



INTERVIEW with Abigail Sellen

Abigail Sellen is a principal researcher at Microsoft Research in Cambridge, UK. Her work involves carrying out user studies to inform the development of future products. She has a background in cognitive science and human factors engineering, having obtained her doctorate at the University of California, San Diego. Prior to this Abigail worked at Hewlett-Packard Labs in Bristol, UK, Xerox Research Labs in Cambridge, UK, and Apple Computer in Cupertino, California. She has also worked as an academic researcher at the Computer Systems Research Institute at the University of Toronto, Canada and the Applied Psychology Unit in Cambridge, UK. She has written widely on the social and cognitive aspects of paper use, videoconferencing, input devices, human memory, and human error, all with an eye to the design of new technologies.

YR: Could you tell me what you do at Microsoft Research Cambridge?

AS: Sure, I'm in a group at Microsoft Research called 'Computer-Mediated Living' which brings together psychologists, sociologists, computer scientists, hardware engineers and designers. Our goal is to inform the development of new technologies that fit into and enhance everyday life, but that also go beyond the usual metaphors for software and hardware design. You could say that we are trying to go beyond the desktop metaphor to bring technology out of that box and into the everyday world around us. Our focus has

been largely on the home, but more recently we've been working on exploring new uses for gesture-based interaction using technologies such as Microsoft's Kinect, which is taking us into new domains such as surgical settings.

YR: Right. Could you tell me about user studies, what they are and why you consider them important?

AS: OK. User studies essentially involve looking at how people behave either in their natural habitats or in the laboratory, both with existing technologies and with new ones. I think there are many different questions that these kinds of studies can help you answer. One question is: who is going to be the potential user for a particular device or service that you are thinking of developing? And, relatedly, will this technology be used collaboratively, such as by family groups or work colleagues? A second question—which I think is key—is, what is the potential value of a particular product for a user? Once we know this, we can then ask, for a particular situation or task, what features do we want to deliver and how best should we deliver those features? This includes, for example, what would the interface look like? Finally, I think user studies are important to understand how users' lives may change and how they will be affected by introducing a new technology. This has to take into account the social, physical, and technological context into which it will be introduced.

YR: So it sounds like you have a set of general questions you have in mind when you do a user study. Could you now describe how you would do a user study and what kinds of things you would be looking for?

AS: Well, I think there are two different classes of user studies and both are quite different in the ways you go about them. There are evaluation studies, where we take a concept, a prototype or even a developed technology and look at how it is used and then try to modify or improve it based on what we find. The second class of user studies is more about discovering what people's unmet needs may be. This means trying to develop new concepts and ideas for things that people may never have thought of before. This is difficult because you can't necessarily just ask people what they would like or what they would use. Instead, you have to make inferences from studying people in different situations and try to understand from this what they might value.

YR: In the book we mention the importance of taking into account social aspects, such as awareness of others, how people communicate with each other and so on. Do you think these issues are important when you are doing these two kinds of user studies?

AS: Well, yes, and in particular I think social aspects really are playing to that second class of user study I mentioned where you are trying to discover what people's unmet needs or requirements may be. Here you are trying to get rich descriptions about what people do in the context of their everyday lives—whether this is in their working lives, their home lives, or lives on the move. And what you find is that being with other people,

communicating with them, and being aware of the activities of others is often what drives people to use technology. So, taking account of the social context of behaviour is key to understanding what value new products and services might bring to people's day-to-day activities, and also how they would fit into those existing activities.

YR: And what about cognitive aspects, such as how people carry out their tasks, what they remember, what they are bad at remembering? Is that also important to look into when you are doing these kinds of studies?

AS: Yes, if you think about evaluation studies, then cognitive aspects are extremely important. Looking at cognitive aspects can help you understand the nature of the user interaction, in particular what processes are going on in their heads. This includes issues like learning how users perceive a device and how they form a mental model of how something works. Cognitive issues are especially important to consider when we want to contrast one device with another or think about new and better ways in which we might design an interface.

YR: I wonder if you could describe to me briefly research where you have looked at both cognitive and social aspects.

AS: A good example is a study we did aimed at designing and developing new devices for reading digital documents in workplace settings. When we first set out on this study, before we could begin to think about how to build such devices, we had to begin by asking, "What do we mean by reading?" It turned out there was not a lot written about the different ways people read in their day-to-day lives. So the first thing we did was a very broad

study looking at how people read in work situations. The technique we used here was a combination of asking people to fill out a diary about their reading activities during the course of a day and interviewing them at the end of each day. The interviews were based around what was written in the diaries, which turned out to be a good way of unpacking more details about what people had been doing.

That initial study allowed us to categorize all the different ways people were reading. What we found out is that actually you can't talk about reading in a generic sense but that it falls into at least 10 different categories. For example, sometimes people skim read, sometimes they read for the purpose of writing something, and sometimes they read very reflectively and deeply, marking up their documents as they go. What quickly emerged from this first study was that if you're designing a device for reading it might look very different depending on the kind of reading the users are doing. So, for example, if they're reading by themselves, the screen size and viewing angle may not be as important as if they're reading with others. If they're skim reading, the ability to quickly flick through pages is important. And if they're reading and writing, then this points to the need for a pen-based interface. All of these issues become important design considerations.

This study then led to the development of some design concepts and ideas for new kinds of reading devices. At this stage we involved designers to develop different 'props' to get feedback and reactions from potential users. A prop could be anything from a quick sketch to an animation to a styrofoam 3D mockup. Once you have this initial design work, you can then begin to develop working prototypes and test them

with realistic tasks in both laboratory and natural settings. Some of this work we have already completed, but the project has had an impact on several different research and development efforts.

YR: Would you say that user studies are going to become an increasingly important part of the interaction design process, especially as new technologies like ubiquitous computing and handheld devices come into being—and where no one really knows what applications to develop?

AS: Yes. I think the main contribution of user studies, say, 15 years ago was in the area of evaluation and usability testing in laboratory settings. One change is that with the advent of mobile and ubiquitous computing, fewer of these technologies can be evaluated or understood in such controlled circumstances. By their very nature they must be useful in many different environments with much more complexity than is present in a laboratory. Our evaluation methods therefore have to adapt too and be oriented more toward evaluation in real world settings and everyday activities. Here we can learn a lot from the methods of sociologists and anthropologists. I think also the role of user studies is shifting from an emphasis on evaluation to more of an emphasis on the invention and development of new product concepts. One of the implications of this is the need to work more closely with people who know how to do design. I think we have a lot to learn from designers and their techniques. The bottom line is drawing on other disciplines is more important than ever for a user studies researcher.

YR: So they are essentially working as a multidisciplinary team. Finally, what

is it like to work in a large organization like Microsoft, with so many different departments?

AS: One thing about working for a large organization is that you get a lot of variety in what you can do. I have found that as part of the research laboratory of such an organisation, I get a fair amount of choice in what I do and don't have to be tied to a particular product for any long period of time. If, on the other hand, you work for a smaller organization such as

a start-up company, inevitably there is lots of pressure to get things out the door quickly. Things are often very focused so there's less time to spend looking at any one issue deeply. I prefer the flexibility of a large organisation, and, while it may sometimes be more of a challenge to do publishable research and produce useful technologies at the same time, there is great satisfaction when you can have an impact on real products that affect people's lives. ■