Exemplar Individual Assignment #1

Overview

This document models an exemplar solution for this assignment. It demonstrates how to apply Norman's design principles to analyze the "good," "bad," and "augmented" artifacts requested in the assignment prompt. Feel free to use this exemplar as a starting point for your own solution; just be sure not to plagiarize any of the text!

Good design: Bushnell Neo XS Golf Watch

The Bushell Neo XS Golf Watch supports an impressive range of functionality. Aside from supporting GPS-tracked distances for thousands of pre-loaded golf courses, it supports a GPS odometer, alarm, stopwatch, and countdown timer—all the features you'd expect in a sports watch.

The **conceptual model** of the watch is organized around its core features. Since it is a golf watch, the golf functionality is placed in a separate "Golf" area accessible from the "Golf" button (see upper-left button). The remainder of the functionality is accessible from the "Menu" button (see lower-left button). In a series of menus (e.g., the menu illustrated in screenshot on the right), the user can access each item of functionality. The three buttons on the right allow the user to navigate up and down within the current menu, and to select a menu item. This kind of menu-based conceptual model is similar to what one is used to in a computer-based app: up and down scrolling of items, and push-button selection. Another advantage of this model is that it does not require the user to remember the watch's functionality. All functionality is readily accessible from the menu system.

Affordances: All four buttons on the watch afford pushing. The watch's screen affords tapping as well: a user of electronics, when confronted with a digital screen in this modern age, will expect to be able to tap. However, such tapping is not supported; the screen is not a touch screen.

Mappings: This watch does a beautiful job of exploiting natural mappings. The three buttons on the right side of the watch are arranged spatially to match their functionality: the "up" button (which scrolls

upwards) is above the "down" button (which scrolls downwards), with the "select" button in between the two. These mappings are preserved in various functionality areas as well. For example, the "up" button moves the time forward in time-setting mode, just as the "down" button moves the time backward. The only potential issue is the "Menu" button. It can be used to back out of a menu, but there is nothing about its spatial location that matches this functionality. Its position to the left of the other navigational buttons perhaps conveys a sense of backing out: one can be seen to be moving left when one backs out of a menu. However, the designer's choice to overload the "Menu" button with this functionality seems arbitrary; it does not truly exploit a natural mapping.

Feedback: Pressing the two buttons on the left-hand side yields immediate feedback: the two menus associated with those buttons immediately come up. The up and down arrow buttons yield no feedback when pressed, whereas the middle ("select") button turns on the watch light (which is perhaps unexpected feedback). Once in menus, the menu scrolls immediately in response to the up and down arrow buttons' being pressed. Likewise, the select button leads to an immediate screen change appropriate for the functionality that was selected.

Constraints: This watch exploits physical, semantic, and logical constraints. With respect to physical constraints, buttons can only be pressed; they are either pressed or not. With respect to semantic constraints, only golf courses that are close to the user's current located are shown as options on the "Golf" menu. These options change as the user moves around to different geographic locations. Finally, with respect to logical constraints, only valid times can be chosen when setting the time, just as only valid options can be chosen in the general settings mode. There do not appear to be any cultural constraints in the watch.

Visibility (not required in your analysis, but I'm including it here because it's relevant): many consumer electronics suffer because they support more functions than there are available interface controls. Through a hierarchical menu system, this watch does a nice job of maintaining visibility across all functions, with one exception: setting the timer. When in timer mode, there is no visible way to set the time (in minutes and seconds) from which to count down. Through trial and error, one discovers that holding down the middle button switches to timer set mode; however, this functionality is not visible. The watch could improve in this respect by including separate menu items for setting and running the timer.

Bad Design: Fireplace Flue in Banff, Canada

This is a fireplace flue and control knob I encountered on a vacation to Banff, Canada many years ago. The control knob is used to open and close the flue in the chimney. When the flue is open, smoke can escape from the chimney. When the flue is closed, the chimney is sealed shut; no smoke can escape.

Conceptual Model: The fireplace flue is presented as an extremely simple user interface that includes a single dial. Hence, just as was the case for the thermostat explored in class, the user is forced to infer quite a bit from the user interface; there are really no clues. The key inference to make is the relationship between the dial and the physical flue inside the chimney. One might guess that the flue is oriented the same way as the dial, but this turns out not to be the case. To the contrary, the flue is positioned perpendicular to the orientation of the dial. Without a more descriptive user interface, many people will likely have trouble forming a correct conceptual model in this case.

Affordances. This interface provides a powerful affordance: the circular knob affords turning. There are no other affordances in this interface.

Mappings. This interface fails with respect to the natural mapping principle. Indeed, as pointed out above, the flue is positioned *perpendicular* to the orientation of the knob. A natural mapping would be to make the flue's orientation directly mirror the knob's orientation.

Feedback. This interface suffers from poor feedback, in that the feedback is not immediate, and when it comes, it is in the form of potentially life-threatening smoke—as I personally discovered when I used this interface!

Constraints. A physical constraint is built into the knob, whose rotation is limited so as not to damage the flue it controls. There do not appear to be any semantic, logical, or cultural constraints built into this interface.

Augmented Design: Side-by-Side Garage Door Openers

This picture shows side-by-side garage door openers for a double-door garage. The owners of the garage augmented each control with "R" and "L" labels (**signifiers**) to indicate the door each opener controls. Interestingly, the controller labeled "R" is to the left of the controller labeled "L." This is likely the reason the units needed to be labeled.

Conceptual Model: Garage door openers have an extremely simple conceptual model: Press to start moving the door, which will continue to move until (a) it reaches the fully up or fully down position, or (b) the button is pressed again. These garage door openers function according to this conceptual model.

Affordances. The openers include buttons that afford pushing. There are no other affordances in this interface.

Mappings. The openers suffer from a poor natural mapping. Instead of being spatially oriented to indicate which door they control, they are flipped around, so that the unit controlling the right garage door is on the left, and the unit controlling the left garage door is on the right. This explains the need to label each unit with a **signifier** indicating which door each opener controls.

Feedback. This interface has immediate feedback. When a door is not moving, pressing the button immediately puts the door in motion. When a door is moving, pressing the button immediately stops that motion. You will also notice green and red lights on each button. This also provides some form of feedback; however, I do not have access to these garage doors, so I cannot say what the colors mean. My guess is that they may somehow convey the current state of each door.

Constraints. Each button has a *physical* constraint: It is either pressed or it is not. The garage doors themselves also have physical constraints that limit how far up and down they can go. There is also an important *semantic* constraint that dictates how "left" and "right" are interpreted. Although I do not have access to the garage in which these openers are installed, I would guess that the openers are labeled from the perspective of someone *who is in the garage*. There do not appear to be any logical or cultural constraints in use in this interface.