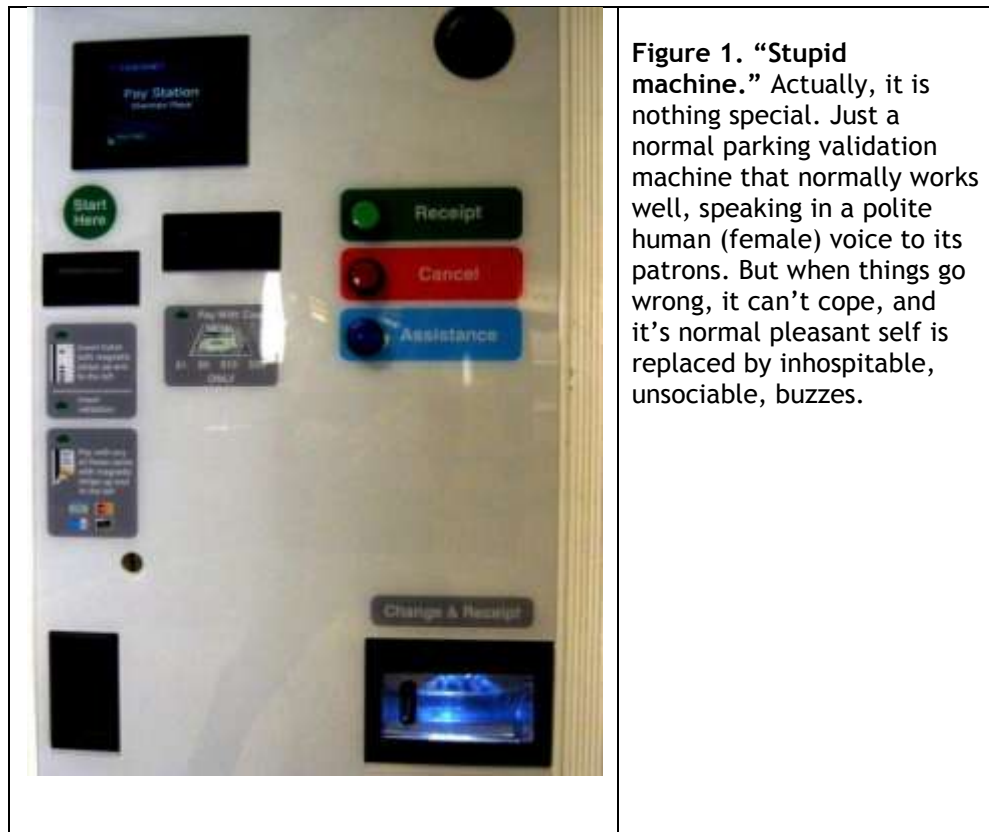


1.1 SOCIABLE DESIGN

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“Stupid machine,” I heard the woman shout, as I walked through the lobby of the building. She had parked her car in the garage and now wanted to pay and go on her way. She had inserted her parking pass and paid, but then never received the receipt which she needed to let her car out of the lot. “Stupid, stupid,” she said, kicking the machine. She pushed a button: “bzzz” answered the machine. “It won’t give me my ticket,” she yelled to nobody in particular, pushing more buttons and getting buzzing sounds in response.

Machines are stupid. The problem is that those who design them do not seem to realize this. They assume perfection, a smoothly operating ticket machine, always performing smoothly and efficiently. People, it is true, get in the way. “If only we didn’t have all these people around, one can imagine them saying, “the machines would work just fine.” Actually, I don’t have to imagine: I have heard designers say just that. The result is the use of terms should as “fool-proofing,” or “idiot proofing” to designs, putting in words the contempt that engineers and designers often feel for other human beings: fools and idiots, they call us.

What about the irate woman? What had she done that deserved such treatment? Nothing, nothing at all. The paper ticket that had been inserted into the machine didn’t come out again. Not her fault, as even engineers will tell you. The next dislike on their list of peeves, just after people, is paper handling. It is really difficult to move paper about reliably and efficiently, especially things like tickets that have been mishandled by their owners: touched, put in pockets, had drinks spilled on them, or worse of all, been folded. See, there it is again: it is people who are to blame.

It is time to socialize our interactions with technology. Sociable machines. Basic lessons in communication skills. Rules of machine etiquette. Machines need to show empathy with the people with whom they interact, understand their point of view, and above all, communicate so that everyone understands what is happening.

Reticulating splines

Message from the Mozy backup program

I am backing up my files, using one technology to protect me against the potential failures of another technology, hoping to protect my precious computer files against computer failure, or for that matter, fire or earthquake. My backup program talks to me, giving continual progress reports, letting me know that it is working hard on my behalf, doing wonderful, mysterious, complex, and no doubt absolutely essential things to protect me from unknown disasters that might befall my precious manuscript. “*Reticulating splines*,” it tells me. The very incomprehensibility of the technical jargon it spits out at me is strangely reassuring, suggesting that I not bother to think about such complex things but instead, leave it to the experts, which in this case is a computer program on my home machine that is talking to a mysterious “server” located somewhere in the mysterious cloud of servers scattered about the world. All I need to know is that it is working hard to store all my data in remote locations, so that even if my house burns down, even if California slides into the ocean in a massive earthquake, my data are safe.

The phrase “reticulating splines” turns out to be an insider’s joke. The game developer, Will Wright, inserted the phrase into his *SimCity 2000* simulation game because “it sounded cool.”² The phrase has since persisted, yielding several thousand hits on Google, and showing up in games ever since. And, of course, in my Mozy backup program. But wouldn’t you know it, we have reached the stage of technological social interaction where there is normally so little communication, so few social skills, that even a nonsensical phrase is

reassuring. “Don’t bother your pretty little head about this,” my technology condescends to tell me, “I’m on the case.”

Our technology is indispensable to life, yet irritating, frustrating, condescending, and non social. Each piece of technology is designed in isolation of all others, so not only is the technology anti-social toward humans, it is anti-social towards the other technologies within which it must coexist.

We live in a strange technological world, dependent upon machines and systems we no longer can comprehend, that although essential to our working lives are incomprehensible to us. Moreover, many of these systems are incomprehensible to everyone, for they have become so massive, so complex, that no single individual can hope to master it. Whether it is the international banking scene, the management of trade, the scheduling of freight and passengers, or even the fare systems of airlines, the rules are so complex that no single person can master them. The operating system of the home computer may contain 100 million separate lines of commands.

The lack of comprehension goes both ways. The technology does not understand us, nor does it even try. We do not understand the technology, and even though we may try it offers little assistance. We live in a technological world, increasingly unsociable, one that seldom communicates, and even when it does, it does so in a patronizing voice: “I’m busy reticulating your splines,” so please don’t bother me. And don’t worry your pretty little head about it, I’m doing just fine.”

We are all detectives in a strange technological world, searching everywhere for clues to what is happening. We seek reassurance and guidance. We seek explanations. Lacking them, we make them up, grasping at any clue that might hint as to the happenings. Meanwhile, world of technology in which we live takes over more and more of our lives, uncommunicative, uncomprehending, and increasingly ugly, uncaring, and tedious. Uncomprehending in both directions:

Machines, of course, don’t have intelligence, although the engineering community is working hard to try to give them some. But with or without intelligence, they need social manners, which is something that is seldom considered. The burden is actually on the designers, not the machines, because the intelligence, courtesy, empathy, and understanding is put in there by designers and engineers. Of course, to us everyday people who must interact with the machines, we see the machine, not the design team who constructed them, so to us, it is the machine that lacks understanding, that causes our frustration, and that is to blame.

SOCIABLE DESIGN

In the beginning, technologies were simple. Knife, hammer, ax. Today they are complex, with petabytes of this and gigahertz of that. They operate according to their own principles, often a formal logic that is quite unnatural to the untutored human mind, and they tend to be strong and silent, seldom explaining, seldom conversing, but quick to criticize, quick to fail if their precise operating requirements are not met, requirements, mind you, that are seldom specified, even after the problems have arisen. When machines work as desired, we can put up with them. But when things go wrong, what then? We

push buttons, the machine responds back with beeps and buzzes. How do we cope when things go wrong? More importantly, why should that be our burden?

By sociable design I do not mean machines that talk to us, that discuss the weather and sports. I don't even mean perfect machines. What I do mean is interaction that is understandable, effective, and socialized in the sense that it recognizes the needs and desires of the people who interact with machines. We need machines that do not expect perfection from people, machines that admit they sometimes break down, and that as a result are designed to convey as much as possible about what has happened and what the person might do next. Machines that are always displaying sufficient information that we can always have confidence and trust, always understand what is happening, so that when things go right (and they mostly do), we end up with a feeling good, and if things go wrong, we understand why and are in a better position to cope.

Sociable design. Design that recognizes the people who must always interact with the machine. For that matter, the principles apply even when no machines are present. Products are invariably machines, but what about services? What about where we wait in long lines, talk to other human beings, clerks and salespeople and service representatives? The same principles apply: sociable design, to make the interactions more, more understandable, even pleasurable for all concerned: customer and clerk.

Traditional product design includes testing to ensure that the design is understandable and usable. But the testing is artificial, done in a controlled setting, where the tasks are not those actually needed by the people who are asked to help evaluate the product. The tasks are assigned by the testing staff. This is necessary in order to ensure that the particular part of the product that the designers wish to evaluate actually gets used. But this means that the test is artificial: the person is not using the product the way someone would in a real situation: there is no higher level purpose. Moreover, the environment is sterile: it is isolated from the real world, there are no friends coming by to chat, no telephone calls, no interrupting messages to distract. And no competing activities.

Sure, we should bring people into the usability testing laboratories and ask them to use the product under consideration. This provides valuable information about the understandability and effectiveness of the basic design: do people understand it? Can they do the task asked of them? All this is essential to the design process, but it says nothing about the sociability of the design.

Almost every product or service is specialized, specific to some particular part of our lives. Kitchen appliances are specialized for some aspect of cooking or cleaning up. Even the most general device of all, the home computer, contains an ensemble of specialized programs, each specific to one small component of our lives. In the real world, life is not so neatly partitioned. We do activities, not individual tasks, the difference being that an activity has some high-level goal (such as to have an enjoyable evening with friends) whereas tasks are low-level and specific (sharpen the cooking knife), often an important component for the high-level goal, but a vastly different level.

Cooking as an activity is comprised of many slower-level activities, which in turn is comprised of low-level tasks. Sharpening the knife is a subgoal of chopping the vegetables, which in turn is a subgoal for preparation of some

dish, but all of these activities are of much lesser importance than the high-level goal of a pleasurable, social dinner with friends. We don't have tools for the important goals: all our tools, all our products, are for the small components. Sociable tools would at least understand the higher level context in which they are usually used.

When we use computers, the goal is not to do some word processing or to find a telephone number and not even to search for something on the internet. You would never guess this, however, because all of our tools assume they are the only thing of interest. But all these tasks are subservient to the important goals. In fact, all three might be part of a single activity aimed at satisfying a single, higher-level goal, perhaps that pleasurable evening: the word processor is being used to write an invitation, the telephone to discuss the menu, and the internet to search for recipes. Our isolated, context free tools cannot be sociable. A sociable design would support the high-level activity as well as the lower-level tasks.

No activity is done in a vacuum. Life provides a continual stream of events. We are continually interrupted by friends, colleagues, bosses. Our personal lives never leave us, so in the midst of unrelated activities, we might still wish to communicate with our friends and family. Many activities take a long time to do, so we might have to stop periodically for rest, food, or at the end of the day. Finally, people seldom do a single thing at a time. Each activity has numerous simultaneous components, and moreover, we are usually doing, or at least thinking about, multiple activities at the same time.

When in reading a book, a bookmark may mark the page but it may still take minutes to reestablish the context of the text and to find at the line where reading stopped. Many books try to add natural breaking points: chapters in novels, subheadings in non-fiction. Some of us try hard to find natural signifiers in the text - some noticeable mark where we can stop, perhaps a paragraph break or at a Figure or Table, hoping that when we are able to resume, we will be able to recall the mark. Note that paragraph breaks are artificial signifiers, designed to assist the reader. In the real world, events and conversations do not have paragraphs.

Because the computer is such a multi-purpose device, it is frequently used for multiple simultaneous activities, many of which have to be left unfinished when the inevitable interruption occurs. How do people recall their places? Leave the windows open? In some places, security requires that they be closed. In my life, especially in the midst of complex research on a variety of topics, with one or more partial manuscripts being written about those topics, when I quit for the evening, I carefully arrange all the windows and place markers on my two large display screens so that I will recall my place when I start again the next day. Except that my extremely rude and unsociable operating system often decides in the middle of the night that it is essential to install a new security patch, so that when I show up at my computer the next morning, I am greeted with pure, pristine desktops, sometimes with a polite message that my operating system has installed essential updates. (The note never apologizes for destroying my working environment.)

The computer incident really indicates a lack of sociability. Each individual component is designed as if it were used in isolation, for a single session and then closed. The computer is not designed as a social system, supporting real work. If it were, it would not be difficult to design applications so that they

could be automatically closed down when essential to do so, but then resumed again precisely where they left off. Assume it is essential to install security patches and restart my computer. There is no reason why the previous state could not have been saved so that upon restarting, all the windows were restored to their previous locations, scrolled to the same places, with cursors placed back in the windows just where they were before. That would be polite. That would be sociable.

Sociability refers to how machines interact with one another as well as to how they interact with people. Researchers at Philips and the Technical University of Eindhoven (the Netherlands), found that half of the consumer electronics products returned to stores actually work just fine, by the customers could not figure out how to work them³. The consulting firm Accenture found that 68% of returned products did not meet customer expectations. Another study made the point in its title: *“Broken expectations in the digital home.”* In this study conducted by Sara Bly and her colleagues from Intel Research Laboratories and the University of Washington found that major problems “are often caused by broken expectations, a mismatch between what a person expects to be able to do and specific device capabilities.”⁴ Note that in this study, all the individual components performed properly. They failed to work together as a system, so many of the people ended up having to discard the devices or return them to the store where they were purchased because they failed to deliver the system benefits that were expected. These were all unhappy customers. It doesn’t matter where the blame lies, when expectations fail, emotions rise: anxiety, disappointment, frustration, and at times, anger.

Here we go again: designers tend to develop each product or service in complete isolation of the context in which it is actually used. As the result, things that work well in the laboratory setting fail once introduced into the world. The world is filled with complex activities, overlapping, contradicting, interrupting activities. Sociable devices would recognize this reality and deal with it.

Being sociable requires system thinking: to look at the entire picture of human activity, in its natural, real context of everyday life. Sociable design requires understanding the context of usage, not just what other activities people are doing, but at the other machines as well. Sociable machines do not discriminate: they need to be sociable to machines as well as to people, even if the machines are made by competing companies. We all must live in this world together.

SOCIABLE INTERACTION

Much is known about design. Although the early emphasis by designers was on aesthetics and materials, modern designers are very concerned with ensuring that our products function well, fulfill true human needs, and interact appropriately. An entire subset of design is named “interaction design,” the better to focus upon the relationships between devices, their actions, and the people who use them. But even so, the devices are not sociable.

It’s as if we had a checklist for designers:

- Attractive
- Functional
- Ergonomic
- Usable
- Interactive
- Friendly
- Courteous
- Polite
- Sociable

Hmm, still need to work on sociable. Polite? Courteous? Responsive? Today's machines are all of those. Even the parking payment machine that opened this chapter was polite: In normal operation, it offered a set of buttons to push and responded in a polite, but somewhat bossy female voice: "Take your ticket with you. You will need it to exit the garage." Not even a "please" or "thank you." If you took the ticket out before it had finished that message, it then said "if you need a receipt, please press the receipt button." That seemed to be its entire repertoire of voice: the rest was done by flashing lights, a display screen, and those buzzes. (When I tried to explore these possibilities, a live human voice came out of the speaker, asking what I wanted, and then telling me I had to leave: it was not permitted to push buttons.) I looked up and yes, there was the little dark glass hemisphere that is commonly used to hide a TV camera. I waved at the camera and left. These so called intelligent machines still need human protectors. Sociable? Saying "please" and "thank you" does not make something sociable. A person who secretly observes and tells bystanders to leave does not add to the sociability.

Many of the messages machines flash or speak at us are courteous and nice, filled with thank yous and pleases with all the surface impressions of politeness and courtesy, but with no real warmth, no empathy, no understanding of the real issues. Because unless there is a person peering at us through a TV monitor, the machine is unable to understand who is using it, why, and what is actually taking place. And even when it is a live person watching, although they will offer assistance if asked, as I discovered, they are also suspicious and somewhat imposing. No wonder we don't like machines.

So although the parking machine worked just fine as long as people went through the correct sequence of operations, when people failed to follow the correct sequence, it gave no feedback. I watched one man insert his credit card three different times, until he finally decided that maybe the first time was correct after all and had actually worked. When the machine itself failed, which is what happened with the woman, the machine thought it was finished with the operation even though the last step of dispensing the ticket had not been completed, leaving the woman stranded. But machines seldom do well with unexpected occurrences, such as failure. Their designers seem to think they will always work perfectly and if there are any imperfections at all, it is in the fallible people who use those machines. "If only we didn't have to deal with those pesky people," one designer once told me. As a result, once the machine's actions and the woman's expectations got out of synch, the pleasant, pre-recorded human voice was replaced with buzzes and beeps. Fortunately, the designers did know that people would sometimes need help, so they provided a button marked "assistance" which summoned a human helper.

Sociable doesn't mean talking to us. Sociable doesn't mean saying "please" and "thank you" and "have a nice day." Being sociable doesn't require language. Pets can be sociable without language. To be sociable requires true interaction, behavior that makes us feel good, behaving appropriately in all circumstances. Sociability is not just in the actions, it is also in how we present ourselves, in appearances.

APPEARANCE

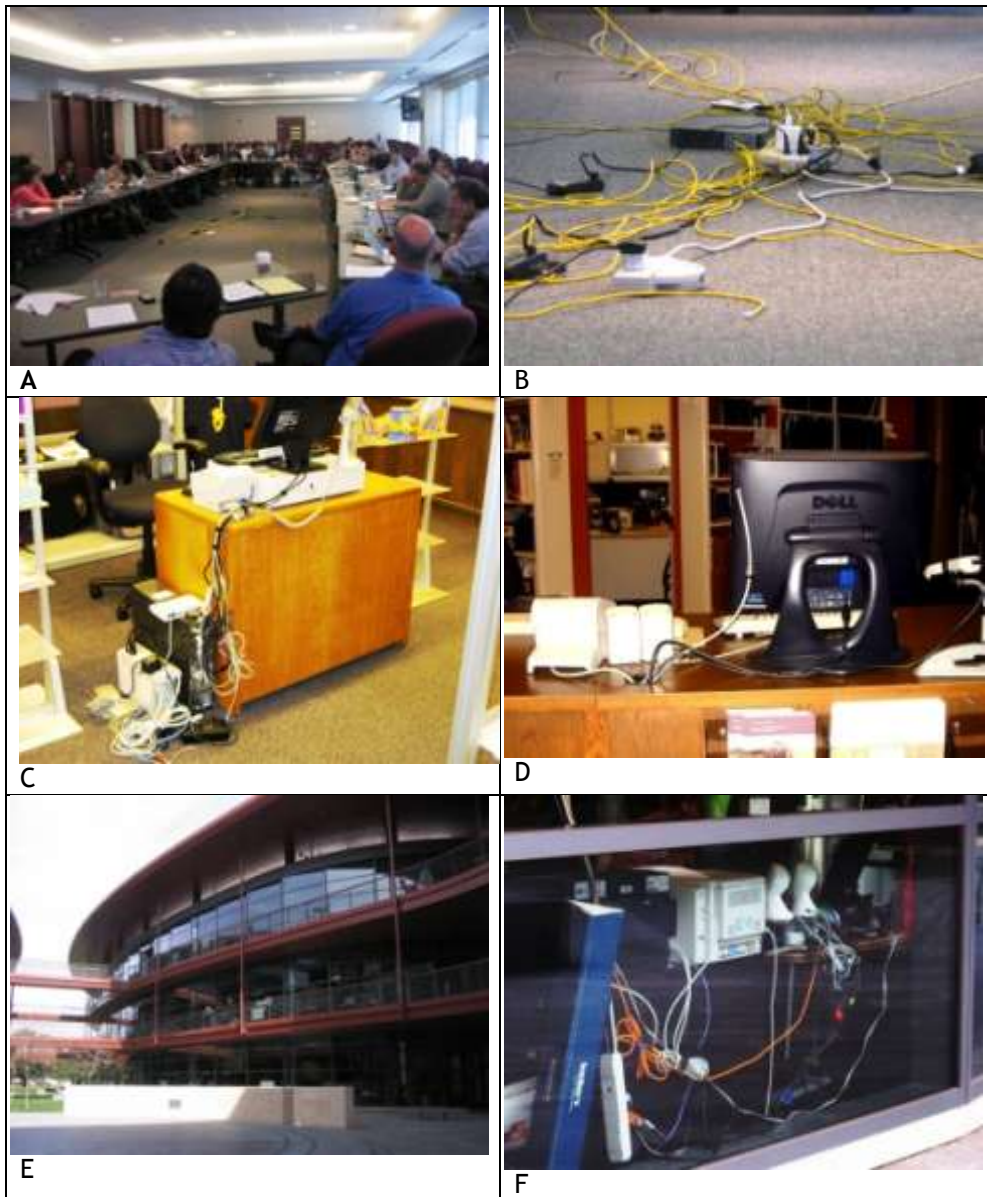


Figure 2. Unsociable appearances. Photographs A and B were taken at a design conference, this one at the National Science Foundation just outside of Washington, DC, but just look at the mess on the floor between the tables, in B. We had to stare at this ugliness for two days as we discussed elegance and beauty. Designers go to great trouble to make the front of their designs beautiful and elegant but neglect the part that visitors see: the entrails, the wires, the ugly infrastructure. C is a bank in Palo Alto, California, D the Engineering Library at Northwestern University, E the attractive James Clark Center at Stanford University, but when visitors look in the windows, they see ugly rear ends, as in F.

Appearance matters. Design should be about social activities, for the objects of design are embedded within social environments, impacting those nearby, even if they are not using the particular item or service. No object is an island, entire of itself. Every item is a piece of the environment, one shared by multiple people. The design speaks to those people. Yet when it comes to the design of many of our everyday objects, especially those involving technology, there is surprisingly little attention paid to the environmental and social impact. No, each piece is designed as if it were an island, independent of actual usage, independent of the surrounds, independent of the people who are affected, even if not directly using the item.

In magazines dealing with architecture and interior design, the photographs of buildings, offices, and homes are always spotless, with nothing out of place. No graffiti mars the walls, the lawns are carefully manicured. No cracks on the sidewalks. All the window coverings are lined up in nice geometrically pleasing arrangements. Inside, no papers litter the tabletops, no disarray is visible. In kitchens, there are nice bowls of fruit or cheese and wine, but no dirty dishes.

The same disregard for context, for the environments in which things are actually used is true of the various design contests and magazines for industrial designers. I have been a juror in several design contests where all the creative designs were shown in beautiful, pure, pristine environments. No wires, no people, no surrounding activity. I tried to get the rules changed so that in the future, all exhibits had to show the device in use, with all the necessary supporting structure, including power cords, speaker cables, networking connections - everything. My fellow jurors listened patiently, smiling tolerantly.

Designers act as if their responsibility ends with the boundaries of the cabinet. Not so. Similarly, all their attention is paid to the front of the equipment, even though many people only see the rear. This same philosophy is true of architects, ensuring their buildings are beautiful, but with almost no attention paid to how well it functions for the people within and around it. The roofs are ugly afterthoughts, with fans and vents spread haphazardly, ignoring the fact that residents of surrounding buildings have to spend their days peering down at the ugly, neglected roofs of otherwise attractive buildings.

The roofs of buildings are like the rear ends of equipment which in turn is like the rear end of animals. Why worry so much about the front of devices when so many of us only get to see their rears: ugly, ungainly, stringing with hanging entrails (wires, they are called). Necessary, functional, but not what one would prefer to be staring at all day long. Arise, designers of the world. Pretty up your rear ends.

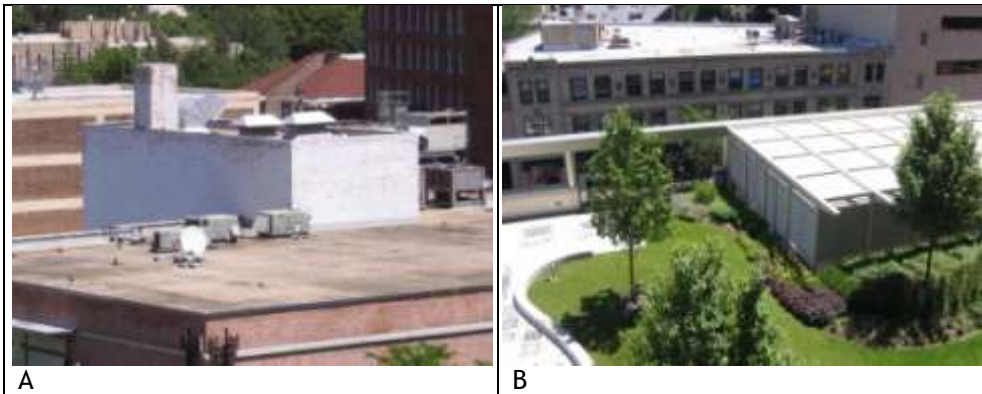


Figure 3. Roofs don't have to be ugly. A is the tradition, ugly roof, unconcerned that others must view it all day. B shows a design that is not only more attractive, but that is ecologically sound: the rooftop garden saves energy, decreasing the need for cooling in summer and heating in winter. The fans, ducts, and other necessary infrastructure are nicely hidden inside the shed.

Look at the examples in Figure 2. Why so ugly? Why is there not more attention paid to the infrastructure, to the surrounds, to the impact that designed objects have upon all that must work near them. We stare at ugly wires in the conference room. Much attention is paid to the design of the front of equipment, so that it is made beautiful and elegant while the rear is neglected. But in most business environments, and even in the home, the beautiful front is seen by the person using the device, while all others, visitors, clients, customers, friends, and even family, must look at the rear end. Most rear ends, whether animal or technological, are not known for their beauty. Figure 2 shows some typical results, although I am certain that everyone has their own horror stories.

It doesn't have to be that way. Figure 3 shows roofs, both ugly and attractive. Moreover, the attractive roof saves energy and is better for the environment. Planted roofs add to the environment both aesthetically and ecologically. Similarly, equipment can be designed so as to minimize the impact of their rears. Figure 1 of Chapter 6 (page 000) shows how the Washington Mutual bank deploys its equipment, carefully hiding the wires, bringing both the bank staff and customer to share the front of the equipment. We don't have to suffer the ugliness of rear ends: but to avoid it requires thought and planning.

SUPPORT FOR GROUPS



A



B

Figure 4. Social groupings. People work well in groups, whether in informal conversations, as in A, or when trying to solve a problem, as in B. Photographs from the annual Human Computer Interaction Consortium, held in the middle of the Rocky Mountains, Colorado, USA.

Support for groups is the hallmark of sociable technology. Group support is obvious in the activities shown in Figure 4, but groups are almost always involved in activities, even when the other people are not visible. Look at the other figures of this chapter, whether it be of a machine (Figure 1) with no people visible or of buildings and equipment: people are always involved. All design has a social component: support for this social component, support for groups must always be a consideration.

In the case of the conference photographs just above, the design support has as much to do with conference structure as with physical space. The conference is deliberately located in an isolated camp in the rocky mountains, in the middle of winter, so it is not easy for the participants to go anywhere. It is organized with considerable “empty” time, which means that they naturally congregate

and discuss the conference topics. The room itself is sociable, with food, chairs, and places to congregate as well as a deliberate group activity: the jigsaw puzzle of Figure 4B.

Sociable design is not just saying “please” and “thank you.” It is not just providing technical support. It is also providing convivial working spaces, plus the time to make use of them.

THE DESIGN OF SOCIABLE TECHNOLOGY

Sociable technology must support the four themes of communication, presentation, support for groups, and troubleshooting. We have already seen examples of these aspects in this chapter. How these are handled determines whether or not we will find interaction to be sociable. People learn social skills. Machines have to have them designed into them. Sometimes even worse than machines, however, are services, where even though we are often interacting with people, the service activities are dictated by formal rule books of procedures and processes, and the people we interact with can be as frustrated and confused as we are. This too is a design issue.

Design of both machines and services should be thought of as a social activity, one where there is much concern paid to the social nature of the interaction. All products have a social component. This is especially true of communication products, whether websites, personal digests (blog), audio and video postings mean to be shared, or mail digests, mailing lists, and text messaging on cellphones. Social networks are by definition social. But where the social impact is obvious, designers are forewarned. The interesting cases happen where the social side is not so obvious.

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