

S. Joy Mountford on Interface Design

*The ultimate technology world will be soft, flexible and addressable.
But the issues will remain the same, according to interface designer S. Joy
Mountford: What do people like and what do people want?*

From airplanes to PCs to consumer electronics, S. Joy Mountford has been developing and managing innovative interface designs for more than 20 years. She was the creator and manager of the highly acclaimed Human Interface Group at Apple Computer. Before joining Apple, Mountford worked at MCC, an A.I. computer consortium. Prior to that she designed advanced user interfaces for military avionics systems. At Interval Research Corporation she led a series of musical development projects. She frequently teaches at Art Center College of Design, Pasadena, and at Tisch School of the Arts, NYU - ITP. Her areas of professional specialty are interaction design techniques for rapid prototyping and methodology for user involvement. She has worked on various online music projects, 3-D design and displays, and applied speech technology.

UBIQUITY: How did you originally get interested in interface design?

MOUNTFORD: My education was in psychology, and my practical training experience primarily in aviation. I came to America on a scholarship to try to understand how pilots multi-task in order to fly more effectively. The goal was to see if pilots, while flying in incredibly unstable vehicles like helicopters, could get their jobs done more successfully and safely. This used to be called "man-machine systems," which was looking at how to make that coupling more effective. A lot of what we did was "human factors", now called ergonomics. Then I moved into artificial intelligence at MCC, a research consortium in Austin, Texas, and started to look at a similar kind of display world, one used not by a pilot but by a knowledge worker involved with navigating large data sets in 3D.

UBIQUITY: What did you do after that?

MOUNTFORD: Someone suggested that I look into a company called Apple, which I had never heard of. In '86 Apple was starting a Human Interface Group. I thought that sounded like something I could do, and I ended up at Apple managing what ended up being a large and successful group, probably during a heyday of Apple, although I think they've had a resurgence recently. I was there from '86 to '94. In '94, David Liddle hired me to work at Interval research, funded by co-founder of Microsoft, Paul Allen. David had the charter to create an open-ended research consortium of people who were trying to design new industries.

UBIQUITY: Let's go back for a second to your coming to the States. When did you come to here? And why?

MOUNTFORD: My undergraduate work was in psychology, and I thought it would be very interesting to come to America and get involved in aviation. So I applied to college here and I got in. It was a little bit of a shock, because when I got there, it wasn't quite how I had thought it would be.

UBIQUITY: In what way?

MOUNTFORD: Well, America in the Midwest was very different from what I was used to. I had received a scholarship to go to the University of Illinois. Any visitor from London in the 1970s was due for a bit of a shock. I had been at a single-sex university, but ended up suddenly in a male graduate institution with a lot of senior people from the military. So it was surprising on all sorts of levels. In addition, I hadn't expected that the content of my studies would be quite so engineering-centric.

UBIQUITY: As you've moved from engineering applications to computer applications, have you felt that you've been doing essentially the same thing or quite different things?

MOUNTFORD: I'm not a person who really cares about what's "underneath" -- and that could be either the computer technology that's underneath, a supporting network, or a helicopter. The display and control challenges are essentially the same. People need to see things quickly and they need to find things quickly. My thesis was

on "attention modeling" -- to see how you might be able to provide different processes of stimulation to different visual/auditory domains to prepare people to respond to information faster and better.

UBIQUITY: What did you find out?

MOUNTFORD: I found out that in the personal computing space, just like in most other design spaces, things start off with a few physical dials, then move to visual displays, and then the visual display space gets immensely complicated very quickly. Then people begin to say, oh, gosh, we have to do something else, which often means adding some auditory information. Then you start hearing a few sounds as feedback sources. Now we're in that visually dominated space with some audio displays that can easily become overloaded. We are starting to look at another critical modality -- touch. We are just starting to examine tactility as the third and currently underused modality. The display of multi-media data being presented to a user needs also to be supported with multi-modal information control. I find this balancing of different modal outputs from a user as input to their display systems to be a very interesting space.

UBIQUITY: So the interface paradigm is a shifting space?

MOUNTFORD: Exactly. I think that every five years there has been a shift of the interface paradigm that I have worked within, which also paralleled technology industry waves. Defense business interests shifted into the AI knowledge worker space, then from the specialized AI work into personal computing (Apple), and then consumer electronics (Interval). Now my interests are in ubiquitous computing or the advent of "smart everyday objects." There is even a notion of smart dust too. I think it will next move into "threads" for wearable computers since there is a lot of very interesting work currently in flexible displays, which will allow you to have technology addressable fibers woven directly into your clothing, so you can move into an even freer environment using follow-me computing.

UBIQUITY: And what after that?

MOUNTFORD: Well technology artifacts could even end up being eaten by people. I'm not sure about the biological issues involved, but Marvin Minsky (the father of AI) talked about these possibilities some time ago.

UBIQUITY: Do you think of that as part of interface design?

MOUNTFORD: I do a lot of visionary work and presentations. Businesses ask me to offer insights on the future of "computing". That's obviously a gigantic subject, so I usually talk to them about those user interface paradigms transitions that I mentioned earlier, and what they need to prepare themselves for. I think various medical innovations are moving into smaller and smarter devices that can be used to monitor our bodies and I suspect some of them may eventually end up being eaten. To me the goal has always been to find out what do people actually need? And if they don't have a particular need, then what do they like? When we were doing data processing, we were doing *jobs*, and now we're thinking much more about what other "non-work" activities technology can be used for -- what else can we do with it? We're now doing video editing on PCs that we would never have thought reasonable 15 years ago. The ultimate technology world will be soft, flexible and addressable. But the issues will still remain: what do people like and what do people want? You're going to have to address this space in order for any new technology capability to be truly pervasive at the consumer level.

UBIQUITY: Someone might wonder, how hard could it be to find out what a person likes?

MOUNTFORD: Describing "likes" is difficult because what you like and what I like are often different, with good reason. On the other hand, what I see and what I hear have more physical similarities. What we all feel is very different too. How can I design something that will appeal to the most people? If I can mediate between the capabilities of the technology and the actual human needs to make a good match then I have made a useful connection between people and technology.

UBIQUITY: What sort of consensus do you feel in your field -- and by the way what do you call the field that you think you're in?

MOUNTFORD: It's interesting that you ask that. I've been doing this type of work for so long that I've seen complete changes in vocabulary. Almost everyone you meet is now an interaction designer of some type, because the tools are accessible for everyday people. People use the word "user experience" now all the time, and experience occurs over time -- it is not instant. The important thing about interaction is that it's a solution to some problem. A solution may be found quickly but experience occurs over time -- belonging to a bigger space. People have got away from words like "usability," evangelized by Jakob Nielsen, where the desire is to figure out how to get user profiles to improve navigation, often of a Web site. I think the term "man/machine systems" is never used now -- partly because it has a "man" in it, which is sort of silly because it really is man/machine systems that we're talking about. It's not to do with computer systems as such, although our national ACM SIGCHI conference uses the word computer but ACM still uses machinery.

UBIQUITY: Expand on that point a bit.

MOUNTFORD: What is a computer? I have no idea anymore. They're all over the place and they all do different things. I think "experience" is a term we currently use more. What do I call myself? Well, I find it hard to answer that because I do many different things. If you have a job in a company, you usually have a title, but I work for myself. I usually refer to myself as principal or founder -- neither of which conveys any particular notion about my work. My answer to your question is one that changes depending on different people's understanding and also their positions. Why? Different people understand different levels of subtlety, depending on their exposure to the computer-human interface. A lot of the time I say I do applications design, and to me that's the way that you get interactivity done. By creating sample working illustrations, you have to build something concrete which typically means prototyping in a particularly quick and rough fashion the product ideas. This helps people "see" what is worth refining and what needs to be started again.

UBIQUITY: Talk a bit about the way this is done.

MOUNTFORD: At Stanford University, where I have been mentoring, they have teams of people visualizing, drawing, making things out of foam core -- anything that shows an artifact -- so that you get a real physical sense of the product you're

designing. One reason that this is important is that experiencing the combination of the physical and visual design ideas is critical to products that you use mainly in your *hands* -- cameras, telephones, PDAs, whatever, all held and put in pockets. As a designer you need to hold the thing and look at it and ask, will this be something that somebody actually wants to *use* and will somebody be *able* to use it?

UBIQUITY: Any great successes to report?

MOUNTFORD: We've finally managed to get the engineering guys to realize that product design is not just about selling another capability. More and more consumers are less tolerant of technology artifacts. People just won't spend their money buying things they cannot use. Therefore, engineers and designers have to go back and start over thinking about the user. It's like Unix, which is not very easy to use because it was designed by and for a bunch of Unix guys. Once I have a camera in my hand and I want to edit my son's graduation party, I get really frustrated if I can't use it. The reason I'm good at what I do is that I'm a little bit like an experienced naïve person, which sounds contradictory, but I have enough knowledge about technology that I can understand the capabilities to know what can be done or designed differently. My point is that new good ideas are cheap but it is rather more important to connect with people in a meaningful fashion. In many ways, it's a question of *not* doing all the things you can do, since often that approach ends up making things harder for people to use.

UBIQUITY: Give us an example from your experience.

MOUNTFORD: One of the things that my group at Apple pioneered was the design and uses of QuickTime. I invited some film people to come and work in my group and create new uses and directions for it. They helped create Navigable Movies, which was the precursor to QuickTime VR, along with content illustrations of what you could do with video on a computer. The vice president at the time said, well, "Now I know why my grandmother will want to buy a computer" although of course everyone realized that a thumb print size video was too small it showed an illustrative vision of how the future might be. We kept pushing and finally people started to realize that you can see new things happening on a computer, and make hypertexted information come to life in a more consumer manner. I think this was a

really good illustration of what happens when you put technology in the hands of people who think of doing different things with it. I believe interface people should foster such creativity and experiments by encouraging some different things to happen. Sometimes distracting things happen but also sometimes that is a very good thing too. Unless you keep that cross-pollination going, you won't make a lot of progress with making technology capabilities pervasive.

UBIQUITY: Do you find yourself going through a typical day and finding yourself horrified by the products you see?

MOUNTFORD: Yes. When Don Norman wrote his first book on interaction, he was working with me at Apple, and he was always leaning out of the window on trips with his Instamatic camera taking pictures of some interface artifact, which later we realized were to be used as examples for his book. Similarly every trip I take, I am reminded of how bad interfaces are everywhere, especially in unfamiliar places, starting with the signs at the airport. It's unbelievable. There you are, incredibly motivated to find information, get food, get to the right place, and so forth, yet the signage is a nightmare. Charles de Gaulle is a good example of probably the worst airport signage ever. You can find bad design and poor interfaces everywhere. On the other hand, I do think the world's appreciation of good design for and with people is getting better, and it's easier to find instances of good design. It also appears to be part of a current business trend to emphasize design as part of success, as seen on several recent covers of credible magazines.

UBIQUITY: It is? Sometimes it seems that there are no two credit card machines alike in the whole world, or two similar machines for pumping gas.

MOUNTFORD: Well, I know what you're saying. My ATM has just changed, and I got shocked when I went there. Huge buttons that lit up! I was so excited. I thought, gosh, I could actually see what I have done when I do it, and they're big enough so I can push them. I'm actually obsessed right now about why everything's so miniature. People are not getting smaller, yet the displays and control surfaces are. I want the biggest buttons. I don't care what it costs. I ask salespeople, what do people do when they're older when they've got arthritis or various other ailments? Like people my age. I don't think of myself as old, but I point out that it's not just

very old people. And they go, well, that's the only thing we have. Have you ever talked to older people? I mean, they have a heck of a time with those things.

UBIQUITY: How does what you do compare with industrial design?

MOUNTFORD: There's a big difference between industrial design and interface design. Not only do we have massively different histories, but experience design, as I said earlier, takes place over time. When you buy a VCR, you try it out in the store for only a couple of minutes, and so longer-term use problems don't occur until you set it up in your home, and experience that it's not doing all the things you thought it would do, in the way you wanted. Then you say, well, I'll return it, but the hassle factor means that most people do not return products that they can't use, if they are under about fifty dollars. So, consumers put up with poorly designed, annoying products and barely discover all the functionality, since they are unwilling to struggle to get the device to be functional. Or they return it and pick up another one and find the same problems. I did that with my cell phone. I returned it twice. I used it for four or five days and I went back and I said, this is too difficult to use. And they gave me another one from the same company with a hugely different interface that was equally difficult to use, but I had to get used to it since I need a mobile phone.

UBIQUITY: Give us a final thought.

MOUNTFORD: I miss the purity of products. I like to know when I buy a camera that it takes pictures. It is designed to optimally do that. I like to know that when I buy a phone it just makes phone calls and is optimally designed for that -- not to also take photos. I don't want everything integrated into one mega-product with swollen capabilities. I don't think that helps me do anything. It's not what I want, and I don't think of doing everything all the time, so it is not useful or appealing.

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