

We are all very familiar with the following coffee machine in our CSE espresso. Faculty and students use it everyday. We really enjoy it, right?



**Graph 1. Coffee Machine**

However, have you ever thought about how the machine works? Maybe you have already known. But what happens if you were a new comer? When I came here last September, I totally had no idea of how it works. It seems quite complicated. There are many buttons (Graph 2), a meter, knob and a few lights (Graph 3). What does the meter indicate, air pressure?



**Graph 2. Control Buttons**



**Graph 3. Meter**

Hmm, does a coffee machine need to be so complicated? How many buttons have you used in Graph 2? For me, I only have used the top-right one, and I totally have no idea of what are the functions of other buttons. You may ask how I got to know how to use this button. Well, I saw other people always used this one... Maybe I should try other buttons, but from the appearance, there are no direct mappings between buttons and functions.

In Graph 1, we can see there are two pipes. We know the left one is for vapor and right one is for hot water. But it's not very obvious to distinguish this from the appearance. There are still no direct mappings of operations. People may not notice the differences until someone tells them or try themselves.

In Graph 3, there is a knob and meter. Since both of them are both in the appearance of the coffee machine, I guess there should be very important functions for them. But I have never used them. It seems to me that they are not very important, or at least for my coffee.

I believe all other buttons, and the knob and meter should have some specific functions. But the basic function of coffee machine is to make coffee (I assume it is). So it seems we don't need so many buttons, which can only lead to confusion.

We know visibility is one of the most important principles of design. In general, we should have the visibility of instructions, operations and outcomes. Visibility indicates the mapping between intended actions and actual operations. Visibility also acts as a good reminder of what can be done and allows the control to specify how the action is to be performed. In terms of these criteria, the coffee machine definitely does not have a good visibility. It's very difficult to know what should do next just according to the appearance of the coffee machine.

**Summary:** A device is easy to use when there is visibility to the set of possible actions, where the controls and displays exploit natural mappings. Still in the coffee machine, the mappings are very unclear. All buttons have the same style and there are no instructions indicating the purpose of each button. A possible solution for these buttons is to design it as the control panel of a microwave, indicate the function of each button, and order them in terms of the importance.

*And now, you can see what happens:*

