

Figure 141: Paper Sketches of Oscilloscope Front Panel

Two frames from a videotape made during usability testing of oscilloscope front panel concepts. The usability of the numerical keypad is being tested. In each version, I have circled the location of the keypad.

Image: Tektronix Corp.

Figure 142: Interacting with Paper Front Panel

This is a frame from the same video. In this image, and the second one in Figure 141, notice how the hand gesture used by the test user is exactly what would be used with the physical control represented. This is a subtle but important point that illustrates the power of the affordances of the controls, even on paper.

Image: Tektronix Corp.

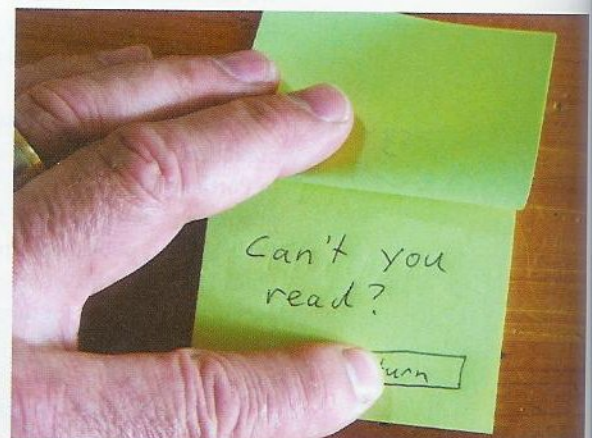
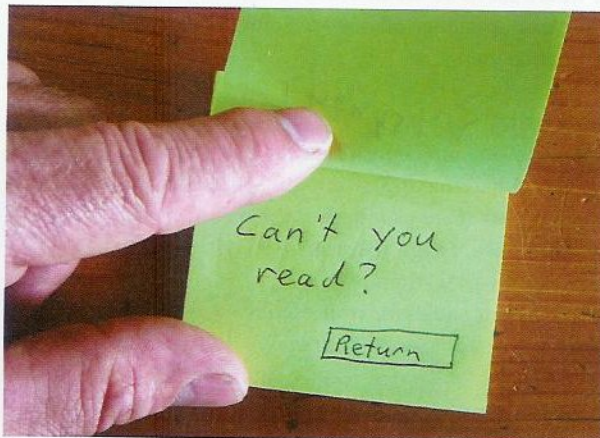


Figure 143: A Simple Finger Exercise

One can create and experience an interactive paper interface in two minutes with nothing more than Post-it notes and a pen. Push a button to go to a particular page. Push the wrong button and return to the first page.






| | Facilitator | User |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|
|  | (Start: Sketch 1.a in front of user.) The sketch in front of you shows the screen of your PDA. I want you to send a message to your 10:00 am appointment. For this exercise, to do anything, just touch what you think is appropriate on the screen, and tell me what you are doing or thinking as you go along. | |
|  | | Okay. I assume that you want me to send a message to Mary Ford, since she is my 10:00 am appointment. So I will touch her name. |
|  | (Facilitator replaces sketch 1.a with 2.b) | Now I see a menu that lets me either call her or message her. |
|  | | So, what I will now do is touch "message" on the menu. |
|  | (Facilitator replaces sketch 2.b with 4.a) | Okay. I now see a screen that lets me send a message to Mary Ford. What now? |

Table 2: Example of Interacting with Dynamic Sketched Paper Interface

The user is guided through a transaction with the agenda originally seen in Figure 20. Each time the user's action would result in a change in a real system, the facilitator gives the user an appropriate replacement sketch with which to continue.

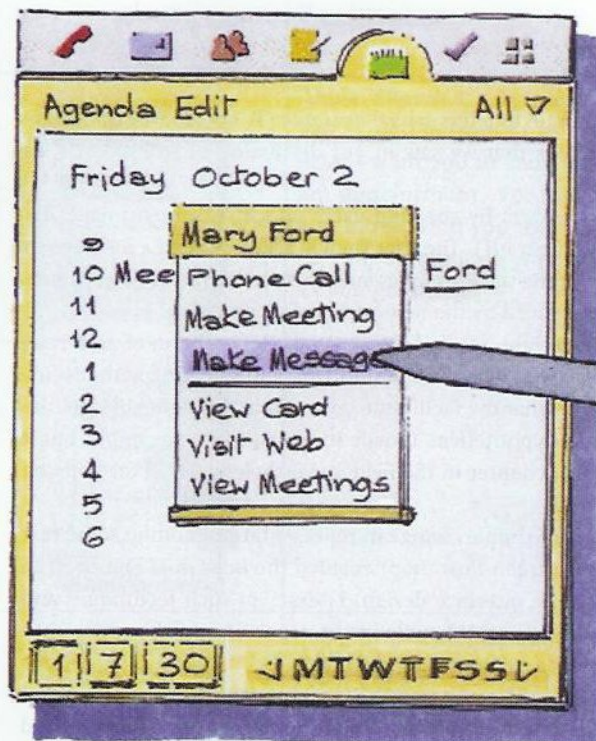


Figure 144: A Computer-based Sketch of the Agenda Interface

This is a screen snap of an interactive computer-based sketch of the agenda seen in the previous example. In this case, the user can explore aspects of the interface listed on the right (the user-controlled cursor can be seen having selected "What a link can do." This invokes an animation, where the user's interactions are represented by the graphical stylus. It is important to note that Ron has preserved the hand-drawn sketch-like character of the interface. It is clearly not done. This is just a probe.

Image: Ron Bird

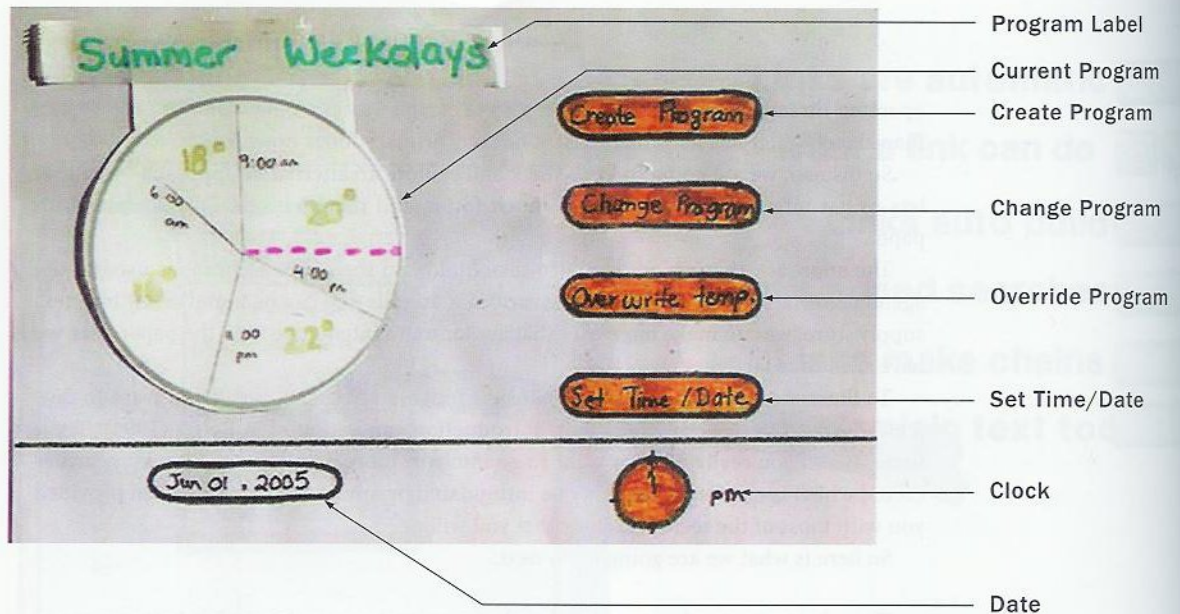


Figure 145: Paper Interface to a Programmable Climate Control System

The basic interface is made up of buttons and circular dials, and displays. The concept is that the user would interact directly on the screen by means of a touch screen.

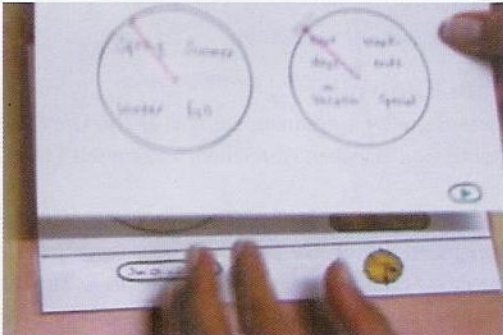
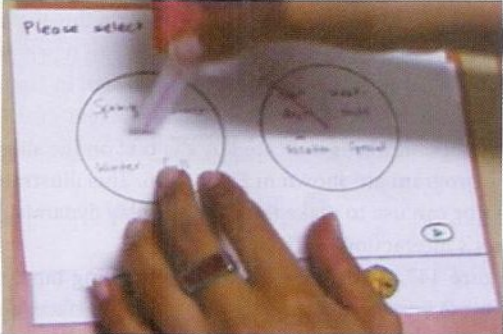

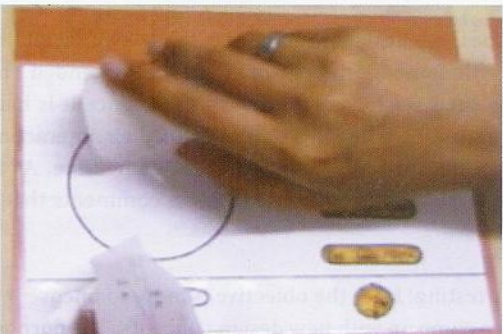
| | |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>If the user pushes the Create Program button, the main part of the display is replaced by two dials. The left one shows the four seasons, the right one four options: "Week Day", "Weekend", "On Vacation", and "Special". The user selects the season and type of day by touching the appropriate "slice" of the display, or dragging the red dial indicator.</p> |
|  | <p>The indicator is actually a piece of transparent tape that is stuck to the dial. The glue is like that on a Post-It. That is, it can be easily lifted up and stuck down in a new position. That is what the facilitator is doing in this image: moving the indicator to reflect the season chosen by the user.</p> |
|  | <p>When the new program is set, the facilitator returns to the original screen, shown in Figure 66, and updates the Program Label.</p> |
|  | <p>The "face" of the dial is also replaced with one that reflects the new program.</p> |

Figure 146: Creating a New Program

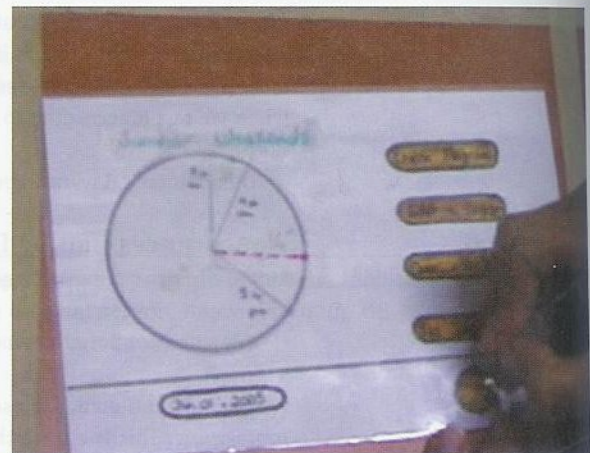
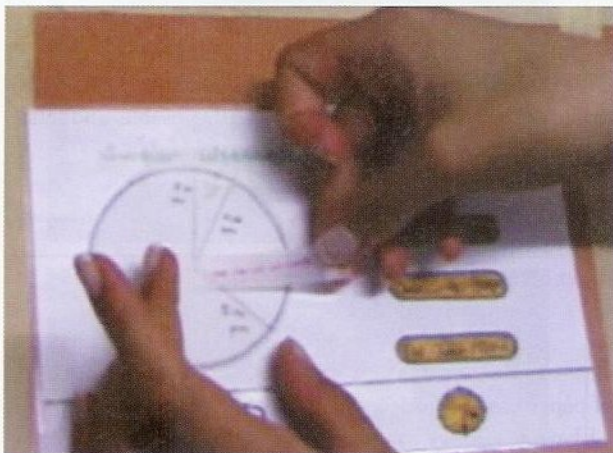
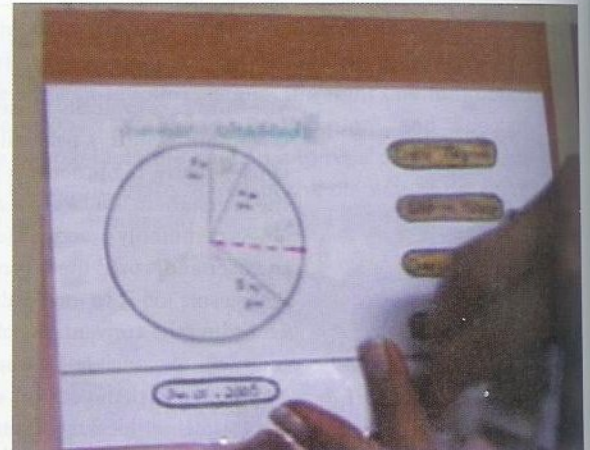
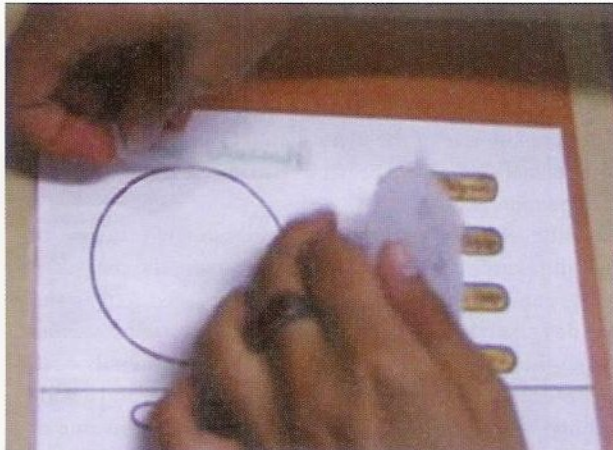


Figure 147: Changing the Display by Erasure and Writing

By covering the paper with plastic, one can write on it with a dry marker, and have what is written easily erased with a cloth when the information needs to be changed. Sometimes this is easier than having a stack of premade objects to stick down.

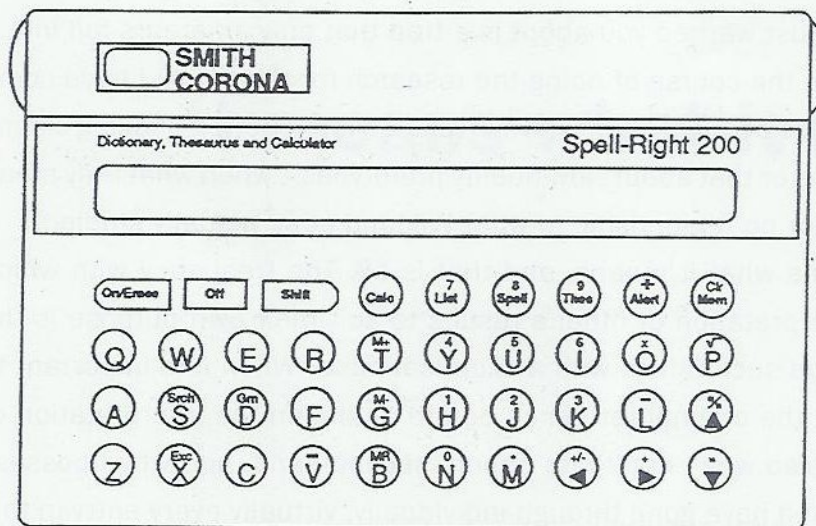
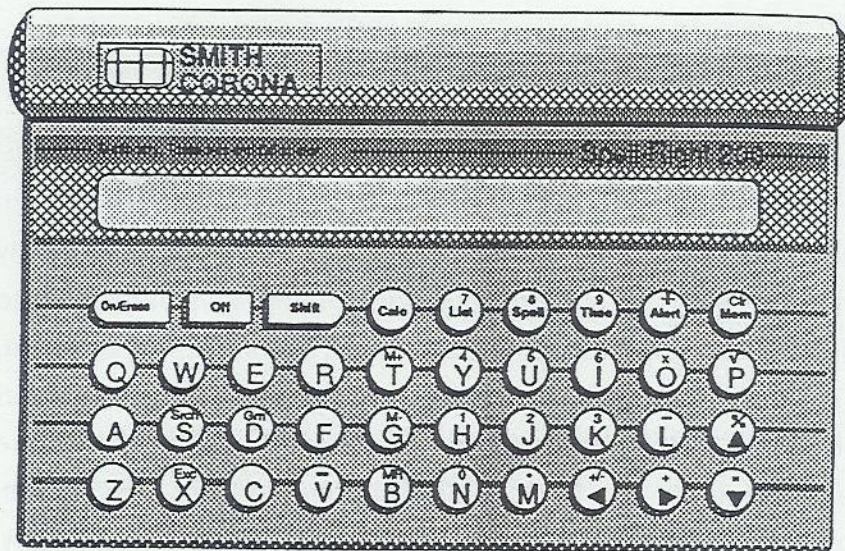


Figure 148: Line Art and Half-Tone Prototypes

These are two of the low-fidelity interfaces for the digital calendar used in the study by Wiklund, Thurrott & Dumas (1992). Contrast their formal drafted graphical style with the freehand renderings of Ron Bird's agenda sketches in Figures 99 and 144.

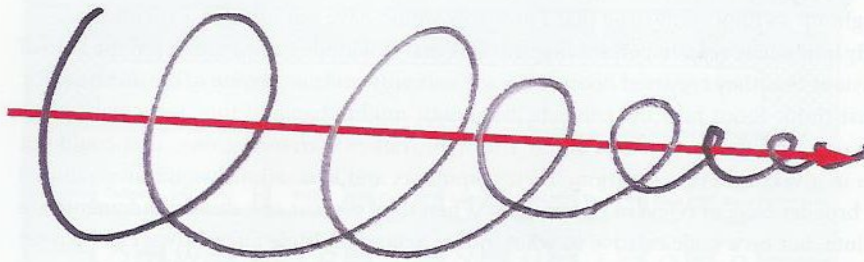


Figure 149: Prototyping as Iterative Incremental Refinement

In engineering, prototyping is like a spiral closing in along a single trajectory. Each prototype is a refinement of the previous one, and takes you one step closer to the final product. Iterative prototyping is a form of incremental refinement and validation, rather than a technique of exploration.

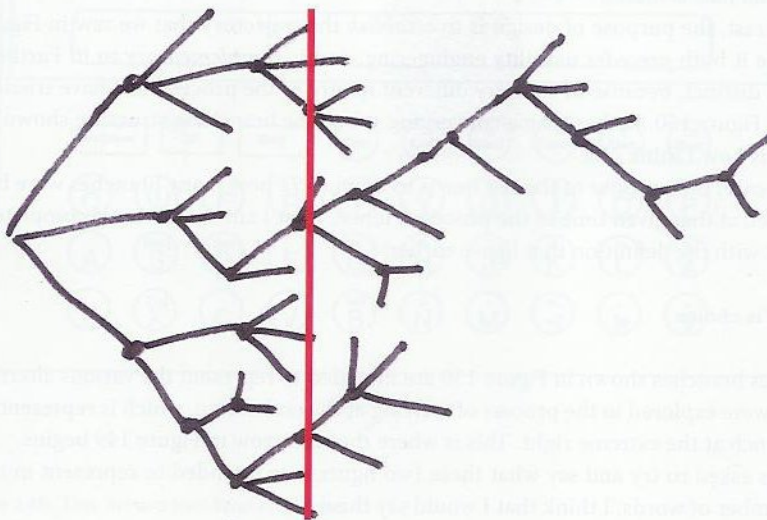


Figure 150: Design as Branching Exploration and Comparison

Design is about exploring and comparing the relative merits of alternatives. There is not just one path, and at any given time and for any given question, there may be numerous different alternatives being considered, only one of which will eventually find itself in the product.

Program

| | from | to | temperature |
|---------|------------------------------------|------------------------------------|---------------------------------|
| Morning | <input type="text" value="7:00"/> | <input type="text" value="9:00"/> | <input type="text" value="15"/> |
| Day | <input type="text" value="9:00"/> | <input type="text" value="5:00"/> | <input type="text" value="15"/> |
| Evening | <input type="text" value="5:00"/> | <input type="text" value="12:00"/> | <input type="text" value="16"/> |
| Night | <input type="text" value="12:00"/> | <input type="text" value="7:00"/> | <input type="text" value="15"/> |

Date

Time

Temperature

Today:

Time: 12:00

Time

Temp.

Program

Figure 151: Two Alternative Programmable Climate Control Interfaces

These interfaces are functionally equivalent to the one shown in Figure 145, and the associated figures that follow. However, each utilizes a different design language, or style. The one in Figure 145 uses a dial-based interface. The one on top in this figure uses a tabular form-based approach, whereas the one at the bottom uses a time-line based approach.

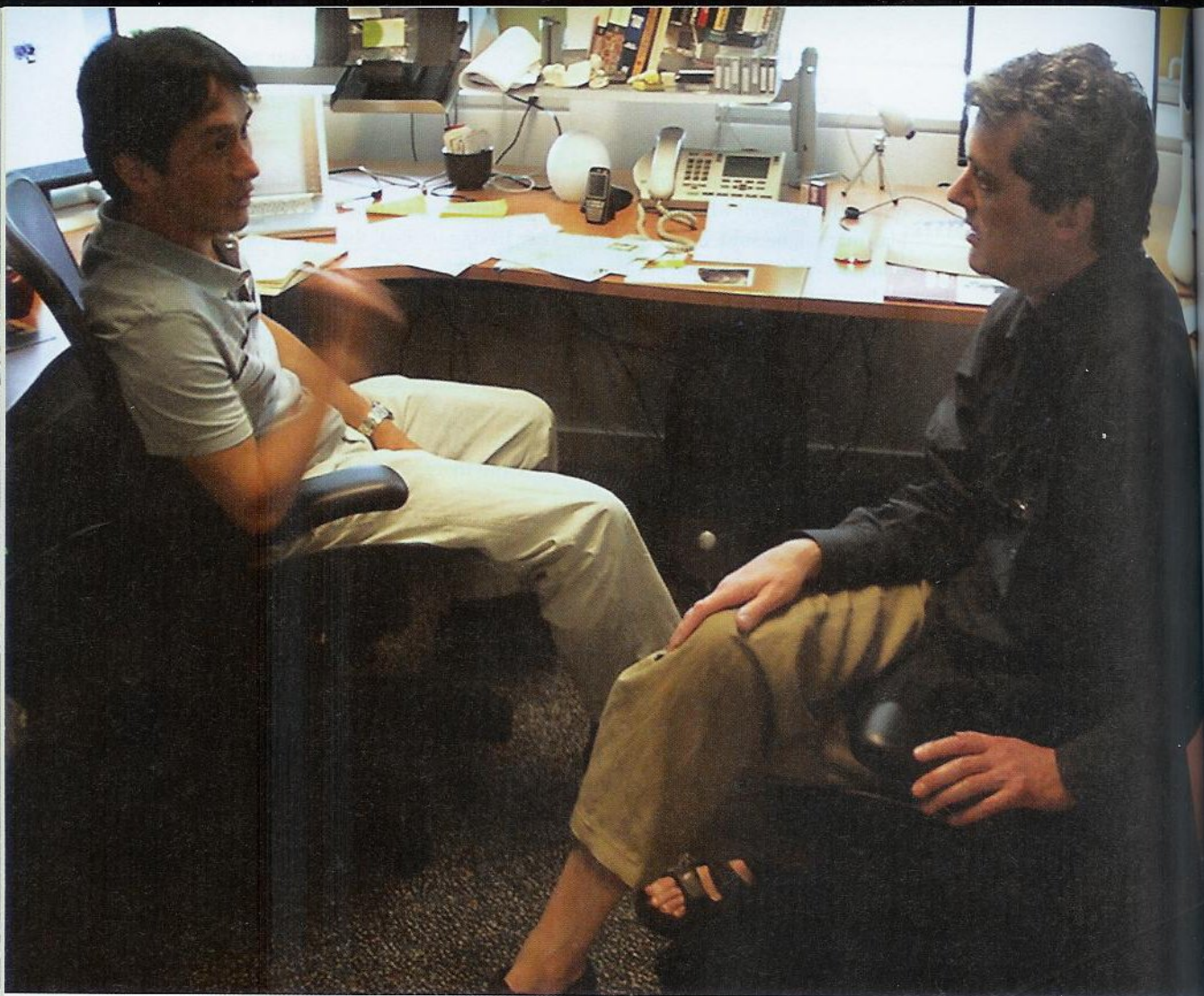


Figure: 152 Are You Talking to Me?

Testing and observing are one set of tools for gaining insights about needs and concepts in the wild. Asking the right questions and having the right kinds of conversations with potential users and stakeholders is another. Here is one place where the ethnographer and social scientist can play a really important role in the design process.

Photo: Richard Banks

What Maryam did at the end of each user's session was ask what seemed to be a simple favour. It went something like this: "Since we finished a bit early, would you mind taking a couple minutes and making a simple sketch of your ideal home climate controller? It can be as rough as you like. It doesn't matter if you can't draw well. Just do a quick sketch on this piece of paper."

And sketch they did. Sometimes they hesitated. Sometimes they were shy. Some were gifted draftspeople, and others were pencil-challenged like me. But every one of them did a drawing, and they were a revelation.

Later, during analysis, Maryam and I spread them all out on a very large boardroom table. All 48 of them. We then sorted them by condition. Thus, we had four long rows: one for each of the three groups who saw only one design (Circular, Tabular, and Linear) and one for those who saw all three.

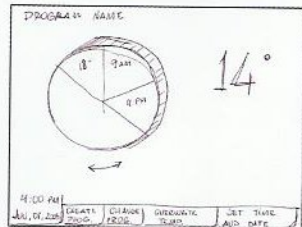
For the first three groups (the single condition ones), we then sorted the sketches according to how close they were to the original. We started with the ones that were most similar, and ended with the ones that were the most different.

The sketches from those who saw all three designs were just clustered by similarity. You can see the sorted sketches in Figures 153 through 156. Compare them to the three designs that the users saw, as shown in Figures 145 and 151.

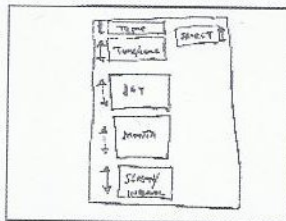
What is clear in these sketches, even to a lay-person, is that the users did have original ideas about alternative designs. What we had not done in the first study, however, was let them communicate them to us in an appropriate language.

I can hear the collective yawn of the participatory design community at this stage as they tell me, "I could have told you so." Okay, *mea culpa*. But at least this episode helps bring closure to this section of the book with yet another example emphasizing that sketching is a language that supports a particular form of dialogue—a dialogue that can help all of us bring our ideas one step closer to fruition.

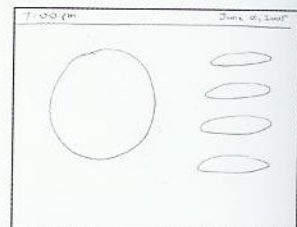
Please sketch your ideal thermostat design in the space provided.



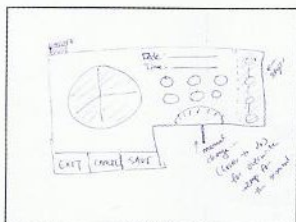
Please sketch your ideal thermostat design in the space provided.



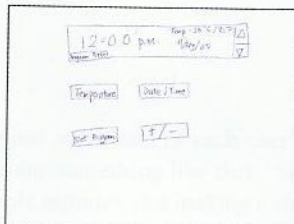
Please sketch your ideal thermostat design in the space provided.



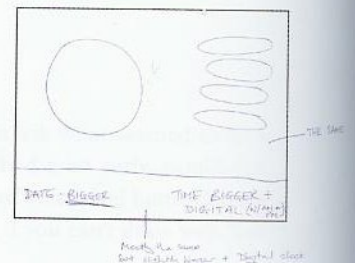
Please sketch your ideal thermostat design in the space provided.



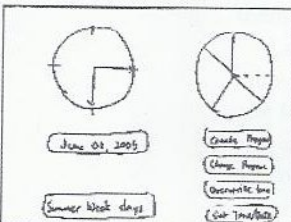
Please sketch your ideal thermostat design in the space provided.



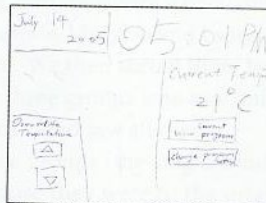
Please sketch your ideal thermostat design in the space provided.



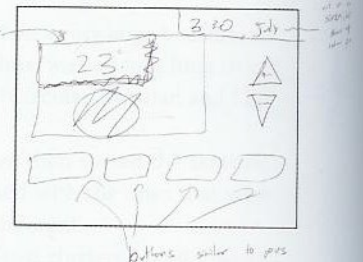
Please sketch your ideal thermostat design in the space provided.



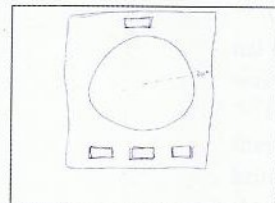
Please sketch your ideal thermostat design in the space provided.



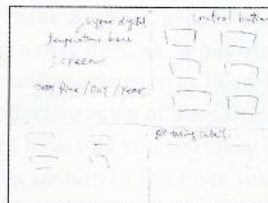
Please sketch your ideal thermostat design in the space provided.



Please sketch your ideal thermostat design in the space provided.



Please sketch your ideal thermostat design in the space provided.



Please sketch your ideal thermostat design in the space provided.

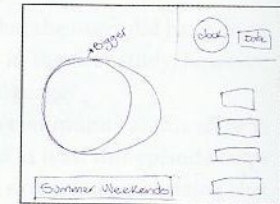


Figure 153: User Sketches from Circular Conditions

Please sketch your ideal thermostat design in the space provided.

Current Date / Time: 216 Jan 2005 15:00
 Current Temperature: 26°C

Program: On

| | |
|---------------|------|
| 21:00 - 07:00 | 22°C |
| 07:00 - 18:00 | 27°C |
| 18:00 - 21:00 | 26°C |

System: Hot / Cool / Off

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Date: Jan 01, 05 (Tue) Time: 12:00

Program: Summer on Vacation

Time: 12:00

Temp: 18°C

Program: [] Time: []

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Please sketch your ideal thermostat design in the space provided.

Date: Jan 01, 2005 Time: 5:30 PM

Current Temp: 21°C

Program: []

Temp: []

Program: []

Please sketch your ideal thermostat design in the space provided.

Date: Jan 25, 2005 14:00

Summer (Jan 12 - June 31)

Temp: 18°C

Change Temp: []

Please sketch your ideal thermostat design in the space provided.

Date: Jan 25, 2005 15:00

Program: Summer Vacation

Interval/Time: []

Temp: []

Temp: []

Please sketch your ideal thermostat design in the space provided.

TEMPERATURE

DATE

CURRENT TIME

MONTH/SEASON

PROGRAM SCREEN

TEMP, TIME, INTERVAL

Figure 155: User Sketches from Linear Conditions