

The Design of Everyday Things

Chapter Three: “Knowledge in the Head and in the World”

Book by Don Norman

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1: Overview

- Behavior
- Knowledge in the world
- Habits die hard
- Memory
- Approximations
- Knowledge in the head
- Knowledge in both
- Mapping
- Culture
- Discussion

2: Behavior

People survive in the world through behavior guided by the following:

- Internal knowledge
- External knowledge
- Constraints

We change our environment and tools in a way that allows us to minimize the amount of knowledge we actually need.

Behavior is determined by combining knowledge in your head with knowledge from the world.

3: Examples of Behavior

- When you're on FaceTime with a friend at night and are alone at home, why do you get put on high alert when they ask who's behind you?
- Why do you lick your lips whenever someone tells you that you have dry lips?
- How do you get around a city that doesn't speak the language you do?

4: Knowledge in the World

When you interpret and understand the world's structure, the world becomes knowledge.

You don't need to know the inner workings of some system, just enough to be able to manipulate and use it to accomplish something.

Declarative knowledge is knowing facts and rules of some system - be they true or false. This is absorbed by your surroundings and fairly easy.

Procedural knowledge is knowing the inner workings of some system enough to be able to manipulate it. This is practiced by you and fairly hard.

5: Examples of Knowledge

- The result of the addition of 1.1 to 2.2 in Python is obviously 3.3.
- The tongue is the strongest muscle in a human body.
- You know how to program something in your favorite programming language.
- If it's noon on a weekday, you'll have trouble finding a seat for lunch at Lowry.
- I often walk across the street without looking both ways. I can hear and feel if cars are speeding up or slowing down in my direction.

6: Old Habits Die Hard

Everything works until something changes. People come up with interpretations or mental models of the knowledge they have, relying heavily on that mental model.

You don't need to know every small detail to be able to come up with an interpretation of the manipulatable world around you. The world however is complex and ever-changing so those mental models will eventually break.

7: Examples of Old Habits Dying Hard

- When at home, we often walk to the empty fridge looking for food.
- When transitioning from Windows to Mac, I found myself holding the control button rather than the command button for key commands.
- The mental model around taxis and how to get around in a car that isn't yours has changed greatly with companies like Uber and Lyft.
- This one isn't an example because it's automatic, but I like messing with you by telling you that you're now manually breathing.

8: Memory

Humans are complex, and we still don't know how the brain really works. Top scientists agree that there are two forms of memory: short-term and long-term.

Short-term memory is memory that deals with the most recent experiences or material currently thought about. It's retained and retrieved fairly effortlessly and comes with a limit - about five items or so.

Keep in mind when designing something that users will not retain a lot of information.

9: Memory (cont.)

Long-term memory is memory that deals with experiences that are not so recent. It's retrieved with more effort. These kinds of memories can be altered and implanted.

Memory for arbitrary things are retained with no real meaning or relationship to what is already held in memory. These tend to not have mental models associated with them.

Memory for meaningful things are retained with real meaning or relationships to memories already held in memory. These tend to have mental models associated with them.

10: Memory (cont.)

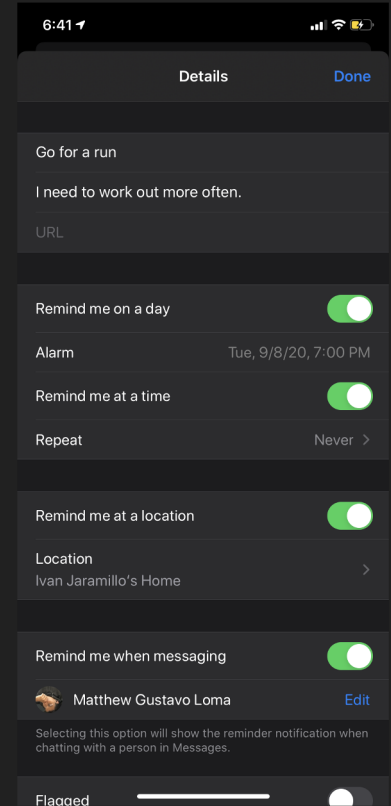
The Don Norman quote I'll keep in mind while designing something is “the most effective way of helping people remember is to make it unnecessary” on page one hundred.

You can “create memories for the future” or set up reminders for yourself, but they'll need a signal and a message to be a successful reminder. Otherwise you've set yourself up for failure.

Oftentimes in real life, we don't need to be precise to survive. We use approximations all the time and leave room for error.

11: Examples of Memory

- I love Apple's Reminders app
 - I don't have to really remember whatever today's errands have to be done
 - A banner shows up at the top reminding me what the errand is
 - If I want to brush off the errand for a bit, I can tell the app to remind in an hour, in the afternoon or next morning
 - I will be reminded if I'm messaging someone specific (which is often) or if I'm at a certain location



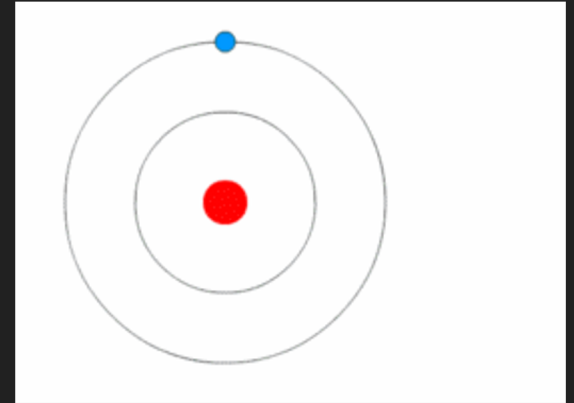
12: Approximations

As satisfying as impossible fit metal art, we as humans don't need to be as precise. Our conceptual models don't need to be perfect just make sense.

We use technology because we don't need to be perfect with memory or accuracy.

13: Examples of Approximations

- Converting feet to meters isn't pretty. We can use this to get a close enough answer though: $m = f / 3$ where m is meters and f is feet.
- The Bohr model for an atom is not accurate at all, but it's simple enough for use in chemistry. Here is a hydrogen atom.



14: Knowledge in the Head

Internal knowledge must be combined with external knowledge to be able to manipulate the world around you successfully.

No search for knowledge or interpretation of the world around you is needed. You just need to learn or master something.

We must store knowledge and retrieve it when needed if it's not thought about constantly.

Something you know may not be used right after learning it.

15: Examples of Knowledge

- What are the lyrics, if any, to your favorite song?
- What's your last coding project? We can look at code while opening a terminal and not be immediately confused, but anyone who doesn't know how to program will ~~ask if you can fix their computer~~ have no idea what we're doing.

16: Knowledge in Both

Having knowledge in only one is not sufficient for survival. We must have knowledge in the world and in our head for us to combine and utilize.

Knowledge in the world is readily available while knowledge in the head requires you to think.

As time goes on, knowledge will be further embedded in every device we could ever use. That can lead to challenges in being able to communicate the knowledge between a user and the device - requiring learning or training.

17: Examples of Knowledge

- Say you're alone at home on FaceTime with a friend at night. Why do you feel on high alert when they ask who's behind you?
- When cooking you depend heavily on the smells and sights around you while preparing the next item from the experiences you have in the past or a memorized recipe.
- When walking at night, you know to be more alert than normal and depend on any information the world presents to you as well as internal knowledge of the area to determine if you are in any form of danger.

18: Mapping

Mappings are internal relationships between the controls of a device and the device itself.

The best mapping is having the controls mounted directly on the item being controlled.

The second best mapping is having the controls mounted as closely as possible on the item being controlled.

The third best mapping is having the controls mounted in the same spatial configuration as the item being controlled.

19: Mapping (cont.)

You have to think about what's actually possible and safe while creating mappings.

We want to reduce the load on memory as much as possible otherwise people will have to use more effort than necessary and make our product unpleasant and disliked.

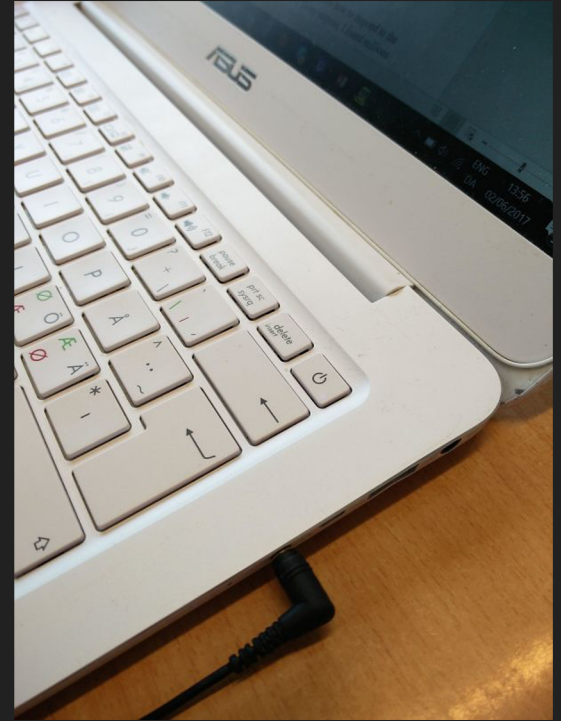
Keep in mind that usability is not often thought about while buying something. Make sure that your users have no regrets! If you're buying, test the product out.

20: Examples of Mappings

- I love Apple's gestures for the MacBook Pro. I can swipe fingers in certain ways and the screen displays information just the way I feel it should. Two fingers swiping from the right to the left let me see information about today's weather, appointments, and reminders.
- A gym squat rack is simple and easy to use. The only issue is your form while working out.

21: Examples of Mappings (cont.)

- This is poor mapping of controls for obvious reasons.



22: Culture

Pretty obviously not everyone sees something the same way. This is especially true for cultures. This is due to standard metaphors and phrases which vary among cultures be they dependent on a region or a field of study and practice.

The book mentions time being represented horizontally (North American), vertically (Aymara, a South American Indian group), or on a line that depends on the direction being faced (Australian).

23: Culture (cont.)

With these differences in culture, you have two options:

- Change your product to fit hundreds if not thousands of cultures
- Force everyone to use your product to fit your culture

24: Examples of Culture

- Facebook tried to adapt to countries whose main language was not English but failed with the vast complexity of the task.
- Programmers often like to avoid using the terminal and prefer to use tools like IDEs. IDEs are then built to please programmers and simplify the task of programming.

25: Discussion

Here are some questions to think about and answer:

- What are your favorite tools? Do you have to think hard while using them?
- Would you prefer to use a tool that forces you to think about what you're doing or use a tool that has poor mapping?
- Why is your room set up the way it is?

26: References

Here are books or links used for this presentation:

The Design of Everyday Things by Don Norman

https://en.wikipedia.org/wiki/Atomic_theory

https://www.boredpanda.com/crappy-design-fails/?utm_source=google&utm_medium=organic&utm_campaign=organic