Assignment P3 (Summer 2020)

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1 QUESTION 1

1.1 Discoverability

The first principle is discoverability. This means making the options and functions visible to the user so that user's do not have to remember the steps and do not have to look at a manual to understand how to perform an action which puts unnecessary cognitive load. I will discuss this principle with *Gulf of Execution*.

Table 1—The table contains the relationship of Discoverability with the 3 phases of Gulf of Execution.

Identify Intentions	Identify Actions	Execute in Interface
This step requires the users to identify the goal in the context of the system. This task becomes very easy when the actions that the system performs are clearly visible to the user. This will clear out the mismatch between the user's own understanding and the system's current structure.	Identifying the actions to accomplish their goal becomes extremely easy when the options are easily visible to the user. They will know what to do and will stop worrying about the interface and think only about their task.	Now that users have identified the actions they need to perform, now they just have to execute them. Again because the operations are easily discoverable, the users can go ahead with executing them to achieve their goal.

1.1.1 *Example*

Let's say the user wants to make a phone call and put it on speaker. When the user is using mobile phone for the first time after using landline phones for years, he might not know that is possible with mobile phone. But the loud speaker symbol on the screen which is easily discoverable, makes him realize it is indeed possible with this current system and it also helped him identify the action he needs to perform to achieve his goal.

1.2 Affordances

This principle says that the systems by their design should tell the users how to use them. If that's the case, the the user definitely need not think about the interface. The interface becomes invisible to them. I will discuss this principle

with *Gulf of Execution*.

Identify Intentions	Identify Actions	Execute in Interface
When the system itself is obvious of what actions it performs, it becomes easy for the user to clear out his misunderstanding about what the system can do.	If the user sees the system he can figure out what he needs to do very easily because of thee affordance. For example, if it is a button, the user knows this action should be to press/click it.	Once the user knows what he needs to do, it becomes very easy to actually execute it as the system itself is telling you what to do by its very nature.

1.2.1 *Example*

If we take example of a vacuum cleaner, when the user holds it, the first thing he sees is a button. The user can easily understand that it needs to be pressed for the machine to start. Once the machine starts, by the very structure of the machine, it is clear that the user needs to move it around to clean the area. In this entire process, the user never thought about the interface. He is only concentrating on his task - cleaning.

1.3 Feedback

Feedback is what the system tells the user in response to the action user performed on the system. This should be immediate and easy to understand. I will discuss this principle with *Gulf of Evaluation*.

Interface Output	Interpretation	Evaluation
After the user has executed the actions, if the system gives any sort of notification in response, it will help the user understand that his actions indeed changed the state of the system.	If the feedback given is easy to interpret, the user need not have to spend much time thinking about what the notification meant and can move on to the next task.	The user should be able to evaluate their interpretation of the output. This should be made easy for the user.

1.3.1 *Example*

Let's say user is using a database client to add rows to the database. Once he executes the insert statement, the system shows a green tick mark and a *Inserted* message. This can be easily interpreted as the data was inserted and the preview of the table with this newly added row at the bottom makes it easy for the user to evaluate his interpretation. In this case, the interface is invisible to him.

1.4 Participant view of the user

1.4.1 *Ease and Comfort*

This principle states that the users should be able to use the interface comfortably without any fatigue and it should be easy for people of all types to use it easily. When the user gets a phone call while driving, the interface should be able to automatically transfer the call to car's bluetooth. By doing so, the user can comfortably answer the call while driving. Here we are also taking into consideration the context of the task and making it easier for the user to use the device.

1.4.2 *Flexibility*

This principle states that system should support natural way of interaction for users for different types and abilities and not force the users to use the system in only one way. The system should be designed in such a way that both novice and experts are able to interact with the system in the way they are comfortable with. The people with disabilities should also be able to interact with the system in the way they are comfortable. For example, the doors in hospitals have a bar that people can use to open and a button adjacent to the door for people on wheelchair who cannot push the bar on the door.

2 QUESTION 2

The interface I would like to discuss is my dryer.

2.1 Description of the Interface

The interface has a display panel with controls around it and a dryer bin where we put in the washed clothes to dry and it has a place where the lint is collected. This can be seen in figure (a). The red arrow shows the lint collector.

Figure 1—The figure shows dryer, the lint clean indicator and suggested icon.

2.2 Description of how it responds to user errors

When the user turns on the dryer without cleaning the lint compartment, the machine starts beeping without any proper error message displayed on it's display. The symbol displayed on the screen cannot be easily mapped to the error without looking at the manual. This can be seen in (b).

2.2.1 *How easy the error is to commit*

The machine can be switched on without cleaning the lint. Since the machine lets me start it without cleaning, it often results in me forgetting to clean it before turning the dryer on.

2.2.2 *Penalty*

After cleaning the lint, the machine does not start from the point it has stopped, instead it starts from the beginning. For example, if I had set the timer to 1 hour and the dryer stopped at 15th minute, it will not dry for the remaining 45 minutes, instead it will again start from the beginning.

2.3 How improved constraints could be used to avoid errors

The machine should be able to detect that the lint is not cleaned. If the lint compartment is dirty, the system should not let the user to turn the dryer on. The power button should become unresponsive and a message should be displayed indicating the user to clean the lint to start the machine.

2.4 How improved mappings could be used to avoid errors

Instead of beeping when the lint is dirty, the system can beep once and show some form of a display that the user can easily understand. It might be a miniature representation of the dryer with the lint compartment highlighted in red which makes it easy for the user to map it to the actual problem. This can be seen in (c).

2.5 How improved affordances could be used to avoid errors

A small slider can be provided on the lint compartment. The slider will move to the left corner when the lint is not cleaned. A message *Slide right to clean lint* can be written on the slider. When the user sees the slider he knows that he has to slide it and the message makes his intentions clear.

3 QUESTION 3

The game I would like to select is Candy Crush Saga (https://king.com/game/candycrush). I have been playing this game since many years and I really like it. This game involves matching similar candies.

3.1 Slip

3.1.1 *Description of the Slip*

The game requires the player to swipe same colored candies to complete a task in each level. At some steps, I will exactly know which candy I need to swipe but I end up swiping the wrong candy.

3.1.2 *Reasons behind the Slip*

The slip mostly happens because of the following reasons:
1. Screen dimension limit. I accidentally touch a different candy just because of the congested layout.
2. The app starts suggesting moves if the user takes some time to make his next move. Often times this is more of a distraction than help. I get distracted by the suggestion and end up swiping the wrong candy.

3.1.3 *Suggestions to prevent the Slip*

1. The app should provide zoom functionality to the user so that they can zoom to the area they want and make the move and zoom out.

2. The app should ask the users if they want to get move suggestions before starting the game. If the user selects no, the app should not suggest moves.

3. The app should let the users undo a move. The users would have to earn this undo feature like any other booster in the game.

3.2 Mistake
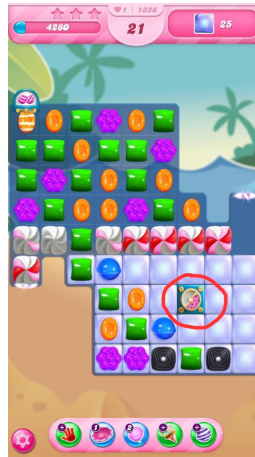
Figure 2—The figure shows the Magic Mixer (marked in red) in Candy Crush Saga.

3.2.1 *Description of the Mistake*

In few levels in Candy Crush Saga there is something called "Magic Mixer". It is a blocker - which means, if I don't break it soon enough, it will block all the candies and I will not be able to swipe them. The mixer increases its spinning speed every time a candy next to it is crushed. The mixer does not break until it is spinning at its highest speed. All this information is shown to the user during the start of the game when the user hasn't even tried to play with it.

While playing the game, I forget what the instructions were to break the mixer and end up wasting my lollipop hammer by trying to break it when it's not spinning at it's highest speed. More details on the hammer is included in the Appendix.

3.2.2 *Reason behind the Mistake*

The information about the mixer is shown only once during the start of the game. Players cannot remember the information all throughout the game and hence the player has no means to know how to break it. The representation of

the mixer is also not very helpful.

3.2.3 *Suggestions to prevent the Mistake*

1. **Discoverability of the information** - There should be an information center while playing the game which will have details about all the objects in the current game. When the user feels stuck, they can refer to the information and continue the game.

2. **Better representation of the Magic Mixer** - The mixer itself should be represented intuitively so that user does not need any guide. Maybe it can show a number which indicates it's current speed(1 to 5). By doing so, the user can go ahead and break the mixer with the hammer when it's at the highest speed(5).
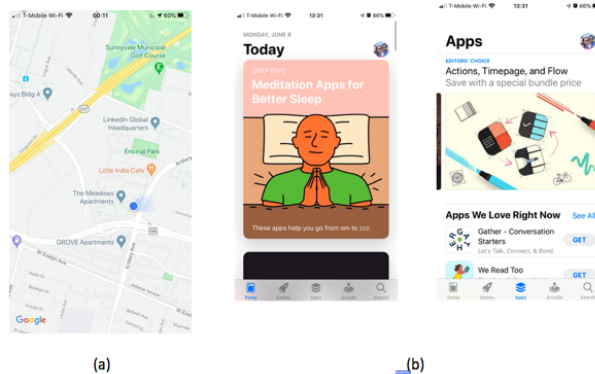
4 QUESTION 4

(a)   (b)

Figure 3—The figure shows Google Maps representation in (a) and Apple App Store pages in (b).

4.1 Good representation of its underlying content

I would like to talk about Google Maps for good representation of it's underlying content.

4.1.1 *Connections between the representation and the underlying content*

This representation is very clear and shows the exact position of the person using the app. The location indicator moves in the way the user moves.

4.1.2 *Makes relationships explicit*

In this interface it is very easy to understand where the person is situated. If the interface shows a Starbucks shop next to the user in the interface, it will be same in the real world as well.

4.1.3 *Representation excludes extraneous details*

The interface does not display the name of each and every building near the user. Instead it shows only the names of building relevant to the user and it does not overwhelmed the user with the details. However, the user can zoom into the area to get more details about the buildings.

4.2 **Not a good representation of its underlying content**

I would like to talk about Apple's App Store for not a good representation of it's underlying content.

4.2.1 *Mismatch between the representation and the underlying content*

When the user clicks on the Apps section on the App store, he expects to see the apps that he has installed. Instead the page is filled with app suggestions and there is no way I could initially find a way to look at the list of my installed apps. After a lot of trial and error I realized I had to click on my photo (top right corner) to get the list of my apps. When they are already showing app suggestions on the "Today" page and also in the Search page, the Apps section should simply list my apps.

4.2.2 *Does not bring Objects and Relationships together*

When a user has opened the App Store through his Apple ID and clicks on the "Apps", he expects to see list of apps installed with his Apple ID. This is the relationship that should exist. Instead, the page shows a bunch of app suggestions without guiding the user where to find his apps.
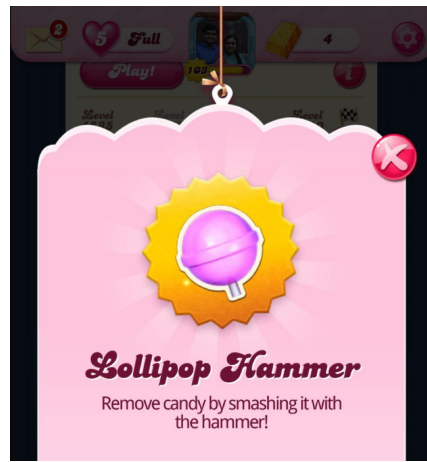
4.2.3 *Representation includes extraneous details*

As mentioned above, the page contains a lot of extra app suggestions which fills out the entire screen overwhelming the user.

5 APPENDIX

5.1 Lollipop Hammer

Figure 4—The figure shows the lollipop hammer.

As explained in the figure above, with the hammer, the user can remove a candy without having to match them with other similar candies.