The Psychology of Everyday Actions

Yugandhar Sainath Gujarathi
School of Computing
Clemson University
ygujara@clemson.edu

Ruthwik Reddy Bommana
School of Computing
Clemson University
rbomman@clemson.edu

ABSTRACT

This report discusses the chapter "The Psychology of Everyday Actions" from the textbook "The Design of Everyday Things", involving the definitions of Gulf of Execution and Gulf of Evaluation and their importance with two examples for each, one being a positive example and another a negative one. Followed by Human Cognition and Emotion and the three levels: visceral, behavioral, and reflective, to be considered for a model to be useful. And how technology can accommodate human behavior. We have described the seven stages of actions and their importance in interaction design.

Introduction

The simplicity with which a user may grasp the present state of a system is known as the Gulf of Execution. It's the gap between what people want to accomplish and what the system permits them to do. The simplicity with which a user may observe and comprehend whether the activity they completed was effective is known as the Gulf of evaluation. When a system offers information about its status in a manner that is simple to receive, comprehend, and matches the way a human thinks of the system, the gap is narrowed. Cognitive systems learn from and interact with humans in a natural way, allowing humans and machines to go beyond what they could achieve on their own. There are various places in the human mind that are important for emotion; together, these regions make up the emotional system. The author claims that the emotional system is divided into three levels (visceral, behavioral, and reflective) [2], each of which has a distinct impact on our perception of the world. Overuse of technology has resulted in increasing isolation, less social connection and social skills, and more human-to-machine exchanges, all of which have built a barrier

description of a VCR problem that exemplifies this point. between many individuals throughout the world. The author also states that there are seven fundamental design principles for interaction design.

Gulf of Execution

The gulf of execution refers to the gap between users' intentions and what the system allows them to achieve or how well it supports their actions. The degree to which the system provides representations that can be immediately viewed and evaluated in terms of the user's expectations and intents is referred to as the gulf of evaluation. When a system offers information about its status in a manner that is simple to obtain, understand, and matches the way a person thinks of the system, the gap is narrowed. There is a huge gulf of evaluation if the system does not "present itself" in a way that allows the user to deduce which sequence of activities will lead to the desired objective or system state, or whether earlier actions have gotten the user closer to her goal. In this instance, the individual will have to put in a lot of work and devote a lot of attentional resources in order to understand the condition of the system and determine how effectively her expectations were realized. To summarize, the gulfs of evaluation and execution refer to a misalignment between our internal aims on one hand, and the expectations and availability of information indicating the state of the world and how I may change it on the other.

A positive example of information science

Let's take a simple example of the Gulf of execution. We kept a bowl of milk in the microwave. My goal is simple. We want to heat it up. How hard is that? Well, typically when we have been cooking in the past cooking is defined in terms of the amount of time it takes. So, in the context of this system, we specify my intent as the microwave it for one minute now what are the actions necessary to do so? We press time to cook

to enter the time cooking mode. We enter the time one minute and we press start.

we specified our intent Microwave for one minute and specified my actions, pressing the right sequence of buttons, and we executed those actions. Could we make this better? There were a lot of button presses in the microwave for just one minute. If we think that's a common behavior, we might be able to make it simpler. Instead of pressing time cook 100 and start I might just press one and wait and watch, so we've narrowed the Gulf of execution by shrinking the number of actions required, but it may have enlarged it by making it more difficult to identify the actions required. When we look at the microwave, time cook gives me an idea of what that button does. That's good for the Gulf of execution. It's easier to look at the button and figure out what to do than to have to go look and read a manual or anything like that and find out on your own. Once you know that all you must do is press the one that's much easier to execute. That's something nice about this interface. It provides both beginners and experts in a hard discoverable way, and a short, invisible way. But let's rewind all the way back to the goal we set up initially. My goal was to heat up my milk specified my intent in terms of the system as microwaving it for one minute, but was that the right thing to do? After one minute my milk might not be hot enough. This microwave has an automatic reheat function that senses the temperature of the food and stops when the time seems right. So, the best bridge of the Gulf of execution might also involve helping me reframe my intention. Instead of wanting to microwave for one minute, it might encourage me to reframe this as simply heating until ready and letting the microwave do the rest.

A negative example of information science

Let’s consider the case of a user who wants to record a television show. They believe that clicking the Record button will solve the problem. Multiple steps must be completed in order to record a show on a VCR: Press the record button to start recording. Set the recording time, which normally entails many steps to adjust the hour and minute settings. Choose a channel to record on by typing in the channel number or using the up/down keys. By pressing a "OK," "menu," or "enter" button, you can save the recording settings. The gulf of execution is the disparity between the user's perceived execution actions and the required actions.

Gulf of Evaluation

The degree to which the system provides representations that can be immediately viewed and evaluated in terms of the user's expectations and intents is known as the gulf of evaluation. The difficulty of measuring the state of the system and how well the system facilitates the finding and understanding of that state is known as the gulf of assessment. "When a system offers information about its status in a manner that is easy to obtain, interpret, and matches the way a human think of the system, the gulf is minimal."

There is a huge gulf of evaluation if the system does not "present itself" in a way that allows the user to deduce which sequence of activities will lead to the desired objective or system state, or whether earlier actions have gotten the user closer to her goal. In this instance, the individual will have to put in a lot of work and devote a lot of attentional resources in order to understand the condition of the system and determine how effectively her expectations were realized.

To summarize, the gulfs of evaluation and execution refer to a misalignment between our internal goals on the one hand, and the expectations and availability of information describing the status of the world and how I might change it on the other.

A positive example of computer science

For example, we have a goal to make the room warmer. So, we do something to my thermostat with the intention of making the room warmer. What does the system do Well, it turns the heat on now it would be the successful result of my action? But how do we know that the heat was turned on? Well, maybe we can hear it. Click on the button that's a one-time kind of thing. It might be quiet, and we miss hearing it. we have no way of double-checking it. So, we are not sure if we heard it and we must go find a way and put our hand on it and try to feel the heat coming out. And there's more going on in the heater it might

have worked, but the heater doesn't immediately turn on for one reason or the other. These are signs of a large Gulf of evaluation. Neither the sound nor the event or optimal displays because they're either hard to reach or possible to miss. Feeling the Heat might be easy to interpret, but hearing the heater turn on might not. So, either way, we must do a lot to evaluate whether my actual was successful. And this is all for a very small piece of feedback. Ideally, if we weren't successful, we want the system to also tell me why we weren't successful. So, we can evaluate what we did wrong and respond accordingly. There's a very large Gulf of evaluation if there's no indicator on the actual thermostat. So how can we resolve that? Well, simple. We just mark on the thermostat; the heat is on. That sounds trivial, but nothing in the fundamental design of the system. demanded a note like this. It's only in thinking about the system from the perspective of the user that we find that need and can let you know the system as well isn't still very ideal. For various reasons. It'll turn the heater on or air conditioning off even when it hasn't reached the temperature we put in and it gives me no indication of why we can look at the system and evaluate the temperature is set lower than the current temperature in the room. But at the same time, we can see that the heater isn't on under those circumstances. We have no way of knowing that. The heater is malfunctioning if the switch is wrong or fine, you know, in this case, it might just be that it's set to the wrong mode. The mode is visible, but after I'm going to check it if it appears to be malfunctioning. We can imagine we'll turn the message on the screen indicating the direction of the relationship or something similar that would give some sign it's currently set incorrectly.

A negative example of computer science

Let's take our on-demand video service example. Imagine that the user has gotten all the way to finding the program that they want to watch, and they've pressed the play button on their remote. Imagine the interface responds by hiding the menus that they were using to navigate amongst the service. Can they interpret the meaning of that output? And can they interface. What did it do in response? There might be something visual, there evaluate whether that interpretation means that their goals were realized? If they're a novice user, maybe not. An expert might correctly interpret that the screen blacking out is because the service is trying to load the video. They then evaluate that interpretation and determined that their goals have been realized that the service is trying to play the show they want to watch. But a novice user might interpret that output to mean that the service has stopped working at all like when your computer just shuts down and the screen goes black. They then incorrectly evaluate their goals were not actually realized in the system. We might get over this by showing the buffering icon. That's a different kind of output from the system that helps the user correctly interpret that the system is still working on the actions that they put in. They then can evaluate, then maybe their goals were correctly realized after all because the system is still working to bring up their show. So, as you can see, each of these three stages presents some unique challenges.

Human Cognition and Emotion

The Visceral Level

The visceral level of design is concerned with how things appear. It is here that the user will have unconscious and automatic sentiments about the first impression of a design. The design's visceral level elicits immediate and intense reactions. When it comes to visceral design, it's important to consider the users' attitudes, beliefs, and feelings. Because this design level is all about the user's first impression, you must try to get into their heads and play with their emotions in order to either improve the user experience or meet a business need. Visceral reactions are instantaneous and unconscious. They are just concerned with the current situation. Most scientists refer to these as "precursors of emotion," rather than "emotions." You will have a visceral reaction if you stand on the edge of a precipice. Alternatively, bask in the warm, soothing glow following a great experience, such as a delicious meal.

- This is the first stage of information processing.
- Humans react to audio-visual actions and other features of a product during this stage

of processing.

- At this visceral level, the user will be dominated by the product's exterior appearance and feel.
- Humans must decide whether something is nice, awful, safe, or hazardous.
- Human minds are conditioned to prefer or detest things based on their own cognitive abilities.

The Behavioral Level

Behavioral design is primarily concerned with user satisfaction and efficacy. Users are more concerned with the usability of the design at this level of design; therefore, the user's cognitive process is more conscious. When designing for the behavioral design level, consider how users conduct their activities and build in a way that leads them to their ultimate objective quickly. Users, as you may be aware, will not only complete their responsibilities, but will also fail to do so at times. As a result, you must consider the feelings that users will experience after completing their assignment as well as when they fail, and you must account for both factors when managing the users' actions. A careful flow approach throughout the design will ensure good usability. It is possible to learn new behavioral states. When there is a good comprehension and awareness of the results, they give birth to a sense of control, and frustration and fury when things do not go as planned, especially when neither the cause nor the available treatments are known. Even when it reveals a negative outcome, feedback provides confidence. A lack of response can lead to a sense of powerlessness, which is unpleasant. Good design gives feedback, which is crucial in controlling expectations. Feedback—knowledge of results—is crucial to learning and the development of skillful behavior since it is how expectations are addressed.

- When making decisions, the emotional brain is crucial.
- The level of product description that is more comprehensive than visceral.
- Working with complicated systems is far more challenging than working in basic surroundings.
- This level focuses on semantics and usability practices.
- It determines how the product behaves and provides feedback.
- A dialog box with an error message, for example, informs the user of the next step to take.
- An electrical switch's ON and OFF marks may easily illustrate how it works.

The Reflective Level

The reflective level is where conscious cognition takes place. As a result, this is where sophisticated understanding emerges, as well as reasoning and deliberate decision-making. Because the visceral and behavioral levels are subconscious, they react quickly but without much thought. Reflection is a slow, deep, and cognitive process. It usually happens after the events have occurred. It's a look back at them, evaluating the conditions, actions, and outcomes, and sometimes assigning blame or responsibility. The reflective level produces the highest levels of emotions since it is here that causes are ascribed and future predictions are made. When we add causative aspects to observed occurrences, we experience emotions like guilt and pride (when we believe we are the cause) as well as blame and praise (when others are thought to be the cause). The tremendous highs and lows of predicted future occurrences, all projected by a runaway reflective cognitive system yet vivid enough to elicit physiological responses associated with great wrath or pleasure, are likely to be familiar to most of us. Emotion and cognition are inextricably linked.

Analysis and reflection of all events occur at the reflective level, which is the final stage of processing.

- The human brain stores every experience and its meaning.
- This level is primarily concerned with studying previous user experiences and future requirements in order to develop a strategy for achieving the goal.
- Then, based on the preferences of the users, we select a way for carrying out the plan.

Design must take place at all levels

Reflection is likely the most crucial stage of processing for the designer. Reflection is deliberate, and the feelings elicited at this level last the longest: those that assign agency and cause, such as shame and blame, or praise and pride. Our recollection of experiences includes reflective replies. Memories survive significantly longer than acute experiences or usage periods, which are the realms of the visceral and behavioral levels. It is contemplation that leads us to promote a thing, or to advise others to use it—or to avoid it altogether. The importance of reflective memories is frequently greater than the importance of reality. When we reflect on a product with a strong positive visceral response but disappointing usability problems at the behavioral level, the reflective level may very well weigh the positive response heavily enough to overlook the severe behavioral difficulties (hence the phrase "attractive things work better"). Similarly, too much aggravation, especially as we approach the end of the experience, can cause us to overlook the pleasant visceral elements. Advertisers hope that despite a frustrating experience with the goods, the great reflected value connected with a well-known, highly prestigious brand would overcome our judgment. Vacations are frequently remembered fondly, despite evidence of continuous hardship and anguish in diaries.

Each of the three stages of processing interacts with the others. All these factors influence whether a consumer likes or dislikes a product or service. One bad experience with a service provider can ruin all future interactions with that company. One fantastic encounter might make up for previous shortcomings. All expectation-based emotions, such as hope and joy, frustration and rage, are housed at the behavioral level, which is also the level of interaction. At a combination of behavioral and introspective levels, understanding emerges. All three are required for enjoyment. The need of designing at all three levels is so great that I wrote an entire book on it, Emotional Design.

How Technology Can Accommodate Human Behavior

Technology has become increasingly important in our lives as a result of its advancement. In our regular routine, we use it all the time. How frequently do we say, "Ok Google..." or "Hey Siri..." when we need to quickly check something on our phones? This occurrence demonstrates our ever-increasing reliance on technology. Technology has progressed significantly in recent years, from smartphones and wearables to artificial intelligence. The modern workplace has seen significant transformations as a result of technology. People have become so reliant on technology that businesses are now formulating strategies based on it. With the advent of the e-commerce business, the traditional mode of interaction between a seller and a buyer has significantly changed. When we go to a

restaurant, we first take a picture of the food to post on social media before trying it. When we travel, it's the same way. Rather than living in the moment, we want to capture it. That is the extent to which technology has gotten ingrained in our daily lives. We are, in a sense, growing addicted to it. Gaming addiction in youngsters is a good illustration of this, as it has a negative impact on their academic performance. Consider how the internet has altered our social behavior. We now communicate more through phone calls and emails, which have mostly supplanted conventional face-to-face meetings. We can't deny that technological innovation has had an impact on our social bonds. The times we spent with our friends and families are now memories. We are, in a sense, stuck in a digital cave from which we must emerge and begin living in a healthy environment. Are they, however, the only ways that technology has influenced our lives? No, that is not the case. We hear bogus news every day in some shape or another. For these folks, social media platforms have become a hotbed for distributing bogus news. It has a societal impact. People are more likely to believe such misinformation than to rely on print media for accurate and confirmed information. Society's opinion is shaped by the content provided in the media. It can lead to a shift in how we interact with others and how we judge them. People must determine the most reliable source of information. Copyright violations are also on the

rise these days, thanks to rogue websites. We've heard that movies are occasionally leaked on these sites. Many times, we find ourselves in a situation where we start shopping online for one thing but end up buying something different because the last item has a better deal. We do it because we don't want to lose out on a great offer on that product. E-commerce corporations affect consumer behavior in this way. Just think about how much time you spend on social networking apps or binge-watching a series on a streaming service. This is how people's actions are manipulated. We must make effective use of our time. In this sense, we allow technology to control our emotional, social, societal, and personal conduct. However, in the long run, we must aspire to use it efficiently to increase productivity in our everyday routine. Instead of being the master of our life, it must serve as a supplement.

Seven Fundamental Design Principles

Goal, plan, specify, perform, perceive, interpret, and compare are the seven stages of activity. These stages let the user traverse the execution and assessment divides. The first step, "goal," establishes the benchmark against which the action will be judged later. The next three stages (plan, specify, and execute) span the Execution Gulf, while the final three stages (perceive, interpret, and compare) span the Evaluation Gulf.

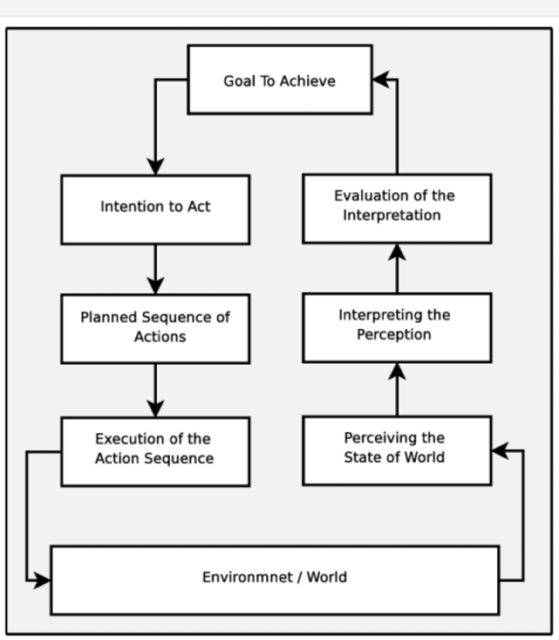

Figure 1: Seven stages of action

Whenever we use a product or a website or an app in our minds, we try to create a set of actions. First, we are going to do this, and all these actions are based on our perception, what we are perceiving how we are perceiving that app or result of our actions. So, all our actions are going to be based on perception, which is also called mental models. And our goal is what we want to accomplish in the end, we will talk about mental models later. So, let's see what are those seven stages of action? These seven stages of action were also proposed by Don Norman let's see what are those seven steps? Number one is what and why do we want to accomplish. first is our goals and triggers, what is triggering to accomplish this goal? The second one is what are the alternative action sequences? can we achieve the same goal by doing something else or with another sequence of actions by pressing this button and going to this URL and maybe copying and pasting everything? Can we create a Google document like that? So, this is the sequence of actions. Every user has a different sequence of actions, they might use some other sequence to accomplish the same goal, then you will think that what actions can we do now Can we press this button is activated or is it disabled? Then the next step is how do we do it? How we are going to click on this button using my keyboard or using my mouse or tapping on it. Then the next step is feedback. What happened? The app needs to tell you what happened when you clicked or when you did this action. Then the next step is you are going to perceive the feedback from what happened.

And then, in the end, is it okay how we accomplished my goal in the end we are going to see whether we have created a Google Document. So, these are seven stages of action. If we can master these. You can apply them on any app, any website any product. Let's elaborate on the seven stages of actions with a screen of the Gmail app. And now in my Gmail app., you can see my trigger and goal is to delete emails. Now my trigger was getting rid of unnecessary mail. That was my main aim was to delete emails, we don't want unnecessary emails. So, my goal was we want to delete emails. Now we are on this screen. And we can see how many possible alternatives to seek action sequences are we can long-press on one email to select it. Or we can alternatively press on the left circle side okay and

select multiple emails. Or maybe we can select just one email. So, there are two possible ways to select the emails either we can tap in the circle, or we can long press on the email. Next was Can we press Delete? What actions can we do to know if the lead icon is enabled or disabled right now we cannot tell that this is enabled or disabled because most of my emails are highlighted in black color. So highlighted or enabled are basically in black color, but the top icons are in gray. Now the next is we took the action we press the delete button which is how to do it. we are going to delete and press the delete button. Then the next message we are going to see on the screen will be a yellow notification bar that you want to undo the messages has been deleted. This is what happened we need to perceive it we need to translate it whether we can understand the message. This is the next step in what this notification means. So, we just comprehend that may have successfully completed so notification as we have deleted the emails, and do we want to recover them? Do we want to undo your action? And in the end, my goal was accomplished we have deleted all my emails we want to so these seven stages of action you can apply it on any mobile screen, any app any product anything you are designing or developing.

Discussion and Conclusion

As this chapter focuses on "How people do things: The psychology of everyday actions", it plays an important role in the design and evaluation of computing systems. The topics like different levels of an emotional system consisting of visceral, behavioral, and reflective levels. The topics like how technology can accommodate human behavior and the fundamental design principles let us know the importance of human psychology in everyday things. The reading of this chapter helped us understand this importance and changed the way we look at interaction design applications. We also understood that the interaction design applications should focus on how and what people tend to react to each design and make necessary considerations for user-friendliness.

Teamwork Section

As per the work done for this task, both team members read chapter two from the textbook TDET [1]. In the first meeting, we discussed the concepts read in the chapter such as the importance of Gulf of Evaluation and Gulf of Execution, and discussed possible examples we could write for these two sections. As well as the other concepts mentioned by the author describing the importance of human psychology in the design of interaction models. We then divided the write-up into two equal parts for each and finished the writing. After the report was complete, we had a proofreading session where both the teammates were involved in the entire report's proofreading and made the necessary corrections for a better report content-wise and format-wise.

References

[1] "The Design of Everyday Things" by Don Norman.

[2] "Emotional Design" by Don Norman.