Topic 6: Psychology in Design

Key principles

The intersection of psychology and design is extensive. There's an endless list of principles that occupy this space, but there are a few that I've found more ubiquitous than others. Let's take a look at what these are and where they are effectively leveraged by products and experiences we interact with everyday.

1. HICK'S LAW

One of the primary functions we have as designers is to synthesize information and present it in a way that it doesn't overwhelm users—after all, good communication strives for clarity. This directly relates to our first key principle: Hick's Law. Hick's Law predicts that the time it takes to make a decision increases with the number and complexity of choices available. It was formulated by psychologists William Edmund Hick and Ray Hyman in 1952 after examining the relationship between the number of stimuli present and an individual's reaction time to any given stimulus.

It turns out there is an actual formula to represent this relationship: RT = a + b log2 . Fortunately, we don't need to understand the math behind this formula to grasp what it means. The concept is quite simple: the time it takes for users to respond directly correlates to the number and complexity of options available. It implies that complex interfaces result in longer processing time for users, which is important because it's related to a fundamental theory in psychology known as cognitive load.

Cognitive load

Cognitive load refers to the mental processing power being used by our working memory. Our brains are similar to computer processors in that we have limited processing power: when the amount of information coming in exceeds the space available, cognitive load is incurred. Our performance suffers and tasks become more difficult, which results in missed details and even frustration.

Examples

Three photos of television remotes where the majority of buttons have been covered, leaving only holes for the channel, volume, and number buttons.

There are examples of Hick's Law in action everywhere, but we'll start with a common one: remote controls. As features available in TVs increased over the decades, so did the options available on their corresponding remotes. Eventually we ended up with remotes so complex that using them required either muscle memory from repeated use or a significant amount of mental processing. This led to the phenomenon known as "grandparent-friendly remote."

Key takeaways

Too many choices will increase the cognitive load for users.

Break up long or complex processes into screens with fewer options.

Use progressive onboarding to minimize cognitive load for new users.

2. MILLER'S LAW

Another key principle is Miller's Law, which predicts that the average person can only keep 7 (± 2) items in their working memory. It originates from a paper published in 1956 by cognitive psychologist George Miller, who discussed the limits of short-term memory and memory span. Unfortunately there has been a lot of misinterpretation regarding this heuristic over the years, and it's led to the "magical number seven" being used to justify unnecessary limitations (for example, limiting interface menus to no more than seven items).

Chunking

Miller's fascination with short-term memory and memory span centered not on the number seven, but on the concept of "chunking" and our ability to memorize information accordingly. When applied to design, chunking can be an incredibly valuable tool. Chunking describes the act of visually grouping related information into small, distinct units of information. When we chunk content in design, we are effectively making it easier to process and understand. Users can scan the content and quickly identify what they are interested in, which is aligned with how we tend to consume digital content.

Examples

Two example numbers side by side, one a single unbroken string of ten digits, the other with parentheses around the first three digits, and a dash after the second three digits (resembling a phone number much like Jenny's from Tommy Tutone's classic song).

The simplest example of chunking can be found with how we format phone numbers. Without chunking, a phone number would be a long string of digits, which increases the difficulty to process and remember it. Alternatively, a phone number that has been formatted (chunked) becomes much easier to interpret and memorize. This is similar to how we perceive a "wall of text" in comparison to well-formatted content with appropriate headline treatments, line-length, and content length.

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3. JAKOB'S LAW

The last principle we'll look at is Jakob's Law (short for Jakob's Law of Internet User Experience), which states that users spend most of their time on other sites, and they prefer your site to work the same way as all the other sites they already know. In 2000, it was put forth by usability expert Jakob Nielsen, who described the tendency for users to develop an expectation of design patterns based on their cumulative experience from other websites. This principle encourages designers to follow common design patterns in order to avoid confusing users, which can result in higher cognitive load.

Mental models

I know what you're thinking: if all websites followed the same design patterns, that would make for quite the boring web. The answer is yes, that is probably true. But there is something incredibly valuable to be found in familiarity for users, which leads us to another fundamental concept in psychology that is valuable for designers: mental models.

A mental model is what we think we know about a system, especially about how it works. Whether it's a website or a car, we form models of how a system works, and then we apply that model to new situations where the system is similar. In other words, we use knowledge we already have from past experiences when interacting with something new.

Mental models are valuable for designers, because we can match our user's mental model to improve their experience. Consequently, users can easily transfer their knowledge from one product or experience to another without taking time to understand how the new system works. Good user experiences are made possible when the designer's mental model is aligned with the user's mental model. The task of shrinking the gap between our mental models and those of our users is one of our biggest challenges, and to achieve this we use a variety of methods: user interviews, personas, journey maps, empathy maps, and more. The point of all this is to gain a deeper insight into not only the goals and objectives of our users but also their pre-existing mental models, and how that applies to the product or experience we are designing.

Examples

Have you ever wondered why form controls look the way they do? It's because the humans designing them had a mental model for what these elements should look like, which they based on control panels they were already familiar with in the physical world. Things like form toggles, radio inputs, and even buttons originated from the design of their tactile counterparts.

Key takeaways

Users will transfer expectations they have built around one familiar product to another that appears similar.

By leveraging existing mental models, we can create superior user experiences in which the user can focus on their task rather than learning new models.

Minimize discordance by empowering users to continue using a familiar version for a limited time.