

User-Centered Research: A Status Report from the Field

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Introduction

During the past twenty years, user-centered research (UCR) has become an increasingly common and important part of contemporary product development. As noted elsewhere (Rothstein, 1999), the origins of this approach to design and development actually stretch back to the beginning of industrial design in America. Starting in the 1940s and 1950s, Henry Dreyfuss, widely considered the father of industrial design in the United States, preached and practiced a method of design that clearly focused on studying people's behaviors and attitudes as a first step in designing successful products. During the next forty to fifty years, Dreyfuss's example served to motivate other highly successful and influential designers (e.g., Robert Probst, Jay Doblin, Niels Different, and William Stumpf) to adopt a user-centered approach to their design work.

The influence of their work spread industry wide starting in the mid-1980s as individuals and groups in product design eagerly embraced UCR. Many began publishing, promoting, and practicing design based on a careful and increasingly sophisticated study of consumer behavior, attitudes, and values. In fact, the field has today become somewhat crowded, with a variety of individuals authoring a wide assortment of books and journal articles that explicate, contextualize, and advance user-centered methods and processes. Researchers like Stephan Wilcox (2001, 1996) have focused on describing and exploring the link between user-centered product development and social science research, particularly anthropology and ethnography. Others, such as Kerry Dodd (2001), have contributed greatly to defining the purpose and goals of the user-centered approach. Still others (McCallion, 2001; Rothstein, 2001; Robinson and Nims, 1996) have focused on creating methods and techniques for interpreting research findings about users into new design scenarios and experiences. Finally, and perhaps most significantly, a number of individuals (Cagan and Vogel, 2002; Kelley, 2001; Ulrich and Eppinger, 2000) have developed comprehensive product development methodologies that feature a strong user-centered research component. Fully detailed and illustrated, these books have become required texts in many design education classrooms today and, as such, are significantly influencing the education of tomorrow's designers and design managers.

A careful reading of the current literature reveals three key conclusions about user-centered research in contemporary product design:

The definition and goals of user-centered research are widely understood and defined.

While individuals and groups refer to a user-centered approach in a variety of ways, there is largely a common definition to which all ascribe. In short, whether it is called empathic (Leonard and Rayport, 1997), human-centered, or discovery research and design, the approach focuses on a careful study of people's behaviors, attitudes and values as a way to

gain an understanding of how to best shape successful design strategies and concepts. The approach relies upon an increasingly diverse mix of qualitative and quantitative research methods, analysis tools and concept-generation exercises— many of which, through publication, are well known and applied throughout design practice and education.

A variety of goals have also been clearly articulated to explain the merits of user-centered research and design. The most fundamental, described by researchers like Donald Norman (1988) and Kerry Dodd (2001), emphasize the goal of connecting design to the real needs, wants and expectations of targeted consumer groups. Others (e.g., Cain 1998, Rhea 1992) stress that this type of research has broader applications that can be used to influence larger business objectives and shape new consumer-focused strategies and experiences.

User-centered research is regarded as an integral part of the design and development process.

To most, UCR is presented as an essential component of how concepts are conceived, developed and tested in contemporary design. It is involved in all parts of the design process used to best address user needs and expectations. This entails using the research during early phases to identify new design opportunities as well as testing concepts during later development and postproduction phases. As such, the UCR is defined as a tool for generating new opportunities as well as evaluating concepts in development.

The methods employed to conduct user-centered research are well defined.

Given the steady borrowing of research methods from more established social science disciplines, it is not surprising that many of the methods used to conduct user-centered research are well understood and defined. Basic methods for studying people, such as observations and interviews, come from a large body of knowledge developed over many decades by qualitative researchers in a variety of fields. Learning about these basic methods and applying them to study design problems has been relatively quick and easy.

Of greater interest is the impressive number of methods that contemporary designers and researchers have developed to address the unique problems design poses. Interestingly, these methods, the vast majority of which have been published in readily available business and design journals, apply to all phases in the design and development process. For example, cultural inventories (Robinson, 1996) and lifestyle audits (Rutter, 1996), though developed independently, are both new design research tools developed specifically to study social and cultural references in daily life. Participatory design (Sade, 2001), which is used to engage actual users in design speculations, is an excellent example of a research method developed to support design work during concept generation and development phases. Finally, a wide variety of methods (McCallion, 1999; Raynor, 1997; and Rutter, 1996) have been developed to test and evaluate design concepts with consumers prior to final development and production.

Project Description

Given all of this activity, it might be reasonable to assume that user-centered research— as a defined methodology and embedded part of design processes— has become well established, well articulated, and fully adopted as a mature body of knowledge in contemporary product

design. But is this true? Has user-centered research, as a whole, reached maturity? Or is it— or parts of it— still in an adolescent stage of experimentation? Are parts of it in an infancy stage? And how well has it really been understood and adopted throughout contemporary product design and education

Key Questions

This project aimed to explore these questions by comparing and contrasting user-centered research and design as it is understood and applied by contemporary design consultants, corporate design groups, and design educators. Organized as a basic benchmarking exercise, the project focused on exploring the following topics and questions:

Topics	Questions
Definitions	How do the groups describe UCR?
Methods	What UCR methods do the groups use?
Integration	Is UCR an integral part of the design process?
Drive to Experiment	What motivates groups to create new methods?
Measurements of Success	How do groups measure the success of UCR?

Data Collection

A sample group comprised of thirty corporations, consultants and educational institutions agreed to participate in the project (see Appendix A). Drawn from the membership of the Industrial Designers Society of America and involved in a diverse number of specialty areas, the group was selected to represent a small cross-section of contemporary design practice and education in the United States. The consultant group, for example, included mainstream product design consultants (both new and well established), as well as consultants specializing in research and testing. The corporate group comprised both large and small corporations in a wide variety of industries, including automotive, footwear, housewares, and consumer electronics. Finally, the educational group included both private and public institutions, some of which were housed in specialized art and design schools and others located in large research universities.

Semistructured interviews, based on a common interview guide, were conducted with individuals working in each of the institutions. As best as possible, the individuals were selected because of their knowledge and experience with the research and design/educational processes practiced at their respective institutions. Conducted as “conversations with a purpose” (Robson, 1993), the respondents were encouraged to respond to issues and questions using their own words and in the sequence they desired.

Analysis

The interview data, along with information derived from a comprehensive literature review and Web search, was analyzed by employing a combination of content analysis and descriptive diagramming. As a final step, the interview data was sorted according to a set of benchmarking charts organized around the key issues and questions of the project. This

activity resulted in relative percentages and clearly revealed similarities and differences between the three groups.

Findings: Definitions, Goals, and Integration

The majority of respondents defined UCR as a way to gather information about users to influence the design process.

A high percentage of the respondents (over 80 percent) in all three groups provided a description of UCR that generally conformed to this basic definition. It is important to note that the respondents were asked to describe UCR as it is actually understood and practiced in their group, not as it is defined in textbooks or journals. The responses strongly suggest that the fundamental purpose and goal of UCR have been widely comprehended and put into practice.

The language used to describe UCR varied greatly.

There was a considerable difference in the language the groups used to describe UCR. The majority of corporate respondents offered short, simple descriptions like “The role of research is to understand users” or “User-centered research would be research focused on who uses stuff and how it’s used.” While perfectly correct, these types of responses are simplistic and may suggest an absence of deeper understanding.

By contrast, the consultant and education groups tended to describe UCR in greater detail and with more eloquence. For example, one emphasized UCR as a means to “. . . elicit deep, tacit information about users’ unmet needs and aspirations.” Another stressed that UCR is “. . . based on a good understanding of user profiles. Who people are and what they do. Their attitudes and values. And then using this information to drive the creative process.”

Two major goals emerged.

There was a general consensus among all three groups that the primary goal of UCR was to influence the design process so that new or improved products address real consumer needs and expectations. This goal emphasizes the descriptive function of UCR, which results in user-based criteria from which design concepts are generated and evaluated.

A second important goal was also described by 15 percent of corporate respondents and 30 percent of consultant respondents. Some referred to it as “innovation,” others as “inspiration” or “the discovery of new ideas.” As such, this goal emphasizes the generative function of UCR, with groups using it to visualize new concepts and opportunities.

User-centered research is an integral part of the design process.

The majority of respondents (70 percent) indicated that UCR was useful from the initial phases of a project to final post-production evaluation. As such, it was seen as a key part of how products are defined, developed and tested. However, when prompted to describe when UCR was most often utilized or addressed, 20 percent of the respondents (spread equally between the three groups) indicated that it was most useful during the early phases of the process when criteria are being established and early concepts visualized.

Some respondents did not use or teach UCR.

A small percentage in each of the respondent groups indicated that they did not use UCR as a significant part of their design or educational work. Interestingly, the largest percentage occurred in the education group, where 20 percent of the respondents indicated that UCR was not integrated into their educational programs. As a result, these educators were not able to provide detailed definitions of UCR nor discuss how it had been integrated into curriculums. While the reasons for this varied slightly, the most common one was that UCR did not support “traditional” art and design educational programs. “User-centered research is not our emphasis,” one educator noted. “We’re more interested in the cultural part of the equation of design as opposed to the problem-solving aspect. The work here is less about trying to solve problems, and more about designers coming up with a personal point of view and communicating that through design.”

Findings: UCR Research Methods

Basic methods are well understood.

The majority of all respondents were familiar with basic UCR methods like observation, interviewing, and surveying. Of those, most were able to provide a definition of the methods and examples of how the methods had been used on projects to gather information about users.

A discrepancy between formal and informal application.

A clear distinction emerged between respondents who employed UCR methods formally and those who did so informally. The distinction related specifically to how rigorous and systematic the respondent group was when applying research methods. Informal observation, for example, might involve a research/design team heading off to mall and, with no previous preparation, observing people as they shop. By contrast, formal observation might involve observing people in the same environment but equipping the research/design team with a detailed observation guide and object inventory form. As suggested, the use of formal methods implies a much greater level of knowledge and skill about basic research methods and processes.

The majority of consultants (70 percent) seemed to apply research methods formally. Many could identify a range of research methods and provide a fairly detailed description of the process involved in planning and conducting research with specific methods.

The corporate group was more evenly divided, with close to 50 percent of the corporate respondents applying research methods informally— that is, without a great deal of rigor and discipline. Some respondents noted, for example, that in-depth research was not possible due to budget and schedule pressures. Others indicated that unstructured research— spontaneous mall intercepts, for example— was simply “good enough.”

In education, 70 percent of the respondents indicated that they taught and/or applied methods formally, while 30 percent of the respondents applied them informally. Those in

the formal group said were generally able to identify a variety of methods and describe in detail what students were expected to do when applying the methods. It should be noted, however, that close to a half of these educators also noted that their programs did not include any formal coursework focusing on research methods, terminology, or processes.

Interview Findings: The Drive to Experiment

Lack of interest in the corporate group.

Seventy percent of the corporate respondents noted that they did not explore or create new research methods to study users. Articulated reasons for this condition include the following:

- ?? The need for new methods is not apparent when companies design and manufacture the same set of products for the same consumers over a period of years. These companies often feel their existing techniques and methods describe the market adequately.
- ?? The development of methods for studying consumers is often a responsibility of a separate marketing departments in many corporations.
- ?? Design groups are not provided resources to explore new methods.
- ?? Hiring specialized design research consultants is always possible when new methods and approaches are required.

New methods are often created by modifying existing ones.

Many respondents in this study were well aware that new design research methods had been created during the past decade or so. Nearly 40 percent of the respondents in the consultant and education groups noted that they actively explore the development of new methods. Interestingly, they most often accomplish this by borrowing existing methods from other design/research groups, the social sciences, ergonomics and/or marketing, and modifying them to suit a design context. "I would say we use sort of tried and true techniques," one consultant said, "but we maybe have our own twist on them."

Different motivations fuel experimentation.

For those innovators in the consultant group (40 percent), the drive to explore new methods was fueled by a set of related factors: economic pressure to provide quality research at reduced costs and in less time; an on-going need to clearly connect research findings to subsequent design work; and a desire to differentiate from other design or research consultants.

In the education group, over 80 percent of the respondents emphasized that students in their programs are encouraged or expected to explore new research methods. As such, the primary engine of innovation is education and student work. In fact, most educators required students to investigate methods on their own. As one noted: "Our students are encouraged to do whatever they want to understand users better."

Findings: Measuring the Success of UCR

Difficult to Measure

While the corporate and consultant respondents acknowledged a desire to measure the success of their research, close to 30 percent indicated that this was difficult if not impossible to do with any degree of confidence. According to these respondents, the primary reason for the difficulty was that UCR had become so embedded in their design processes that separating it to evaluate its effectiveness was not really possible.

Mix of Factors

Other respondents identified a variety of factors they used to gain insight into the success of their research. Two general observations emerged as the responses were evaluated: first, that there were no dominant measurement factors used by corporations and consultants and, second, that all of the respondents used a mix of internal and external factors to evaluate the effectiveness of the research.

The corporate group was clearly the least articulate in defining how they measured success. This was evidenced by a low response rate to questions and probes about measuring the success of UCR and also by a low number of defined factors (seven total). Of these, 20 percent of the corporate group indicated that they primarily measured the success of the research by, one, evaluating how/if the final product delivered the intended benefits to consumers and, two, how the product performed in the marketplace. A smaller percentage from this group (less than 20 percent) suggested that success was also measured by a few key internal factors, including:

- ?? a positive impact on the thinking and performance of development teams.
- ?? answers to essential questions posed as the research began.
- ?? a clear direction in terms of design opportunities and solutions.
- ?? cost effectiveness.

Respondents in the consultant group were slightly more prepared to identify factors for measuring success, and 40 percent of the respondents in this group measured it primarily by evaluating the market performance of a product. A couple of the respondents noted that they accomplished this by gathering feedback from clients and end users. Others measured it by actual sales totals. The consultant group also echoed many of the secondary factors their peers in corporations had identified, with a number of interesting additions:

- ?? The research contributed to industry recognition.
- ?? The research uncovered unexpected insights.
- ?? The research clearly influenced decision making.

In the education group, there was a much greater consensus about measuring the success of UCR (though many suggested it was hard to separate it from measuring the success of UCR due to the way it had been integrated into their program). In fact, 70 percent of the educators measured it by evaluating student performance on design projects. In this regard, the key indicator of success was whether a student successfully addressed significant research

findings about users in a final design concept. Many educators also relied on a variety of external factors to determine the effectiveness of UCR. Of these, the placement of students in industry scored high with over 60 percent of the respondents identifying it. 40 percent regarded industry recognition (e.g., design awards) as indicative of success, while 30 percent relied on external advisory parties (i.e., advisory boards or professional organizations like the IDSA) to provide input about the effectiveness of their research functions. Finally, under 20 percent of the education respondents identified feedback from industry employers and former students as a meaningful measure of success.

Lack of Details About Measurement Tools

While the respondent groups were able to identify a variety of factors for measuring the success of UCR, the vast majority of them did not offer any details about how they accomplished it (in spite of probing by the interviewer). For example, while 40 percent of the consultants identified market performance as a key factor, less than 10 percent offered details about how they collected information about it (e.g., collecting sales totals from clients at three month intervals or developing surveys to obtain feedback from users). Similarly, 70 percent of the educators insisted that student performance was a key factor when determining the success of the research. However, in spite of probing, the majority of educators did not offer any details about how the evaluation was accomplished other than through traditional critiques during which faculty “. . . filter and assess the students’ work.”

Conclusions

This research project set out to provide a snapshot of how user-centered research is understood and applied in contemporary design practice and education. As a small study based on a very limited number of respondents, the project has severe limitations and should not be considered as an accurate or comprehensive description of product design and education today. Nonetheless, the findings are based on a legitimate sampling and provide fertile material for drawing a few suggestive conclusions.

UCR is well known but not necessarily well understood

The results of this small study clearly suggest that there is a high degree of awareness about user-centered research in contemporary practice and education. Evidence for this is found in the generous amount of information available about UCR and in the respondents familiarity with UCR.

That being said, a large challenge remains in understanding, articulating and disseminating a clear and concise description of UCR. The study revealed a wide variance in how individuals and groups described UCR and, as such, raised questions as to how well UCR is really understood.

The responses of the sample groups, for example, displayed notable differences in *language* and *quality of understanding*. On the one end of the spectrum, a percentage of individuals from all three groups (largest in the corporate group) offered simple, vague and superficial definitions of UCR. On the other end of the spectrum, a variety of respondents from the

consultant and education groups provided descriptions that clearly expressed a deeper understanding of the purpose and value of UCR.

Simple	Complex
“We define it by just talking to users— the everyday person as well.	“We call it generative research, which is more qualitative, discovery-type research.”
“ . . . research focused on who uses stuff and how it’s used.”	“It’s based on a good understanding of user profiles . . . and using that to drive the creative process.”
“We’ve got to understand how people use things.”	“ . . . we come at it as being physical, social and cultural, and we’ve added emotional and ecological . . . the things we design need to fit into people’s lives along those dimensions.”

These verbal responses can be contrasted with definitions described in textbooks and articles about UCR. In this medium, clarity and depth are norms. “Experience-based Design (note: another name for UCR),” writes John Cain, “is a process that employs a deep understanding of people’s everyday product and service use and experience and applies it to inform and shape business objectives and goals” (Cain, 1998; p. 11). Or, more simply, “The techniques of empathic design [another name for UCR] are gathering, analyzing and applying information gleaned from observation in the field” (Leonard and Rayport, 1997; p. 104).

Healthy amount of experimentation and development occurring.

The development of new methods and approaches for studying people in a design context is one of the most impressive features of UCR in contemporary design. This study revealed that consultant groups are the most active in this area. This is perhaps not surprising given the pressures and competition consultants face on a daily basis. Developing more effective research and design methods provides tangible benefits to consultants, including: a unique identity in a crowded marketplace, a competitive edge, and the opportunity to streamline internal development processes.

Localizing the source of new research ideas and approaches to a relatively small group of practitioners, however, creates a significant communication challenge for the profession as a whole. In short, it becomes essential that effective communication channels be established to transfer the knowledge created by these individuals and groups to other practitioners and educators. This study revealed that a variety of effective communication channels already exist (e.g., journal articles and books) and that the current “research innovators” regularly contribute.

Design education was also identified as a source for new ideas and approaches. A variety of educators noted that they encourage/require students to create fresh ways to study and understand users. While the intention of these educators is perhaps admirable, positioning undergraduate students as the primary source of new knowledge raises serious questions as to educational purpose and effectiveness. In fact, a disturbing pair of conditions was

revealed in this study. On the one hand, 80 percent of the educators stressed the importance of using student work to create new research methods and approaches. However, only 30 percent of the educators indicated that their programs included any formal coursework in basic research theory, terminology, processes and methods. In short, the majority of education respondents expect students to experiment and innovate with methods and approaches without equipping those students with fundamental knowledge about research.

Measuring the success of UCR— the last frontier.

How respondents measured the success or failure of UCR emerged as the most significant challenge facing proponents of UCR. While perhaps understandable, this deficiency is significant in that a compelling argument for the effectiveness of UCR becomes difficult in isolation of reasonable and appropriate measurements. Wisely, many of the respondents identified a set of factors to measure the effect of UCR. With probing, however, it became clear that most of the respondents were either unwilling to discuss their evaluation methods in detail or unaware of existing tools and systems for measuring these factors. Nor did many share news about new methods or approaches they had developed to get at this key information – which, of course, stands in stark contrast to their eagerness to discuss the new methods and approaches they had developed for gathering information about users.

Given the professional roles of each of the groups, it is highly likely that innovation in this area will again occur primarily with consultant groups since measuring and, to some extent, quantifying the effectiveness of their processes can play a significant role in selling their service. The educator group could also play a vital role in terms of faculty and graduate research focusing on the exploration and development of evaluation methods drawn from a variety of disciplines. In either case, the challenge seems to consist of exploring and specifying effective measurement tools while disseminating that knowledge widely for the betterment of all involved in contemporary product development.

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Appendix A

Corporation Participants– Focuses and Locations

	Major Focuses	Location in United States
Corporation 1	Automotive	Western
Corporation 2	Personal Care/ Household Upkeep	Central
Corporation 3	Footwear/Apparel	Western
Corporation 4	Computers/Electronics	Western
Corporation 5	Electronics	Eastern
Corporation 6	Bath/Kitchen Hardware	Central
Corporation 7	Personal Care/Household Upkeep	Eastern
Corporation 8	Kitchen Utensils	Eastern
Corporation 9	Household Upkeep	Central
Corporation 10	Outdoor Sporting	Western

Consultancy Participants– Focuses and Locations

	Major Focuses	Location in United States
Consultancy A	<i>Varied Products</i>	Central
Consultancy B	<i>Varied Products</i>	Central
Consultancy C	<i>Varied Products</i>	Central
Consultancy D	<i>Varied Products</i>	Eastern
Consultancy E	<i>Varied Products</i>	Eastern
Consultancy F	<i>Varied Products</i>	Central
Consultancy G	<i>Varied Products</i>	Western
Consultancy H	<i>Varied Products</i>	Western
Consultancy I	<i>Varied Products</i>	Western
Consultancy J	<i>Varied Products</i>	Western

Appendix A (continued)

Education Participants— Institution Types and Locations

	Public or Private Institution	Location in United States	Undergraduate and/or Graduate Program
School I	Private	Eastern	Undergraduate
School II	Private	Central	Graduate
School III	Private	Central	Undergraduate
School IV	Private	Western	Undergraduate/Graduate
School V	Public	Central	Undergraduate/Graduate
School VI	Public	Eastern	Undergraduate/Graduate
School VII	Public	Central	Undergraduate/Graduate
School VIII	Private	Central	Undergraduate/Graduate
School IX	Public	Eastern	Undergraduate/Graduate
School X	Private	Eastern	Undergraduate/Graduate