Contextual Inquiry in Practice

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"What are we supposed to do?" an engineer asked us. "Knock on people's doors, asking them to let us watch them use our product?" The answer in this case was "Yes, do that." Not without setting up the visit ahead of time, of course, and there's some planning to do, but in the end it all comes down to showing up and watching. Sometimes the most difficult barrier to introducing a new way of working is people's assumptions about what is or is not "done."

But once people accept the idea that they are going to do something they never considered a possibility before, they need to know exactly what steps to follow. Otherwise no real action can take place. We're now ready to discuss the concrete actions that will enable a Contextual Design project to get started. We will deal with team formation in a later section; here, we will describe how to set the focus for a project, how to plan who to talk to, and variations on the data-gathering process that may be required by different problems.

SETTING PROJECT FOCUS

Before you can do useful work, you must define the problem you intend to solve in terms of the work you plan to support. Typically, a project's mission is defined in terms of the solution it will deliver: "an ordering system for all departments," "the next version of product X," "an electronic clipboard for doctor's offices." (As we discussed in Chapter 2, this is the kind of problem statement that is usually given to the project team by marketing or by the internal client.) To figure

out what to do next—who to talk to and what to look for to decide what is important in this domain—the project team must transform this statement about the solution into a statement about the work.

Your initial project focus will usually be too narrow, too much restricted to exactly the work of the tool you expect to build. To see

Broaden your focus to include the whole work process

the whole work context and identify opportunities and potential problems, you want to expand the focus beyond tool use. Ask: What is the work we expect to support? How does this work fit into the customer's whole work life? What are the key work tasks? These are the aspects of work to find out about. Who is involved in making the work happen? Who are the informal helpers? Who provides the information needed to do the job, and who uses the results? These are the people to talk to. Where does the work happen physically? What is the cultural and social context in which the work happens? These constrain the interview situation you can set up. These questions will guide you in thinking about how your system fits into your customers' overall work. Use them to identify what kind of people you want to interview, what tasks you want to see performed, and what you want to watch for while you're there. Remember this is a focus, not a checklist. Use it to guide what you pay attention to during the interview.

To expand your perspective on the work, look for metaphors for the work—unrelated kinds of work that have the same structure as the

Study analogous work to stimulate insight into how work is structured

work you want to support. If you are studying online search and retrieval, you can study how people search for physical objects in libraries and grocery stores. This will help you understand the basic structure of finding, independent of technology and content. If you are studying PC maintenance groups, look at taxi dispatch services; the maintainers need to go out on calls without losing contact with a central organization in much the same way that a taxi is dispatched by the central office while maintaining contact with the office and with other taxis. Studying a taxi service would give insight into the problems of maintaining this kind of coordination and suggest different ways of organizing the PC maintenance group. Metaphors like this give you insight into the work you are supporting, suggesting hidden aspects that might be important. Use the metaphor to structure your thinking, and conduct

interviews in the metaphor's work domain if it would be useful to know how it really works.

With a clear statement of project focus, you are ready to apply it to the particular project situation, starting by defining how to gather data. Different kinds of projects will constrain the data-gathering process in different ways: If you are extending an existing system, that system defines the work you need to study. If you are addressing a new work domain, you need to be open in what you study. The kind of data you look for will be driven by the work you plan to support, but also by the goals of the project.

DESIGNING THE INQUIRY
FOR COMMERCIAL PRODUCTS

A project in commercial software may be generated in three principal ways. Each different starting point implies a different set of issues and a different way of collecting data.

Designing a known product: A "known product" is one of a class of products that is known and accepted in the marketplace, like a word processor or a spreadsheet. Competitive products are already established. The market has expectations for this kind of product—you must include certain capabilities to be taken seriously. This may be the next version of a product you are already shipping.

Gather data on people using competitive products. You must meet the market expectations they create. Gather data on the basic work practice of the market, whether the customers use competitors, your products, or no automated systems at all. Use your existing customer feedback channels to help set your focus. This will reveal what aspects of work are currently not well supported. Designing your product to support these unmet needs will differentiate your product from the rest of the market. If they are important enough, you will define the new field of competition for the next generation of products, just as the formatting capabilities of early versions of Lotus 1-2-3 defined the new ground of competition for spreadsheets. At the same time, gather data on detailed tool use. You want to make sure that you do the expected function just a little better than anyone else. You also want to pay

Look for the new delighters: the unrecognized needs

attention to what aspects of existing products get in the user's way, and design ways to streamline it.

Addressing a new work domain: A new work domain is totally new. It has been created by changing work or life practice (the fitness industry) or new technological possibilities (tele-commuting) and is not addressed well by any prod-uct. Any new product will change the way people work in the market, and there's no existing product to use as a guide. The danger lies in thinking that because the work will be changed, there's no way to study it. Before spreadsheets were invented, people did the work—they used paper ledgers to chart their accounts. Before word proces-sors were invented, people did the work—they used typewriters. Define the work your new systems will replace, and study it to learn what matters and how it is structured so the market can make the transition to your new products. (This will not stifle any innovation in your products. Both the first spreadsheets and the first word proces-sors were developed through detailed understanding of the people in their prospective markets.) Define the intent people are trying to achieve. Gather data on people achieving their intent with current tools. Look at how they use paper, informal contacts, and whatever else is available to do what they need to do. Look for problems and places where the lack of tools keeps them from trying to achieve their real intent. Use metaphors to think about what may be important in the new work domain.

> *All work is already being done some way; study it for clues*

The new market may be best addressed not by a single product, but by multiple products working together to support the work com-prehensively. When we discuss designing the system in Part 5, we'll show how to manage multiple coordinated products.

New technology: Sometimes a project seeks to take advantage of a technology that has just become available or affordable. Instead of being tied to a particular work domain, the project is looking for opportunities to use the technology. You may define specific products, you may design alterations to existing products to take advantage of the new technology, or you may discover that whole new markets open up once the technology is available.

Look for analogs of the technology and how they are used in the real world. If you are automating something that already exists, such as sound or text-to-speech, look for places in everyday life where

sound or speech is already used effectively. Look at the context: What else happens when people talk, such as eye contact and nonverbal cues? When is silence important? Look at what the new technology replaces: for example, infrared links replace signal-carrying wires, so where are wires used? Network wires, control pad wires, speaker wires. Look for the underlying metaphor of the new technology and study that: a PDA (personal digital assistant) is like a Day-Timer with smarts, so look at Day-Timers and ask what you could do with them if they were smart. Look at the fundamental new characteristics introduced by the new technology: Wireless links allow moving around, so how is movement important? PDAs are small, so how does size matter? And use metaphors for the technology to get a different perspective of its use. Go to the places where the new technology can make a difference to stimulate your thinking about how it might be used.

Build on how analogs of the technology are used in the real world

DESIGNING THE INQUIRY FOR IT PROJECTS

IT projects tend to be driven by business needs. However, the statement of need tends to focus on the immediate problem as perceived by the customer. Responding only to the stated problem usually results in a patchwork of small systems, each addressing a small part of the work in isolation, and none working well with any of the others. It's often necessary to negotiate the project focus with the customer so that customer needs are met but the resulting system also ties work together. The proper role of IT is to work with the customer to step back, determine the underlying issues that resulted in this problem, and work out a solution that ties the work and the information systems that support it together. IT organizations always want to create and deliver coherent systems that work together to support a business seamlessly. Any new system should be defined to fit into the overall business strategy. Tying the work together means IT organizations always want to be in the business of process redesign. Rather than automating whatever idiosyncratic work practice exists, IT benefits from working with the customer to imagine changes to their process that take advantage

IT's role is to tie the work together through information systems

of technology. There are three kinds of requests IT usually has to deal with.

Upgrades: The request is to add or modify a feature of an existing system. Typically this is called "maintenance" by the IT department. We avoid this term because "maintenance" implies that no new, interesting work happens in this task. In fact, much of IT's workload is in this kind of "maintenance," and much of the improvement or degradation of the information systems taken together is the result of "maintenance" work. So we borrow a term from the commercial vendors and call these "upgrades." The upgrade request is often stated in terms of a design change: "Just make it so I can enter several orders at once." Your challenge is to understand the reasons behind the request and design a solution that fits the need, keeps work practice coherent, and preserves the integrity of the system design. Look at the whole of the work task and related tasks to understand how the change affects the work as a whole. Look at detailed tool use to see what UI mechanisms work and which get in the way. Look for other point requests that can be addressed with the same mechanism.

> *Look at tool use and its edges to extend the system*

New systems: The problem as stated is to provide a system to support some aspect of the business (e.g., order processing). There is no explicit intention on the client's side to change the way they work in any major way. Introducing a new system to automate the inefficient ways that things are done currently is a waste. The challenge is to move the design team and the client together to invent ways to improve the work. The result will be to define new ways of working and the software systems that support them. Expand your statement of focus by looking at the whole work process that the original request is a part of. How does it support the real work of the department? If this is the primary intent of the process, look at how the intent is accomplished. If not, ask what the intent is and whether it can be accomplished in a more direct way. Is the process contained in one department, or does it span departments? Plan interviews with people at each point in the process.

> *Ask: how will the new system support the real work of the department?*

Process redesign: The project is started to implement a business process reengineering directive. Typically the directive does not specify

exactly what the new work practice will be or the exact requirements on supporting systems. Instead, it just gives broad outlines of the new process and hints of supporting systems. "In the new claims-handling process, one person will be responsible for the claim from the time it comes in until it is settled. All claim data will be available to all parts of the company through a central database." The directive leaves open how the claims process works on a daily basis, how people will interact with the new system, and exactly what kinds of interactions the new system must support. The focus for such a project needs to look at the customers of the new process: what do they need, and why? Look at how the work is accomplished now: What have people had to do to make the process work? What will get in the way of introducing a new process? Helping people accept and adapt to the new way of working is a part of the design problem. Plan how to include the customers in the design process. When they are a part of redesigning their own lives, they will more easily accept and adapt to changes.

> *CD develops the details of business process redesign*

The project focus gives the team an initial cut of what they are working on, who their customers are, and what the key tasks are. It suggests things to look for in the field and suggests some of the places to go. This prepares you to determine the specific interviewing situations needed to get the right data and make the project work.

DESIGNING THE INTERVIEWING SITUATION

Your initial inquiry into the work gave you a focus for the project and also revealed some characteristics of the work domain and told you what work tasks you need to observe. Exactly how you will set up the interviews is driven by the nature of these tasks. The key questions for defining the interviewing situation are always: How do I get close to the work? How close can I get? How do I create a shared interpretation with the customer? Different kinds of tasks make different demands on the interview.

Normal: A normal task can be planned, is performed in a reasonably continuous session, and can be interrupted by the interviewer.

Writing a letter, delivering mail, installing software, and writing code are all normal tasks. The interviewer can plan to be present to observe a normal task and can interrupt at will to understand it. Normal tasks can be studied through a standard contextual interview. It may be useful to ask the customer to save work of the sort you want to study to do during the interview. This does alter the normal work flow, but very minimally, and the increase in relevant data makes it worth it. Audiotape these interviews, but videotape is rarely worth the extra trouble. Videotape them only if the work is so UI-intensive that you have to see the interaction to understand what's going on, or if it's especially important to communicate the customer experience to developers who can't go on interviews themselves.

Use a standard contextual interview

Intermittent: An intermittent task happens at rare intervals over the course of a day. It cannot be scheduled and does not last long. It's so infrequent that the chances of observing it during a standard contextual interview are low—you'd spend hours to get five minutes of data. Looking something up in documentation and recovering from a system crash are intermittent tasks. The key to learning about them is to create a trail that will enable the user to re-create a retrospective account of the event. In documentation, you could ask the user to keep a paper log of every time they use the documentation, perhaps numbering the pages themselves so they can walk through the story later. You could design the documentation so the user can keep their log right in the documentation itself. You might instrument online help, so the software automatically records what the user did. Start with a face-to-face interview, then leave them to log what they do. Return later to perform an interview that follows the form of a retrospective account, walking through each artifact in turn to discover what the user did.

Create a trail to walk and talk with the user

Uninterruptable: Some tasks simply cannot be interrupted to do the interpretation. A surgical operation, a high-level management meeting, and a sales call are all situations that cannot be stopped to talk about what is going on. In these situations you want to capture the events clearly enough that you can recall all the details later. You might plan interruptions, such as providing for regular 15-minute breaks in a long meeting where participants can

Plan discussion breaks between events

discuss what happened in the part of the meeting just concluded. You might videotape the event, then review the videotape with the customer, stopping to discuss events as they occur. If even videotape is too intrusive, you can at least keep good notes and review them with the customer. If you videotape, interpret the tape with the customer. You lose too much insight and cannot be sure of your interpretations if you review the tape alone later.

Extremely long: Some tasks take years to complete. Shipping a major software system, developing a new drug, and building a 747 are all tasks that take substantially longer than the two to three hours of a typical contextual interview. To understand tasks of this sort, pursue two strategies: first, interview a wide range of users at different points in the process and playing different roles in the process. Since work strategy repeats, common patterns will emerge even though the cases are different. Then, choose willing customers with the best examples and do a work walkthrough, which is like an in-depth retrospective account. Set up an event in which customers bring in project documentation from all parts of the process and walk through the history of the project, week by week, meeting by meeting. Use the project artifacts to ground the inquiry. Include project documents, such as plans, reports, and designs, and also process documents, such as the calendars and email of those most concerned. Use the artifacts to drive the conversation. Expect this recreation to take a day or two.

Create interviewing situations that reveal a cross section of work

Extremely focused: Sometimes the problem is so focused on the minutia of a person's actions that it's too hard to run a standard interview. You might be polishing the detailed interaction of a computer user with an application's UI or studying the details of how a craftsman manipulates his tools. You would miss too much if you depended on unaided observation, and you would also get in the way of the work too much if you interrupted every moment. This is a case where videotape can be useful. It will capture the details you would miss, and you can run it repeatedly until you understand a particular interaction. But view it and interpret what you see with the user. You cannot understand all their motivations on your own.

Videotape and interpret with the user

Internal: Sometimes the inquiry needs to focus on internal mental processes, such as how decisions are made. In this case, the interviewer

must be present when the mental process is happening because there's no way to recover enough in a retrospective account. You may need to

Use ongoing observation with lots of interruption

create events that will cause the mental process to happen so that you can be present. Then interrupt a lot; make a lot of hypotheses about what the customer is taking into account in their thinking. Warn the customer this will be very disruptive, but as long as the customer has to make the decision, they will keep working through it and you will learn something about how they do it.

DECIDING WHO TO INTERVIEW

At this point you know what you are looking for and you know how to set up the interview for the tasks you need to observe. Now you must start putting names on the customers you will visit. In general, you want to interview two or three people in each role you identified as important to the focus. You want to collect data from 10 to 20 people in all, unless the focus is very narrow. Six to ten interviews is sufficient if there is only a single role or you are studying detailed UI interaction instead of overall work process. If you are making commercial software, you want to go to at least four to six businesses to see variety. In choosing sites and individuals, go for diversity in work practice. You are looking for the common underlying structure that cuts across your customer base. You will do this best by studying very different customers, rather than studying similar customers to confirm what you learned.

Diversity in work practice usually is not equivalent to diversity in market segment. Financial institutions, high tech, and retail may be

Interview customers whose work is as different as possible

different market segments, but office work is done very similarly in any modern corporation. These different types of companies will not give you substantially different perspectives. In fact, office work is so similar it is actually hard to get a different perspective. One design team studied the military and Japanese companies, in an attempt to find cultures that would be substantially different; they found little that was new. To get different work practice, look for different business strategies (doing the work as a business for hire vs. doing it as a department in a large company). Look for cultural differences (a trucking company vs. a high-tech

company). Look for different physical situations (a company distributed across several states vs. a company located at a single site). Look for differences of scale (a small business vs. a large corporation). If your customer is internal, see if you can study similar work practice in other companies. Look for other places in your own company where similar work is done, and study it. Use metaphors to give you different ways of thinking about the work.

Given these parameters for numbers and diversity, choose the people you will interview. It's okay to be smart when choosing—include the important client who has to buy into an internal project. Focus on customers from the key markets you think are most likely to spend money.

Let focus changes drive customer selection

Expect setting up customer visits to take a couple of weeks, by the time you've found the right person to interview, talked to all the people who are affected, and have set everyone's expectations correctly. However, don't get too far ahead in lining up the visits. As you study the data, you will change your idea of what to find out about next. You don't want to be locked into studying ten documentation writers after you've studied three and discovered that, for your purposes, they all work in much the same way. Make sure you talk to the people you will interview individually in advance and that they understand what will happen.

change interviewee example

Your inquiry into the work that the project supports will yield lots of detail about the work and what to look for. It will be too much for anyone to keep track of during an interview. So boil it down to a short statement of the key characteristics of the work. This statement can be written by interviewers in their notebook and will keep them on track during an interview. A focus for an ordering system might be "how people find out about, decide on, and make requests for the things they need to do their work." Such a focus implies things to look for during an interview: "how people learn about what is available, through catalogs, friends, and local experts, whether formal or informal; who is involved in the decision and how they come to agreement; what processes have to be used to make the request and who gets involved in filling it."

A pithy focus statement keeps the interview on track

Focus ex̄ar

The initial focus will be revised and expanded through inquiry into the work. (In the above example, the team discovered that it matters to people to track the requests they have made and when they are expected

to be filled.) Focus statements are best when they use simple language. People looking for "requests" will think more broadly about what a request might be and how it might be filled than people looking for a formal-sounding "order." The result will be greater insight into the work and consideration of a greater range of possible solutions.

MAKING IT WORK

For commercial software and internal systems alike, the crucial first step is to ground the design in relevant customer data. This part of the book has given you a solid grounding in the basics

Customers feel heard and valued after an interview

of setting up and running a successful interview. This way of collecting customer information is new, and most organizations do not have the procedures in place to make scheduling these interviews easy. The groups that have the easiest time are those who already create events with individual customers, such as usability tests or focus groups. There can be internal resistance, too. The sales force, marketing, or the internal customer representative can be suspicious of letting engineers talk directly to customers. (See Chapter 20 for strategies on dealing with resistance.) But reactions to the visits are nearly always enthusiastic. Customers feel like they are being listened to for the first time, and the sales force and marketing soon come to recognize the benefits. When the customers are internal, they feel like they have control over the new system. Teams developing custom software often do more interviews than strictly necessary to allow everyone to participate.

As with all skills, experience comes with practice, but you need neither experience nor practice to get started. Whether you are working on the initial requirements for a large system or are refining the UI of a small system, you can define a data-gathering strategy appropriate to your project. A few interviews run along these lines will return a wealth of data on the customers you serve and the work they do. Increased interviewing skill will come with experience.

But be warned: it's addictive. People who get used to having contextual data when they design often have a very hard time breaking the habit.