Using Contextual Inquiry To Learn About Your Audiences

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Abstract

This article discusses how technical communicators can use Contextual Inquiry (a field research method) to gather information about their audiences and their specific needs for online and hardcopy documentation. Inquiry is based on three principles: 1. Data gathering must take place in the context of the users' work. 2. The data-gatherer and the user form a partnership to explore issues together. 3. The inquiry is based on a focus; that is, the inquiry is based on a clearly defined set of concerns, rather than on a list of specific questions (as in a survey). This article includes a description of Contextual Inquiry as we have used it at Digital Equipment Corporation and examples from our experiences as technical communicators and usability engineers on various projects that have used this method..

Introduction

As a technical communicator, you need to constantly gather information about who your audience is and what your audience's purpose is for using the product you document. In your constant search for more information about the audience and its purposes, you may have found yourself in one or more of the following situations:

1. You are updating a user information set for an operating system that has existed for over 10 years. You and your team have revised the user information in every way imaginable, and you are no longer sure whether new releases will have significantly better user information.

2. Your company is fighting for its slice of the open systems pie. It plans to sell its version of a client server architecture. The only visible portions of the product are the Application Programmer Interfaces (APIs), error messages, and your documentation. You want to create documentation that really supports users in their work. To accomplish this, you need to discover how software engineers plan, write, and maintain distributed programs, and what you can do to make your user information superior.

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3. You have been asked to work on a strategic new software product involving multimedia and video teleconferencing, and possibly some virtual reality Since your product is so new and you have no idea how people might use it, how do you know what user information to provide?

The technical communicators in all three scenarios can benefit from using Contextual Inquiry, a field research method that provides detailed information about who the audience is and why they use (or don't use) certain products or features within products. You can use Contextual Inquiry in conjunction with other data-gathering and audience-analysis methods, such as questionnaires, or you can use it by itself.

For example, the writers of an operating system used a combination of a survey and Contextual Inquiries at customer sites to create a new online information utility, show how they added value to the product, and eliminate over 600 pages from the printed documentation set. This article explains how they and other user information groups have used Contextual Inquiry to improve their user information.

What is Contextual Inquiry?

Contextual Inquiry is a qualitative data-gathering and data-analysis methodology adapted from the fields of psychology, anthropology, and sociology (Darroch and Silvers, 1982, Glaser and Strauss, 1967). Essentially, Contextual Inquiry consists of observing and talking with users in their workplaces as they do real work. Employees of Digital Equipment Corporation have used Contextual Inquiry data in a variety of ways.

For example, the data provided detailed information for designing specific products and their associated user information (Good, 1989), ideas for new products, and new information about processes and business practices (Huntwork et. al. 1993).

The Contextual Inquiry method was developed and refined at Digital Equipment Corporation, beginning in 1986, based on ideas from Digital employees and other professionals in the human-computer interaction field. Digital continues to refine the method as it works on new products and processes.

Contextual Inquiry is based on the following three principles:

1. Data gathering must take place in the context of the users' work.
2. The data gatherer and the user form a partnership to explore issues together.
3. The inquiry is based on a focus; that is, it is based on a clearly defined set of concerns, rather than on a list of specific questions (as in a survey).

Data Gathering Takes Place in the Context of the Users' Work

One definition of context is "the interrelated conditions within which something occurs or exists." Advocates of Contextual Inquiry realize that you cannot fully understand what people are doing or why they are doing it unless you can see—and perhaps experience—the interrelated conditions in which these people work or use the products in question.

For example, before conducting a Contextual Inquiry at a truck manufacturing site, one of the authors (Mary Beth) had been told that people on the assembly line used the database to keep track of parts. She went to the site with pre-conceived ideas about how the manufacturing site was using the database. However, when she actuallly visited the site, she found herself standing next to two men in an open assembly bay, with no air conditioning in 100-degree heat, wearing a hard hat, watching men converse in Portuguese while they pointed at the screen with grease-stained fingers. As a result, she left the site with a completely different understanding of how the site used the database.

Observing and talking with people in the context of performing specific tasks helps you gather data that is different from the type of data you get from a questionnaire or a telephone survey. The questionnaires and telephone surveys usually provide summary data and abstractions, while data from Contextual Inquiry is usually more concrete because it is based on in-the-moment experience. The following anecdote is an illustration of this distinction.

Digital sent a number of PC servers to customers for field test; and after a certain period of time, requested the customers to send their comments to the product development team. One customer wrote that everything installed smoothly, but that it seemed to take a long time to find things in the documentation. However, the customer could not think of specific chapters or pages that should be revised.

Conversely, we observed an actual installation at a

different field test site. The people at this site also had difficulty finding information. However, because we were there to observe and talk with them about their experience, they were able to point to the exact sections of the book they were having trouble with and make specific suggestions about reorganizing sections on configuring PC options.

The People at the Inquiry Form a Partnership

Contextual Inquiry differs from a traditional interview in that traditional interviews have an interviewer who is usually in charge of the topics and flow of conversation. Contextual Inquiry is based on the premise that the inquirer and the participant are equals. The inquirer may be an expert at one thing, such as writing online help or coding in C, and the participant is the expert in his or her work. For example, if you are interviewing people in the record-keeping department of a hospital, they are experts in the hospital's system of record-keeping.

"Contextual Inquiry is based on the premise that the inquirer and the participant are equals."

As Holtzblatt and Jones point out (p. 185), acknowledging users as experts has a number of important results:

- It makes clear to the participant that the inquirer did not come to visit to solve problems and answer technical questions.
- It becomes acceptable for the inquirer to ask questions (even if the questions may sound naive).
- It protects the inquirer from misinterpreting actions.

Rather than interpreting on our own, we can ask participants why they did things.

Partnership also allows the inquirer and participant to explore issues together. For example, if a participant is having trouble using a particular feature, the inquirer and participant can brainstorm together ways to improve the feature. Partnership also provides a way for an inquirer to continually validate the assumptions that he or she makes while observing users. Within a partnership, an inquirer can probe to learn about the expectations and assumptions behind the user's behavior.

The Inquiry Is Based on a Focus

Unlike a traditional survey, which consists of a specific set of questions that each respondent is asked to answer, a Contextual Inquiry is based on a focus; that is, a perspective or set of concerns. Basing an interview on a focus rather than on a specific set of ques tions gives the interviewer the flexibility to follow a promising avenue of conversation that might not have been in a list of questions.

For example, technical communicators might have the focus "what can we do to improve the documentation?" To explore that focus, technical communicators ask questions about the last time a participant used the documentation, whether they found what they needed, and so on.

The scope of a focus may be different depending on the project or the stage of the development cycle. If you are the technical communicator with the new multimedia project discussed in scenario three, your focus might be very broad, such as "what types of information will users need, and what delivery medium (online, hardcopy, interactive video, and so on) will work best for them?"

Who Conducts a Contextual Inquiry?

In our experience, a variety of team members have conducted Contextual Inquiry. If the Contextual Inquiry is being conducted for product development, usually various members of the entire product development team participate. For example, in a FORTRAN project and in a Network Management project, people from engineering, product management, and information design participated in the collection and analysis of Contextual Inquiry data. The focus for these inquiries included not only the user information, but also the addition or deletion of specific features and improvements to the user interfaces of the products.

However, an information design team (technical communicators) can conduct its own Contextual Inquiry specifically about the user information. A user information team for distributed computing and for an operating system have done this. In addition, a usability engineer was asked to conduct a study with the following information-specific focus: "How do components of demonstrations, tutorials, and reference information work together from users'

points of view? How could the information design group leverage this information to improve its multimedia strategy?"

How Do You Conduct a Contextual Inquiry?

Contextual Inquiry is a methodology that has various implementations, depending on the type of project and your information needs. There is no one process for conducting it. In fact, we recognize several different processes, depending on the type of project and the stage of the development cycle. These processes are compared in Table 1.

Regardless of the type of implementation, the Contextual Inquiry method consists of the same basic steps:

1. Work with Marketing to identify key markets.
2. Identify customers within those markets and arrange visits.
3. Set the focus for the visit.
4. Conduct the visit.
5. Analyze the information from the visit.

Because the artifact walkthrough is the most common type of Contextual Inquiry for user information, we will discuss how to conduct an artifact walkthrough in detail and we will provide examples from contextual inquiries that we or our colleagues have conducted.

Table 1: Various Implementations of Contextual Inquiry

Implementation	Explanation
Work-based interview	This is the traditional Contextual Inquiry method. Use a work-based interview when participants allow you to observe and interview them while they engage in an activity. It consists of interviewing a user while he or she does actual work.
Post-observation inquiry	Use post-observation inquiry when work cannot be interrupted, for example, if you are observing employees at a help desk. In this method, you observe and take notes about the calls employees handle. Then interview them about those calls after they finish with the callers, or after a certain period of time.
Artifact walkthrough	Use artifact walkthroughs under the following circumstances: • When the activity you want to observe takes place sporadically over time (for example, users may go a week without using the documentation, and then use it five times in one day). • When a process takes place over a period of time and when it involves several people. This is probably the most common approach for studying user information. It consists of asking either an individual or a team of people to recreate a *specific* process for you, using artifacts from the actual process to stimulate their recollection. For example, a team of writers may recreate the process they used to write their *latest* documentation set (not just documentation sets in general). They would bring artifacts associated with the process (such as personal calendars, memos, reports, documentation plans, drafts, and so on), create a timeline on the wall of a conference room, and tape these artifacts at the appropriate places along the timeline.

Work with Marketing to identify key markets

Contextual Inquiry allows you to gather detailed, in-depth data about how specific users do or do not use your information. Because of the amount of time involved in a visit to one customer—usually a half-day to a day—you cannot visit many customers. Instead, you must carefully choose those you do visit to make sure that they represent important audiences.

For example, if you were planning a new release for the FORTRAN programming language, you need to know your company's target markets for the language. Do you sell to professors of astrophysics at major universities, or to geologic modelers of the earth's crust at companies who use geologic modeling to find new oil reserves? If Marketing has no intention to sell to professors of astrophysics—or if there is little money to be made selling to them, as opposed to modelers at oil companies—then do not visit any professors of astrophysics.

This type of sampling is called *purposive sampling*, and it is very different from the random, representative sampling that most people assume they get from questionnaire respondents. If you have 200 people respond to a questionnaire, you may indeed get a random representative sample of everyone using your tool. However, the purposive sampling method forces you to think carefully about who your target market is—that is, whose needs are more important than others as far as revenue generation is concerned. The Contextual Inquiry method also provides you with detailed information about how people use your product and exactly where the problems are with it; this concrete data is different from the summary ("from memory") data that you gather by using a questionnaire. With Contextual Inquiry, you want to learn *specific* things about users in your target market.

Identify customers and arrange visits

It is important to have an idea of your focus when you identify customers and arrange visits. If you are not sure what you want to talk about, it is difficult to know who you want to talk to. Thus, although we present our steps sequentially, this step and the next are best done together.

Identify customers

Use the following tips to help you identify customers:

- Select specific customers within the markets you have identified.

  For example, people on the FORTRAN project may contact all the major oil companies, but perhaps not all use FORTRAN to do their geologic modeling. The FORTRAN project would obviously visit only sites that used FORTRAN, and they would specify companies by name, such as Arco.

  Another example comes from a team creating network management tools and documentation. The next release of the product was geared toward medium-sized business networks, and Marketing specifically wanted to take market share away from their primary competitor. So, this team visited not only current users of their product, but also users of the competitor's product. They learned more about what people liked and disliked about the competitor and what Digital might be able to do to create a product that would be more appealing to users than the competitor's product.

- Try to visit at least three customer sites in each market.

  For example, the network management tools team would visit three current users of their product and three users of each competitor's product.

  We suggest at least three because one site or company may be totally unlike any other; if you conduct two visits, you may be confused or frustrated from lack of overlap between the findings at the first and second companies. If you visit three sites, you should begin to see some overlap in either the way your product is used or in the problems people encounter with it.

- Choose three sites or customers that are as different from each other as possible.

  For example, the FORTRAN group looking at geologic modelers might visit a big oil company like Arco, a small oil company, and a thinktank or research institution that did geologic modeling and then shared their results with a variety of companies, including oil companies.

  Choose sites that are different from each other because, after visiting three, you will have a

clearer picture of all the possible ways your product can be used (or possible problems that people can have with it). If you do see overlap among three very different sites or companies, you can be more confident that any problems that you fix for one of those sites might help many other customer sites within that market.

Arrange visits

Arranging the visit includes choosing specific users within the customer site, choosing who attends each interview, and scheduling the visit (including asking customers to do any preparation, if appropriate).

- Work with product management, marketing, and sales to identify specific people at customer sites.

  Your focus should determine the specific job roles of people to whom you want to talk. For example, the operating system team knew they wanted to talk to users of the operating system. However, they did not know if they should talk to casual users, programmers, or system managers until they set a focus about improving the system management user information. Then they knew they wanted to talk to system managers.

  The usability engineer who was studying the client-server architecture selected application developers because they represented the largest audience segment for the product. Future studies will address other audiences, such as system designers, system integrators, and administrators.

  The FORTRAN team placed a request for participants on the internet and found some local FORTRAN programmers willing to participate. (They also found people from Sweden to New Zealand who were willing to participate, but there was not enough time or money in the budget to travel to these users.)

- Try to interview at least three people at each site (for the same reasons that you want three different sites).

- Try to choose people that are as different from each other as possible (for the same reasons that you want to maximize the differences between the sites).

- Choose who attends each interview.

  When you choose who visits which customers, keep a few simple guidelines in mind:

  - ✔ Try to visit in pairs. That is, two people visit one customer. Having two people pay attention to the customer's words helps you to remember more of them.
  - ✔ At least one person, but preferably both, in the pair of visitors should be trained in Contextual Inquiry.
  - ✔ Pair people with different job roles. That is, send a writer with a programmer, a product manager with a writer, and so on, because each person has a slightly different perspective based on his or her job role.

- Telephone specific people to schedule the visit. (You may need to work through sales to obtain specific telephone numbers and names.)

  If you plan to inquire specifically about a person's use of documentation, you will probably use the artifact walkthrough method. By artifact walkthrough, we mean reconstructing a process using artifacts such as notes, e-mail, or a revised document. This method requires the participant to do some important preparation. The participant can do any or all of the following:

  - ✔ Keep a diary of documentation usage between the time of your phone call and the day of the actual visit; then, recreate each usage when you visit
  - ✔ Look through a few recent days of work and create a list of when the documentation was used; be prepared to recreate those events.
  - ✔ Place bookmarks in every spot where the documentation is used (some online help and online book software lets users place bookmarks in them).

Set the focus

Setting the focus is an important and sometimes difficult task, especially if your Contextual Inquiry includes the entire product team. If your inquiry includes only members of the information design group, your focus is probably going to be the types of information you need to provide (if it is a new product), or how you can improve existing information.

One technique for setting focus that works at Digital is to have a meeting of the people participating

in the Contextual Inquiry. Declare one person to be the facilitator of the meeting. That person makes sure that everyone understands Contextual Inquiry and the purpose for the meeting. Then follow these steps:

1. Brainstorm open-ended questions and write them on 3x5 cards or Post-it™ notes.
2. Defer the following items:
   - ✔ Questions that the participants cannot answer themselves, such as "how large is this market?"
   - ✔ Closed-ended questions such as "Do you like the documentation?" Or "Do you think the online help is too slow?" (You can create a survey for closed-ended questions; often, groups conduct both Contextual Inquiry and a survey to get both types of data.)
3. Create an affinity diagram with the remaining Post-its. An affinity diagram is a categorization or grouping of questions that are similar or that seem to go together. We write the questions on cards or Post-its so that the team can rearrange them. You might group all questions that have to do with the online help, or you might group all questions that deal with a certain topic, regardless of the media the information is presented in. There is no one correct affinity diagram. Rather, as long as the groupings make sense to the team and help the team discuss the issues, you have a good affinity diagram.
4. Develop generalized questions as headings for the categories in the affinity diagram and write them on a card or Post-it above each category.
5. Review the categories and the headings with the team to make sure everyone understand the focus. If there are many categories, choose one or two as the most important and agree that everyone will try to ask questions about these areas during an interview.

The writers working on one of the products to be incorporated in the client-server architecture met with the usability engineer for a focus-setting meeting. Here are some of the original questions that they came up with:

1. Can you think of a better name for the product guide?
2. How useful do you find the product guide?
3. Do you use Bookreader to get product information?
4. For what kinds of information do you use hard copy?
5. Do you use online information systems other than Bookreader?
6. If you don't use Bookreader, why not?
7. Do you find it disruptive to have information distributed between the product guide and other documentation?
8. How could books that describe Digital added value, such as the product guide, better supplement the documentation set?
9. How do you use the product guide?

To create an affinity diagram, the team organized similar questions into the following groups:

Group A

1. Can you think of a better name for the product guide?
2. How useful do you find the product guide?
7. Do you find it disruptive to have information distributed between the product guide and other documentation?
8. How could books that describe Digital added value, such as the product guide, better supplement the documentation set?
9. How do you use the product guide?

Group B

3. Do you use Bookreader to get product information?
4. For what kinds of information do you use hard copy?
5. Do you use online information systems other than Bookreader?
6. If you don't use Bookreader, why not?

The team examined each group and developed general questions that capture the meaning of the questions in each group. For Group A the general ques-

tion was: "How do programmers incorporate the product guide into their work tasks?" For Group B, the general question was: "How do programmers use hard copy and online information?" The completed affinity diagrams for their questions looked like this:

How do programmers incorporate the product guide into their work tasks?

Can you think of a better name for the product guide?

How useful do you find the product guide? Why? Can you provide examples?

Do you find it disruptive to have information distributed between the product guide and other documentation? Can you tell us about one instance when it was or was not disruptive?

How could books that describe Digital added value, such as the product guide, better supplement the documentation set?

How do you use the product guide? Can you give us specific examples of when you used it, and why?

How do programmers use hard copy and online information?

Do you use Bookreader to get product information? How? Show us.

For what kinds of information do you use hard copy? Can you give us specific examples of when you looked in the hard copy documentation?

Do you use online information systems other than Bookreader? Which ones? Why? Can you show us some of these other online information systems?

If you don't use Bookreader, why not?

Some people who are experienced in Contextual Inquiry have only to review the affinity diagram of the focus and then conduct the inquiry. Others feel more confident if they have documented the focus areas—including the open-ended questions under the headings. We call this an interview template. It is acceptable to use such a template, but keep in mind that you do not have to ask every question on the interview template. The user's actual work or use of the documentation will determine which questions you discuss at length, and which questions you omit.

Conduct the visit

Most contextual inquiries have three parts, regardless of whether you are conducting a work-based interview, an artifact walkthrough, or another type of Contextual Inquiry. These parts are:

- An introduction
- An inquiry about the work
- A summary of learnings and shared understandings (Holtzblatt and Jones, p. 196)

The following are some tips to help the entire interview process go smoothly:

- If possible, tape record or video record all three parts of the interview.
- Even if you are taping, take notes about what the users do and say, your interpretations of why they are doing and saying what they do, disruptions to the user's work, and design ideas that you or they might have.
- Because it is more important to maintain the inquiry than to take notes, we recommend that one person in the pair of inquirers take notes and the other concentrate on the flow and content of the interview.

For example, the distributed computing team videotaped their interviews. One person was in charge of running the equipment and taking notes; the other person was in charge of conducting the inquiry, although that person took notes as well.

An introduction

The introduction is somewhat like a traditional interview. That is, we introduce ourselves and explain the focus of the inquiry. Having distilled many questions into two or three general focus questions allows us to state the focus of our inquiry in one or two sentences.

We also make it clear that the users are the experts at the kind of work they do, and that they should never worry about whether they are using the product properly or not. However they use it is correct for them. We also use the introduction to make it

clear that our topics of conversation will depend entirely on what they are doing now or on what they are prepared to discuss. In addition, we ask for an overview of their work so that we can get a broad view before we delve into specifics about the product in question.

Other routine parts of the introduction might include the following:

- Asking permission to record, or having them sign a recording release form.
- Telling them how long we plan to spend (we recommend at least two hours per session to get an in-depth view of what they do).
- Explaining that they are in charge of the interview and that they can terminate it or take a break at any time.

An inquiry about the work

The inquiry about the work is where the various Contextual Inquiry methods differ the most. Depending on the participant, you may be able to:

- Observe participants as they use documentation while you are there and discuss their use with them as they use it.
- Observe participants as they use documentation to answer hotline questions, make sales calls, or perform tasks that cannot be interrupted. Take notes during your observation and, when the participant can be interrupted, interview the participant using your notes as a guide.
- Ask users about their previous use of documentation because it is unlikely that they will use documentation while you are there. As we have previously stated, since documentation use is often intermittent, this method will probably be the most common. If you use this method, the participants need to prepare before the interview.
  - ✔ From the diaries they kept, have the participant recreate each usage.
  - ✔ One way to help users remember how they use documentation is to have them look through what they were working on. If it is a slide presentation, have them look at each page and tell you what they were trying to do on the page. Prompt them with the following types of questions: Did they have to use the online help to place that graphic? How did they create a table in the center of the page?
  - ✔ From the bookmarks they created, look at each bookmark and have the users explain what they were trying to do and why they looked in this part of the documentation.

In all three cases, continually ask users what they were doing, why they were doing it, and what they expected in terms of system response and functionality, or in terms of the kind of information provided in the documentation.

For example, during one interview, an application developer described a problem that took him two days to solve. After he explained how he had identified and corrected the problem, the interviewer summarized the developer's comments, which were that the error message name did not provide a clue into the problem, and that not having the error message documented compounded the problem. At this point during the interview, the developer discovered that the documentation did, indeed, contain a description of the error message, and the developer assumed that he had previously overlooked it.

The interviewer decided that this was a good opportunity to learn about the effectiveness of the description in the documentation. So she asked, "Now that you have resolved the error, why don't you read the description in the documentation to see if it would have been helpful if you had read it when you first encountered the error."

The developer read the description and said, "Now that I am thinking about it, I understand the problem with this troubleshooting manual. It assumes that you already have a working client and server, and it is not geared to problems that occur while a client and server are in their development stages. Errors between a working client and server differ greatly from those that occur when you have no idea whether the client or server are working properly."

The process of retracing the steps involved in tracking down the problem and hearing the interviewer restate the issues brought the application developer to a deeper unders tanding of his work and provided insight into why the documentation was not useful to him.

A summary of learnings

The final portion of the interview is when you summarize what you have heard and when you test any assumptions that have occurred to you during the interview. In a situation where one person of the interview pair asks questions and the other person takes notes, this is a good time for the note taker to review his or her notes and to question any inconsistencies or ambiguities that appear. This is also a good time to test any assumptions or ideas that might have occurred to you during the interview.

The operating system writers observed that the system managers whom they interviewed always had to refer to the error-message manual whenever an error message appeared on the screen. For some, this was difficult because documentation was often locked away in someone's filing cabinet, or other people were lined up around the documentation waiting to look something up. A survey verified that many of the users did not have immediate access to a documentation set. Thus, the documentation group came up with the idea of creating the Help Message utility so that whenever a system manager encountered an error, typing HELP/MESSAGE displayed an explanation of the message.

This innovation saved system managers from having to chase down the hard copy documentation or to wait in line before addressing the problem. It also allowed the writers to eliminate over 600 pages from the hard copy documentation set. The best part of all came when customers filled out a questionnaire describing what they liked and disliked about the new version of the operating system. One customer said that the Help Message utility was the best new feature for that release.

The operating system writers observed a problem and tested their assumption for resolving that problem. This allowed them to make a recommendation that was based on users' experiences. As a result, their idea enjoyed high customer acceptance.

Analyze the information from the visit

It is important to review your notes after the interview and to add anything that you might have forgotten to record. For example, you might include your ideas, impressions, or anything that was said during the interview that is not in the notes. It is also a good idea to listen to the recording of the interview and to add to the notes. The more thorough and exact your notes, the more data you will have.

After you are satisfied with the completeness of your notes, the next step is to analyze them.

There are three steps to the analysis process:

- Set a focus for analysis.
- Choose a data display.
- Organize the data into the data display.

Set a focus for analysis

This usually takes place with the interview team. We recommend the following process:

- The team meets after all of the interview data has been recorded and everyone has had a chance to read the notes from all interviews.
- The team sets a focus for analyzing the data.

  Often, it is the same focus you set for the inquiry itself. However, sometimes the team has gained insights from the interviews that make the original focus obsolete. When this happens, the team identifies a new focus for analyzing the data.

  The focus-setting process is the same as described previously. The team lists questions it wants to answer during the analysis process, then it organizes similar questions into groups. Last, the team writes general questions for each group that describe the contents of the group. The team keeps the focus questions in mind as it records the data.

Choose a data display

We have created various data displays. The most common is an affinity diagram. Another popular display is a "data/action" table. You may also want to create a workflow diagram to show how a person uses your information set or to show the process the person used to search for information.

Affinity Diagram. You create an affinity diagram using a process similar to that of setting your focus.

- Record the important findings.
  - ✔ Each member of the team reads a copy of all of the interview notes prior to the data analysis session.

- ✔ Then you can record important items individually or as a group. By individually, we mean that each person is responsible for recording items from one visit. As a group, we mean that the whole team reads each transcript together. (This can be aloud or silently; we have done it each way. Having members of the team read silently is faster.) When a team member reads an item relevant to the focus, he or she tells the rest of the team where on the script they found the item, and then records that item onto a Post-it. It is also helpful to code items according to the interviewer and item number so that the team can return to the original interview notes if questions arise.
- ✔ Place the Post-its on the wall or on a white board as the questions are written so that the whole group can see them. When duplicate items occur, place one under the other on the wall. If questions arise, the people who performed the interview have the last word in settling any questions relating to interviews they performed.
- ✔ This process is time-consuming, but important. The data in the interview notes must be refined before it is useful. A two-hour interview can yield as many as 300 Post-its, or as few as five.

- When all important items have been recorded onto Post-its, create an affinity diagram from the items. Organize similar items into groups. It is important that every member of the team participate in this process. It works best if everyone stands up at the wall or board where the Post-its have been placed. Try to keep groups small — no more than four or five items per group.

  Also avoid the following:

  - ✔ Categories that relate to organizations within your company (for example, "hardware," "software," or "documentation")
  - ✔ Categories that are obvious (for example, "problems" or the ubiquitous "miscellaneous")

- Create general headings for each group that summarize the contents of the group.
- Organize similar groups into larger groups and create headings for these groups.

When you are finished, you will have several general headings that summarize the data from your inquiries.

Data/action table. We have used data/action tables when we have very tight schedules for incorporating Contextual Inquiry learnings into the product development schedule. The process we use for creating the data/action table is as follows:

1. Each member of the team reads the notes/transcripts prior to the data analysis meeting.
2. One member of each interview team tells the story of his or her visit. This story usually sets more context than the notes and often includes some anecdotes that did not make it into the notes.
3. The team chooses an interview to analyze. Each member reads the notes about the interview silently, looking for possible action that the team can take, based on the data in the notes. When a team member thinks of an action, he or she stops the other members of the team, points them to the appropriate part of the notes, records an action on a Post-it, and records the data for that action on another Post-it. This step continues until the team has analyzed all the notes/transcripts.
4. Once the team has reviewed all the transcripts, the team creates an affinity diagram of the actions, based on which member can do what action.

For example, a hardware Hub management (a kind of network routing and management tool) team created a data/action table that was divided into the following categories:

- Actions product management can take
- Actions Hub management engineering can take
- Actions the documentation group can take
- Actions Marketing can take
- Actions somebody (not sure who) can take
- New product ideas

Some of the things that the documentation group can do are listed in Table 2. (Note that the column labeled **P** is for **Priority**; items were given a priority of 1 for high, 2 for medium, and 3 for low.)

Table 2: Sample Data/Action Table

Heading	P	Action	Data	Benefit
Hardware Doc Improvements	1	Make sure adequate (and the required) docs ship with the modules and the hub	User could not configure [option]	User can configure [option] and use hub management tool
	1	Document 48v. UPS interface (make clear it's UPS)	User could not find any documentation	It will be possible to use 48v backup
	1	Make hub and Hubwatch configuration rules simpler/explain them better	User said that if Digital wants to sell to small account like Z., we should not assume any networking knowledge	Easier for less-skilled users to install and maintain our products
	1	Explain why to use 4 pins/pinout setup (Quick Start)	Non-standard use caused user grief when 2 wires were bad	Easier for user to troubleshoot
Software Doc Improvements	1	Create a Quick Reference Card	User likes starter books	User can learn basics quickly

Work flow diagram. Create a work flow diagram when you are interested in the process that people use to accomplish a task. To create a work flow diagram, do the following:

1. Review the notes/transcript from each interview.
2. Create a flow chart that shows the process that each participant in each interview used.
3. Display and compare all the flowcharts.
4. Create a composite work flow diagram or task list that includes the task steps that most participants share.

Table 3 is a composite work flow diagram based on interviews with application developers. It also contains details about the goal of each task and the kinds of information the application developers need for each task.

Conclusion

The strength of Contextual Inquiry lies in its ability to help teams gather direct user information. Contextual Inquiry helps product development team members—from technical writers to salespeople—gather detailed, user-centered descriptions of problems; in some cases, Contextual Inquiry provides opportunities to brainstorm possible solutions with customers during the interview.

The rich Contextual Inquiry data is especially useful when you start to implement the solutions to problems that you have observed. For example, the Contextual Inquiry of application developers not only revealed the importance of code examples to developers, it provided guidelines for implem enting effective code examples. Application developers wanted code examp les that:

- Are delivered online to facilitate pasting into their own routines
- Were concise
- Contained all setup and close-down code
- Provided references to associated calls
- Explained concepts that were not obvious
- Related to the tasks that developers were trying to accomplish

Whereas a questionnaire or a conventional interview might reveal that application developers wanted more code examples, this Contextual Inquiry generated specific guidelines that will help writers to create code examples that are useful to their audience.

Table 3: Application Development Task List

Task	Goal of the Task	Kinds of Information Required	Delivery Preference
Research	To learn enough technical detail about the technology to gain confidence in it and to identify potential problem areas.	Conceptual overview information. This should include general high-level tasks, problem areas, constraints and features.	Hard copy
Design	To write down the high-level organization of the application or module and to identify interrelationships among its components.	Details of technical product features so developer understands what is feasible and what is not.	Hard copy
Implement	To write the code for the routing or module.	Task-oriented information that describes how to perform specific tasks, that is, what API to use, dependencies associated with the API, and how to process error return code. Explanations of syntax and compiler messages.	Online
Debug	To narrow down a problem to a specific API and to identify and correct errors as quickly as possible.	Explanations of error messages, descriptions of APIs, and troubleshooting information.	Online
Test	To verify that the module performs as expected.	Descriptions of APIs, explanations of error messages, and troubleshooting information.	Online reference information and error message explanations
Integrate	To integrate a module into a larger system.	Descriptions of APIs, explanations of error messages, and troubleshooting information.	Online

Writers who participate in Contextual Inquiries gain an in-depth understanding of their audiences that can help them provide more useful documentation that supports their work. Writers can also use Contextual Inquiry to validate the added value that documentation provides to users.

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References

Darroch, V. and R. Silvers (Eds.), (1982). *Interpretive Human Studies: An Introduction to Phenomenological Research*. Washington, D.C: University Press of America.

Glaser, B. and A. Strauss, (1967). *The Discovery of Grounded Theory: Strategies for Qualitative Research*, Chicago: Aldine.

Good, Michael, (1989). "Seven Experiences with Contextual Field Research." *SIGCHI Bulletin*. 20(4) April, 25-29.

Holtzblatt, Karen, and Sandra Jones, (1993). "Contextual Inquiry: A Participatory Technique for System Design." In *Participatory Design: Principles and Practices*. Douglas Schuler and Aki Namioka (Eds.). Hillsdale, New Jersey: Lawrence Erlbaum. pp. 177-210.

Huntwork , Paul K., Douglas W. Muzzey, Christine M. Pietras, and Dennis R. Wixon, (1993). "Changing the Rules: A Pragmatic Approach to Product Development." *Digital Technical Journal*. 5(4) Fall, 18-35.