SI 501 Overview: Contextual Inquiry and Consulting Foundations

Kentaro Toyama
Based on previous versions by Kristin Fontichiaro, Eric Cook

UMSI and Human-Centered Practice

Consider airport security. Moving millions of people through checkpoints while ensuring that no dangerous people or weapons get through is inherently difficult. On the one hand, security is the highest priority. On the other hand, speed and efficiency are important. At some airports, a short line moves quickly; at others, the line is long, and the wait is interminable. Obviously, some ways of solving this problem are better than others. But, what accounts for the differences?

Small things matter. For example, the bins used to hold laptops, shoes, and other items as they are pushed through the scanning machine – Are they light, sturdy, and easy to hold? Where are the empty bins kept? Can travelers easily access the bins without getting out of line? Or, will they get in each other's way? Given typical patterns of carry-on belongings, are the bins easy to load? Is there enough table space for multiple people to load their bins, or do travelers have to wait one by one before loading? Are there clear signs that explain what should go into the bins? Are they written in the most commonly used languages of that airport's travelers?

The travelers aren't the only people involved. The security officers who work the lines are also part of the system. Who returns the cart of used bins back to the start of the line? Is there an easy path to get there? Does returning the bins require temporarily blocking the metal detector? Does it require getting in the way of travelers? Does someone else cover for the officer while she's returning the bins, or does the line stall? Are the bins easy to stack? How many bins can be stacked on a cart? Who checks if bins have been properly loaded, and should they have other duties?

These seem like minor questions, and the right choice to any of them may only save a few seconds per traveler. But, added up and multiplied by the number of travelers, it could mean the difference between a five-minute wait and a thirty-minute wait. And, those are only the questions having to do with bins. What about metal detectors and scanners? Or, the conveyor system for bags? How many security officers are required for one line? What kind of training do they need? How should all the equipment be arranged? How should the lines be formed?

One reason why airport security can be a headache is because designing such systems is not easy.

* * *

At the University of Michigan School of Information, we emphasize human-centered approaches to designing and evaluating systems. We believe that understanding people – their needs, preferences, and behaviors – is essential for designing better information systems, processes, technologies, and organizations.

Human-centered approaches are relevant for many contexts. A human-centered archive feels intuitively organized to its patrons. A human-centered service responds efficiently and empathetically to customers. A human-centered app provides experiences users want in a form that is pleasant to use. Good systems tend to be human-centered – they have been designed with the human users and operators in mind. Bad systems often privilege bureaucratic rules, engineering priorities, and the whims of the environment.

Human-centered systems, however, take skill to design well. One of the greatest challenges with systems like these is that the problems seem obvious, and because they seem obvious, few people put in the effort to observe the context carefully and understand the root causes of the problems. As Arthur Conan Doyle had Sherlock Holmes say, "The world is full of obvious things which nobody by chance ever observes."

Contextual Inquiry: A Formal Technique for Understanding People in Context

In SI 501, we teach one particular human-centered approach for understanding systems and processes called *contextual inquiry.* It emerged from the computer software industry and was formalized by Hugh Beyer and Karen Holtzblatt as part of something they called "contextual design." The technique, however, is applicable to a range of situations well beyond technology, and its effectiveness has also made it popular in start-ups, in libraries, and elsewhere.

As Beyer & Holtzblatt (1998) explain, "The core premise of Contextual Inquiry is very simple: go where the customer works, observe the customer as he or she works, and talk to the customer about the work. Do that, and you can't help but gain a better understanding of your customer." (You can replace "customer" with "user," "patron," "client," and so on; the methodology applies whatever the context.)

Like many skills, contextual inquiry is easy to understand but it takes practice to do it well. In an end-to-end design process, contextual designers interview and observe users as they interact with their environments, information flows, technology systems, and colleagues. They process interview transcripts, sketch work patterns, and analyze data to identify key points of tension and failure. Contextual designers then identify solutions, design new processes or technologies that are compatible with their interview data, and then prototype, test, and implement solutions.

In SI 501, we focus on the first half of this process – gathering and analyzing data, and recommending solutions. (SI students will learn more about the second half of the process – prototyping, testing, and implementing solutions – in other courses.)

Consulting and Qualitative Analysis: The Other Side of 501

In almost any form of professional knowledge work – certainly in the work contexts that most UMSI graduates go into – there will be times when you will be called on to provide someone with thoughtful, targeted, strategic recommendations based on a rigorous examination of a specific problem. Whatever your job title happens to be at the time, in effect, you'll be serving as

a consultant. These projects can be pivotal in a career, because they offer you a chance to shine beyond your everyday work. Our goal is to provide an environment in which you can gain many of the skills of a good consultant: presenting yourself appropriately; doing background research; managing timelines; writing clear emails; drafting reports; and delivering persuasive presentations.

Consulting projects, of course, range widely in their content. Some consultants gather quantitative data and crunch numbers. Others build technical systems customized for their clients. In this class, we will be focusing on qualitative data analysis – the collection, interpretation, and analysis of information that is qualitative. Qualitative information includes text documents, interviews, visual material, direct observation, and other information that hasn't been quantified.

Qualitative analysis is sometimes overlooked in our age of "big data," but it's at least as important a skill in any kind of knowledge work. It is especially critical to human-centered design and user experience research, but other fields also benefit from it. Increasingly, libraries, archives, and museums do qualitative research to understand and tailor services their users. Quantitative data analysis often begins with hunches and hypotheses that were developed through qualitative information. Steve Jobs's insistence on glass screens instead of plastic for the iPhone was a qualitative decision (Blodget 2012). Carla Hayden's choice, as CEO of Baltimore's Enoch Pratt Free Library, to open up the library during the city's unrest in 2015 was a qualitative decision (Cottrell 2015). These were decisions made without, in conjunction with, or even in spite of, quantitative data.

Course Outline

In SI 501, you'll work in a team and be matched with a client organization on a *client project*. The clients have come to UMSI asking for help streamlining, improving, or somehow adjusting a work problem involving how information moves from step to step, stage to stage, or person to person. Your client might be a library, a school group, a non-profit organization, a corporation, a government agency, a doctor's office, a museum, or some other entity.

Because both contextual inquiry and consulting involves a series of skills, this course is designed to allow you to spend as much time learning through doing. Although there will be assigned readings as well as discussion and quizzes about them, we will not be quibbling about the finer points of theory in this course. Instead, you will spend most of your time doing activities and exercises that help build consulting and contextual inquiry skills.

UMSI follows university-wide guidelines for out-of-class work: For each credit hour, students should expect to spend three hours outside the classroom. SI 501 is a 3-credit course, which means that you should expect to spend an average of nine hours of work per week outside of class. (A typical UMSI course load of 12 credits per semester translates to an approximate weekly commitment of 48 hours.) Some weeks will have less work; others will have more. The rest of this section overviews the skills you will practice.

Meet Your Client, Scope Your Project

Early on in the class, you will scope your project – determine the breadth and depth of the project, and identify the people you need to interview and observe. If you're working on a client project, you will meet with your client (preferably at their work site) and do this together with them. Some preliminary scoping has been done for you already, but you will need to further refine the boundaries of your task in this initial meeting.

Clients have a tendency to pile on work, so you will need to manage expectations. You will need to be friendly but firm. You want a project that has enough complexity to keep you interested for an entire term and for which you could make useful recommendations but not so complicated that you can't complete it. Remember that for this class, you are focused on understanding the situation and providing recommendations only; implementing solutions is not part of the class.

Similarly, if you take up a design challenge, you'll work with your instructors to come up with a good scope.

Interview, Observe, Collect Artifacts

Once you have a problem to study, you can identify whose work is of interest. In SI 501, you will be gathering a certain kind of information – *qualitative data* – about what they do, what they think, and what the results are. That means going into "the field"; you need to go where the work is. You will travel to people's offices or job sites – wherever the relevant work is actually happening.

Gathering qualitative data involves at least three things: (1) interviewing people; (2) observing them as they engage in the relevant processes (we will do this as much as we can under conditions of the pandemic); and (3) collecting artifacts. Each of these activities has its own challenges. For example, interviewing people requires an appropriate setting, a prepared protocol that includes meaningful questions posed in the right order, a rapport-building demeanor, and so on. Some interviewees are shy at first; others might be outright hostile. In some settings, workers may be worried that their managers will overhear them; in others, people may tell you what they think you want to hear. Gathering authentic data is a challenge.

Contextual inquiry involves four principles that can help: (1) as already mentioned, "go where the work is to get the best data" (Beyer & Holtzblatt 1988 p. 47); (2) understand things as they actually happen, not as people claim when summarizing; (3) seek concrete data, instead of abstracted statements; (4) seek to observe and absorb, not to judge individual performance.

With your team, you'll do at least six interviews and observations; some teams will be able to do ten or more. Through interviews, observation, and an understanding of relevant artifacts, you'll be looking for clues, details, and behaviors that can help you understand why the work unfolds the way it does and what motivates and influences it. You will be looking for how a workflow breaks down or how it can be further improved.

Interpretation and Affinity Diagrams

Once you've gathered data, what does it all mean? To uncover hidden work practices and root causes, you'll need to recall, interpret, and make sense of that data. Contextual inquiry recommends that within 48 hours of an interview, you meet as a team and hold an *interpretation session*. You'll talk through your interviews, make notes, and sketch out diagrams and pictures to help you understand what the work actually looks like. You might hypothesize about the underlying meaning behind statements. What does User #1 do first? How does User #2 know it is time to move to Step 4? How does User #3 know when User #2's task is complete? What works? What doesn't? These processes can be hard to articulate. Sketching *models* of the workflow can help make sense of the data, and the models can be consolidated to find overarching trends and themes.

A key aspect of contextual inquiry involves something called an *affinity wall* (or an *affinity diagram*), where you take interview and observation data and organize them into a single, hierarchical map of information. This kind of formal interpretation helps to identify critical issues, brainstorm solutions, and persuade others (*i.e.*, the client) that your analysis is based on data and sound analysis.

May We Make a Recommendation?

After data analysis, you'll formulate recommendations. What does the data tell you are tensions in the workflow? How could they be mitigated? What would make information flow more effectively? One focus of contextual inquiry is to identify *systemic* fixes where appropriate. Instead of solving only surface issues, you are hoping to find a way to adjust an underlying issue. Holtzblatt et al (2005) write:

> Most people look at user data and see some small problem and can design a small fix or define a needed function. But lots of small ideas don't add up to a system that coherently supports the whole of the work. Instead we want to encourage teams to generate ideas that support more of the overall work intent, more of the overall process, and solve some of the larger problems or issues (p. 197).

Often, "the data will talk to you." The set of techniques you'll learn in this course will help you make decisions based on what's actually going on, not what is supposed to take place, or what someone says is happening.

In addition, the data and your analysis serve as evidence when you make your recommendations. You can say, "We saw A, B, and C, and from that, we concluded X, and we suggest Y and Z." The data bolsters any advice you provide.

You will make your recommendations as a written report and as a presentation. (In some cases, a client may not have time to listen to a presentation; but in any case, everyone will have a chance to make their presentation to the class.)

Conclusion

MSI and MHI alumni regularly report that the skills they learned in SI 501 directly translated to their internships or their jobs, whether in UX, in data analysis, or at libraries and archives. Some also mention that they have formed long-term bonds with their team members which led to strong professional networks. We hope both will happen.

In addition, one of the goals for the course is that you leave your clients impressed and happy. We hope in many cases that they will implement your recommendations (though whether they do or not often depends on factors that are outside your control).

Throughout, your professor and GSI are here to support your work in class and in the field. Don't hesitate to approach us about any questions or comments you may have about the course. Come and visit during office hours. Ask questions in Lecture or Discussion or via email or on Canvas. The more you put into the course, the more you'll get out of it!

References

Beyer, Hugh, and Karen Holtzblatt. 1998. *Contextual Design: Defining Customer-Centered Systems*. San Francisco, Calif: Morgan Kaufmann.

Blodget, Henry. 2012. Steve Jobs freaked out a month before first iPhone was released and demanded a new screen. Business Insider, Jan. 22, 2012. http://www.businessinsider.com/steve-jobs-new-iphone-screen-2012-1

Cottrell, Megan. 2015. Baltimore's library stays open during unrest. American Libraries Magazine, May 1, 2015. https://americanlibrariesmagazine.org/blogs/the-scoop/qa-carla-hayden-baltimore/

Holtzblatt, Karen, Jessamyn Burns Wendell, and Shelley Wood. 2005. *Rapid Contextual Design: A How-to Guide to Key Techniques for Human-centered Design*. San Francisco: Elsevier/Morgan Kaufmann.