

Assignment P2

Nicholas Schrandt

nschrandt3@gatech.edu

1 QUESTION 1

I spent an hour in the morning deliberately thinking about the tasks I engaged in. Below is a comparison of those tasks and a discussion about the level of directness and invisibility of each task.

1.1 Compare Tasks

The tasks I engaged in are:

1.1.1 *Study for my Mandarin lesson*

The goal of this first task is twofold: to increase my ability to speak, hear, and read Mandarin Chinese, and to prepare for my upcoming lesson with my Mandarin tutor. There are two primary interfaces I interact with when completing this task. First, I have my PowerPoint slides from the previous lesson, which have embedded audio files that allow me to listen to the phrases, words, and sentences we most recently covered. The other interface I use are my hand-written notes taken during the past lesson. The object of this task would be my understanding and ability to speak, read, write, and hear the language.

1.1.2 *Converse with my Mandarin tutor*

My goal for this task is similar to the previous task; I still want to increase my fluency with Mandarin Chinese, but I also want to learn from my tutor through conversation. In this task, the interface consists of my computer, my webcam, my microphone, and the video communication application I am using to communicate with my tutor. Once again, the object of this task is my comprehension of the language, but is also my tutor, with whom I am interacting.

1.1.3 *Water my garden*

The goal of this task is to provide adequate water to the plants that I have growing in my garden. The interface for this task is a watering hose and the hose attachment on the end of that hose which controls how the water is expelled from the hose. For example,

certain settings on the attachment send the water out in a solid stream, while others send it out as more of a mist or drizzle. This is important, as certain plants are more fragile than others, so the strength of the stream of water can damage them. The object of this task are the plants in the garden.

1.1.4 Respond to text messages from my family

The goal of this task is to communicate with my family our plans for dinner that evening. The interface used to complete this task is my mobile phone, the text messaging application on the phone, and the digital keyboard that application uses to type in messages. The objects of this task are the members of my family that are involved in the discussion.

1.1.5 Play the video game “Satisfactory”

The goal while playing this game is to move about a three dimensional world, discover resources, and build and manage an extensive factory. The interfaces I use for this task are my computer monitor, my keyboard and mouse, and my headphones. The objects of this task are the digital world and objects within the game.

1.2 Discussion of Interaction

Below I will discuss the level of directness and invisibility of the last four tasks mentioned above.

1.2.1 Converse with my Mandarin tutor

For this task, the directness and invisibility of the interaction is quite high. The object of the interaction is directly in front of me via the webcam interface and the voice of my tutor is coming through directly into my headphones, so it's very similar to if I was interacting with them in person. The only occasion where I think about the interface itself is when we need to share screens.

1.2.2 Water my garden

This is also a fairly invisible interface for most of the task. I am directly manipulating the hose, which is the interface, and the water goes where I aim. The only time the interface becomes visible is when I need to adjust the hose setting to a lighter or harder stream.

1.2.3 Respond to text messages from my family

In this instance, the directness and invisibility is much lower than in the previous tasks. I have to type out everything I want to say via the digital keyboard and then send it, and I do not receive any feedback about the success of my interaction until I receive a response. If we were conversing in person, I would simply say what I wanted to say and receive feedback almost immediately. This makes this interface highly visible.

1.2.4 Play the video game “Satisfactory”

This is an interface that for me has become very invisible because I have frequently used it for this type of task for years. Since I have extensive experience, the interface is something I can pretty much ignore. However, for a novice user, I believe that the invisibility of this interface is quite low. The mouse and keyboard allow for movement of the player character in the game world in a standard way, but there are many other controls that the user has to learn themselves from in-game instructions.

2 QUESTION 2

A task that I have become invisible to me by learning is the task of playing the piano.

2.1 Components of the interface

The components of this interface include the set of white keys, the set of black keys, and the foot pedals. When I was learning how to use this interface, I had to think about where to put my hands, how to hold each of my fingers, how hard or soft to press each key, when to press or lift each pedal, etc. Not only can each of these separate components of the interface be challenging to learn on their own, but they must also be learned together.

2.2 Current thought process

Since I have spent more than twenty years learning this interface for myself, as well as twelve years teaching the interface to others, I have become incredibly familiar with it and have developed a high degree of muscle memory. I no longer need to think about where I need to hold my hands or how hard to press each note. This allows me to focus on other aspects of playing music such as reading notation, fine-tuning the mechanics of a piece, or simply performing it.

2.3 Redesign

When I was a piano teacher, I frequently tried to make small redesigns of the interface for novice users to aid in their ability to develop the necessary muscle memory and familiarity that would make the interface more invisible. One example is by putting small colored stickers on the keys to denote which note each key was. By then color-coating the notation in a similar fashion, the user would not have to spend nearly as much time associating the notation with the interface.

3 QUESTION 3

The domain I have chosen for this question is cooking a meal, including using the various appliances and utensils.

3.1 Description of perception

In this section, I will briefly discuss how each type of human perception is used to give feedback about the domain.

3.1.1 *Visual*

The most obvious way visual perception gives feedback during the task of cooking a meal is in how food's appearance changes during the process. For example, when cooking white onions, they start out as very white and maintain a solid shape. As heat is applied they begin to change color and shape. If the onions become black, the user can perceive that they have burned. If they are golden brown, the user can perceive that they have been caramelized to some degree.

3.1.2 *Auditory*

Auditory perception can provide feedback of heat. Frequently a recipe will require that a pan with oil be heated before any ingredients are added. If a user heats their pan and then drops a single piece of food into the pan, the audio response can tell them how hot the oil is: if there is no sound at all, it's probably not hot, whereas if it immediately begins to sizzle, the user can tell that the oil is hot.

3.1.3 *Haptic*

A clear example of using haptic perception to receive feedback during cooking is when cooking certain kinds of meat. In the case of steaks, the level of doneness can be determined by how firm the meat is. By pressing against the meat, either with a finger or a utensil, a user can tell how cooked the interior of that cut is.

3.2 Designs for feedback

In this section, I will discuss potential designs for each of the three perception types that can add additional feedback that does not currently exist.

3.2.1 *Visual*

A potentially very useful interface for determining levels of heat would be a pan or pot that has some kind of visual indication built directly on the cooking surface. For example, the bottom and sides of a pan begins to glow more and more red as the temperature of that surface increases. This would allow a cook to determine how hot their cooking surface is at a glance, without having to use auditory or haptic feedback.

3.2.2 *Auditory*

A potential use for auditory feedback that I am not aware of is when measuring specific quantities of ingredients. Currently, the most common interface are specific containers that have visual markings on them that act as an intermediary medium (measuring cups, teaspoons, tablespoons). These containers could instead provide audio feedback about how much of an ingredient is being added to them. I am skeptical of the viability of this, as the payoff seems disproportionately small compared to the effort required to implement such a solution.

3.2.3 *Haptic*

Cooking is already a very haptic domain, and the way I believe it can be used in a way that I have not already seen is as a replacement for auditory feedback, especially for users who are deaf or have difficulty hearing. Integration with wearable technology like smart watches can allow certain auditory cues like an over timer ring to instead be a specific vibration pattern.

3.3 TASTE

Another perception outside of the three discussed above is taste, and the uses for feedback in the domain of cooking are quite obvious, and likely required. Tasting food throughout the process of cooking a meal is a way to determine if further steps need to be taken and what those steps might be. For example, a user might taste a sauce to determine if one particular spice is too heavy and needs to be countered with another complimentary ingredient.

4 QUESTION 4

The two tips I've chosen for this question are using multiple modalities, and giving the user control of the pace.

4.1 Multiple modalities

An interface that violates this suggestion is the interface on my thermostat that allows me to set a heat/cooling schedule for each day of the week. The interface shows a specific time and a temperature value, as well as an indicator for what day it's on and buttons to save the value or move to the next time interval. The buttons are entirely digital and the only feedback the interface gives is visual feedback. This has caused problems as the buttons to save a value or move to the next interval do not behave as expected. If a new value is entered for that time, and then the button to progress to the next time is selected, the new value is not saved. In order to save the new value, the user must explicitly press the save button, but the screen also then progresses to the next interval. This means that the user can assume that the value was saved when it actually wasn't.

To redesign this interface, I would include auditory feedback in the form of a small, simple sound that indicates whether a value was changed or not. If a change was made, it plays a confirmation tone, and if they skip, a neutral or flat tone when a value is skipped or not saved.

4.2 Giving the user control of the pace

An interface that violates this suggestion is the interface on an old digital wristwatch I owned that allowed the user to set the time. The interface on this watch consisted of a small digital screen and four buttons. Holding down one of those buttons for a period of around two seconds would switch the display into a mode that allowed the time to be altered. However, the user only had a few seconds to make a change before it switched back into a previous mode. This means if the user was not fast enough, they would have to re-engage the button to switch back to edit the time.

A simple redesign would be to expand the window of time before the watch switched back to the read-only mode.