as "generative" and that it is more useful in generating ideas for new products than "evaluative" research such as traditional human factors testing and marketing surveys (personal interview, November 11, 2004). Evaluative research tends to traditionally be favored by many engineering or marketing led product development teams. An unbalanced focus on evaluative design research, or lack of appreciation for generative research, can discourage field research during the design process.

Engineers and marketers are not the only barriers when it comes to incorporating field research into the design process. Apparently, an obstacle to implementing field research in the design process has been industrial designers themselves. Rhea described his experience in publicly debating the benefits of design research with Hartmut Esslinger, the founder of Frog Design (one of the more successful design firms in history, and currently in the top echelon). During these public forums in the 1980s, at design related conferences, Rhea would promote the idea of conducting design research and field work; while Esslinger would strongly denounce the activity as having little worth. Rhea also conducted design research for Dave Kelly (founder of IDEO) in the 1980s before IDEO was known for its world class design research capacity. From Rhea's point of view, a majority of the industrial design profession "either resisted it, or was highly ineffectual about it." (personal interview, November 9, 2004). Sanders encountered a similar attitude at Richardson Smith in that the designers did not have much interest in having research play a role when designing products for ordinary people (personal interview, November 11, 2004). Wasserman contends that "old design" has been, for at least the last 30 years or more, the dominant approach in industrial design. Typically many designers may have felt that they had the "expertise required and all the knowledge that they needed without having to go systematically to the field, and find out information about people." (personal interview, December 29, 2004).

Conclusion

Inclusion of the social sciences in the design process has brought a higher degree of methodological sophistication to the field research process. While using traditional methods of data collection, such as observation and interviewing, social science disciplines have helped add ways to gather and analyze data that increases the reliability and applicability of information to design. Examples of these new (or adapted) methods for design include: video ethnography, experiential sampling, cultural inventory, multi-dimensional scaling and Velcro modeling. All of these methods were developed to collect and analyze data in order to produce actionable design guidelines appropriate to the unique needs of product design. Unlike traditional scientific research, research conducted in the design context often needs to be conducted quickly; and with the intent of applying the information directly to design.

Somewhat early in the history of industrial design, marketing and human factors approaches were recognized, and either used or conducted by industrial designers. Besides its own, less formal form of field research (including observation and interviewing), industrial design has borrowed and been influenced over time by approaches offered by other disciplines through collaboration. With this convergence, field research has become increasingly popular – not only in industrial design, but in other disciplines involved in product development.

Interestingly, some industrial designers carried out field research, using methods common in anthropology prior to 1958. Methods such as observation and interviewing were used then, and continue to be a mainstay in practice today. However, this kind of field research was typically not at the level of sophistication found today, nor is there any indication that data was analyzed in a scientific way. For example, in the days of Henry Dreyfuss, observational data was gathered and probably applied directly to design. Today, interview data can be analyzed using multi-dimensional scaling tools before it is applied to design revealing additional insights.

The strategic use of field research in design is a significant shift in practice that has occurred recently. This shift can be seen clearly by analyzing the dialogue, award winners, and promotional literature found in the industrial design community. Figure 2 below, while only an estimate, describes this shift.

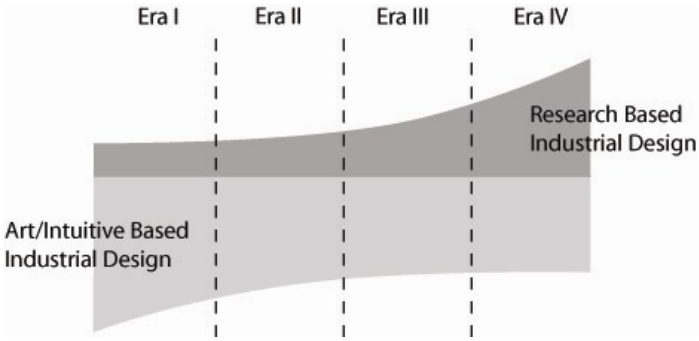

FIGURE 2. Art/intuitive based industrial design vs. research based industrial design

Not only can a shift be observed, but the potential for a new growth area of industrial design practice and education is implied. While art/intuitive based design will probably always be at the core of what industrial designers do, the opportunity for growth in research based design is considerable. By discovering product opportunities found through field research during the pre-concept stage of product development industrial designers can be elevated to a more strategic and leadership role in business.

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