Assignment P2

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1. TASK LIST

Table 1—Task list with respective goals, interfaces, and objects.

Task	Goal	Interface	Object
Connect earbuds	Listen through earbuds	Earbuds	Earbuds
		Headphone jack	Laptop
Navigate to lecture video playlist	Watch lecture videos	Keyboard	Laptop
		Computer display	
Type and write information	Take notes	Tablet display	iPad
		Stylus	Stylus
Navigate to assignment website	Read assignment	Keyboard	Laptop
		Computer display	
Duplicate a Pages document	Begin assignment	Keyboard	Laptop
		Computer display	
Respond to text	Coordinate with someone	Keyboard	Laptop
		Computer display	
Look at contact information	Find someone's address	Phone display with capacitive touch	iPhone

1.1. Navigate to lecture videos

This task was mostly direct, but the interface is not yet invisible. Because it is on the computer, which I have become familiar with, the interaction feels direct. It is simple to move through various websites to find the lecture videos, but I am not familiar enough with the EdStem platform that it has become invisible. I still need to spend time thinking about where the videos would be or why a certain lecture looks as if I have not yet completed it even though I watched it. In the past, I thought much more about the interface because it was new, and I did not understand the icons. Though it makes more sense, it is not yet something I can navigate without thinking.

1.2. Type and write information

This interaction for the task is somewhat direct, and the interface is not invisible. I use the Notability application on my iPad, which has many features. From attempting to scroll through pages, I create accidental marks or text boxes. It is difficult and laggy to insert or delete note pages. The iPad keyboard gives very little feedback, so I find words misspelled or autocorrected to the incorrect words and random unintended punctuation. The display does not always draw what I feel like I have drawn with the stylus. Because of these issues, I am spending a large portion of time manipulating the interface rather than interacting with the object directly or completing the task.

1.3. Duplicate a document

The interaction for duplicating a document has become very direct and relatively invisible. I feel like I am interacting with the computer directly, and I do not need to spend much time thinking about the interface. Instead, I can complete the task quickly and easily. The interface became invisible mostly through good design. When I first used a Mac, the "right click" option was confusing, but I learned to use two fingers to tap the touchpad. The good design means that action options for the document are clear and that the duplicated document is easy to find. Because it is in the same location with "Copy" appended to its name, it is clear what has happened.

1.4. Respond to text

Responding to a text has become direct and nearly invisible. There is a good deal of interaction with the object because it feels like the letters typed are fairly accurate. Most of the time, I use fairly common words, so autocorrect makes the interaction more direct when my thumbs are not precise enough. I do not have to spend much time thinking about the interface rather than the task because I am very familiar with it and because of the great design. The recent messages are near the top of the messaging application, and there are indicators for unread messages, which makes it easy to find the recent texts that still need responses.

2. INVISIBILITY BY LEARNING

2.1. The task and interface

One task that I have been using more regularly, especially since the pandemic began, is exercising by using the Les Mills workout application on my phone. The interface includes many videos and playlists based on type of workout. The majority of the time using the app is spent on the workout videos, which I can follow along. The videos use to require a lot more thinking because the exercises were new to me. Sometimes, exercise moves were demonstrated quickly or were not explained adequately. For the dance workouts, many moves were taught briefly before being incorporated into the dances, leaving me and some friends jumping around like helpless chickens in an attempt to follow along. Because I was trying to learn the dances and other exercises accurately, I had to rewatch some of the demonstrations and interacted a lot more with the interface.

2.2. Current thought process

Nowadays, because I have more experiences with the exercises and a different mindset, I spend less time focusing on the application interface. The familiarity with the general exercise moves means that I do not need to take time out of the workout to learn. By listening to the workout cues more, I am better able to understand the exercise and to perfect the motions without having to stare at the phone screen. With the dance workouts, I have learned to focus more on moving than on getting the movements executed perfectly, which likely would never happen anyways.

2.3. Redesign

The application interface could be redesigned to get to the point of invisibility more quickly. One of the benefits of using technology instead of a typical in-person workout class is that the video could be personalized. Because the account and sign-in are linked to an individual, the exercise video could include additional instructions for each instance the individual is learning a new move. The application could have settings to include or ignore the additional instructional video segments, and these segments could individually be skipped if the user taps a "Skip Instruction" button. This is a great example of where a wearable device, such as an Apple Watch, could be incorporated into the applica-

tion. A user could select to skip the instructions with a tap of the watch without having to physically interact with their phone, which means that they can spend more time focusing on the workout and less time on the interface. These suggestions for a redesign aids in the instructional components of the workout application, which would bring users to the point of invisibility more quickly.

3. PROCEDURAL ELEMENTS

3.1. The task

For the following question, the interface design for using a smartwatch to navigate a route as a pedestrian will be considered. The specific example that was observe was the Maps application on an Apple Watch that is connected to an iPhone.

3.1.1. *Visual*

Apple's Maps application contains different options of visual feedback for the user. On the screen, the estimated time of arrival, the next direction, and a view of the map is displayed. In addition, the view can be simplified to show the next step without the map view. The user is mainly looking at text and a simplified indicator of which direction to turn. Each of the next steps can be scrolled through so that the user has a better idea of their route.
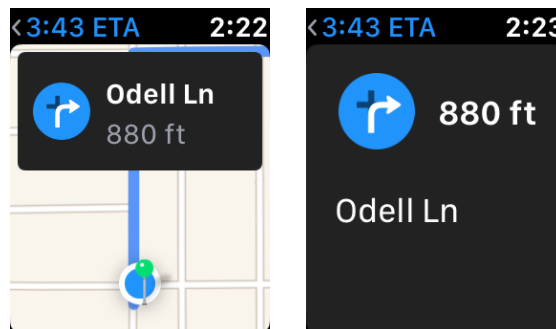

Figure 1—Maps on an Apple Watch. The left shows the general view, and the right demonstrates the simplified view.

3.1.2. *Auditory*

As a pedestrian using only the smartwatch, there are no auditory cues. These can be heard only from the phone that the smartwatch is connected to. The directions are given as commands from the phone's speaker or from earbuds that are also connected to the phone.

3.1.3. *Haptic*

One of the helpful features of the Maps application on the Apple Watch is that it will give haptic feedback immediately before the user needs to turn. This allows the user to spend more time focused on their walk and their immediate surroundings, and it also vibrates to help them find when they need to change directions.

3.2. Design

3.2.1. *Visual*

Future designs of Maps on the Apple Watch could display photos of the intersection along with the path that the pedestrian needs to take. This would provide a particular benefits to pedestrians because they have more time to be aware of the present surroundings than a driver, who passes by too quickly to notice much. By providing pictures of intersections or landmarks nearby, the application can help a pedestrian find the location of the next turn or of their destination. It also correlates to how directions may be given by visual cues, such as, "Turn right at the large rock" or "Turn left by the yellow sign."

3.2.2. *Auditory*

In the future, there still does not seem to be many benefits to including auditory cues on the smartwatch. It is possible that the watch could beep prior to a turn or increase in pitch or volume near the turn. The watch could also beep frequently when the user takes a wrong turn and is no longer on the route. However, as a pedestrian, the auditory cues would be distracting and would generate additional security concerns. A tourist in a busy city could become a target for theft if it's obvious that they are lost, and someone could follow them by listening to any auditory cues.

3.2.3. *Haptic*

The current haptic feedback is helpful, and in the future, more information can be conveyed. The small vibrations could begin a bit earlier and increase in intensity at the time of the turn. Another possible design is to use different types of vibration patterns to indicate to a user when to turn left versus right. This would allow the pedestrian to continue walking without looking down at their watch or phone. In addition, there could a specific vibration to indicate that the

user is not following the original directions and that they should either turn around or tell their phone to recalculate the route.
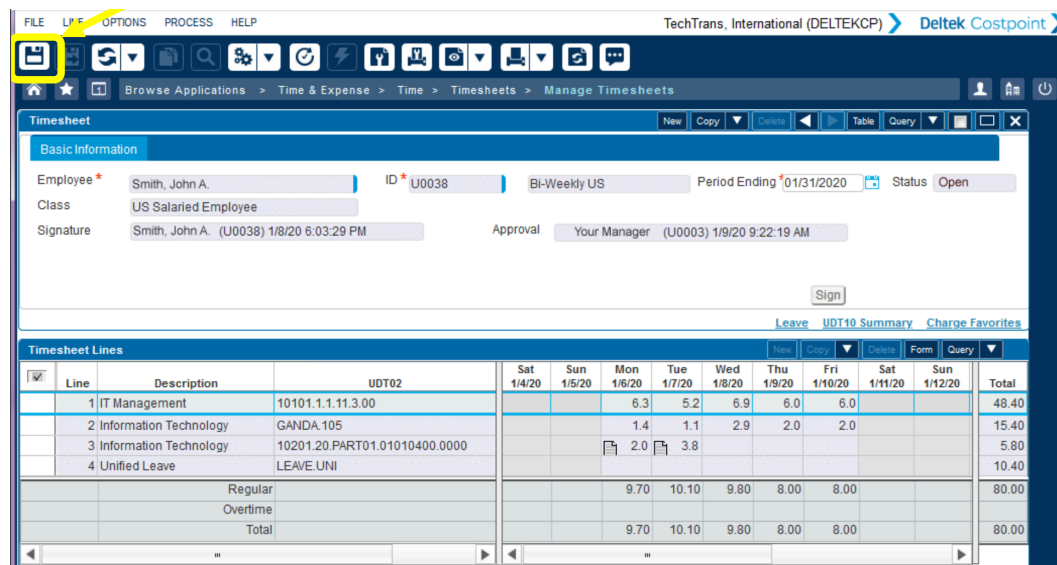
3.3. Additional human perception

An additional human perception that could be used for feedback is thermoception. Although it would likely be more of a nuisance and a risk, the smartwatch could get warmer to indicate to the pedestrian that they are closer to their destination. This generally would not be helpful or wanted, but it may be an interesting take on playing the hot/cold game for children. In the game, an item is hidden, and someone is telling the searcher "hot" or "cold" depending on whether they're getting closer to or farther from the hidden object.

4. REDUCING COGNITIVE LOAD

4.1. Emphasize essential content & minimize clutter

An application that I use daily that has a terrible design is the new Deltek interface for managing timesheets for government contractors. To display a screenshot of the application, I looked on Google, where there are various instructions and tutorials that are unnecessarily long. I only need to view and modify my current timesheet to track the number of hours that I work on each project, but getting to that view is difficult.

Figure 2—Deltek Costpoint's cluttered timesheets with hidden essential content. Source: TechTrans International.

There are many options that I have not been able to adequately explore, and the essential content is not emphasized more than everything else. The quantity of the clutter makes the interface overwhelming.

I would redesign the interface so that the "Basic Information" about the employee is not in text boxes and is given less space than the bottom component with the actual timesheet. In addition, I would remove several of the fields in "Basic Information" because much of the information does not change and is not relevant to the general user on a daily basis. A redesign should also feature more emphasis on the "New" buttons, which are difficult to find but are essential, and hide away some of the other unnecessary functions in dropdown menus.

4.2. Give users control of the pace

A more well-known interface with potential for reduced cognitive load is YouTube. When forced to view advertisements, the users are required to watch a certain number of seconds before the "Skip Ad" button is enabled, which contributes to cognitive load. A larger contribution to cognitive load is that the "Skip Ad" button sometimes seems to become disabled if it is not clicked in time. This does not allow the user to control the pace of the interaction. While it is understandable that such an application would want to maximize the amount of time that an advertisement is played, it increases cognitive load substantially when the option to skip is removed after it is given. A redesign of the interface would leave the "Skip Ad" button functional after it has been enabled, and the button should remain even as a subsequent advertisement begins.