Cognitive Engineering Assignment

The product I will discuss:

Oven/stove

Product Description:

This is the gas-powered oven in my current residence. For this project, I will not be discussing the stovetop burners. Instead, I will focus on the oven portion of this device. Like most ovens, this appliance has a limited amount of operations and controls. As you can see in the picture, the button options are: Bake (refers to the actual cooking or heating operation of food), Light Bulb (used to switch internal oven light on and off), Quick Bake (not entirely sure, which will be discussed later), Broil (not entirely sure, which will be discussed later), Steam Clean (not entirely sure, which will be discussed later), Self Clean (not entirely sure, which will be discussed later), System Operation Status (Oven, Preheat, and Door Locked), Up/Down arrows, Timer (on and off), Off (hold button to switch the device off), Bake time (to set desired baking

time), Set Clock, and the miniature screen used to display actual time and timer clock. At first glance, especially regarding the general purpose of an oven, the limited number of controls seems sufficient to operate the device successfully. However, in this paper, I will argue that this design, which is rather ubiquitous for ovens, is somewhat unintuitive and possibly dangerous.

Analysis of how these features support or don't support Nielsen's second principle of matching:

Regarding Nielsen's second principle of matching, I feel the oven fails to meet most standards. Firstly, this device seemingly attempts to make the language and symbols easy to interpret for all user audiences, but they fail in several aspects. Most buttons are unintuitive, and their meanings are confounded with their operation, making the device difficult to use without an instruction manual or an external source, like the internet. Instruction manuals are often not available to second-hand users, like people who rent a home that has an oven, or people who by an oven that has been used. To understand what most buttons do without using an external resource, the user must tinker with the buttons and explore their functionality, which is not exactly ideal with something as hazardous as an oven.

A perfect illustration of this problem is my lack of understanding of some buttons, like broil or self clean. These buttons seem easy to understand, but for someone with minimal cooking experience, the word broil is not a familiar term. Furthermore, the button self clean seems self-explanatory, but I have no idea what the designers meant by this button. Does foam come out of the vents? Is this foam flammable? How long do I wait to use the oven after pressing this button? There is no one-to-one meaning of each button and its function. Thus the design fails to "speak the user's language," and the lack of clear explanations forces me to exert extra effort to learn how to use the oven, which decreases usability altogether.

Furthermore, the device's buttons are not well mapped to one another. For example, there is no separate button to adjust the temperature. To access this feature, the user has to press the bake button. The word bake seems to imply that it initiates the baking operation. Still, that word could also be interpreted as an 'on' button, especially since there is a dedicated off button. Once the baking temperature pops up on the display screen, it is automatically set to 400 degrees, and to adjust the temperature, the user must use the up and down button. Again, this may seem obvious, but this can easily be missed by technologically challenged individuals. Consider how the elderly often avoid technology. Because this group has had less time around technology than the current generation, they suffer from a lack of exposure and fear of not understanding products or committing user errors.

Analysis of how these features support or don't support Nielsen's eighth principle of minimal design (and more generally aesthetically pleasing features):

As one would expect, the oven's failures of Nielsen's second principle tie in perfectly with Nielsen's eighth principle of minimalistic design. This type of design focuses on having a limited number of buttons with controls that map easily to their operations. This design style also prioritizes aesthetics by focusing on user goals and outward appearance. According to the UX law of the Aesthetic-Usability Effect, an aesthetically pleasing design bolsters usability and minimizes mental effort. If done correctly, minimalistic design is an optimal choice because it allows for a pleasing experience that requires minimal effort from the user.

However, this design type is not always optimal. My oven seems to have a minimalistic design with a limited number of controls available, yet I still have trouble understanding how to use it. In this case, I feel that the lack of design has caused ambiguity in operating the device, and as a result, there is no clear way to navigate decisions. For example, if I wanted to change the

temperature after having already started baking, there is no button to perform this action. I would have to hold the off button for three seconds and repeat the process of starting the oven again. According to the UX law of Occam's Razor, ideas of how to perform operations are selected based on the decision with the least amount of assumptions. On this basis, a user may not choose or even think about holding the off button down without prior knowledge or being explicitly told so. Since ovens are powered by electricity and gas, there are incredible risks involved if user error were to occur. If a user was unaware they needed to hold the off button for three seconds, they could unintentionally leave the oven on, which could result in an explosion or fire. User error could result in major damage or even injury and death.

In summation, the lack of buttons and unclear connections between operations and controls cause a poor and possibly dangerous design. The oven may still benefit from a minimalistic design as long as the mapping issues and ambiguity are fixed. A small screen with a more advanced user interface would allow for easier navigation between decisions and clearer connections between operations and controls.