## Project I: The Design Analysis of Digital Standing Desks and the Apple Magic Mouse

A digital standing desk and an Apple Magic Mouse were the two items we looked at in great detail for this project. The point was to evaluate their design by how simple it is for people to use and understand what it does. To figure out what was good and bad about each product, we used basic design ideas like **affordances** and **signifiers**. **Affordances** are the relationships between the properties of an object and how a user can interpret said properties to use the item. On the other hand, **signifiers** are the properties of the object that indicate how it can be used. The standing desk is a good example of good design because it has easy-to-use settings and clear feedback systems. On the contrary, the Apple Magic Mouse has problems with usability and does not have clear indicators. Both designs are simplistic, but the standing desk executes simplicity better than the Apple Magic Mouse.

Good design is shown by how well a product conveys its purpose and how effectively it can execute its purpose. Products with strong feedback and signifiers automatically lead users, making jobs easier and lowering the number of mistakes made. Also, **feedback** gives clear data that helps users figure out how well their actions worked. On the other hand, people who use improperly designed items often do not know how to use them because they do not have clear instructions.

We were able to tell what works and what does not about the digital standing desk and the Apple Magic Mouse by looking at them through the designer's eyes. This comparison not only shows the differences between good and bad design but also shows how important designing with users in mind is for making products that work and are easy to use.

## Good Design - Digital Standing Desks

The digital standing desk is a well-designed product with clear **affordances** and **signifiers**. The up and down buttons and the digital height display panel make it easy to change the height of the desk by functioning as signs for the user. Like a normal desk, the desk's flat surface makes it easy to put things on it, like a laptop or books. These design choices help make the desk simple to use, reducing misunderstanding and frustration and improving the overall user experience.


**Figure 1:** This is a standing desk with a control panel on the underside of the main platform.

1. **Affordances**

   The standing desk has a few **affordances**, or properties of an item that define how it can be used. The flat surface(s) on top of the desk and sturdy structure **afford** placing objects on top of the desk, while the control panel, with its buttons and height indicator, **affords** that the desk's height can be adjusted in some capacity. Additionally, the hooks on the bottom side of the desk allow items to be hung on the bottom, such as bags or other similar items. In the above image, this standing desk also **affords** placing items in the side drawers.

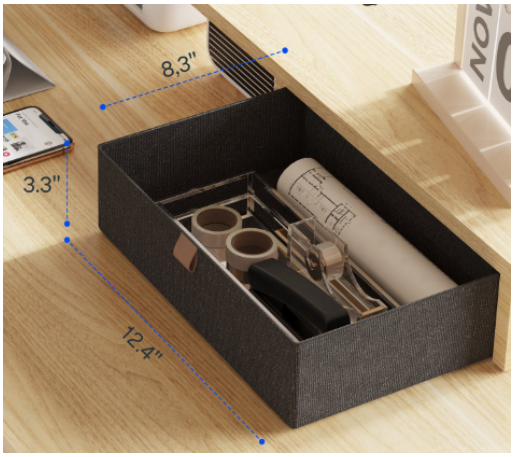


**Figure 2:** The side drawers of the standing desk, complete with signifying straps.

2. **Signifiers**

   **Signifiers** are features that indicate how an object can be used. A standing desk is such a simple object that it does not need many **signifiers** for a user to easily understand how to use it. For example, the control panel buttons have arrows to **signify** which direction they move the desk in. The drawers also have **signifiers**, with each drawer having a tab to pull on to reveal the additional space inside.

3. **Gulf of Execution**

   The **gulf of execution** is the difference between what the user intends to do with the item and how well the item can follow the user's intentions. To bridge the **gulf of execution**, users will form a **system image**, or a mental representation of an object. This system image is created based on the current observed object and similar objects in the past, in this case, other desks or standing desks. The previously mentioned **signifiers** and **affordances** allow the user to associate features of the standing desk with other similar objects that they have seen in the past and can execute their intentions easily, such as placing an object on top of the desk. Additionally, the placement of the control panel makes it easily accessible for both taller and shorter users.

4. **Gulf of Evaluation**
   The **gulf of evaluation** is how easily the user of an object can interpret whether their use of the object was correct or if anything happened. To bridge the **gulf of evaluation**, the standing desk has both audio and visual **feedback** to indicate that the desk is working as intended, with the desk making noise when moving, and the height meter changing as well.

5. **Mental Model**
   **Mental models** are the representation of an idea that is created in one's mind to make sense of the idea. The shape of the standing desk is similar to a normal desk sans the height at a given time, which makes it easy to identify.

## Bad Design - Apple Magic Mouse

**Figure 3:** The top of the Apple Magic Mouse, which is devoid of signifiers.

1. **Affordances**
   Limitations in the Apple Magic Mouse's **affordances** negatively impact its usefulness. The way the mouse is designed makes it look like you can click and move it, but it doesn't make it clear that it has extra features like motions and/or touch sensing. Users who have used a "normal" mouse might have a hard time figuring out how to make the most of the mouse because it doesn't have clear **affordances**. This can cause them to miss chances to have a smooth experience.

2. **Signifiers**
   On the Apple Magic Mouse, there are almost no **signifiers**. The surface does not have any buttons or marks that can be seen to help the user figure out where or how to click or

how to use extra features like scrolling. The mouse looks good and minimalistic but at the expense of its user-friendliness. Users cannot be sure how to do certain things because there are no clear signs. A well-designed item should have clear **signifiers**, but the Magic Mouse does not.

**Figure 4:** The bottom of the Apple Magic Mouse, with the charging port located on the bottom, circled in red.

3. **Gulf of Execution**

   Due to a lack of signifiers and affordances as said above, the Apple Magic Mouse has a significant **gulf of execution**. Users may have trouble figuring out how to do simple tasks like right-left clicking or scrolling because of the absence of obvious indications and the smooth, buttonless interaction. Especially for a device like the Apple Magic mouse, because it has more features but a lack of signifiers, you might have a hard time figuring out everything that the mouse can do. New users struggle to discover and execute more complex motions, such as swiping or multitouch, due to a lack of obvious direction or physical design. Users can seek external resources and directions but a good design is the one that makes functions easier without this extra step. Additionally, the charging port is located on the bottom of the mouse making it impossible to use while it is out of battery.

4. **Gulf of Evaluation**

   The Apple Magic Mouse has a large **gulf of evaluation** due to a lack of **feedback**. The mouse only gives **feedback** when you successfully execute a feature, (left click, right click, scroll, etc) and there is a possibility that there is no feedback even when you do properly execute a feature, such as left clicking something that provides no response when left clicked.

5. **Mental Model**
   The designer likely wanted to make a smooth, simple gadget with looks and ease of use in mind. But as a user, I think of a mouse as having clear left and right buttons and maybe a scroll wheel. There is a gap between what I expect from the Magic Mouse and what the creator had in mind because it does not visually have these abilities.

**Figure 5:** A hypothetical solution to the charging port problem, with the cord being able to be inserted into the top of the mouse so it could function as a wired mouse when out of battery

6. **Solution**
   In our opinion, the Apple Magic Mouse can be designed better by adding minimal changes. For instance, it would be a better design if the designer added physical **signifiers** to indicate how to click or how to scroll. With small changes like this, the mouse would be easier to learn how to use while still maintaining its simplistic look.

## Studio Session Critique

In the studio session, we mainly received critiques about the lack of visual aids, as well as captions for the visual aids. Additionally, we were critiqued for a poor explanation of the gulf of execution and evaluation. To address these critiques, we have added extra details to the images to add clarity, as well as just increasing the volume of pictures in our project. We have also expanded the definitions of the gulfs of execution and evaluation to be more comprehensive.

## Citations


1. Standing Desk

2. Apple Magic Mouse