

Chapter 1

Introduction to User Centered Design

- Introduction to User Centered Design:

Aspects of User Centered Design, Product Appreciation
Assignment – Evaluating the product from user centered
design aspects such as functionality, ease of use,
ergonomics, aesthetics

Bad designs

Elevator controls and labels on the bottom row all look the same, so it is easy to push a label by mistake instead of a control button.



People do not make same mistake for the labels and buttons on the top row. Why not?

Opening the file drawer



- The handle on the top **doesn't** open the top file drawer.
- Instead, it pulls the whole file cabinet out from under the table.
- The handle to move the cabinet is very close to the top drawer.
- It is easy to mistake the top handle as the handle for the top drawer.

Plugging in a USB connector



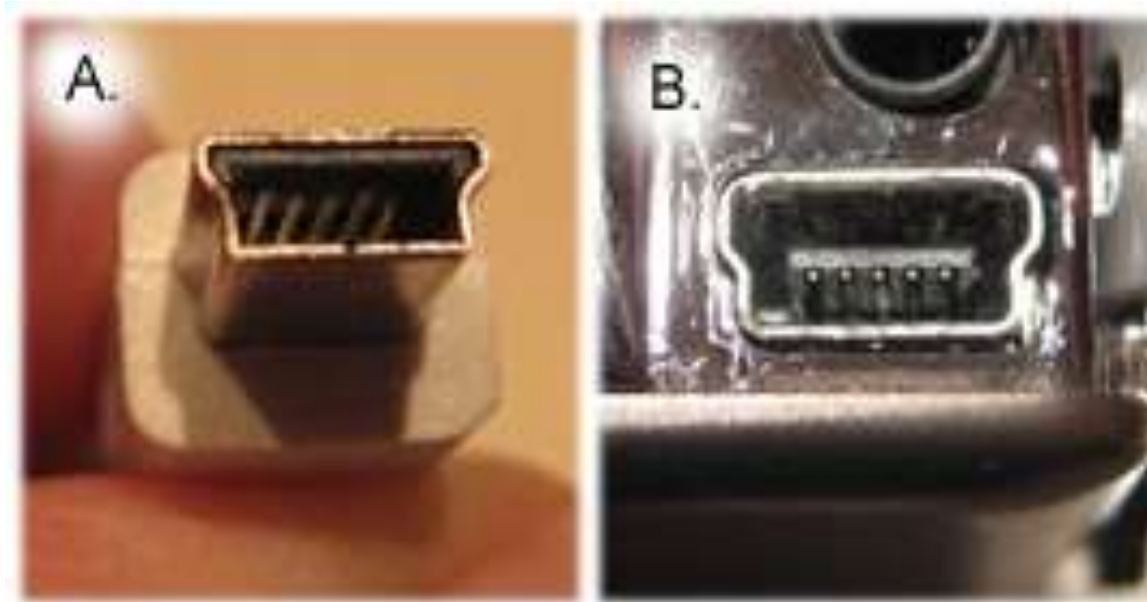
- Frequently turn it the wrong way.
- USB symbol on "top" of the connector so if the connector is oriented horizontally, the symbol faces up.
- That doesn't help if the connector needs to plug in vertically.

Good design



If the handle on top had been recessed like the drawer handles as shown , it wouldn't be as likely to be used accidentally.

Good Design



- If the connector could be inserted either way or work if it was asymmetrical, like the mini USB connector in Photo A., which plugs into B.

Good design

Why is the TiVo remote much better designed than standard remote controls?

- Peanut shaped to fit in hand
- Logical layout and color-coded, distinctive buttons
- Easy-to-locate buttons



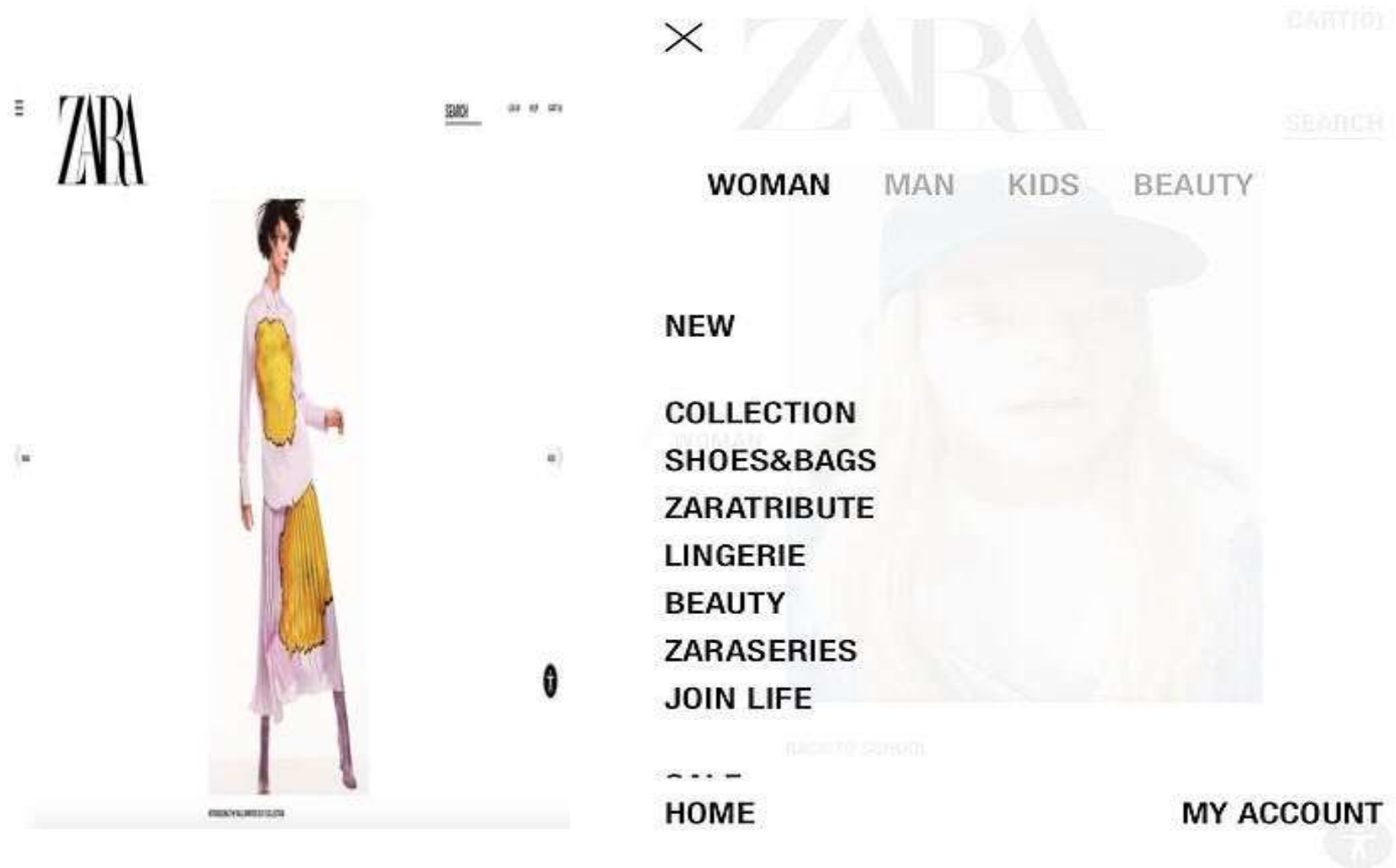
Dilemma

Which is the best way to interact with a smart TV? Why?

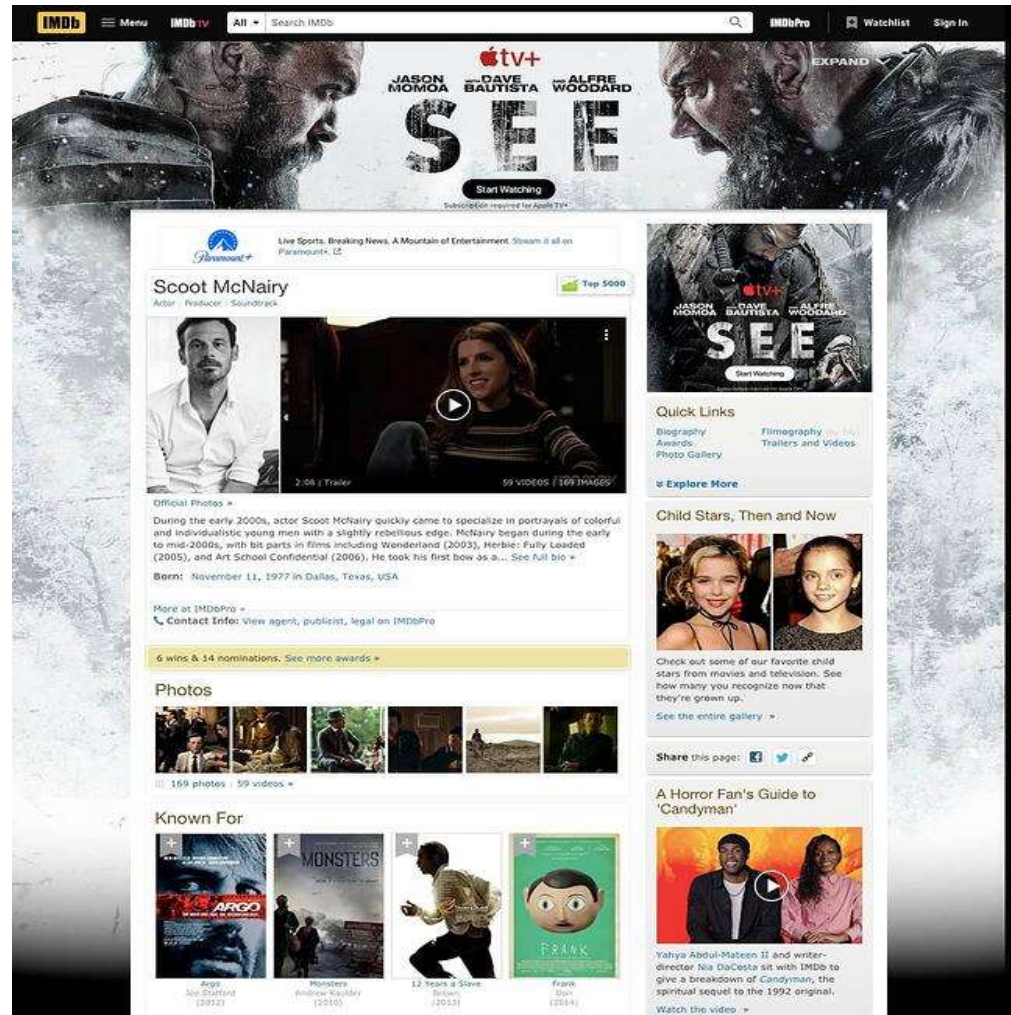
- Pecking using a grid keyboard via a remote control
- Swiping across two alphanumeric rows using a touchpad
- Voice control using remote or smart speaker



Zara- Unconventional navigation



IMDb-Cluttered layout




CNN - Slow load time

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THANKSGIVING TRAVEL UPDATES
CNN Weather's live feed shows conditions in cities and at airports across the US X

PODCAST: Parts Unknown LIVE UPDATES: Ahmaud Arbery killing trial Thanksgiving weather TRENDING: Word of the year Dick Vitale Black Friday deals

RNC payments to Trump lawyers irritate GOP officials



A pair of payments is raising questions among former and current officials about the Republican party's priorities in a critical election year

SCOTUS will hear dispute over North Carolina GOP legislators' defense of voter ID law

Trump says Rittenhouse visited him at Mar-a-Lago

Inflation isn't going away. Here's how to make money from it

Gap lost \$300 million in sales because of supply chain mess

Opinion: There may be something more going on with the Harris and Buttigieg gossip

Trump now has a ninth-degree black belt in taekwondo, but there's a catch

Biden administration Covid vaccination data shows mandates work, OMB says

San Francisco declares a water shortage emergency and urges residents to cut usage

Jobless claims hit lowest level since 1969


Why some US cities are facing a spree of 'smash-and-grab' crimes

Daytime TV host reportedly eyeing Senate race in key swing state

Germany's incoming government unveils plans to legalize cannabis and phase out coal

LIVE UPDATES Jury in trial of Arbery's killing asks to see video and hear 911 call from the shooting

Opinion: There is no conceivable justification for defense's treatment of Ahmaud Arbery



Anchovy: The latest headbanger

eBay-Complex product pages

Mr. Sign in or register Daily Deals Brand Outlet Help & Contact Use code Watchlist My eBay Sell

ebay Shop by category Search for anything All Categories Search Advanced

Back to previous page United in category: Consumer Electronics > Portable Audio & Headphones > Headphones

GoDaddy Sell from your online store and eBay. Start for Free

Jabra Elite Active 65t Alexa True Wireless Sport Earbuds with Charging Case NEW
Direct from Jabra with 1-year warranty
8 sold in last hour

Condition: Certified - Refurbished
Color: Copper Blue
Quantity: 1 Limited quantity available \$29.500 / See feedback

Price: **US \$35.99**
List Price US \$44.99
Save \$64.00

Buy It Now
Add to cart
Add to Watchlist

Two-year warranty included
Comprehensive warranty from Allstate, US only. Learn more, including how your info is shared here.

100% buyer satisfaction 499 sold Free shipping and returns

Take \$5.40 off this item (Show me how)

Shipping: Free 4 day shipping
Get it by Fri, Sep. 03 | See details
Located in: Louisville, Kentucky, United States
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What to design

Need to take into account:

- Who the users are
- What activities are being carried out
- Where interaction is taking place

Need to optimize the interactions users have with a product:

- So that they match the users' activities and needs

What is user centered(interaction) design?

“Designing interactive products to support the way people communicate and interact in their everyday and working lives.”

Sharp, Rogers, and Preece

(2019)

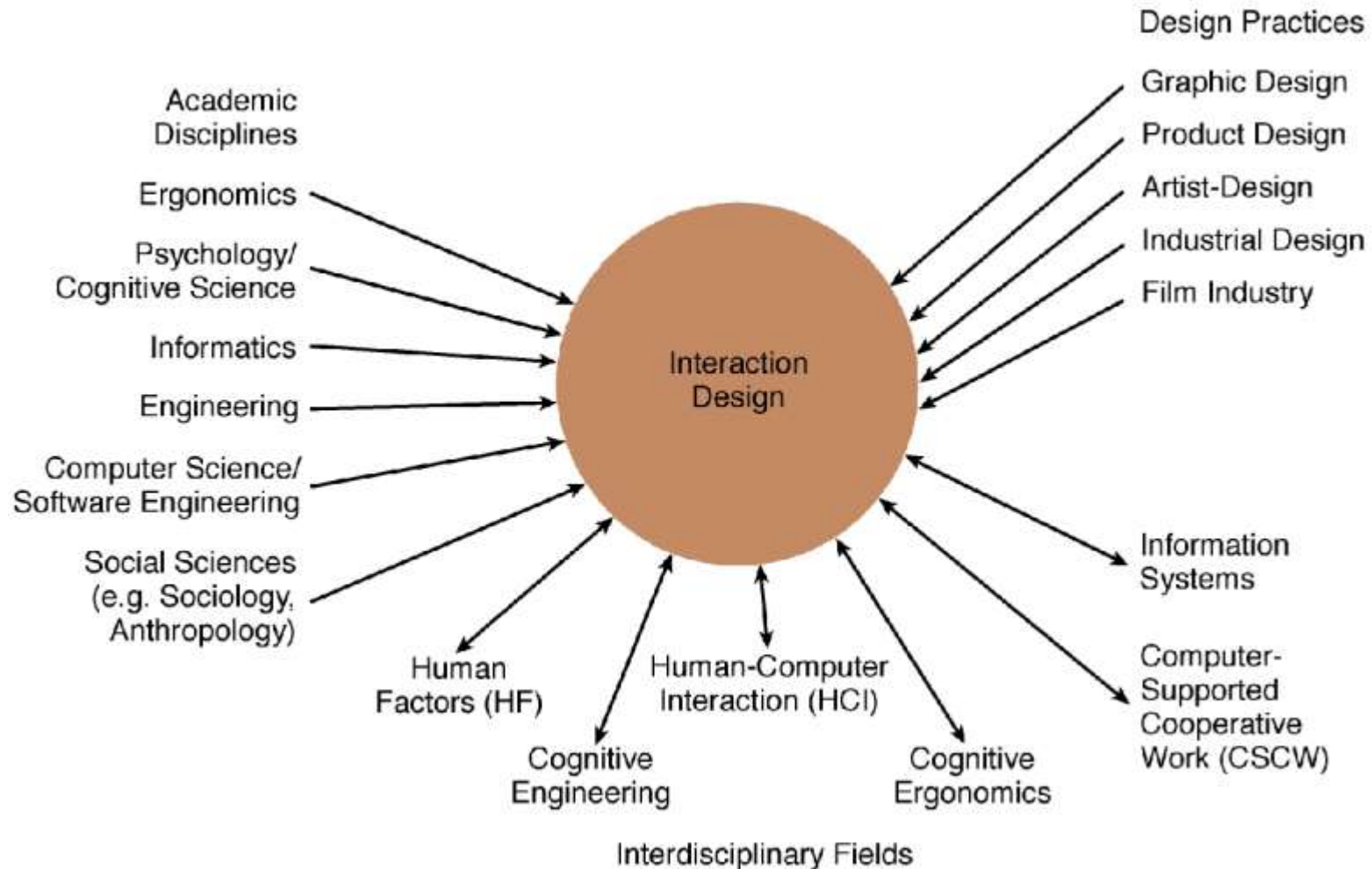
“The design of spaces for human communication and interaction.”

Winograd (1997)

Goals of interaction design

- Develop usable products
 - Usability means easy to learn, effective to use, and provides an enjoyable experience
- Involve users in the design process

Interaction design



Interaction design in business

Large number of ID consultancies. Examples of well known ones include:

- **Nielsen Norman Group:** “help companies enter the age of the consumer, designing human-centered products and services”
- **Cooper:** “From research and product to goal-related design”
- **IDEO:** “creates products, services and environments for companies pioneering new ways to provide value to their customers”

Usability goals

- Effective to use
- Efficient to use
- Safe to use
- Have good utility
- Easy to learn
- Easy to remember how to use

The user experience

How a product behaves and is used by people in the real world

- The way people feel about it and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it
- “Every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters.” (Garrett, 2010)
- “All aspects of the end-user's interaction with the company, its services, and its products. (Nielsen and Norman, 2014)

Cannot design a user experience—only can design *for* a user experience

Why was the iPod user experience such a success?



Figure 1.6 The iPod Nano Touch

Source: ©Press Association, reproduced with permission.

- Quality user experience from the start
- Simple, elegant, distinct brand, pleasurable, must have fashion item, catchy names, cool...

Core characteristics of interaction design

- Users should be involved throughout the development of the project
- Specific usability and user experience goals need to be identified, clearly documented, and agreed to at the beginning of the project
- Iteration is needed through the core activities

Why?

Help designers:

- Understand how to design interactive products that fit with what people want, need, and may desire
- Appreciate that one size does not fit all (for example, teenagers are very different to grown-ups)
- Identify any incorrect assumptions they may have about particular user groups. (for example, not all old people want or need big fonts)
- Be aware of both people's sensitivities and their capabilities

Accessibility and inclusiveness

Accessibility: the extent to which an interactive product is accessible by group of people

- Focus is on people with disabilities; for instance, those using apple voiceover(screen reader,spoken descriptions)

Inclusiveness: making products and services that accommodate the widest possible number of people

- For example, smartphones designed for all and made available to everyone regardless of their disability, education, age, or income

Disability

Disabilities can be classified as:

- Sensory impairment (such as loss of vision or hearing)
- Physical impairment (having loss of functions to one or more parts of the body after a stroke or spinal cord injury)
- Cognitive (including learning impairment or loss of memory/cognitive function due to old age)

Each type can be further defined in terms of capability:

- For example, someone might have only peripheral vision, be color blind, or have no light perception

Cultural differences

5/21/2015 versus 21/5/2015?

- Which should be used for international services and online forms?
- Why is it that certain products, like smartphones, are universally accepted by people from all parts of the world, whereas people from different cultures react to websites differently?

Visibility - poor interface



- This is a control panel for an elevator
- How does it work?
- Push a button for the floor you want?
- Nothing happens. Push any other button?
Still nothing. What do you need to do?
- It is not visible as to what to do!

Visibility - Improving on a poor interface



...with this elevator, you need to insert your room card in the slot by the buttons to get the elevator to work!

How would you make this action more visible?

- Make the card reader more obvious
- Provide an auditory message that says what to do (which language?)
- Provide a big label next to the card reader that flashes when someone enters
- Make relevant parts visible
- Make what has to be done obvious


What do I do if I am wearing black?



Invisible automatic controls can make it more difficult to use



Feedback

- Sending information back to the user about what has been done
- Includes sound, highlighting, animation, and combinations of these
- For example, when screen button is clicked, it provides sound or red highlight feedback:

 → “ccclichhk”

 → 

Feedback

- When a user finally takes an action or interacts with our product, they often get an immediate reward of more content or a completed task.
- **A well designed user experience offers us feedback that keeps us reassured we are on track.**
- Digitally, feedback appears in the form of loading bars, error messages, vibrations, etc.

- In a tangible example, if you've ever turned your car key in the ignition and heard the engine purr—that is great feedback, you know then to shift into drive.
- Feedback is the error message you receive when you type in the wrong password; it's the delightful pinging sound you hear when you've processed a payment in the app store.

Constraints

- Restricting the possible actions that can be performed
- Helps prevent user from selecting incorrect options

Logical or ambiguous design?



- Where do you plug the mouse?
- Where do you plug the keyboard, in the top or bottom connector?
- Do the color-coded icons help?

How to design them more logically



(A) provides direct adjacent mapping between icon and connector

(B) provides color coding that associates the connectors with the labels



Consistency

- Design interfaces to have similar operations and use similar elements for similar tasks. (for example, always use Ctrl key plus first initial of the command for an operation: Ctrl+c, Ctrl+s, Ctrl+o)
- The main benefit is that consistent interfaces are easier to learn and use

When consistency breaks down

- What happens if there is more than one command starting with the same letter? (for example, save, spelling, select, style)
- You have to find other initials or combinations of keys, thereby breaking the consistency rule (for example, Ctrl+s, Ctrl+shift+l)
- Increases learning burden on user, making them more prone to errors

Internal and external consistency

- Internal consistency refers to designing operations to behave the same within an application

(eg: your logo is the same online and in print)

- External consistency refers to designing operations, interfaces, and so on to be the same across applications and devices

(eg: the **user interface of Adobe products**. Once you know Photoshop it is much easier to reuse the same knowledge to start using Illustrator and so on.)

Keypad numbers layout

A case of external inconsistency

(a) phones, remote controls

1	2	3
4	5	6
7	8	9
	0	

(b) calculators, computer keypads

7	8	9
4	5	6
1	2	3
0		

Affordances: to give a clue

- Refers to an attribute of an object that allows people to know how to use it. (For example, a mouse button invites pushing, a door handle affords pulling)
- Norman (1988) used the term to discuss the design of everyday objects
- Has since been popularized in interaction design to discuss how to design interface objects (for example, scrollbars to enable moving up and down; icons to click on)

What does “affordance” have to offer interaction design?

- Interfaces are virtual and do not have affordances like physical objects
- Norman argues that it does not make sense to talk about interfaces in terms of ‘real’ affordances
- Instead, interfaces are better conceptualized as ‘perceived’ affordances:
 - Learned conventions of arbitrary mappings between action and effect at the interface

Bringing cognitive psychology knowledge to HCI

What goes on in the mind?

**perceiving..
thinking..
remembering..
learning..**

**understanding others
talking with others
manipulating others**

**planning a meal
imagining a trip
painting
writing
composing**



**making decisions
solving problems
daydreaming...**

Core cognitive aspects

- Attention
- Perception and recognition
- Memory
- Reading, speaking and listening
- Problem-solving, planning, reasoning and decision-making, learning
- Here we focus on attention, perception & recognition, & memory

Attention

- Selecting things to concentrate on from the mass around us, at a point in time
- Information at the interface should be structured to capture users' attention, e.g. use perceptual boundaries (windows), colour, sound and flashing lights

Design implications for attention

- Make information salient when it needs attending to
- Use techniques that make things stand out like colour, ordering, spacing, underlining, sequencing and animation
- Avoid cluttering the interface - follow the google.com example of crisp, simple design
- Avoid using too much because the software allows it

An example of over-use of graphics



Perception and recognition

- How information is acquired from the world and transformed into experiences
- Obvious implication is to design representations that are readily perceivable, e.g.
 - Text should be legible
 - Icons should be easy to distinguish and read

Which is easiest to read and why?



What is the time?



What is the time?



What is the time?



What is the time?



What is the time?

Memory

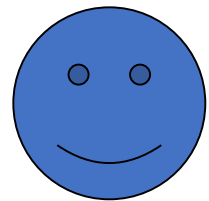
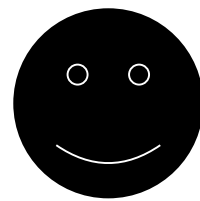
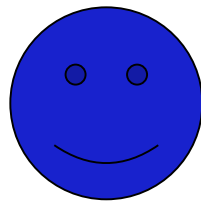
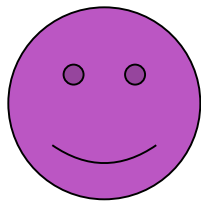
- Involves encoding and recalling knowledge and acting appropriately
- We don't remember everything - involves filtering and processing
- We recognize things much better than being able to recall things
 - The rise of the GUI over command-based interfaces
- Better at remembering images than words
 - The use of icons rather than names

The problem with the classic '7 \pm 2'

- George Miller's theory of how much information people can remember
- People's immediate memory capacity is very limited
- Many designers have been led to believe that this is useful finding for interaction design

What some designers get up to...

- Present only 7 options on a menu
- Display only 7 icons on a tool bar
- Have no more than 7 bullets in a list
- Place only 7 items on a pull down menu
- Place only 7 tabs on the top of a website page
 - But this is wrong? Why?



Affordance, Signifier, Mapping and Feedback

Affordance

- **An affordance is the relationship between an object and the actions a person can take with that object.**
- For example, a button **affords** pressing, a door handle **affords** pulling or turning, and a smartphone screen **affords** all types of interactions like swiping, tapping, pinching, and scrolling.
- Affordances rarely exist on their own. Meaning that a product or experience will have functionality built-in, but there are almost always clues designed to orient the user towards affordances.


- A good example of Affordance on a technological aspect is the volume slider on your computer.
- Its simple, and easy to read and understand, explaining what it is doing while you are operating it.





Implicit Affordance




Explicit Affordance



All ▾ dog food 

Hello, Sign in
Account & Lists ▾ Returns
& Orders Try
Prime ▾ 

 Hello
Select your address

Best Sellers Deals Store New Releases Gift Ideas Customer Service Electronics Home Books Coupons

Prime Day is Oct 13-14

Pet Supplies Bestsellers Dogs Cats Small Animals Fish & Aquatics Birds Brands Deals Subscribe & Save Pet Profile

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Roll over image to zoom in



VIDEO

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[Visit the Hill's Science Diet Store](#)
★★★★★ 492 ratings | 6 answered questions
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Size : **33 lb**

Brand	Hill's Science Diet
Flavour	Lamb Meal & Rice
Item Weight	33 Pounds
Sensitive Ingredient Information	Chicken Meat Free
Item form	Dry

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- Maintain your dog's healthy skin and shiny coat with nourishing omega-6 fatty acids & vitamin E
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Signifiers

- Once you've bestowed your product with affordances, you must then decide how you can give subtle but intuitive clues to your user about how to interact with them. These clues are called **signifiers**.
- These can be any kind of perceptible information that signals your user to act in a desired way.
- Signifiers can be explicit textual information, sound, texture, lighting, color, symbols, or even proximity of objects to one another.
- With smartphones and laptops, for example, we rely on cues like shading, color, text, sounds, and haptics(touch and motion).

- “Signifiers” can be used to just mean component labels, but in more complex discussions or within design systems, signifiers can also be:
- ❑ The colour of the component when aligned to accepted digital design patterns
 - ❑ Text labels on or near a component
 - ❑ Icon labels on or near a component
 - ❑ The emphasis of any text (bold, italic, underline)

Good examples of signifiers





Source: Kia



Mindfulness for any moment

Stress less. Move more. Sleep soundly.
There's something for everyone.



Continue



Affordances and signifiers together

- Through UX and UI design of an interface, we can layer signifiers onto an affordance to communicate:
 - a) What the thing can do (*affordance*)
 - b) Its current state or significance (*signifier*)

Example: Perceiving a chair, the structure, plains and stability, we know it can be sat or stood on.

Example: Perceiving a button on a screen, we know it is something that can be pressed to produce an action.



Looks like
a button

A screenshot of a web form titled "Sign in". It contains two input fields: "Email" and "Password". Below the "Password" field is a link that says "Forgot password?". At the bottom of the form is a large, rounded, teal-colored button with the text "Sign in" in white. A blue arrow points from the handwritten text "Looks like a button" to this button.

Example: The chair has a balloon tied to it, implying that it is reserved for some special occasion.

Example: The button is greyed out, suggesting it is inactive.



Looks like a
button, but
inactive or
disabled

A screenshot of a web form titled 'Sign in'. It contains two input fields: 'Email' and 'Password'. Below the 'Password' field is a link that says 'Forgot password?'. At the bottom of the form is a 'Sign in' button. The button is greyed out, indicating it is inactive or disabled. A blue arrow points from the text 'Looks like a button, but inactive or disabled' to this button.

Example: The button (*affordance*) is greyed out (*signifier*)

Sign in


Email

Password

[Forgot password?](#)

Sign in

The button
(affordance)
is greyed out
(signifier)

A vertical rectangular box representing a sign-in form. It contains the title 'Sign in' at the top, followed by two input fields labeled 'Email' and 'Password'. Below these is a link 'Forgot password?'. At the bottom is a button labeled 'Sign in'. A blue arrow points from the handwritten text 'The button (affordance) is greyed out (signifier)' to the 'Sign in' button, which is rendered in a light grey color to indicate it is disabled.

- **Example:** There are two buttons (*affordance*) and it is perceivable that one is probably the preferred action (*signifier*)

The image shows a sign-up form with the following elements:

- Sign up** (header)
-
-
- Sign up** (button, dark blue)
- Already have an account?
- Sign in** (button, light blue)

It is perceivable that one button has greater importance or relevance (*signifier*)

- **Example:** A button (*affordance*) which uses the interface's primary action style (*colour signifier*) which describes the action (*word signifier*) which includes a forward arrow (*directional signifier*).

The image shows a 'Create account' form. It has a title 'Create account' at the top. Below the title are two input fields: 'First name' and 'Email address'. At the bottom of the form is a dark blue button with the text 'Next' and a right-pointing arrow '>'. A blue arrow points from the text 'Affordance (button)' to this button.

Affordance (button)
+ colour
+ text
+ icon

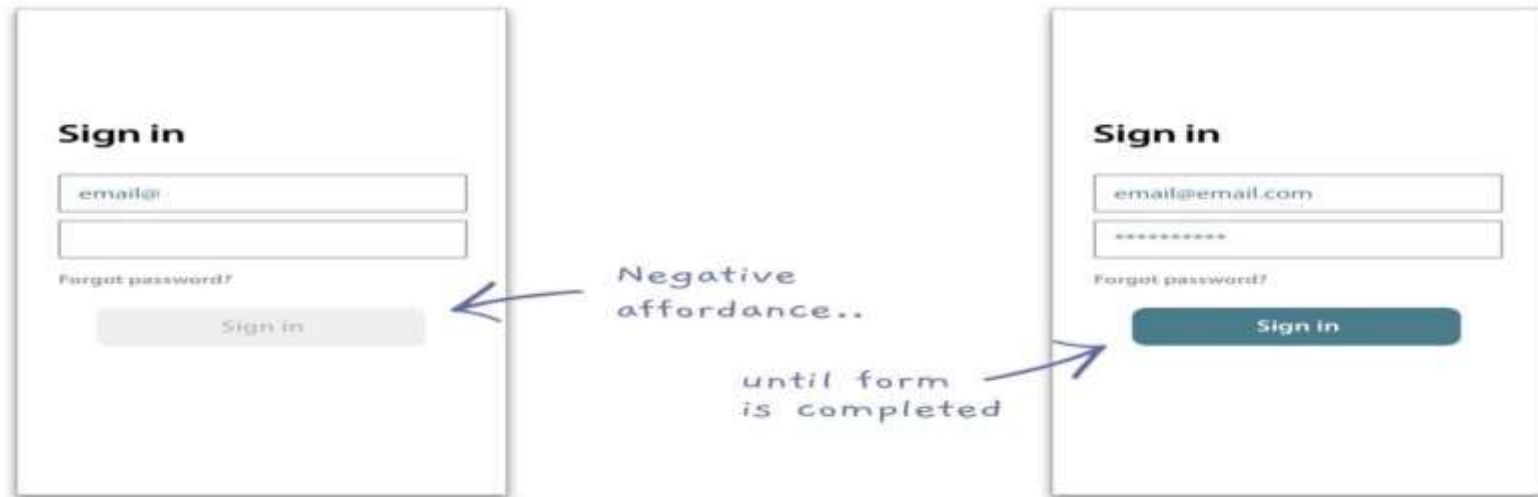
False affordance

- The thing looks like it can do something, but it can't.



Is this a link?
If not, it's a false
affordance

Negative affordance



- There is an affordance such as a button, but it is not active.
- It looks like a button, it is a button, but it doesn't behave like a button.
- This is ok if it's a temporarily disabled button, which becomes active when the user completes a form, but not if it's just a button on a screen doing nothing.

Hidden affordance

Source: medium/@h_lacke

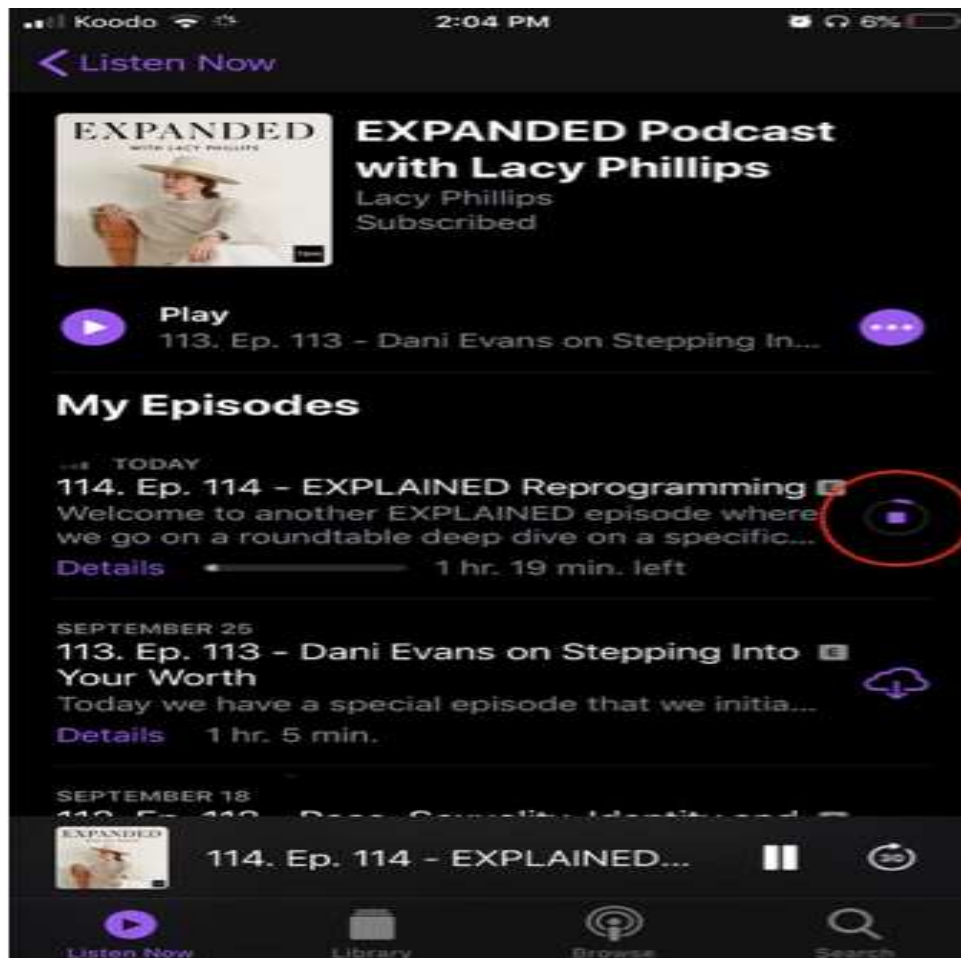


- The thing is not perceivable or available until the user interacts with it.
- A classic example is the ghost button, which I see missed all the time by users. Almost invisible until you serendipitously stumble upon it or hover over it and then you can use the interface.

Feedback

- When a user finally takes an action or interacts with our product, they often get an immediate reward of more content or a completed task.
- **A well designed user experience offers us feedback that keeps us reassured we are on track.**
- Digitally, feedback appears in the form of loading bars, error messages, vibrations, etc.

- In a tangible example, if you've ever turned your car key in the ignition and heard the engine purr—that is great feedback, you know then to shift into drive.
- Feedback is the error message you receive when you type in the wrong password; it's the delightful pinging sound you hear when you've processed a payment in the app store.



- ✓ Feedback reassures us that we are making progress.
- ✓ For example, when downloading a podcast, if you didn't see any type of loading bar you might assume that the content isn't yours yet or that the app doesn't allow downloading.



Start a meeting



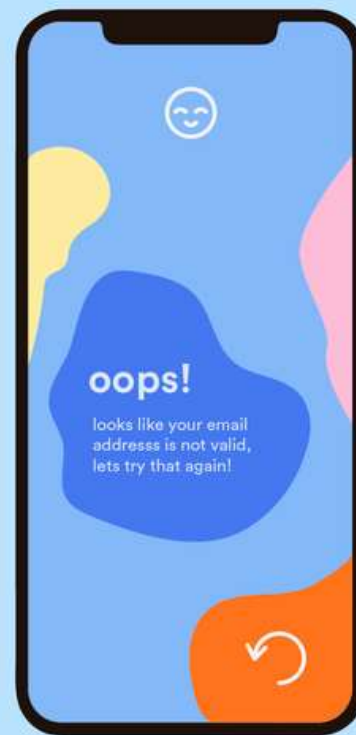
Join a meeting

Hangouts

Conversation moved to Trash.

[Undo](#)





Visibility

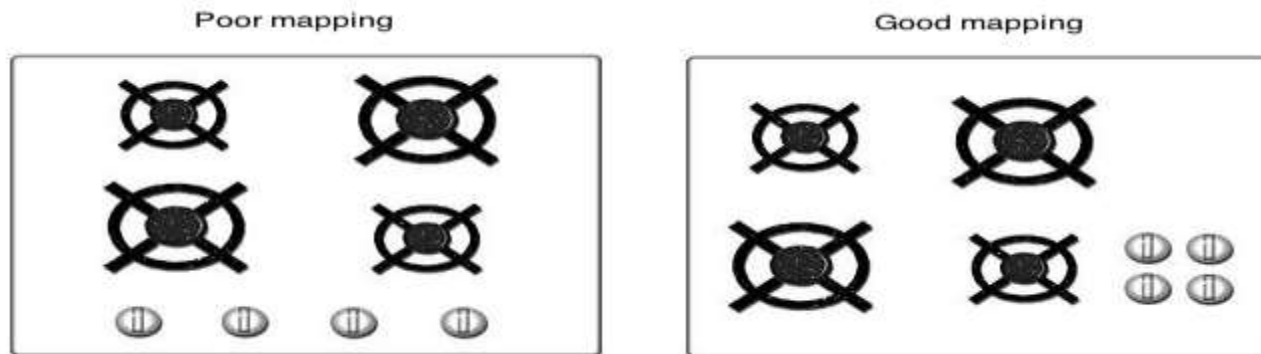
- Visibility is the basic principle that the more visible an element is, the more likely users will know about them and how to use them.
- Equally important is the opposite: when something is out of sight, it's difficult to know about and use.
- The skill in applying this principle is realizing that you can't make everything visible, because it'll ultimately clutter the interface but instead need to prioritize what interface elements are by far the most important for the user experience and prioritize their visibility.

- The trade-off between hamburger side-bar menus and tab-bar menus in mobile applications is a very recent design debate centered around this very principle of visibility.
- While the hamburger menu provides a convenient place to store a variety of menu items in a mobile app, it comes at a huge disadvantage: the lack of visibility of the contained menu items.
- We've seen a shift in major apps like Facebook away from hamburger menus and back toward tab-bar menus to improve the visibility of their key experiences.



Mapping

- Mapping is about having a clear relationship between controls and the effect they have on the world.
- Mapping should be as natural as possible.
- Stove tops are a great example . When you see the first image, the mapping is not very clear because it's difficult to determine which control operates each burner. Versus the second image, it's far clearer the control that controls each burner, which has a better mapping.



- This slider also has a strong mapping, since it's clear moving it to the right will increase its value versus moving it to the left will decrease it.



ERGONOMICS

- ❖ **Ergonomics** is about ensuring a good fit between people and the things they interact with.
- ❖ Ergonomics should be considered in the design of every product, system or environment.
- ❖ Ergonomists can help you to identify which **user characteristics** you should take into account during your design process.
- ❖ As ergonomists, our goal is to influence the design of man-machine systems so that human capabilities and limitations are considered from the early stages of the design process, and are accounted for in the final design.
- ❖ Knowledge and experience, show that a design that considers such issues will result in an optimal system that enhances productivity, safety and job satisfaction.

- ❖ **Soft ergonomics** is the study of designing virtual interfaces that cater towards the wellness of the human body, its emotional and cognitive abilities.
- ❖ Soft ergonomics can be defined as the ability of any virtual interface (computer application, website, ATM options, parking meter etc.) to make it comfortable for the user to use the interface while working on the user's request.
- ❖ It tries to find a compromise between user expectations, system workflow and aesthetics.
- ❖ Users from various cultural and technological background are exposed to a common interface. The interface developer seeks to ensure that the interface does not harm the user psychologically, physiologically or emotionally.

Soft ergonomics generally takes into account the following human factors when building a virtual interface:

1. Physical Limitations:

- Not all who use a virtual interface are physically equal.
- If the designed interface only caters to right-handed individuals, or people within a certain height range, then the interface might need a redesign.
- One of the leading discussion is with respect to visually impaired users.

2. Emotional Needs:

- The interface should be 'designed for the occasion' or context.
- It should not leave the user confused, either by how to start using the interface or what to do when an error occurs.
- Confusion leads to frustration, which eventually builds stress in the body causing long term emotional damage.

3. Cognitive Abilities:

- If the product (e.g. software application, website) is designed for any casual user, then the designer should not expect that all users will be experts with high cognitive abilities.
- The usage of the application should not need the user to know a lot of information prior to using the interface.
- For example, using an automated teller machine can require memorizing a pin number but not the account number.

Criteria for Soft Ergonomics

The following lists (non-exhaustive) some of the most common criteria for evaluating soft ergonomics.

➤ **Consistency:**

- ☐ The design should be consistent across the entire application.
- ☐ Consistent sequence of actions, identical terminologies and platform conventions should be followed throughout the application.

➤ **Efficiency:**

- ☐ The virtual interface should allow efficient use of user's time. The screens should load and display content within acceptable amount of time.
- ☐ The more than expected time a user has to wait, more stress is built into the human body causing long term damage.
- ☐ The interface should also have functionality for advanced users. While being non-obtrusive to novice users, accelerators or shortcuts should be available for experienced users.

➤ **Design:**

- ☐ The system should preferably have minimalistic and aesthetically pleasing design.
- ☐ Minimalistic design help user easily consume the data and hence there is less stress on the human mind and aesthetically pleasing design increases the 'feel good' factor in the user.

➤ **Memory:**

- ☐ User's memory load should be minimized.
- ☐ All information that a user needs from the application to perform a task should be presented or easily retrievable by the user.

➤ **Context Help:**

- ☐ The 'Help' menu and options that give context help should be always available to the user.

UCD Principles

From Jeffrey Rubin, Handbook of Usability Testing:

➤ **Early focus on users and tasks**

- ☐ Structured and systematic information gathering
- ☐ Designers trained by experts before conducting data collection sessions

➤ **Empirical Measurement and testing of product usage**

- ☐ Focus on ease of learning and ease of use
- ☐ Testing of prototypes with actual users

➤ **Iterative Design**

- ☐ Product designed, modified and tested repeatedly.
- ☐ Allow for the complete overhaul and rethinking of design by early testing of conceptual models and design ideas.

User-Centered Design Process

- Design is based upon an explicit understanding of users, tasks, and environments; is driven and refined by user-centered evaluation; and addresses the whole user experience.
- The process involves users throughout the design and development process and it is iterative.

Phases of the UCD process:

The following are the general phases of the UCD process:

- **Specify the context of use:** Identify the people who will use the product, what they will use it for, and under what conditions they will use it.
- **Specify requirements:** Identify any business requirements or user goals that must be met for the product to be successful.
- **Create design solutions:** This part of the process may be done in stages, building from a rough concept to a complete design.
- **Evaluate designs:** Evaluation - ideally through usability testing with actual users - is as integral as quality testing is to good software development.



6 Laws that Help You Create a Better Design

- ❖ A common goal of every product — to make the users' life easier.
- ❖ Some famous principles from psychology, philosophy and economics that you can apply to your design.
 - *Hick's Law*
 - *Jakob's Law*
 - *Ockham's Razor Law*
 - *Fitt's Law*
 - *Weber's Law*
 - *Pareto's Law*
- ❖ Apart from the basic design principles, there are other rules or laws that you can follow to make your design stand out like the *golden rules*.


Fitts' Law: Make it simple, but significant

- Fitts' law is a predictive model of human movement developed by Paul Fitts, an American psychologist.
- Fitts' law states that the amount of time required for a person to move a pointer (e.g., mouse cursor) to a target area is a function of the distance to the target divided by the size of the target.
- Thus, the longer the distance and the smaller the target's size, the longer it takes.
- By his law, fast movements and small targets result in greater error rates, due to the speed-accuracy trade-off.

- Fitts' law is widely applied in user experience (UX) and user interface (UI) design.
- For example, this law influenced the convention of making interactive buttons large (especially on finger-operated mobile devices)—smaller buttons are more difficult (and time-consuming) to click.
- Likewise, the distance between a user's task/attention area and the task-related button should be kept as short as possible.

- When it is used in a design, it means that your buttons should be large, obvious and the distance between one action to the next should be minimised.
- Pop-up menus better support immediate selection of interactive elements than dropdown menus as the user does not have to move the cursor from its current position.



 Expected Likely Prime Pixel Area

Hick's Law: More options, more problems

- Hick's law, a psychology principle that is named after two psychologists, William Edmund Hick and Ray Hyman, states that the more options available for the users, the longer time it will take for them to make a decision.
- Delivering a good user experience requires that first you find out the functionalities that will answer users needs; second, you need to guide them to the specific functions they need *most*.
- If users end up stuck in the decision-making process of “what next?”, they may become confused, frustrated, or leave your website.

- Hick's Law is a simple idea that says that the more choices you present your users with, the longer it will take them to reach a decision.
- Users bombarded with choices have to take time to interpret and decide, giving them work they don't want.
- When there are lots of options available, your users would need to learn, consider and weigh all the options before making up their mind. That means it takes a longer time to reach their goal.
- Apart from this, more options could mean more problems, especially if there is no clear explanation for each option.

- You can see Hick's Law in action in the [navigation](#) of almost any website.



Follows Hicks law or not?

350.1	350.2	350.3	350.4	350.5	350.6	350.7	350.8	350.9	350.10	350.11	350.12	350.13	350.14	350.15	350.16	350.17	350.18	350.19	350.20	350.21	350.22	350.23	350.24	350.25	350.26	350.27	350.28	350.29	350.30	350.31	350.32	350.33	350.34	350.35	350.36	350.37	350.38	350.39	350.40	350.41	350.42	350.43	350.44	350.45	350.46	350.47	350.48	350.49	350.50	350.51	350.52	350.53	350.54	350.55	350.56	350.57	350.58	350.59	350.60	350.61	350.62	350.63	350.64	350.65	350.66	350.67	350.68	350.69	350.70	350.71	350.72	350.73	350.74	350.75	350.76	350.77	350.78	350.79	350.80	350.81	350.82	350.83	350.84	350.85	350.86	350.87	350.88	350.89	350.90	350.91	350.92	350.93	350.94	350.95	350.96	350.97	350.98	350.99	350.100	350.101	350.102	350.103	350.104	350.105	350.106	350.107	350.108	350.109	350.110	350.111	350.112	350.113	350.114	350.115	350.116	350.117	350.118	350.119	350.120	350.121	350.122	350.123	350.124	350.125	350.126	350.127	350.128	350.129	350.130	350.131	350.132	350.133	350.134	350.135	350.136	350.137	350.138	350.139	350.140	350.141	350.142	350.143	350.144	350.145	350.146	350.147	350.148	350.149	350.150	350.151	350.152	350.153	350.154	350.155	350.156	350.157	350.158	350.159	350.160	350.161	350.162	350.163	350.164	350.165	350.166	350.167	350.168	350.169	350.170	350.171	350.172	350.173	350.174	350.175	350.176	350.177	350.178	350.179	350.180	350.181	350.182	350.183	350.184	350.185	350.186	350.187	350.188	350.189	350.190	350.191	350.192	350.193	350.194	350.195	350.196	350.197	350.198	350.199	350.200	350.201	350.202	350.203	350.204	350.205	350.206	350.207	350.208	350.209	350.210	350.211	350.212	350.213	350.214	350.215	350.216	350.217	350.218	350.219	350.220	350.221	350.222	350.223	350.224	350.225	350.226	350.227	350.228	350.229	350.230	350.231	350.232	350.233	350.234	350.235	350.236	350.237	350.238	350.239	350.240	350.241	350.242	350.243	350.244	350.245	350.246	350.247	350.248	350.249	350.250	350.251	350.252	350.253	350.254	350.255	350.256	350.257	350.258	350.259	350.260	350.261	350.262	350.263	350.264	350.265	350.266	350.267	350.268	350.269	350.270	350.271	350.272	350.273	350.274	350.275	350.276	350.277	350.278	350.279	350.280	350.281	350.282	350.283	350.284	350.285	350.286	350.287	350.288	350.289	350.290	350.291	350.292	350.293	350.294	350.295	350.296	350.297	350.298	350.299	350.300	350.301	350.302	350.303	350.304	350.305	350.306	350.307	350.308	350.309	350.310	350.311	350.312	350.313	350.314	350.315	350.316	350.317	350.318	350.319	350.320	350.321	350.322	350.323	350.324	350.325	350.326	350.327	350.328	350.329	350.330	350.331	350.332	350.333	350.334	350.335	350.336	350.337	350.338	350.339	350.340	350.341	350.342	350.343	350.344	350.345	350.346	350.347	350.348	350.349	350.350	350.351	350.352	350.353	350.354	350.355	350.356	350.357	350.358	350.359	350.360	350.361	350.362	350.363	350.364	350.365	350.366	350.367	350.368	350.369	350.370	350.371	350.372	350.373	350.374	350.375	350.376	350.377	350.378	350.379	350.380	350.381	350.382	350.383	350.384	350.385	350.386	350.387	350.388	350.389	350.390	350.391	350.392	350.393	350.394	350.395	350.396	350.397	350.398	350.399	350.400	350.401	350.402	350.403	350.404	350.405	350.406	350.407	350.408	350.409	350.410	350.411	350.412	350.413	350.414	350.415	350.416	350.417	350.418	350.419	350.420	350.421	350.422	350.423	350.424	350.425	350.426	350.427	350.428	350.429	350.430	350.431	350.432	350.433	350.434	350.435	350.436	350.437	350.438	350.439	350.440	350.441	350.442	350.443	350.444	350.445	350.446	350.447	350.448	350.449	350.450	350.451	350.452	350.453	350.454	350.455	350.456	350.457	350.458	350.459	350.460	350.461	350.462	350.463	350.464	350.465	350.466	350.467	350.468	350.469	350.470	350.471	350.472	350.473	350.474	350.475	350.476	350.477	350.478	350.479	350.480	350.481	350.482	350.483	350.484	350.485	350.486	350.487	350.488	350.489	350.490	350.491	350.492	350.493	350.494	350.495	350.496	350.497	350.498	350.499	350.500	350.501	350.502	350.503	350.504	350.505	350.506	350.507	350.508	350.509	350.510	350.511	350.512	350.513	350.514	350.515	350.516	350.517	350.518	350.519	350.520	350.521	350.522	350.523	350.524	350.525	350.526	350.527	350.528	350.529	350.530	350.531	350.532	350.533	350.534	350.535	350.536	350.537	350.538	350.539	350.540	350.541	350.542	350.543	350.544	350.545	350.546	350.547	350.548	350.549	350.550	350.551	350.552	350.553	350.554	350.555	350.556	350.557	350.558	350.559	350.560	350.561	350.562	350.563	350.564	350.565	350.566	350.567	350.568	350.569	350.570	350.571	350.572	350.573	350.574	350.575	350.576	350.577	350.578	350.579	350.580	350.581	350.582	350.583	350.584	350.585	350.586	350.587	350.588	350.589	350.590	350.591	350.592	350.593	350.594	350.595	350.596	350.597	350.598	350.599	350.600	350.601	350.602	350.603	350.604	350.605	350.606	350.607	350.608	350.609	350.610	350.611	350.612	350.613	350.614	350.615	350.616	350.617	350.618	350.619	350.620	350.621	350.622	350.623	350.624	350.625	350.626	350.627	350.628	350.629	350.630	350.631	350.632	350.633	350.634	350.635	350.636	350.637	350.638	350.639	350.640	350.641	350.642	350.643	350.644	350.645	350.646	350.647	350.648	350.649	350.650	350.651	350.652	350.653	350.654	350.655	350.656	350.657	350.658	350.659	350.660	350.661	350.662	350.663	350.664	350.665	350.666	350.667	350.668	350.669	350.670	350.671	350.672	350.673	350.674	350.675	350.676	350.677	350.678	350.679	350.680	350.681	350.682	350.683	350.684	350.685	350.686	350.687	350.688	350.689	350.690	350.691	350.692	350.693	350.694	350.695	350.696	350.697	350.698	350.699	350.700	350.701	350.702	350.703	350.704	350.705	350.706	350.707	350.708	350.709	350.710	350.711	350.712	350.713	350.714	350.715	350.716	350.717	350.718	350.719	350.720	350.721	350.722	350.723	350.724	350.725	350.726	350.727	350.728	350.729	350.730	350.731	350.732	350.733	350.734	350.735	350.736	350.737	350.738	350.739	350.740	350.741	350.742	350.743	350.744	350.745	350.746	350.747	350.748	350.749	350.750	350.751	350.752	350.753	350.754	350.755	350.756	350.757	350.758	350.759	350.760	350.761	350.762	350.763	350.764	350.765	350.766	350.767	350.768	350.769	350.770	350.771	350.772	350.773	350.774	350.775	350.776	350.777	350.778	350.779	350.780	350.781	350.782	350.783	350.784	350.785	350.786	350.787	350.788	350.789	350.790	350.791	350.792	350.793	350.794	350.795	350.796	350.797	350.798	350.799	350.800	350.801	350.802	350.803	350.804	350.805	350.806	350.807	350.808	350.809	350.810	350.811	350.812	350.813	350.814	350.815	350.816	350.817	350.818	350.819	350.820	350.821	350.822	350.823	350.824	350.825	350.826	350.827	350.828	350.829	350.830	350.831	350.832	350.833	350.834	350.835	350.836	350.837	350.838	350.839	350.840	350.841	350.842	350.843	350.844	350.845	350.846	350.847	350.848	350.849	350.850	350.851	350.852	350.853	350.854	350.855	350.856	350.857	350.858	350.859	350.860	350.861	350.862	350.863	350.864	350.865	350.866	350.867	350.868	350.869	350.870	350.871	350.872	350.873	350.874	350.875	350.876	350.877	350.878	350.879	350.880	350.881	350.882	350.883	350.884	350.885	350.886	350.887	350.888	350.889	350.890	350.891	350.892	350.893	350.894	350.895	350.896	350.897	350.898	350.899	350.900	350.901	350.902	350.903	350.904	350.905	350.906	350.907	350.908	350.909	350.910	350.911	350.912	350.913	350.914	350.915	350.916	350.917	350.918	350.919	350.920	350.921	350.922	350.923	350.924	350.925	350.926	350.927	350.928	350.929	350.930	350.931	350.932	350.933	350.934	350.935	350.936	350.937	350.938	350.939	350.940	350.941	350.942	350.943	350.944	350.945	350.946	350.947	350.948	350.949	350.950	350.951	350.952	350.953	350.954	350.955	350.956	350.957	350.958	350.959	350.960	350.961	350.962	350.963	350.964	350.965	350.966	350.967	350.968	350.969	350.970	350.971	350.972	350.973	350.974	350.975	350.976	350.977	350.978	350.979	350.980	350.981	350.982	350.983	350.984	350.985	350.986	350.987	350.988	350.989	350.990	350.991	350.992	350.993	350.994	350.995	350.996	350.997	350.998	350.999	350.1000
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Weber's Law: Just Noticeable Difference

- Weber's law is named after a German physician, Ernst Heinrich Weber, also called **Weber-Fechner law**, historically important psychological law quantifying the perception of change in a given stimulus.
- The law states that the change in a stimulus that will be just noticeable is a constant ratio of the original stimulus.
- A **stimulus** is anything that causes a reaction in an organism.
- **Perception** is what happens when an organism takes in a stimulus and makes meaning of it.
- Weber's law is an essential concept because it helps understand how people perceive different stimuli.
- The law reveals that perception of stimuli is relative, not absolute.

- Weber's Law can be used for various sensory modalities in GUIs such as brightness, loudness, line length, visual weight of fonts in typography, color matching etc.
- Many times large amount of information is required to be displayed on a limited size computer screen and in various forms viz. text, pictures, drawings, maps, graphs, videos etc.
- Poor visual design of user interface lacks the ability of differentiating between two close enough visual stimuli e.g. two lines with different thicknesses in a map (for wide roads and narrow lanes). What is this threshold of line thickness that may lead to noticeable difference is governed by Weber's law.
- The threshold of noticeable difference between color shades is also governed by Weber's law.

- The law explains that the perceived change in stimuli is proportional to the original stimuli, together with the just noticeable difference, it means that the size of the just noticeable difference (the slightest change in stimuli that can be observed or noticed) is in proportion to the original stimuli.
- When we redesign a product, we should think about how the users adapt to the changes. Usually, if your product has a drastic change, no matter how good the new design is, the users would still think the old one is better. This is a natural human behaviour.
- What you should do instead is — change gradually, so gradually that the users could not see a significant difference. This helps them adapt to and accept the new design.

Jakob's law

- Jakob's law was invented by Jakob Nielsen, a user advocate.
- This law states that asking users to adopt new behaviours or even modify their existing behaviours is very, very hard.
- Your users prefer your website to work in the same way as other websites.
- For instance, if your website has lots of content, there should be a search function, your website footer should contain links to important pages, your website logo should be clickable and linked to the homepage.
- Users do not like surprises, they prefer something that is familiar so they wouldn't need to learn how to use your website.

Ochkam's Razor Law

- Ochkam's Razor is a philosophy principle by William of Ockham, a Franciscan friar in the 14th century which believes that "Simplicity is the ultimate sophistication".
- There are different variations of this principle but it is roughly about when there are multiple solutions to a problem, the simplest one tends to be the best one.
- When designing a product or a website, try to get rid of the unnecessaries as they create clusters and distraction. These make it difficult for your users to reach their goal.

Pareto Principle

- Pareto Principle, as known as 80/20 rule, is named after an Italian economist Vilfredo Pareto.
- This principle says that 80% of the outcome come from 20% of the cause.
- When this is used in product design, it means that the unused functions or features could be removed due to the fact that they do not contribute to the outcome.
- Get rid of everything that is not essential to making a point.

Chapter Ends