

Needfinding: *The Why and How of Uncovering People's Needs*

ALTHOUGH Robert Becker and Dev Patnaik acknowledge that needs don't generate specific product or service solutions, they know that the science of needfinding can be a dynamic platform for design. The authors define terms related to this process and outline the steps that help identify development opportunities. Critical need-finding principles include letting consumers guide the flow of research, collecting data in a variety of different forms, and integrating research and design in a series of iterative stages as a way to fine-tune results.

by Dev Patnaik and Robert Becker

In 1993, Apple Computer released the Newton MessagePad to great fanfare. This personal digital assistant (PDA) offered all the functionality of a desktop computer in a device that was only slightly bigger than the palm of one's hand. Although the product featured cutting-edge technical innovations, the MessagePad sold poorly, and Apple canceled the line in February 1997.

Apple had toiled to create a device that solved all the problems of portable computing but produced a product that was too slow and too big. Moreover, at least initially, it was unable to fulfill its promise of quick and accurate handwriting recognition.

Apple's vision for digital assistants remained unrealized for the better part



DEV PATNAIK,
FOUNDER/PRINCIPAL,
JUMP ASSOCIATES



ROBERT BECKER,
FOUNDER/PRINCIPAL,
JUMP ASSOCIATES

of a decade, until Palm Computing introduced the Pilot. Like Apple, Palm Computing had previously attempted to create a handheld desktop—the Zoomer—and had met with equally poor results. Palm decided to study Zoomer customers to get a better understanding of how people were using digital assistants. The results were unambiguous: Customers used the calendar and address book features but ignored the spreadsheet and word-processor functions. On the other hand, virtually all of them bought Zoomer's optional link to a desktop PC. Conclusion: Users weren't looking for a replacement for desktop computers; they wanted a replacement for their personal organizers.

Armed with this understanding,

developers limited the Pilot's feature set to simple address book and day planner functions. This strategy allowed Palm Computing to make its product small enough to fit in a shirt pocket and simple enough to start instantly at the touch of a button. By understanding the needs of its customers, the company was able to create a PDA that didn't solve all the needs of portable computing but solved the most important ones rather well. Where Apple executives were seduced by the promise of advanced technology, Palm's developers instead used their experience with the Zoomer to get an understanding of what their customers needed and did not need. Today, the PalmPilot is the most successful general-use PDA on the market.

The PDA story is an example of an industry struggling to characterize the needs of customers who don't yet exist. How does a company expose these unspoken needs? Traditionally, firms have used market research methods, such as surveys and focus groups, to get information about people. These methods work well in quantifying customers' preferences among existing solution options, but they do little to identify the needs people can't readily articulate.

To acquire more qualitative information on customers, some companies have begun using research methods drawn from sociology and anthropology.

These social research methods result in a rich description of people's behavior, interactions, and environmental conditions. However, they tend to be more descriptive than prescriptive. In other words, they rarely focus on the needs and consequent business opportunities that customers present. For the full potential of qualitative research to be harnessed, it must be better integrated into the process of design and

development. It has to link the activities of marketing with those of design professionals. And it has to focus on needs.

Needfinding

Thirty years ago, a designer named Robert McKim, who was then head of Stanford University's product design program, was searching for a way to help designers get closer to end users. McKim noticed that the leaders in any organization were people who found important new problems to work on; they were not necessarily the ones who ultimately solved the problems. From this, he hypothesized that designers who wanted to have the greatest impact on

product development needed to be involved at the earliest stages of product definition. As a response, McKim began synthesizing a qualitative research approach to studying people to identify their unmet needs. He termed this approach Needfinding.

Needfinding has developed considerably over the last three decades. At Jump Associates, we have articulated and extended the Needfinding approach in response to the growing understanding of qualitative research methods. As part of our ongoing work with internal design departments, we have helped train client organizations in the basics of Needfinding. This involved drawing on related source material from the social sciences, as well as creating new methods that complement the product design process. This article draws on much of that work, and is intended to provide an overview of Needfinding's core methodology.

Why Focus on Needs?

Most designers intuitively understand that needs are important. They know that they do their best work solving people's problems when they clearly understand what those problems are. However, an understanding of people's needs can be leveraged across an entire business activity, providing value beyond the development of any single product. The points below examine how a research effort focused on needs helps companies to plan short- and long-term product development and allows design managers to determine which problems they should solve first.

NEEDS LAST LONGER THAN ANY SPECIFIC SOLUTION.

Solutions come in and out of favor faster than the needs they serve. Punch cards, magnetic tape, and 5 1/4" floppy disks have successively moved from introduction to obsolescence. However, the underlying need to store computer data has existed throughout the lives of each of those products and continues to exist today. Because people's needs endure longer than solutions, companies should focus on satisfying those needs rather than on producing a particular product. Thinking of the company as a provider of a solution may encourage the company to continue improving that solution, but it rules out creating entirely new offerings that satisfy the need in different ways. Conversely, focusing on needs encourages companies to continue innovating better ways to serve those needs, independent of current solutions.

NEEDS ARE OPPORTUNITIES WAITING TO BE EXPLOITED, NOT GUESSES AT THE FUTURE.

Strategy and product development need not depend solely on predicting the future. A crucial part of that

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future already exists today. While solutions that eliminate needs do occasionally appear, the problems that currently trouble people are likely to continue into the future. Working to solve them is less risky than creating a plan around a prophecy of what tomorrow holds. By understanding people's needs, companies can better gauge whether consumers will be interested in a new product.

NEEDS PROVIDE A ROADMAP FOR DEVELOPMENT.

Consumer needs give companies a method for determining what corporate skills and new offerings should be developed to grow their businesses. A company may not currently have the capabilities necessary to satisfy all those needs, but by identifying the ones that cannot yet be satisfied and working toward meeting them, the company can chart a future development path. Ten years ago, Eastman Kodak customer studies helped the company realize that people didn't just want film and photo processing; their underlying need was to capture and enjoy images of daily life. Kodak developed a road map to better satisfy that need, gradually advancing into areas such as photo CDs and image manipulation software. Kodak originally knew relatively little about creating imaging software for home computers, but because such knowledge was crucial to serving its customers' long-term needs, it developed the necessary capabilities over time.

NEEDS SPUR ACTION.

Unless it emphasizes needs, qualitative social research can only create a picture of the customer's experience; it will not uncover ways to improve that experience. Even the most detailed description of customers' behavior and environments won't help product developers if it doesn't expose opportunities for action. Once a need has been identified, designers can visualize a problem to be solved.

NEEDS ARE OBVIOUS AFTER THE FACT, NOT BEFORE.

People become acclimated to their problems, often developing work-arounds to circumvent a need. In doing so, they can become oblivious to the need's existence.¹ Again, research that relies on the customer's description of a situation may never uncover this need. Because many needs are apparent only after they've been solved, research focused on needs suggests opportunities that competitors may not recognize. For example, consider India-based Bajaj Auto, the world's largest motor-scooter manufacturer. Until recently, most Bajaj scooter owners insisted that they were happy with the way the product operated. Yet before starting a Bajaj scooter, the rider would have to tilt it to fill the eccentrically mounted engine with fuel. Bajaj owners recognized this problem only after Honda

introduced a model in India with a center-mounted engine that didn't require tilting. Honda went on to make significant inroads into the market Bajaj had previously dominated.

What are the central principles of Needfinding?

Needs can be difficult to detect. Although previously undiscovered needs occasionally appear to designers by happenstance, most of us aren't that lucky. Uncovering needs *reliably* requires an organized research effort. Needfinding gives designers and companies the tools necessary for illuminating needs and using them for product development. The following points characterize the philosophy behind Needfinding.

LOOK FOR NEEDS, NOT SOLUTIONS.

Looking for needs rather than specific solutions keeps all possible solutions open for consideration and avoids prematurely limiting possibilities.

Needfinding researchers state needs independently of ways those needs might be served. For example, a store clerk might need to get some boxes from a high shelf. Instead of stating that the clerk needs a ladder, a Needfinding researcher would record that he needs access to boxes on the top shelf. The need leaves open possible solutions that range from using a forklift to rearranging the boxes to coming up with an entirely novel technology.

MAKE RESEARCH AND DESIGN SEAMLESS.

Needfinding researchers are often designers trained in research methods or researchers taught how to conceptualize designs. They may approach the process from a traditional marketing background. In any case, these researchers are involved in both studying people and conceptualizing new products. This approach allows for a seamless transition between research and design. The research is guided by the information necessary for product development, and the design work is conducted with a tacit understanding that could only be acquired by carrying out the research. Translation between the research and design stages of a project is greatly reduced, and both phases of the project are more effective, knowing the requirements of the other phase.

1. Rolf Faste, "Perceiving Needs," a paper for the Society of Automotive Engineers, 1988.

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How to do this within systems, with so many stakeholders? Especially in disaster situations, where the critical behavior scenarios are so infrequent to observe

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GO TO THE CUSTOMER'S ENVIRONMENT.

Researchers obtain the richest information on people's needs by observing and interviewing customers first-hand. The researchers can then directly see many small but important details about the customer's activities and the context in which they occur—details that wouldn't be available outside that context. **By directly observing customers' activities, Needfinding avoids reliance on customers' memory, descriptive ability, or awareness of a need.** In addition, the customer's environment facilitates communication between the researcher and the customer by allowing them both to refer to and use objects in the environment during the discussion.

LOOK BEYOND THE IMMEDIATELY SOLVABLE PROBLEM.

Researchers—especially designers conducting research—often don't see beyond problems that they can immediately solve. This impediment unnecessarily limits the information gathered. To gain the full value of conducting research, Needfinding asks researchers to record and analyze issues that may seem far beyond the scope of the immediate project. Recognizing and dissecting these deeper problems allows the company to plan for issues that should be fixed down the road, even when those problems aren't currently solvable.

A scooter manufacturer, for instance, discovered that customers were annoyed by how dirty their clothes got as they rode to work. Although this couldn't be helped in their new scooter design, they still marked the problem as an issue that could provide opportunities for long-term innovation.

LET THE CUSTOMER SET THE AGENDA.

Although researchers may go to the customer's environment knowing what kind of information is desired, it's important to give the customer leeway to guide activities and discussions. In Needfinding research, customers control the proceedings—at least to the extent that their activities and discussions relate to the research topic. This prevents researchers from prompting the customer on what to do next, and keeps the study open to serendipitous insights.

COLLECT ECLECTIC FORMS OF DATA.

Information about people comes in many forms. A facial expression might express a person's emotions better than her words. Keepsakes found in an office might reveal information about a person's relationship with his work. Needfinding researchers record all these forms of data for later study away from the site, as analyzing data in the customer's environment distracts the researcher from collecting it. **Researchers often pay special attention to contradictions between different sources of data, as these contradictions often mark unrecognized or unarticulated needs.**

MAKE FINDINGS TANGIBLE AND PRESCRIPTIVE.

Written descriptions alone often don't make the customer's needs real to those who haven't been involved in the research. To make decisions based on the research, the findings must be presented in a vivid and actionable form. The needs are better understood when supplemented with drawings, photos, audio recordings, and/or video. Because Needfinding leads to design, researchers also recommend what might be done to satisfy the customer's requirements. Providing the results in a prescriptive, tangible form allows for a smoother transition between studying people's needs and creating new ways to meet them.

ITERATE TO REFINE THE FINDINGS.

Needfinding uses many quick passes to study people, rather than one long research effort. This approach allows design work to proceed in parallel with the research. After each pass, the researchers offer a draft of the findings, outlining their current understanding of customers' needs and contexts. Preliminary design work can then begin, based on this early hypothesis. When more information is needed to complete a design, researchers return to the field for further study. As the researcher-designers gain a better understanding of people's needs, they also refine the products created to serve those needs.

What Is the Needfinding Process?

These principles manifest themselves as an iterative, four-stage process for studying people. They determine the approach used by researchers at every step of that process. The goals of each stage are described in general terms below, followed by descriptions of a few specific methods recommended to achieve them.

FRAME & PREPARE

At this stage, determine the research goals, the customer group being researched, and the specific sites to visit. These decisions focus the research and define a manageable scope for researchers to cover.

Preparation before going to the customer's environment helps researchers to know what questions to ask and what information to look for.

- **Frame the research questions.** Before beginning any research, explicitly decide on the goals of the study. Determine the three questions, for example, that the research should answer. These questions may concentrate on topics such as how objects are used in the environment, how environmental conditions affect people's behavior, how people within the environment interact with each other, or how different types of customers might be classified. The search for answers to these questions then guides the researchers in gathering data.
- **Define the needer group.** Needer groups, the groups of people being studied, generally have a mainstream core, along with sub-groups of extreme users. For example, eating is about as ubiquitous an activity as one can find in humans; yet within the topic of food, there are people whose needs are fairly typical and others with rather extreme needs. School lunch providers, survivalist campers, and astronauts have needs that are unique or more pronounced than those of the mass population. Studying extreme users can highlight needs that might not be noticed from studying only the mainstream group. Yet when a solution for these extreme needs is developed, it's often adopted by the larger group. For example, Tang was originally created as an orange juice substitute for astronauts, but mothers adopted it as a nutritious, quick breakfast drink for their children. At the same time, studying only extreme user groups can result in overbuilt product specifications, so the general populace should also be researched to get a sense of mainstream needs.
- **Study established data for grounding in the subject.** There's no sense in expending resources to rediscover information that has already been published. Study publications, expert interviews, and other established sources to grasp the current level of understanding on the topic. Go to the field only when secondary sources are well understood. As well as decreasing the cost of field research, studying secondary sources also imparts a basic knowledge of the customer's situation that helps demonstrate credibility to the needer group in later stages of Needfinding.

WATCH & RECORD

People are often so accustomed to certain problems in their lives that they become oblivious to them. When asked about the situations in which these latent problems occur, they frequently fail to recognize that the problems exist at all. Directly observe

people's behavior in their own environments to gain a clearer understanding of their situations.

- **Immerse oneself in the needer group.** Becoming a member of the group and immersing oneself in that group's context gives designers an especially rich understanding of the group's needs. That's why many designs, such as bifocals, the Band-Aid, and the Post-it Note, originate from designers making products for themselves. With an intimate knowledge of the problem, the designer can make more-informed decisions about how to meet the needs he or she is trying to serve.
- **Avoid intrusions to keep the behavior natural.** Studying people's activities inherently changes their behavior. Interruptions can change people's workflow, and questions can make them reconsider their actions. In addition, people alter their behavior when they know they're being observed, because they want to make a good impression. To minimize these effects and keep customers' behavior as natural as possible, limit intrusions into their environment and actions. Wear clothing and speak in a way that's appropriate for the subject's environment. Refrain from inquiring about the activities being observed until after those activities have been completed.
- **Use appropriate recording media.** It's often difficult to describe something using words alone—especially when trying to record large amounts of data in a short time. Use additional recording media to capture the richness of information in the customer's environment so that it can be further studied later. Video, audio, photos, and drawings each offer different advantages. Decide what kinds of information will be important to the study, reasonably easy to capture in the customer's environment, and minimally intrusive to the customer's activities. Then proceed accordingly. Video allows one to later review real-time processes in detail. Audio recording captures environmental sounds and exact wordings more inconspicuously than video. Photographs portray images of reality that can be easily categorized and sorted for comparisons. Drawings can capture details invisible to the eye, such as obscured features and object cross sections.

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ASK & RECORD

Observation alone can't tell researchers everything they want to know. Observation may offer occasional indirect indications, but generally doesn't give clear access to people's reasoning and emotions. To better understand these motivating factors, interview people after the observed activities have been completed to understand the context in which those activities just occurred.² Answers to questions and further discussions can give researchers insight into why a person acted in a certain way and what he or she felt during the observed situation. This is crucial information for determining people's needs.

- **Interview in the customer's environment.**

Conduct Needfinding interviews in context, while the issues are still fresh in the person's mind. In these types of interviews, customers can walk through the process under study a second time, explaining emotions and reasoning as they go. Also, both the researcher and the customer can use relevant props in the surroundings to illustrate their points. These references to objects in the environment often trigger the customer to recognize previously latent needs.

- **Record information in the customer's terms.**

When documenting a discussion with a customer, record the person's

statements in his or her own words as much as possible. That person's choice of words can carry meaning that would be lost if the researcher were to translate them. That said, though, the customer may make statements that are too general to guide design work. In such cases, use follow-up questions to get to the desired level of detail, still recording the subsequent answers in the customer's words. Open-ended questions are especially useful for this purpose, as they give customers an opportunity to describe situations in their own words. **In addition, it is often useful to have customers interpret video recordings of their own activities, explaining the motivation for their actions in their own words.**

INTERPRET & REFRAME

Once data is collected, the final stage of the Needfinding process is to interpret the findings and revise the research questions. Information collected in the customer's environment helps refine one's understanding and prepares the team for another iteration of research. Product development can then

continue in parallel to the ongoing Needfinding activity. **Because Needfinding is about studying people, as well as developing products, always frame interpretations in terms of what problems need to be solved to improve the customer's situation.**

- **Create need statements.** Translate the information collected into statements describing customers' needs. Although some of the information will unavoidably remain as tacit knowledge in the researchers' heads, as much of the data as possible should be paraphrased as written need statements. The better the customer's needs are understood and documented, the better the product developers will be able to make informed decisions in their design work.
- **Classify and prioritize the needs.** After the research data has been expressed as need statements, classify them by level of generality and place them into a formal hierarchy of importance.³ This hierarchy later guides decision making during the product development process, when tradeoffs can be made according to options that serve the more important needs.
- **Reframe the research.** **After observing and talking with a few customers, one is likely to find that the research questions should change and the needer group should be redefined.** For example, after beginning a study of how touring motorcyclists use and obtain the things they need on a ride, one might find that the needer group should be sub-divided into bikers whose travel is generally limited to day trips, and those who enjoy longer journeys. Object use may differ greatly between the two groups. At the same time, new questions may emerge from the ongoing design work. The designers may find unanticipated issues that must be answered to advance the design.

Each of these four stages should be repeated to provide an increasing level of focus and detail. The process is analogous to developing a pencil sketch from a marker rendering into a solid-body model and finally a physical form. In each iteration, the activities appear quite similar. Yet each revision increases the designer's sense of certainty as he or she moves from ambiguity to clarification.

2. See Stanley Payne, *The Art of Asking Questions* (Princeton, N.J.: Princeton University Press, 1951) for a particularly useful discussion of how to phrase research questions.

3. Karl Ulrich and Steven Eppinger, in *Product Design and Development*, ch. 3 & 4 (New York: McGraw-Hill, 1995), offer a rigorous method for creating and prioritizing need statements.

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Conclusion

Companies face constant pressure from competitors to improve their offerings. This has pushed product development organizations to optimize their processes around incremental improvement. As the traditional link between a company and its customers, marketing professionals have asked end users to articulate opportunities for immediate improvement. Design and engineering has then been chartered to make these improvements real. This approach has had notable success in industries in which linear improvements in performance—faster, smaller, cheaper, using less power, and so forth—are most desired.

However, this approach breaks down when companies seek to completely rewrite a product's specifications or create something entirely new. While people can easily express their preferences among a set of known options, solutions that aren't immediately apparent can go unvoiced. Companies can find that their customers express a desire for an improvement only after a competitor has created it. This forces marketing into the reactive role of asking for things that the competition already has. Developers, in turn, find themselves working toward a deadline that has already passed. When linear

improvements fail to provide a decisive advantage, new opportunities must be discovered in advance.

Needfinding offers product developers a different dynamic for understanding customers, one that has a role for both marketers and designers. The methodology outlined here is a broad overview of how those involved in product development can preemptively discover opportunities for competitive advantage. Needfinding is not the exclusive territory of any one discipline; both marketers and designers need to work together to discover customers' needs. These needs, in turn, suggest areas of innovation for designers, as well as new markets that await development. The result is a dialogue between company and customer rather than between marketing and design. In this way, both groups can work together to create innovative new solutions and leap past competitors devoted to incremental change. ♦ (Reprint #99102PAT37)

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