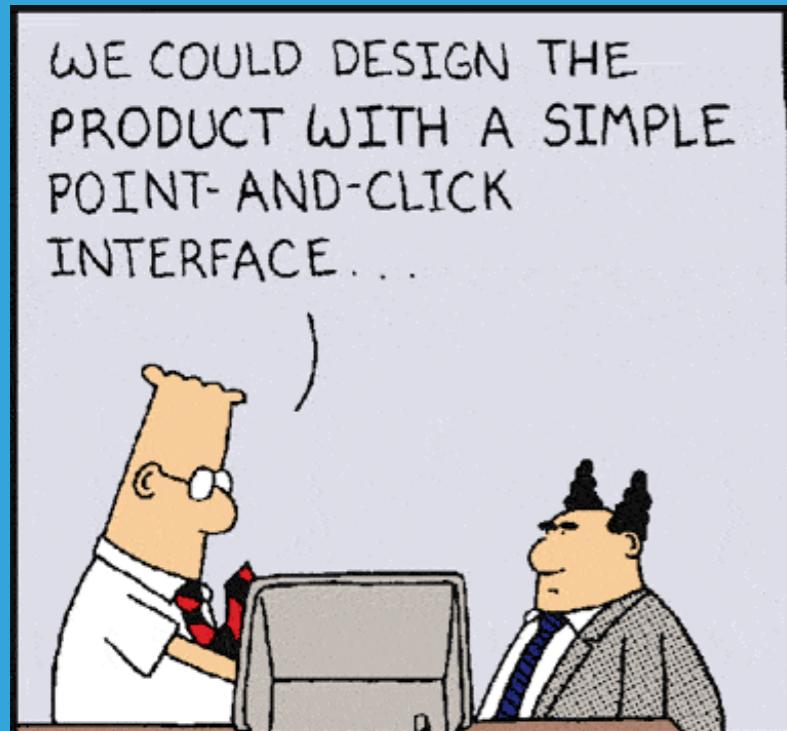


BASED ON CHAPTER 1 OF INTERACTION DESIGN, BEYOND HCI

WHAT IS INTERACTION DESIGN?



Good and bad design

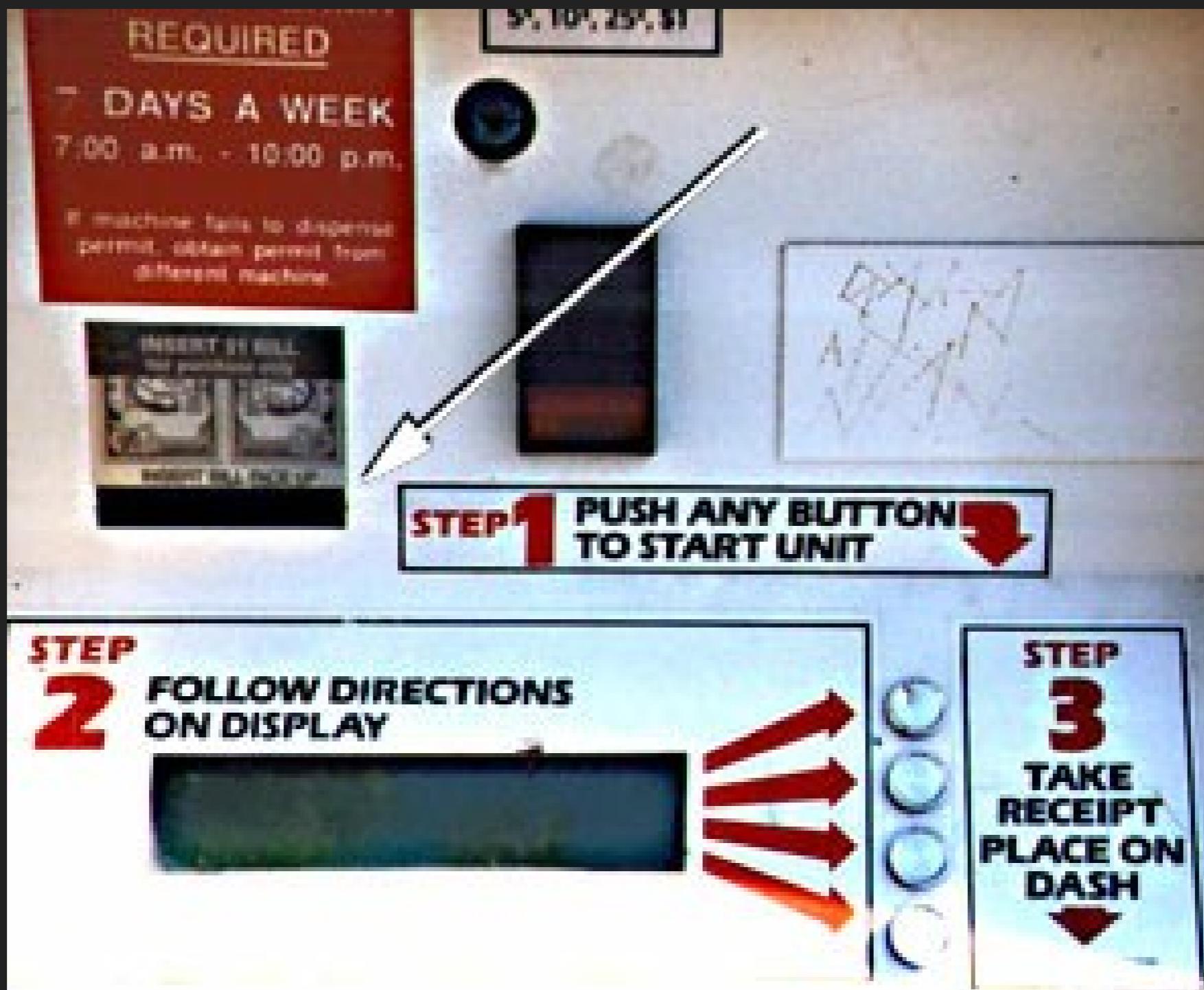
BAD DESIGNS

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?
www.baddesigns.com

WHY IS THIS VENDING MACHINE SO BAD?



VENDING MACHINE, AWARD WINNING DESIGN



Links to smartphone app, allows users to buy drinks simply by scanning the QR code.

Not only vends drinks, but also offers gifts or promotes sampling campaigns.

BAD DESIGN EXAMPLE: HOTEL ANSWERING MACHINE



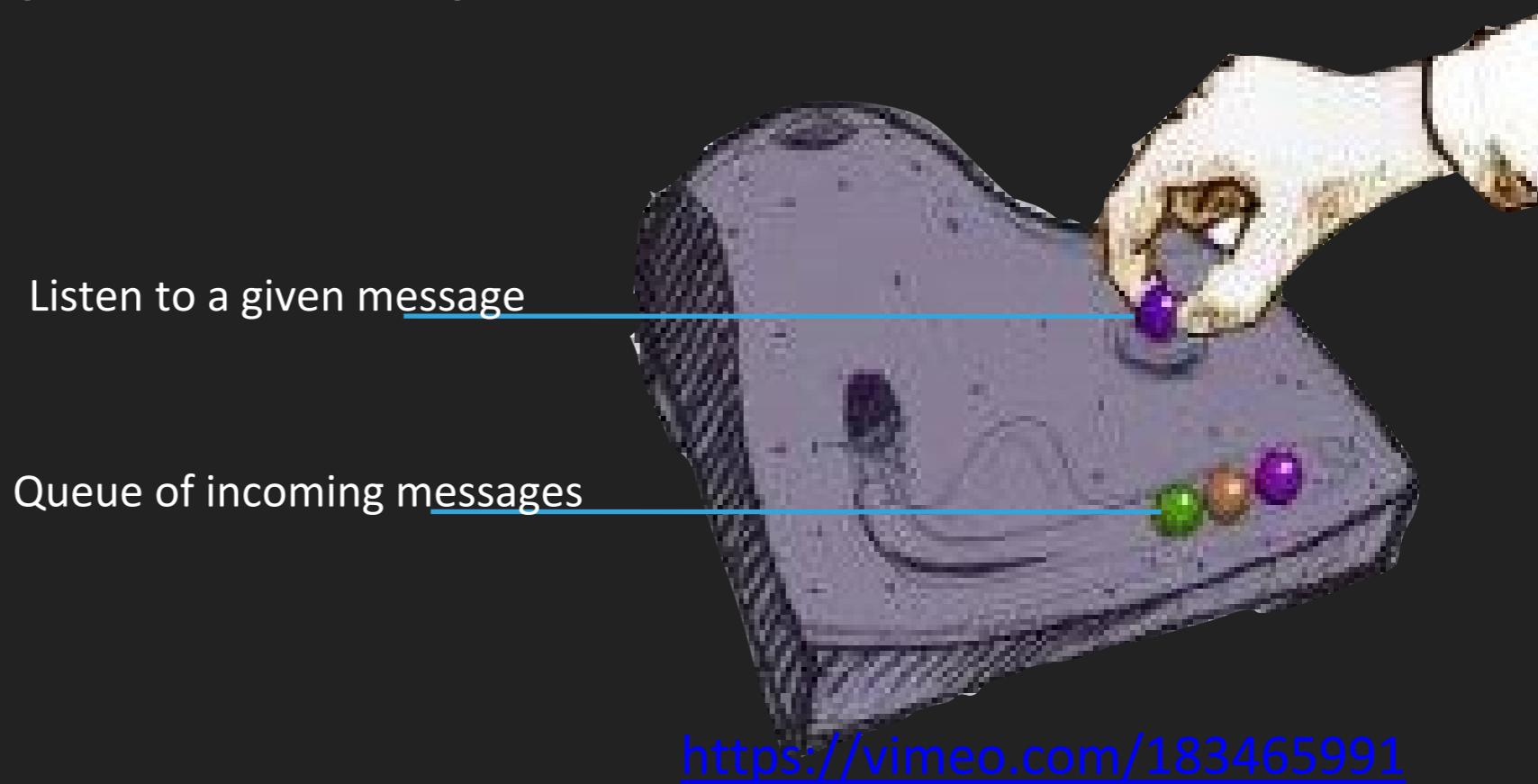
BAD DESIGN EXAMPLE: HOTEL ANSWERING MACHINE

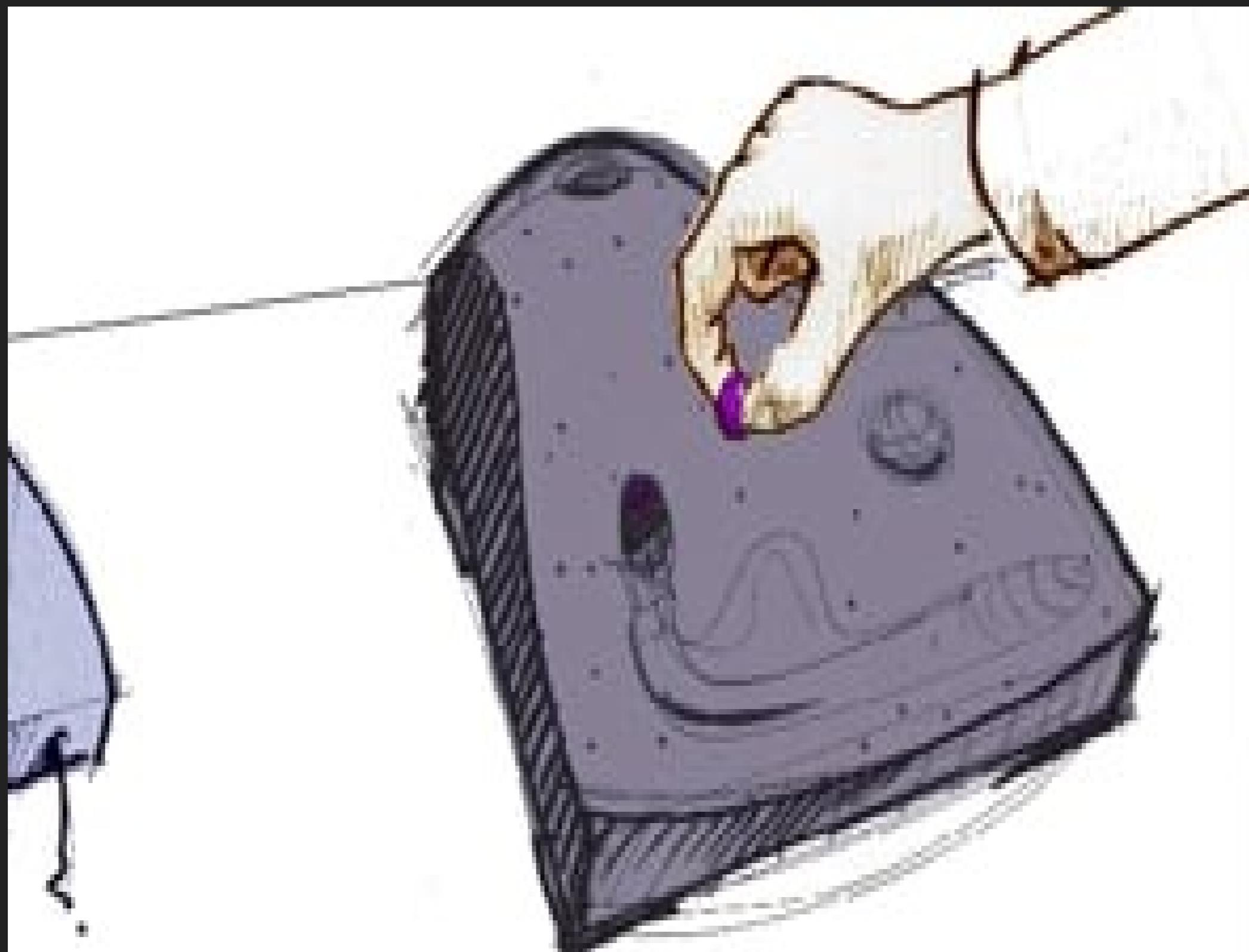
- ▶ Infuriating
- ▶ Confusing
- ▶ Inefficient, too many steps for basic tasks
- ▶ Don't know how many messages left or if there are messages to listen to.
- ▶ Not obvious what to do, instructions are all over the place.



GOOD DESIGN EXAMPLE: ANSWERING MACHINE

- ▶ Marble answering machine (Bishop, 1995)
- ▶ Based on how everyday objects behave
- ▶ Easy, intuitive, and a pleasure to use
- ▶ Only requires one-step actions to perform core tasks

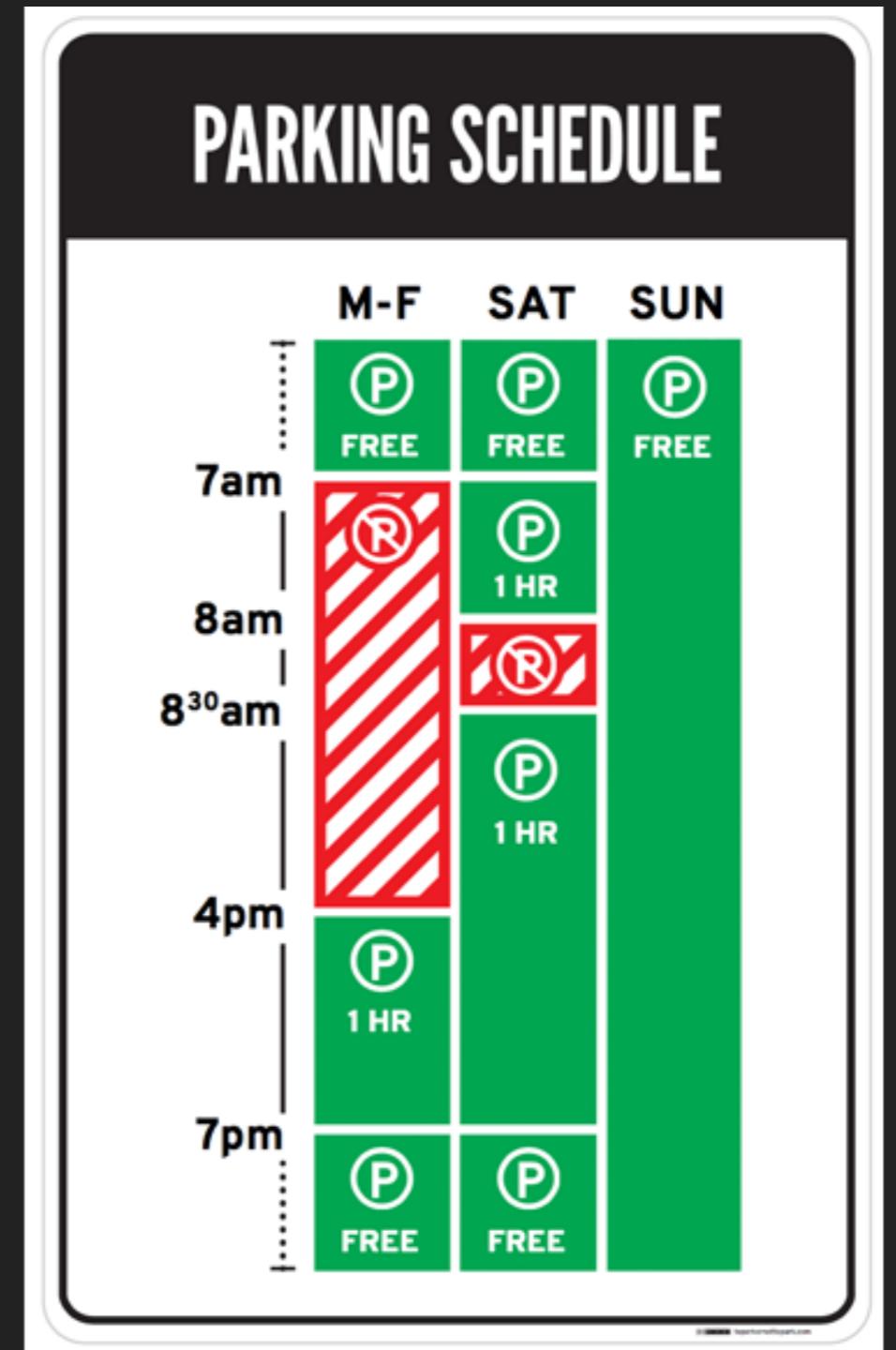




GOOD AND BAD DESIGNS



"A simple" parking sign in LA.



The Good: Nikki Sylianteng's Parking Sign



LIFE MONTREALERS

Proof that Montreal parking signs are the most confusing thing ever

DH

DH Montreal Staff | Apr 17 2018, 8:37 pm



fornoggg / Imgur

GOOD AND BAD DESIGN: REMOTE CONTROLS



- ▶ Too many small, multicoloured buttons, double labelled buttons, buttons arbitrarily positioned with relation to another.
- ▶ Hard to locate right button for even the simplest of tasks.

GOOD AND BAD DESIGN: REMOTE CON

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

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



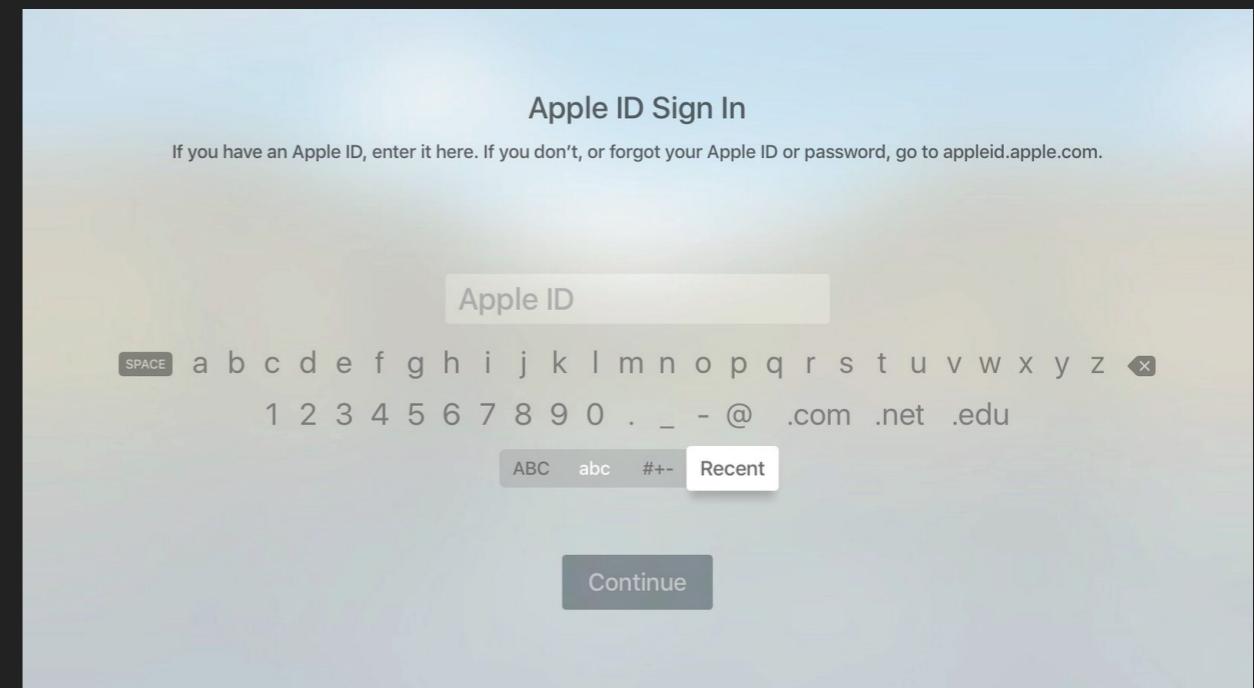
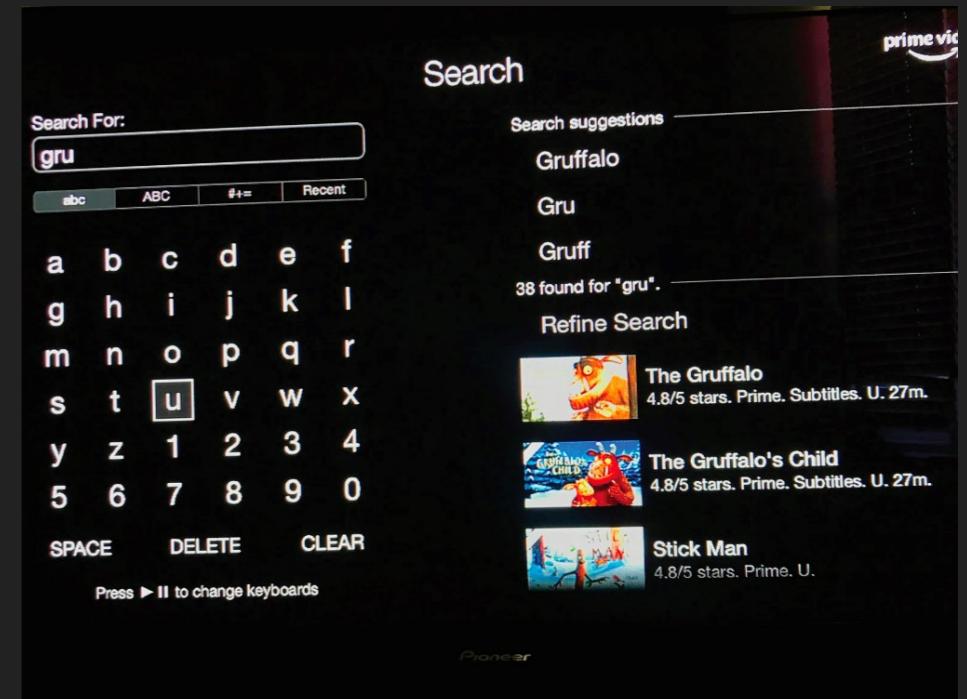
GOOD AND BAD DESIGN: REMOTE CONTROLS



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 on a remote control
- ▶ Voice control using remote or smart speaker



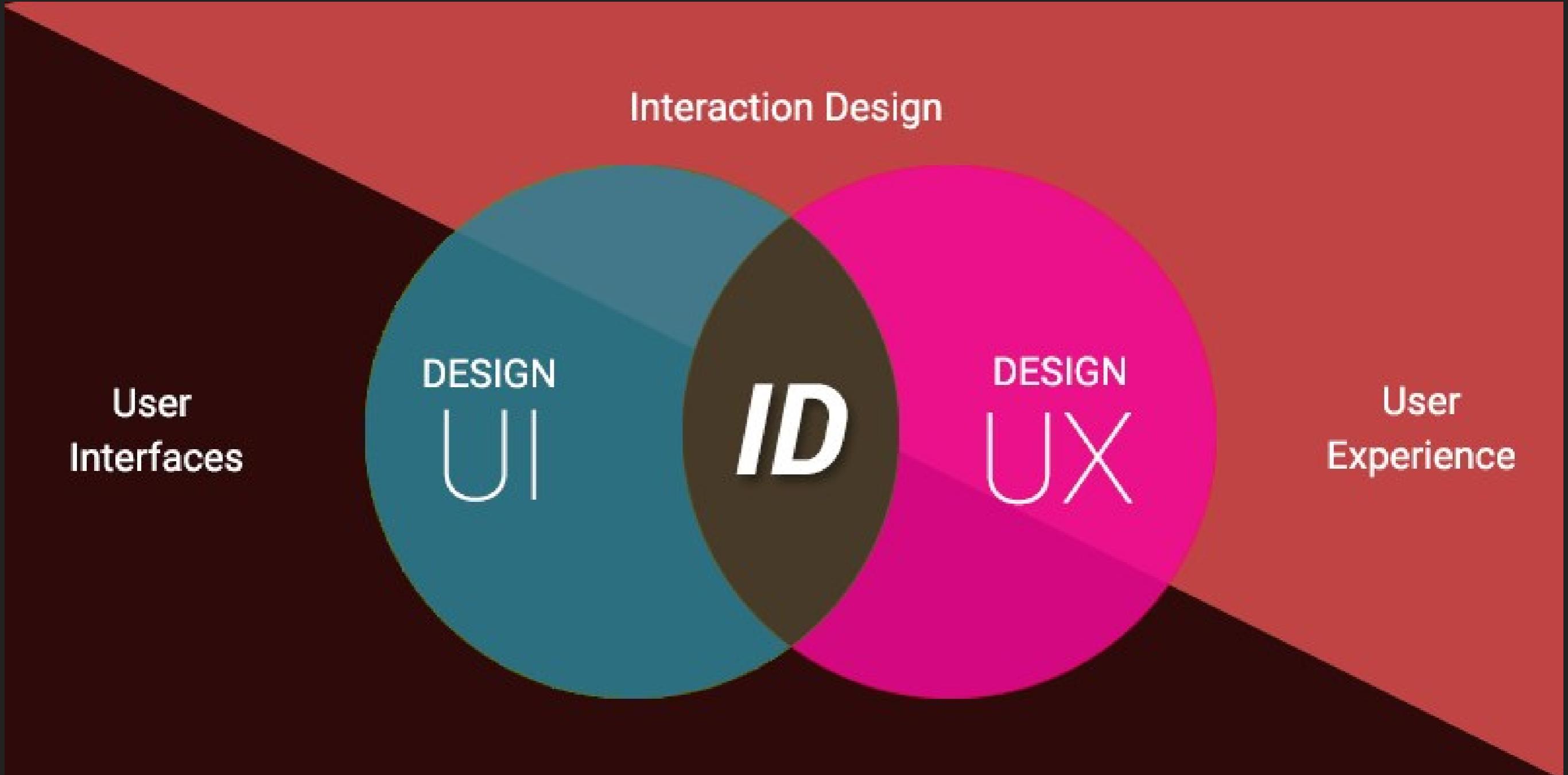


GLAMOS

Create a virtual touchscreen
anywhere you want.

REFERENCES

- ▶ <https://www.interaction-design.org/literature/article/bad-design-vs-good-design-5-examples-we-can-learn-frombad-design-vs-good-design-5-examples-we-can-learn-from-130706>



Interaction Design

User
Interfaces

DESIGN
UI

ID

DESIGN
UX

User
Experience

INTERACTION DESIGN

WHAT IS 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)

WHO IS INVOLVED IN INTERACTION DESIGN?

- ▶ Need understanding of users (emotions, perception, communication), technology, business, manufacturing, marketing...
- ▶ Multidisciplinary teams (engineers, designers, psychologists, sociologists, artists, product managers...)

Benefits

- ▶ More ideas and designs generated.
- ▶ More creative and original designs.

Disadvantages

- ▶ Difficult to communicate and progress with the designs being generated.
- ▶ Different languages, different values, can lead to confusion and communication breakdowns.
- ▶ Complex and costly.

DESIGNING INTERACTIVE PRODUCTS

Considerations:

- ▶ Who are the users?
- ▶ What activities or tasks are they going to be carrying out?
- ▶ Where are they going to be using the product/app/...?

DESIGNING INTERACTIVE PRODUCTS

How do we optimize the users' interactions with a system, environment or product so that it supports the users' activities in effective, useful, usable and pleasurable ways?

- ▶ What are people good and bad at?
- ▶ What can help people with the way they currently do things?
- ▶ What might provide quality user experiences?
- ▶ Listen to what people want and involve them in the design?
- ▶ Use user-centred design techniques during design process.

RELATIONSHIP BETWEEN IxD, HCI AND OTHER FIELDS–DESIGN PRACTICES

- ▶ Design practices contributing to IxD:
 - ▶ Graphic design
 - ▶ Product design
 - ▶ Artist-design
 - ▶ Industrial design
 - ▶ Film industry

RELATIONSHIP BETWEEN IxD, HCI AND OTHER FIELDS–INTERDISCIPLINARY FIELDS

- ▶ Interdisciplinary fields that ‘do’ interaction design:
 - ▶ HCI
 - ▶ Ubiquitous Computing
 - ▶ Human Factors
 - ▶ Cognitive Engineering
 - ▶ Cognitive Ergonomics
 - ▶ Computer Supported Co-operative Work
 - ▶ Information Systems

UX, IA, UI, IxD... THE ABBREVIATIONS CAN BE CONFUSING.

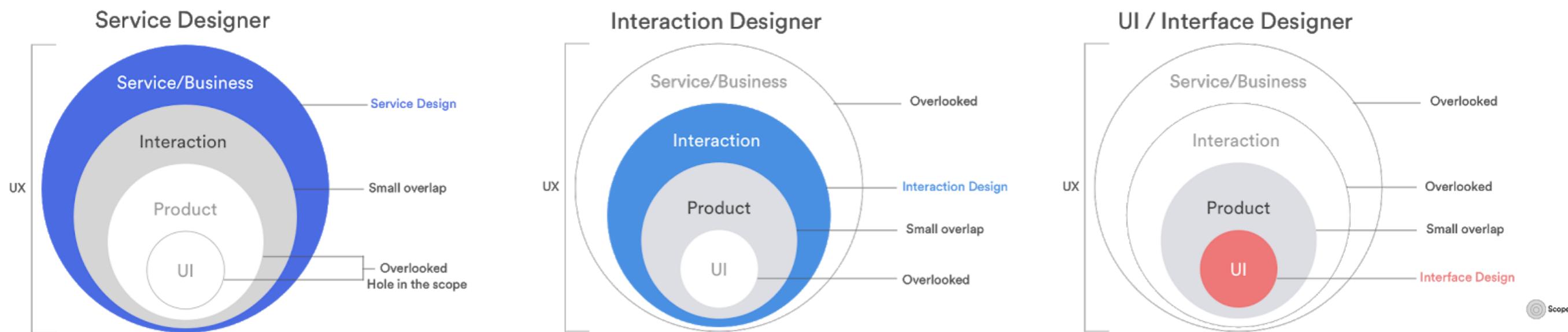
- ▶ In reality, designers, often work across these different specialisms:
 - ▶ designing the overall user experience (UX),
 - ▶ organizing information logically to consider information architecture (IA),
 - ▶ considering the granular design of the user interface (UI),
 - ▶ And determining the interaction (via an interface) between a system and its user (IxD).

DEFINITIONS

- ▶ HCI: multidisciplinary field of study focusing on the design of computer technology and, in particular, the interaction between humans (the users) and computers.
- ▶ UX: focuses on the overall experience between a user and a product. Not just concerned with the interactive elements but also the way that certain elements look, feel or contrived to deliver certain outputs.
- ▶ UI: process of making interfaces in software or computerized devices with a focus on looks or style.
- ▶ IxD: examines the interaction (via an interface) between a system and its user.
- ▶ IA: structural design of shared information environments; the art and science of organizing and labelling websites, online communities and software to support usability and findability.

WHICH KIND OF DESIGN?

- ▶ Number of other terms used emphasizing what is being designed, for example:
 - ▶ Service design, business design, software design, user-centered design, experience strategy, user research, information architect, product design, web design, and many more!



USER EXPERIENCE 101



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)

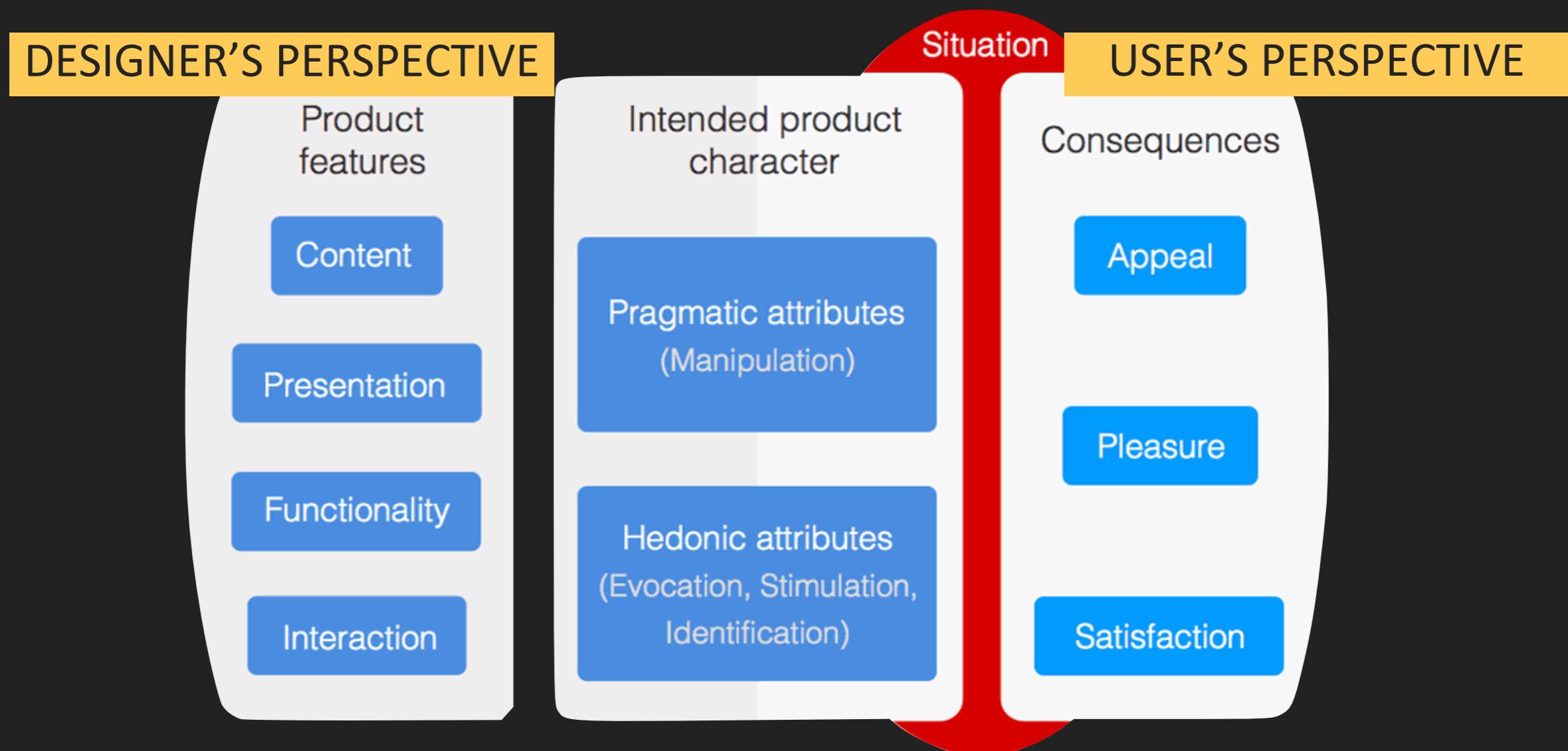
Cannot design a user experience—only can design *for* a user experience.

DEFINING USER EXPERIENCE

“How users perceive a product, such as whether a smartwatch is seen as sleek or chunky, and their emotional reaction to it, such as whether people have a positive experience when using it.” — Hornbæk and Hertzum, 2017

“User experience (UX) is a person's emotions and attitudes about using a particular product, system or service. It includes the practical, experiential, affective, meaningful and valuable aspects of human–computer interaction and product ownership. Additionally, it includes a person's perceptions of system aspects such as utility, ease of use and efficiency.” — Wikipedia

HASSENZAHL'S (2010) MODEL OF THE USER EXPERIENCE

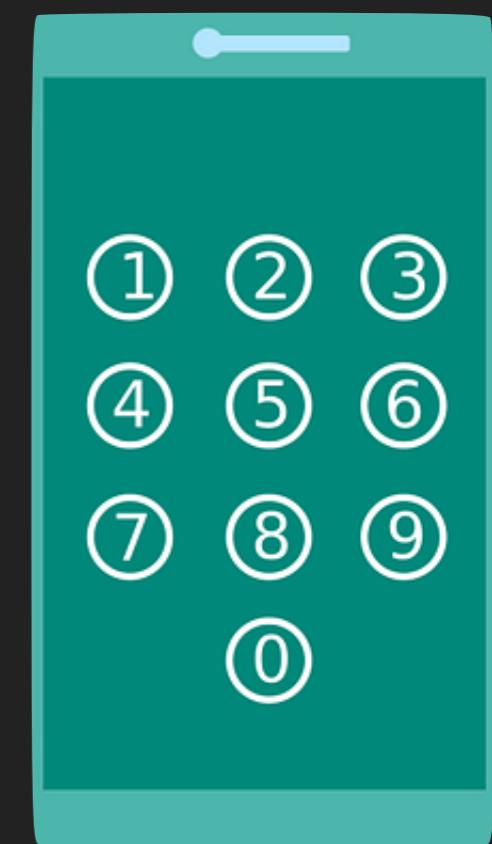
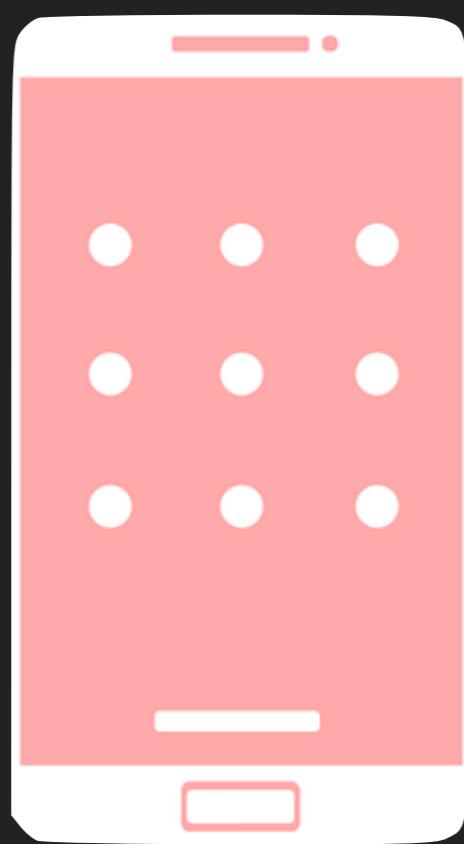
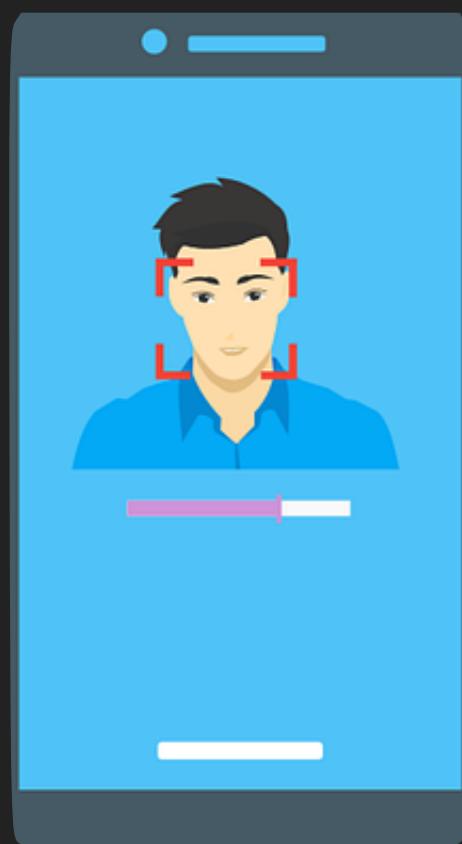


- ▶ Pragmatic: how simple, practical, and obvious it is for the user to achieve their goals.
- ▶ Hedonic: how evocative and stimulating the interaction is to users.

HOW HAS THE APPLE IPHONE CHANGED USER EXPERIENCE?



HOW HAS THE APPLE IPHONE CHANGED USER EXPERIENCE?



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.

UNDERSTANDING USERS

- ▶ 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 INCLUSIVE DESIGN

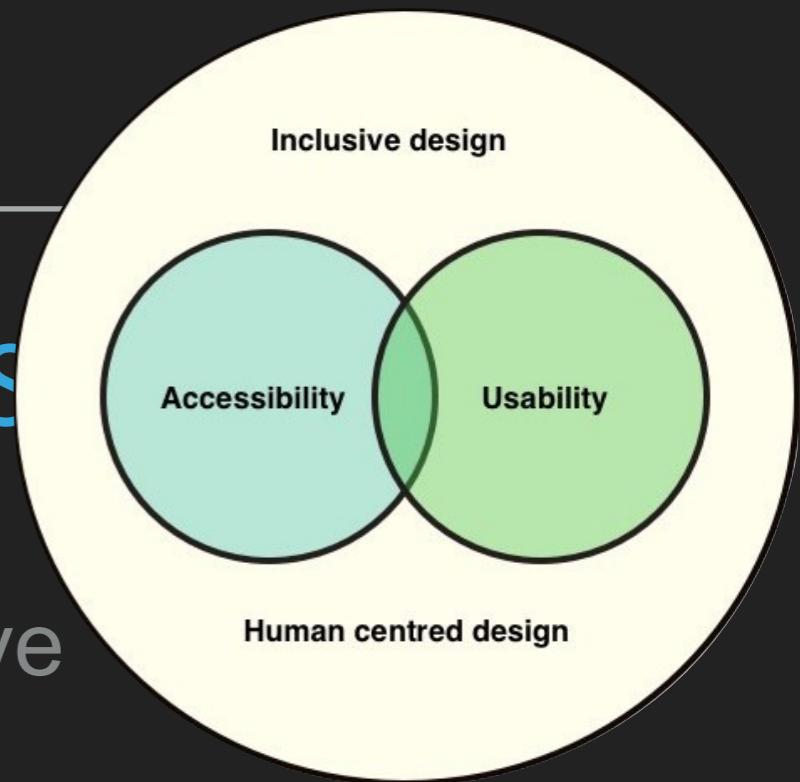
ACCESSIBILITY AND INCLUSIVENESS

Accessibility: the extent to which an interactive product is accessible by as many people as possible

- ▶ Focus is on people with disabilities; for instance, those using android OS or apple voiceover

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



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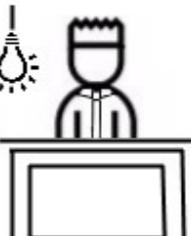
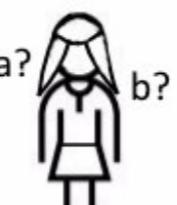
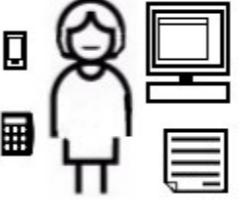
Moosejaw is committed to making our website accessible for all customers, including those with disabilities.

Consistent with this goal, we have taken a number of steps to enhance our site and increase its usability by those who access the web using assistive technology. Our efforts are guided by the Web Content Accessibility Guidelines, Level 1 (WCAG 2.1 AA). We will continue to enhance our digital properties to deliver accessible experiences.

If you experience difficulty accessing our website content, you may share feedback and get assistance from our Customer Service at 1-877-666-7352.

Love the Madness,

Moosejaw

Touch				
	One arm	Arm injury	New parent	Carrying paperwork
See				
	Blind	Cataract	Distracted driver	Dark courtroom
Hear				
	Deaf	Ear infection	Bartender	Noisy office
Speak				
	Non-verbal	Laryngitis	Heavy accent	Interpreter
Think				
	Dyslexic	Migraine	Overloaded	Stressful situation

UNDERSTANDING DISABILITY

1-IN-6 PEOPLE



or **80 MILLION**
people in the EU have
some form of disability

80%

A donut chart with a thick dark blue border. The inner circle is light blue, and the text "80%" is written in white.

OF DISABILITIES
are not visible

UNDERSTANDING DISABILITY

Disabilities can be classified as:

- ▶ Sensory impairments (such as loss of vision or hearing)
- ▶ Physical impairments (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)

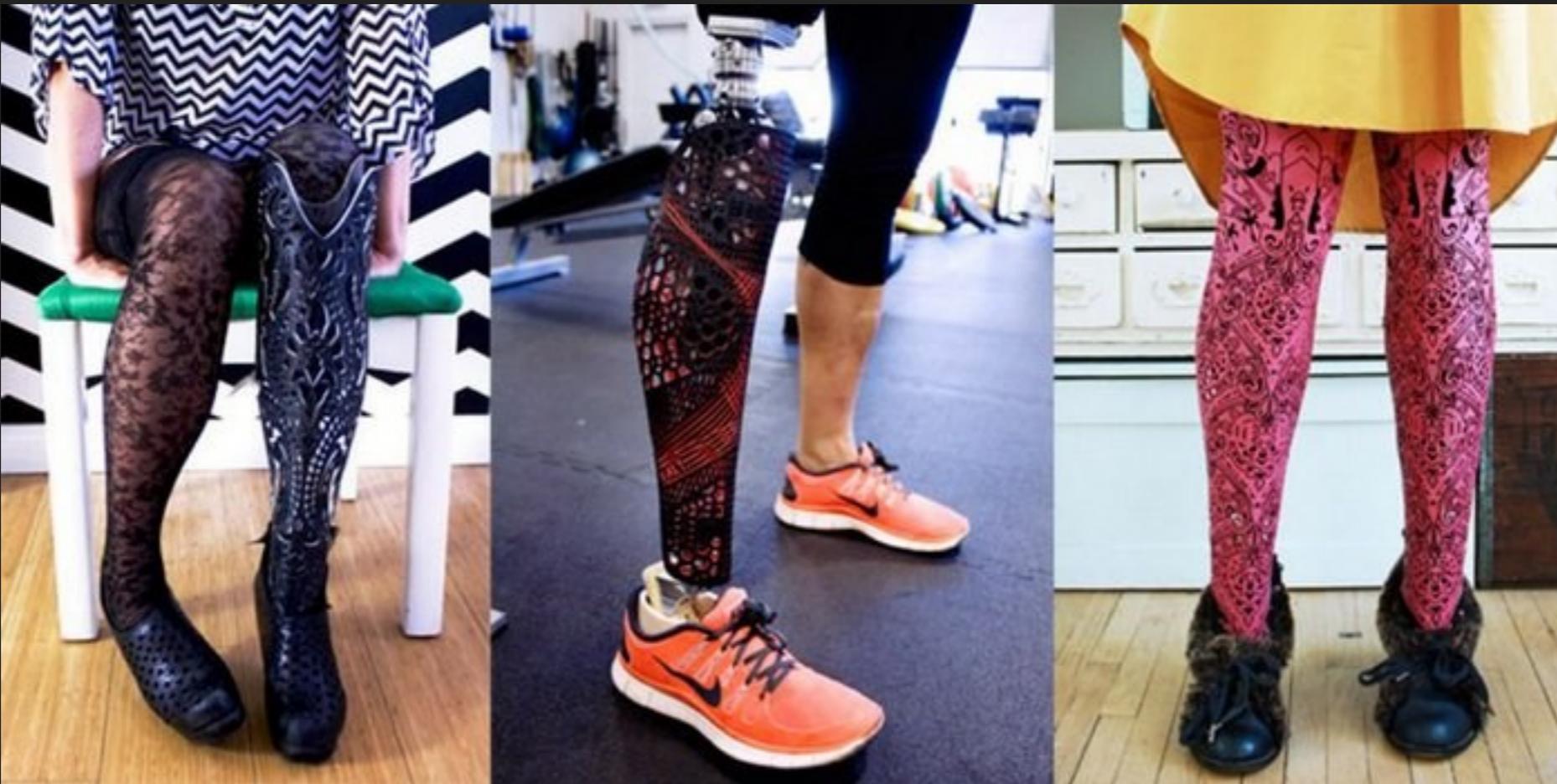
Each type can be further defined in terms of capability:

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

Impairment can be categorized:

- ▶ Permanent (for instance, long-term wheelchair user)
- ▶ Temporary (that is, after an accident or illness)
- ▶ Situational (for example, a noisy environment means that a person can't hear)

BEING COOL ABOUT DISABILITY



<https://alleles.ca/>

“We truly believe that shopping for a prosthetic cover should be fun, fashionable, and affordable. So we totally promise to always bring you hand-made covers, with an inspired style and a beautiful silhouette.”

AIMEE MULLENS



HCI AND DESIGNING FOR DISABILITIES

- ▶ People with permanent disabilities often use assertive technology in their everyday life, which they consider to be life-essential and an extension of their self.
- ▶ Much current HCI research into disability explores how current technologies such as IoT, wearables, VR... can be used to improve upon existing assistive technologies

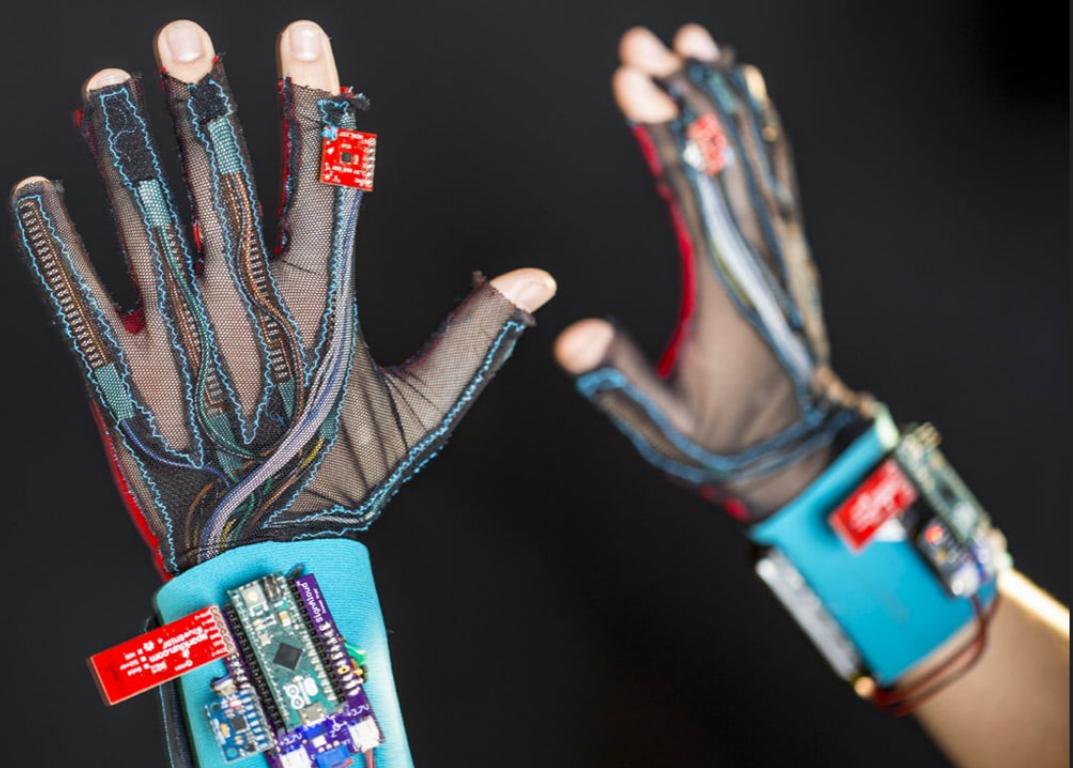
DESIGNING FOR DISABILITIES: VR

Help physically disabled people plan accessible routes around a new town or metro station, in advance of a trip.

- ▶ Helping the recovery of someone who's had a stroke, sports injury or vestibular system issues by improving motor skills and aiding muscle recovery
- ▶ For those who are physically disabled, virtual reality (VR) means the potential to try out-of-reach experiences such as climbing a mountain, skateboarding or swimming in the sea, perhaps for the first time.
- ▶ Vision impairments (such as Stargardt's disease, a reduction in the central detailed vision) can help to see images more clearly using VR.
- ▶ People with Asperger's can find it useful to use VR to practice social skills or have fun in non-threatening environment.



DESIGNING FOR DISABILITIES/ACCESSIBILITY



Sign language translation glove.



Wearable translator.



Obi Robot arm



AIRA AR Smartglasses: Wearable reader

DESIGNING FOR ACCESSIBILITY



Designing for users on the autistic spectrum



Do...

use simple colours



Don't...

use bright contrasting colours



Do this.

write in plain English



use simple sentences and bullets

use figures of speech and idioms



create a wall of text



make buttons descriptive

Attach files

make buttons vague and unpredictable

Click here!

build simple and consistent layouts



build complex and cluttered layouts



Designing for users with dyslexia



Do...

use images and diagrams to support text



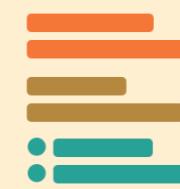
align text to the left and keep a consistent layout



consider producing materials in other formats (for example, audio or video)



keep content short, clear and simple



let users change the contrast between background and text



Don't...

use large blocks of heavy text



underline words, use italics or write in capitals

DON'T DO THIS

force users to remember things from previous pages - give reminders and prompts



rely on accurate spelling - use autocorrect or provide suggestions

dyslexia X
dsyle

put too much information in one place



Designing for users who are Deaf or hard of hearing



Do...

write in plain English

Do this.



use subtitles or provide transcripts for videos



use a linear, logical layout



break up content with sub-headings, images and videos



let users ask for an interpreter when booking appointments

Don't...

use complicated words or figures of speech



put content in audio or video only



make complex layouts and menus



make users read long blocks of content



don't make telephone the only means of contact for users



Designing for users with low vision



Do...

use good colour contrasts and a readable font size



publish all information on web pages



use a combination of colour, shapes and text



200% magnification



follow a linear, logical layout

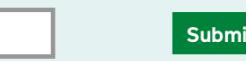


put buttons and notifications in context



200% magnification

spread content all over a page



separate actions from their context



CULTURAL DIFFERENCES

“IT IS NO LONGER ENOUGH TO SIMPLY OFFER A PRODUCT TRANSLATED IN TEN TO TWENTY DIFFERENT LANGUAGES. USERS ALSO WANT A PRODUCT THAT ACKNOWLEDGES THEIR UNIQUE CULTURAL CHARACTERISTICS AND BUSINESS PRACTICES.”

CULTURAL DIFFERENCES

5/9/2019 versus 9/5/2019?

- ▶ 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?

ACCESSIBLE DESIGNS, FOR ALL

- ▶ Designing Interactive Systems' author, David Benyon, offers five reasons an inaccessible product excludes users:
 - ▶ Physical – takes too much strength to use.
 - ▶ Conceptual – has hard-to-understand instructions.
 - ▶ Economic – is too expensive.
 - ▶ Cultural – users can't understand metaphors regarding product interaction.
 - ▶ Social – on joining a group, users don't understand that group's social conventions.



NOT JUST ABOUT DESIGNING FOR
DISABILITY BUT MORE ABOUT
DESIGNING FOR EVERYONE.

ACCESSIBILITY THROUGH UNIVERSAL DESIGN

- ▶ You can increase accessibility by applying the following Universal Design principles:
 - ▶ Equitable Use – Design to accommodate users with diverse abilities (e.g., deafness).
 - ▶ Flexible Use – E.g., accommodate right- and left-handedness.
 - ▶ Simple, Intuitive Use – Simplify complex information. Use a proper information hierarchy, progressive disclosure and effective prompting towards task completion.
 - ▶ Perceptible Information – Optimize readability of vital information and present information redundantly (i.e., use pictures and text).
 - ▶ Tolerance for Error – Arrange elements to minimize accidental actions. E.g., ensure users have data validation so they can only book reservations in the future.
 - ▶ Low Physical Effort – E.g., minimize repetitive actions.
 - ▶ Size and Space for Approach and Use – E.g., accommodate touch target areas for average-sized fingertips.



USABILITY GOALS

USABILITY GOALS

- ▶ Effectiveness
- ▶ Efficiency
- ▶ Safety
- ▶ Utility
- ▶ Learnability
- ▶ Memorability



EFFICIENT: EFFICIENT TO USE

- ▶ The way a system supports users in carrying out their tasks.
- ▶ Once users have learned how to use a system to carry out their tasks, can they sustain a high level of productivity?
- ▶ Criteria: time to complete a task, # of operations to complete a task

The screenshot shows a Google Docs document titled "How to drag and drop from keep into docs". The document content includes:

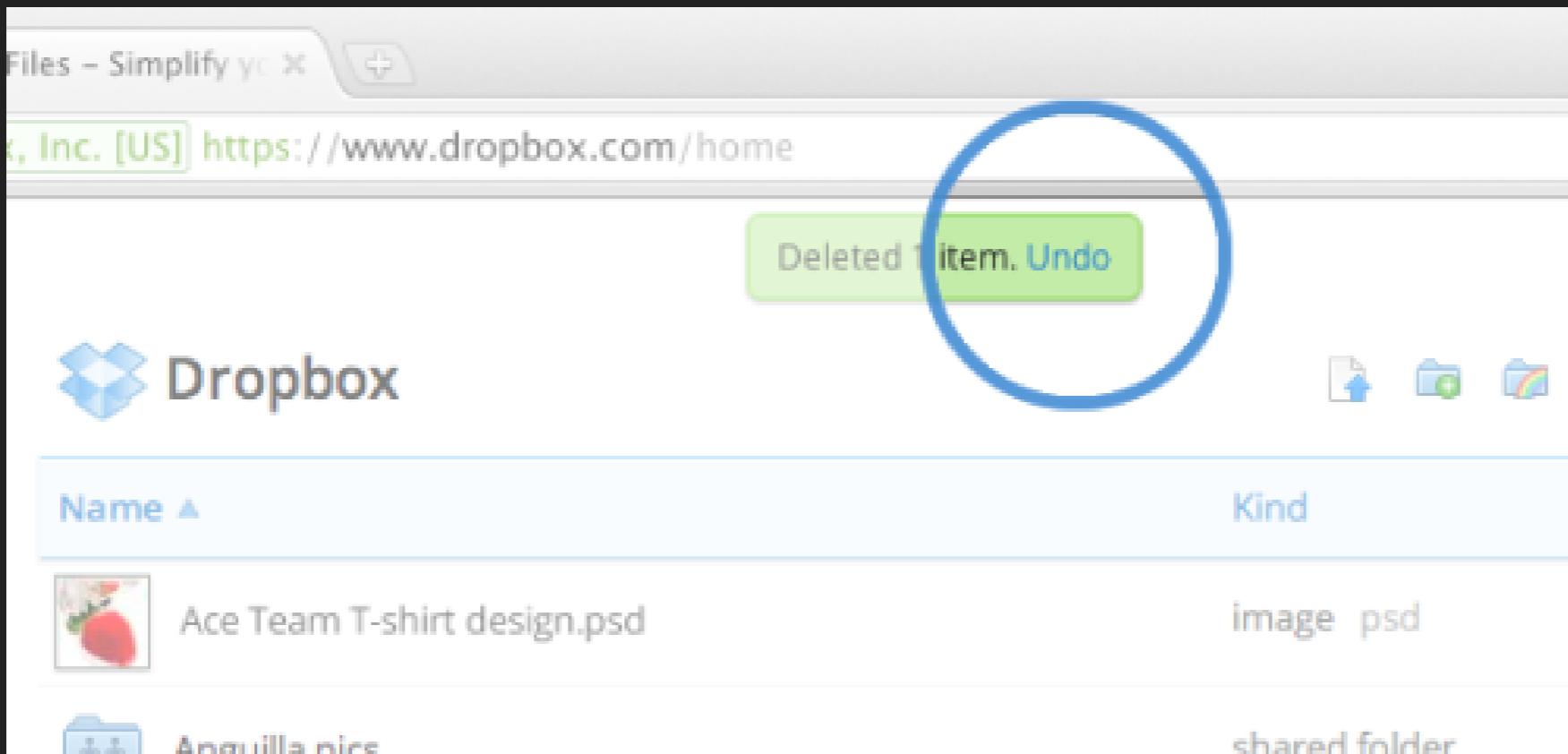
- A heading: "How to drag and drop from keep into docs"
- A paragraph: "From the office of, "Let's see how convenient we can make Google Docs" comes this."
- A long block of text explaining the integration between Google Docs and Google Keep, mentioning key combinations like `[Ctl]+[C]` and `[Ctl]+[V]`.

The right sidebar of the Google Docs interface displays "Notes from Keep" with several entries:

- Record Store Day 2018
 - Mixed Up
 - The Cure
- Lost Whispers
 - Evanescence
- Reading, Writing And Arithmetic
 - The Sundays

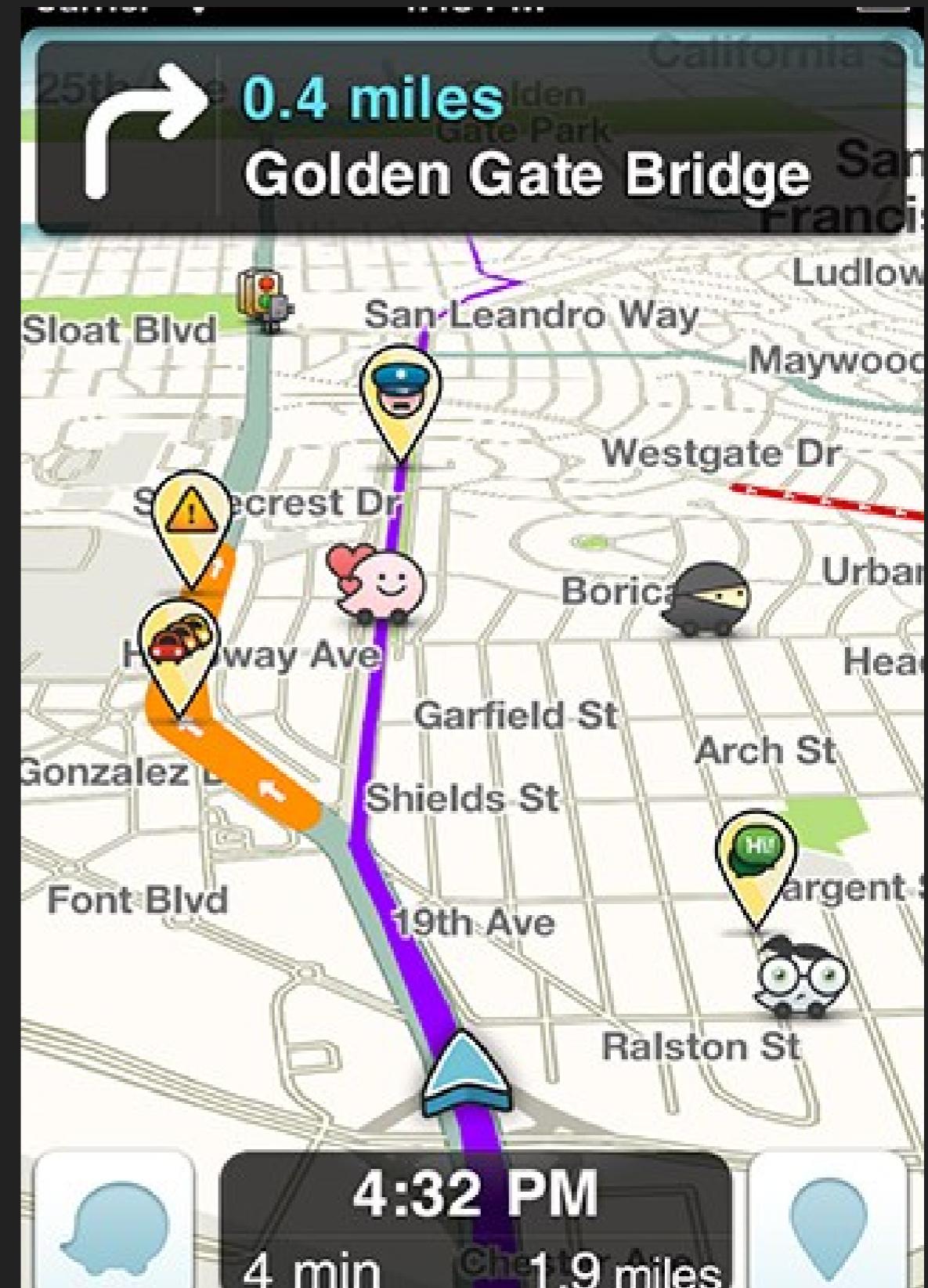
SAFETY: SAFE TO USE

- ▶ Protecting the user from dangerous conditions and undesirable situations.
- ▶ Does the system prevent users from making serious errors, and if they do make an error, does it permit them to recover easily?
- ▶ Criteria: number of errors, time to recover from errors



UTILITY: HAVE GOOD UTILITY

- ▶ The extent to which the system provides the right kind of functionality so that users can do what they need or want to do.
- ▶ Does the system provide an appropriate set of functions that enable users to carry out all their tasks in the way they want to do them?
- ▶ Criteria: availability of core tasks



LEARNABILITY: EASY TO LEARN

- ▶ Learnability: how easy a system is to learn to use/
- ▶ How easy is it and how long does it take
 - ▶ to get started using a system to perform core tasks, and
 - ▶ to learn the range of operations to perform a wider set of tasks?
- ▶ Criteria: time to learn a task, errors made in learning a task



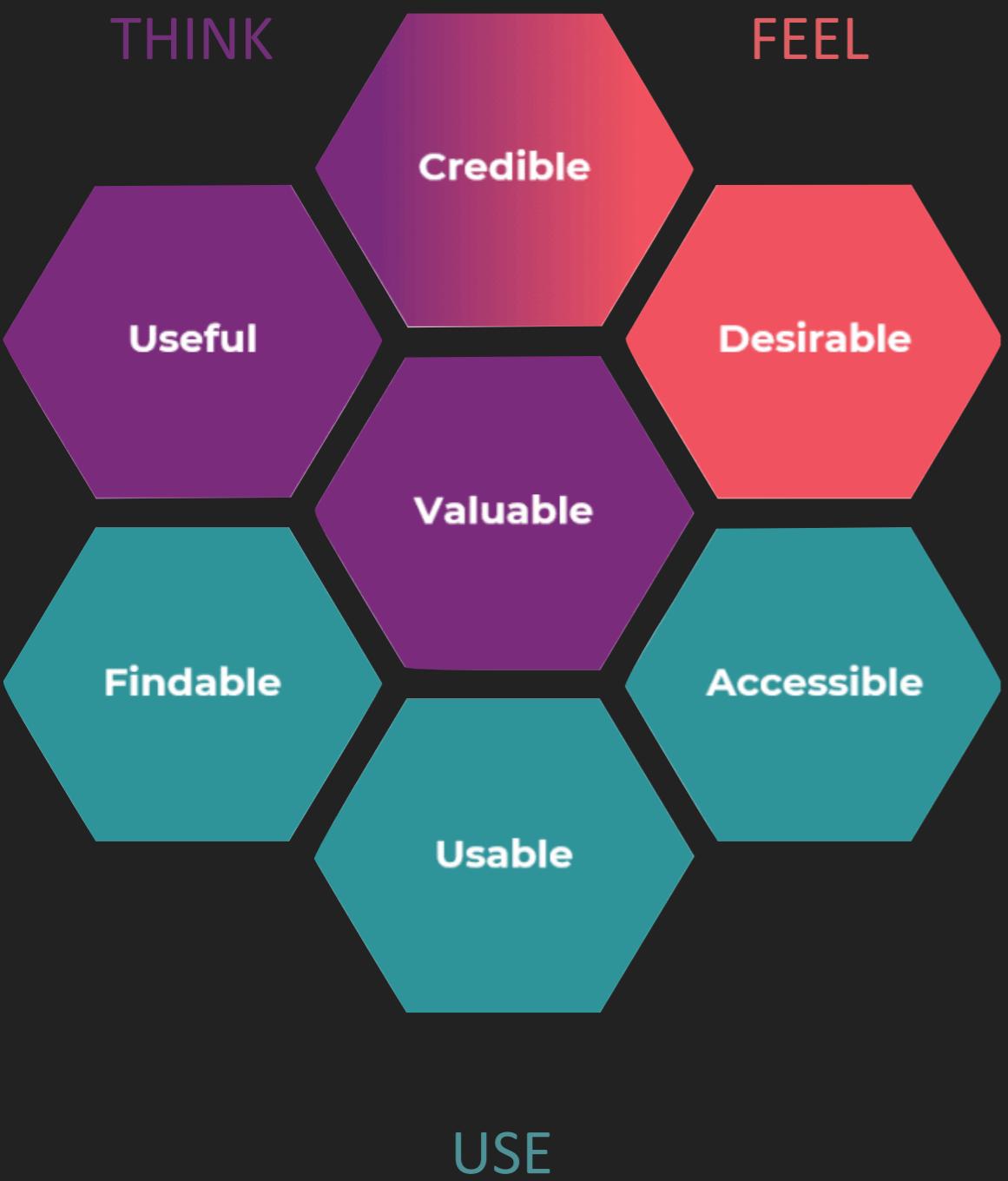
MEMORABILITY: EASY TO REMEMBER

- ▶ How easy a system is to remember how to use, once learned.
- ▶ What kinds of interface support have been provided to help users remember how to carry out tasks, especially for systems and operations that are used infrequently?
- ▶ Criteria: errors made in carrying out a task after system is learned, not being able to remember how to do things



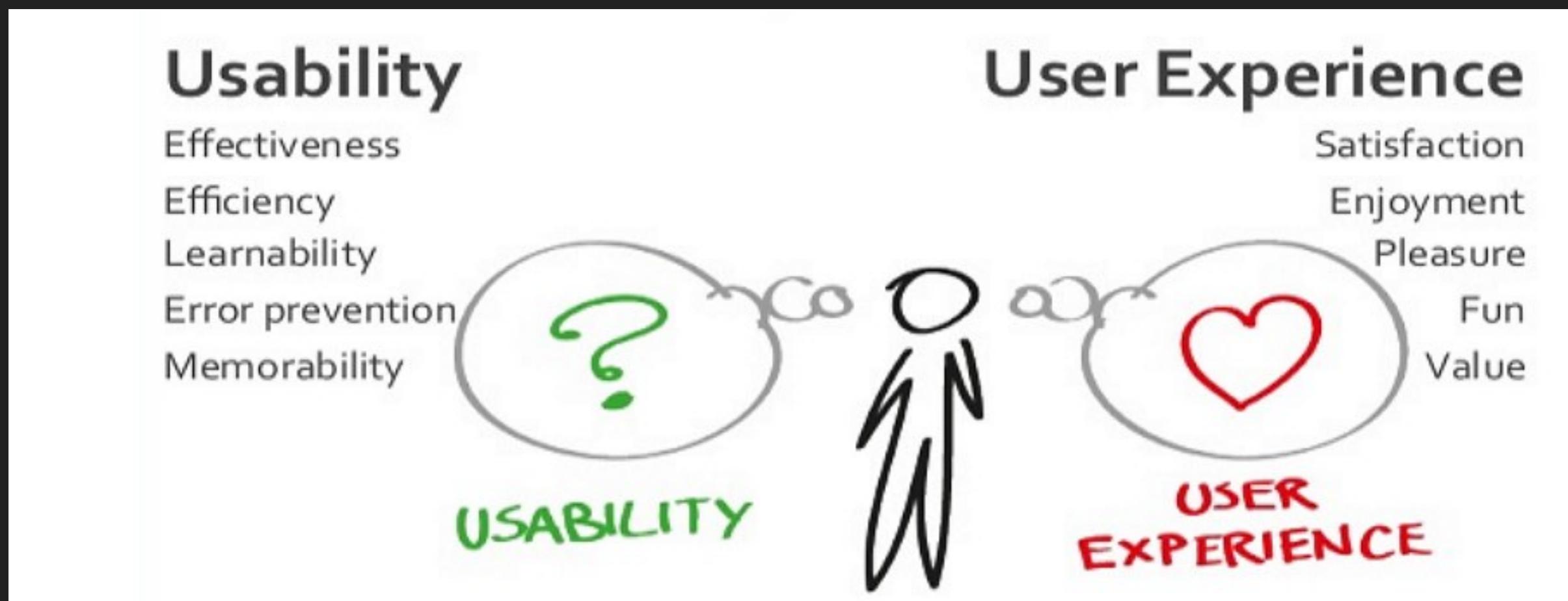
USABILITY

- ▶ Usability is more than just ease of use.
- ▶ You need to ensure designs are efficient, effective, easy to learn and error tolerant if you want them to succeed.
- ▶ There are limitations on the value of usability, and sometimes trade-offs have to be made to ensure economic viability, for example.
- ▶ However, when there is no such conflict, usability should be the priority.



7 FACTORS THAT AFFECT UX

USABILITY VS USER EXPERIENCE



7 FACTORS THAT AFFECT UX

- ▶ 7 factors that describe user experience (described by Peter Morville a pioneer in the UX field):
 - ▶ Useful
 - ▶ Usable
 - ▶ Findable
 - ▶ Credible
 - ▶ Desirable
 - ▶ Accessible
 - ▶ Valuable



User Experience Honeycomb

USEFUL

- ▶ If a product isn't useful to someone why would you want to bring it to market?
- ▶ If it has no purpose, it is unlikely to be able to compete for attention alongside a market full of purposeful and useful products.



USABLE

- ▶ Usability is concerned with enabling users to effectively and efficiently achieve their end objective with a product.
- ▶ Products can succeed if they are not usable but they are less likely to do so.
- ▶ Poor usability is often associated with the very first generation of a product
 - ▶ Ex. first generation of MP3 players; lost their market share to the more usable iPod when it was launched.



FINDABLE

- ▶ The product must be easy to find. If you cannot find a product, you're not going to buy it.
- ▶ For digital and information products; the content within them must be easy to find too.
- ▶ Ex. If a newspaper had the stories within allocated at random, rather than being organized into sections such as Sport, Entertainment, Business, etc. you would probably find reading the newspaper a very frustrating experience.



CREDIBLE

- ▶ The ability of the user to trust in the product that you've provided.
- ▶ Not just that it does the job that it is supposed to do but that it will last for a reasonable amount of time and that the information provided with it is accurate and fit-for-purpose.
- ▶ It is nearly impossible to deliver a user experience if the user thinks the product creator is a lying, clown with bad intentions – they'll take their business elsewhere instead.



DESIRABLE

- ▶ Desirability is conveyed in design through branding, image, identity, aesthetics and emotional design.
- ▶ The more desirable a product is – the more likely it is that the user who has it will brag about it and create desire in other users.
- ▶ Ex. Ford and Porsche both make cars. Both are useful, usable, findable, accessible, credible and valuable but Porsche is much more desirable than Ford. This is not to say that Ford is undesirable they have sold a lot of cars under that brand but given a choice of a new Porsche or Ford for free – most people will opt for the Porsche.



OR



DESIRABLE



ACCESSIBLE

- ▶ Providing an experience which can be accessed by users of a full range of abilities
 - e.g. hearing loss, impaired vision, motion impaired or learning impaired.
- ▶ Sadly, accessibility often gets lost in the mix when creating user experiences.
- ▶ when you design for accessibility, you will often find that you create products that are easier for everyone to use not just those with disabilities.



VALUABLE

- ▶ The product must deliver value. It must deliver value to the business which creates it and to the user who buys or uses it.
- ▶ Without value it is likely that any initial success of a product will eventually be undermined.
- ▶ Value is one of the key influences on purchasing decisions. A \$100 product that solves a \$10,000 problem is one that is likely to succeed; a \$10,000 product that solves a \$100 problem is much less likely to do so.



“NO PRODUCT IS AN ISLAND. A PRODUCT IS MORE THAN THE PRODUCT. IT IS A COHESIVE, INTEGRATED SET OF EXPERIENCES. THINK THROUGH ALL OF THE STAGES OF A PRODUCT OR SERVICE – FROM INITIAL INTENTIONS THROUGH FINAL REFLECTIONS, FROM FIRST USAGE TO HELP, SERVICE, AND MAINTENANCE. MAKE THEM ALL WORK TOGETHER SEAMLESSLY.”

Don Norman

USER EXPERIENCE GOALS

DESIRABLE ASPECTS

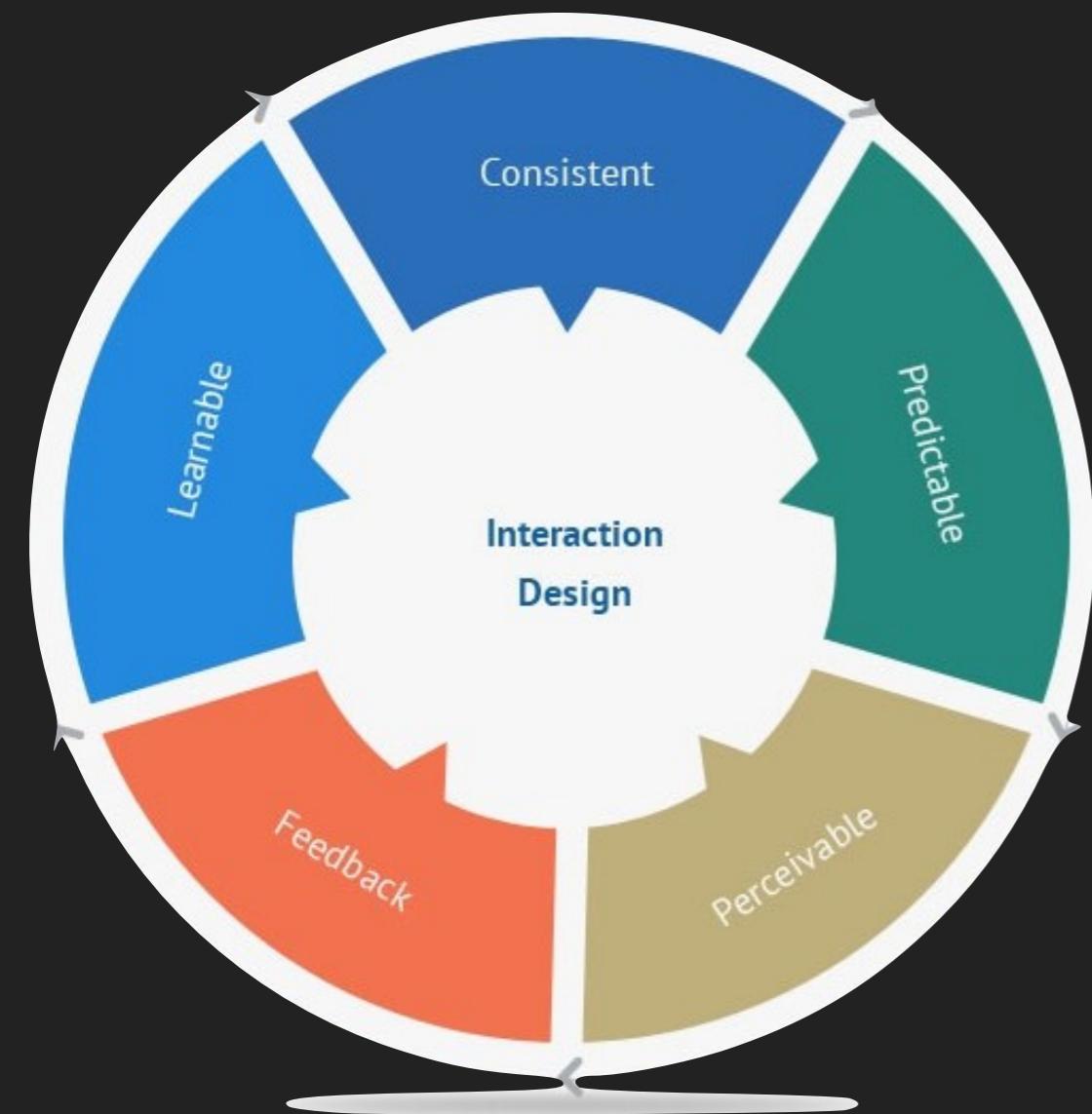
DESSATISFYING
HELPFUL
FUN
ENJOYABLE
MOTIVATING
PROVOCATIVE
ENGAGING
CHALLENGING
SURPRISING
PLEASURABLE
ENHANCING SOCIALITY
REWARDING
EXCITING
SUPPORTING CREATIVITY
EMOTIONALLY FULFILLING
ENTERTAINING
COGNITIVELY STIMULATING
EXPERIENCING FLOW

UNDESIRABLE ASPECTS

BORING
UNPLEASANT
FRUSTRATING
PATRONIZING
MAKING ONE FEEL GUILTY
MAKING ONE FEEL STUPID
ANNOYING
CUTESY
CHILDISH
GIMMICKY

USABILITY AND USER EXPERIENCE GOALS

- ▶ How do usability goals differ from user experience goals?
- ▶ Are there trade-offs between the two kinds of goals? (for example, can a product be both fun and safe?)
- ▶ How easy is it to measure usability versus user experience goals?



DESIGN PRINCIPLES FOR INTERACTION DESIGN

DESIGN PRINCIPLES

- ▶ Generalizable abstractions for thinking about different aspects of design
- ▶ The do's and don'ts of interaction design
- ▶ What to provide and what not to provide at the interface
- ▶ Derived from a mix of theory-based knowledge, experience, and common-sense

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





SWIMMING POOL
WESTERN WHIRLPOOL

4 4

GRAND BALL ROOM
FIFTH AVENUE ROOM

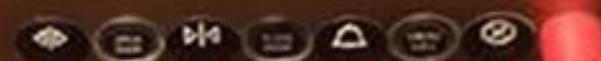
3 3

DAI KUAN
ANTE ROOM

M M

SAUCER ROOM
ANTE ROOM

L L



Office Tower

SL SL

10 10

9 9

B 8

7 7

6 6

5 5

4 4

3 3

2 2

1 1

G G

Ground Floor

4 4

5 5

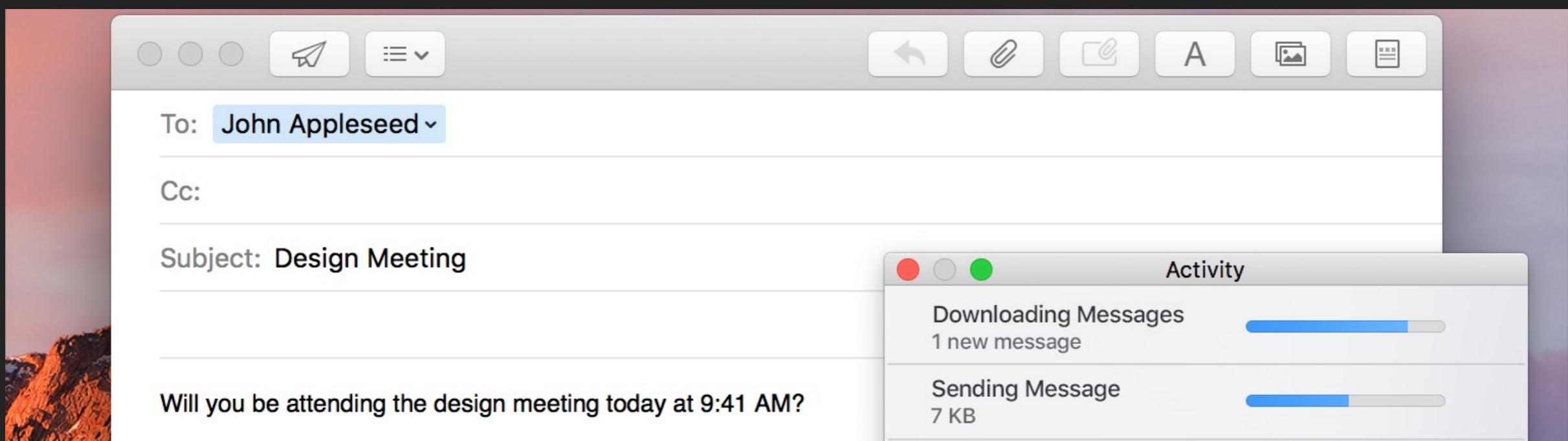
VISIBILITY

- ▶ Problems arise when we cannot “see” how to do use a device
- ▶ Sensor technology like auto faucets - not sure how to use - guess where to put hands
- ▶ Visible knobs, dials and buttons have been replaced by invisible and ambiguous “active zones”



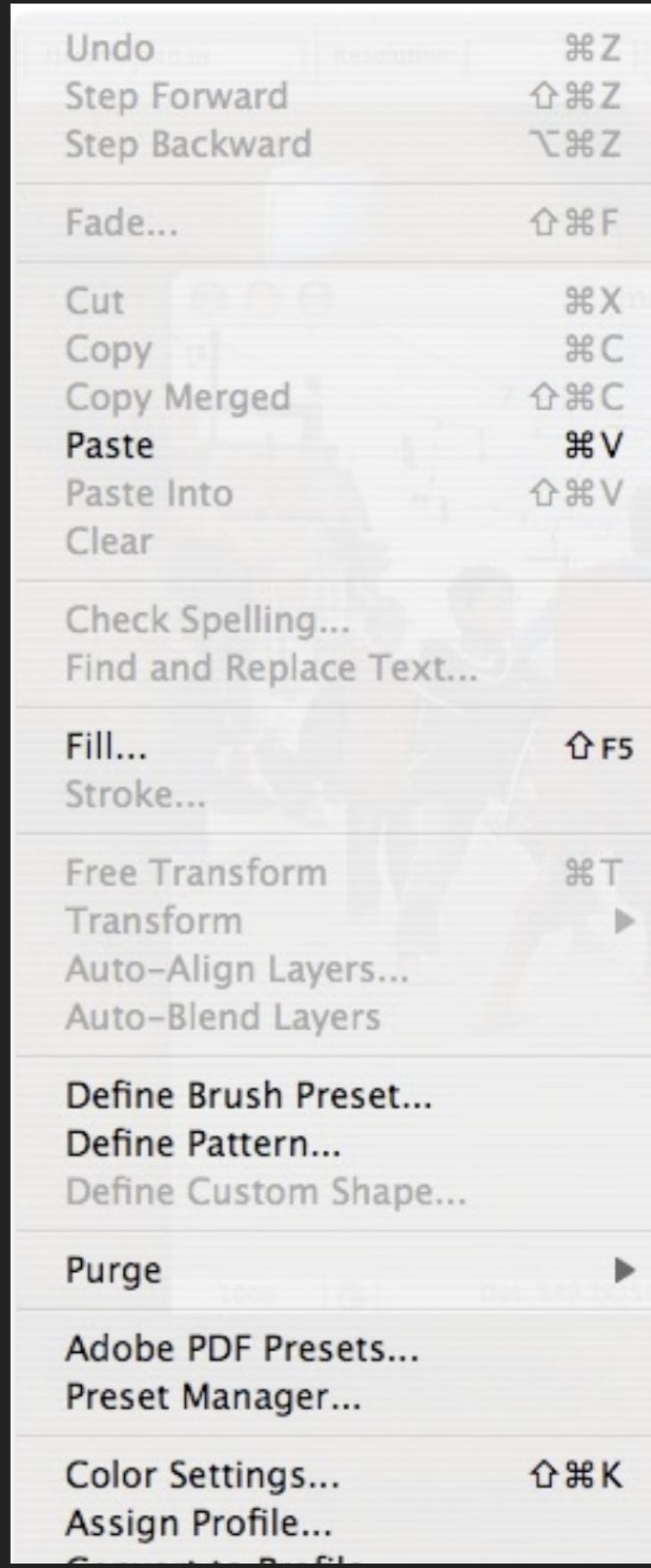
FEEDBACK

- ▶ Sending information back to the user about what has been done.
- ▶ What is the system/device doing now? What action has been performed?
- ▶ Needs to be immediate and synchronized with user action



CONSTRAINTS

- ▶ Restricting the possible actions that can be performed
- ▶ Helps prevent user from selecting incorrect options
- ▶ Physical objects can be designed to constrain things (for example, there being only one way you can insert a key into a lock)



CONSTRAINTS: LOGICAL OR AMBIGUOUS DESIGN?

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



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HOW TO DESIGN THEM MORE LOGICALLY



PROVIDE DIRECT
ADJACENT MAPPING
BETWEEN ICON AND
CONNECTOR.



PROVIDES COLOUR CODING
THAT ASSOCIATES THE
CONNECTORS WITH THE
LABELS.

CONSISTENCY

- ▶ Designing interfaces to have similar operations and use similar elements for achieving similar task.
- ▶ Systems are usable and learnable when similar concepts are expressed in similar ways.
- ▶ Enables people to quickly transfer prior knowledge to new contexts and focus on relevant tasks.

WHEN CONSISTENCY BREAKS DOWN

- ▶ What happens if there is more than one command starting with the same letter? (e.g. save, spelling, select, style)
- ▶ You have to find other initials or combinations of keys, thereby breaking the consistency rule (e.g. Ctrl+s, Ctrl+Sp, 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
 - ▶ Difficult to achieve with complex interfaces
- ▶ External consistency refers to designing operations, interfaces, and so on to be the same across applications and devices
 - ▶ Very rarely the case, based on different designer's preference



AESTHETIC CONSISTENCY



Style and appearance is repeated to enhance recognition communicates membership and sets emotional tone

FUNCTIONAL CONSISTENCY

- ▶ Meaning and action are consistent to improve learnability and understanding
- ▶ Consistent use of symbols to represent similar concepts, leverages prior knowledge and makes new things easier to use



TRAFFIC ALWAYS TURNS YELLOW
BEFORE RED — CASSETTE
RECORDER CONTROL SYMBOLS

CONSISTENCY: 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)

AFFORDANCES



Button - Push



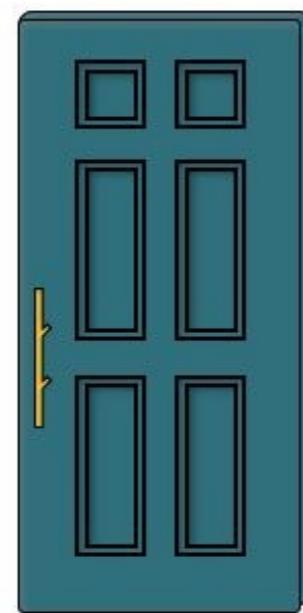
Switch - Flip



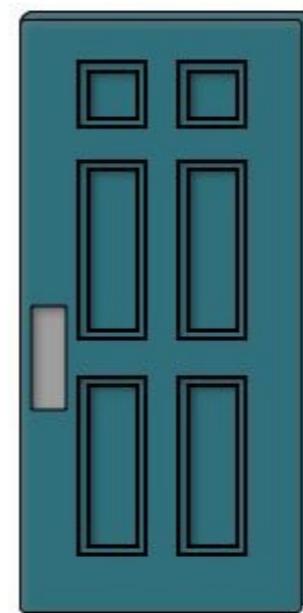
Knob - Rotate



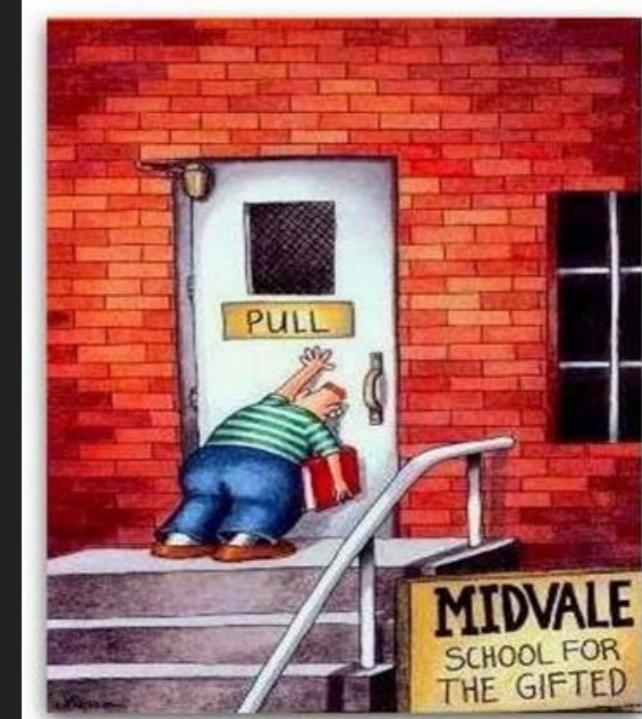
TURN



PULL



PUSH



Source: *The Far Side* by Gary Larson

DESIGN PRINCIPLES

- ▶ Donald Norman's *The Design of Everyday Things*. New York: Basic Books (1998).
- ▶ Donald Norman - cognitive scientist and engineer who has pioneered many ideas surrounding user centred-design.
- ▶ Worked for Apple, Hewlett Packard, Northwestern University, UCSD
- ▶ Critiques and examines many everyday items as examples of problematic designs
- ▶ Design principles a framework for discussing and thinking about everyday interactions .

DON NORMAN: THE NORMAN DOOR



- ▶ <https://www.youtube.com/watch?v=yY96hTb8WgI&t=2s>

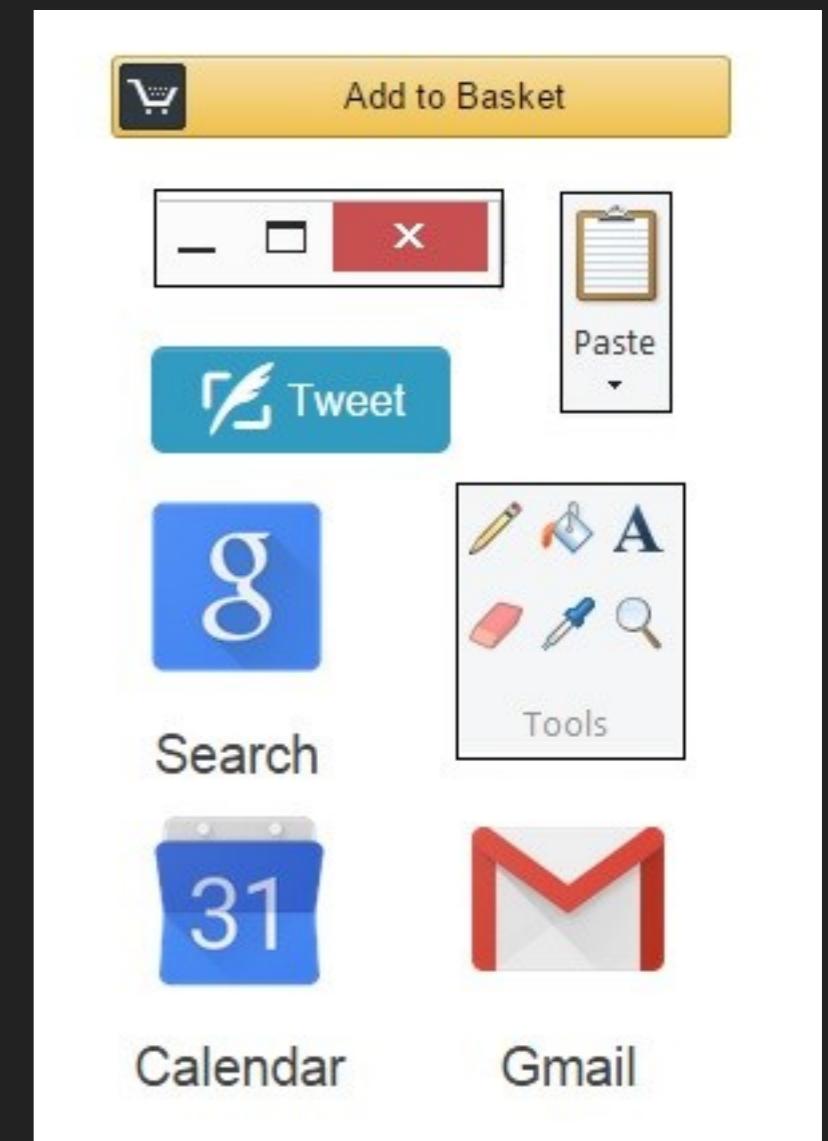
WHAT DOES “AFFORDANCE” HAVE TO OFFER INTERACTION DESIGN?

- ▶ 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
 - ▶ Some mappings are better than others

VIRTUAL AFFORDANCES

Virtual affordances

- ▶ How do these screen objects afford?
- ▶ What if you were a novice user?
- ▶ Would you know what to do with them?



KEY POINTS

- ▶ IxD is concerned with designing interactive products to support how people communicate and interact in their everyday and working lives.
- ▶ IxD is concerned with how to create quality user experiences for services, devices, and interactive products.
- ▶ It is multidisciplinary, involving many inputs from wide-reaching disciplines.
- ▶ Optimizing the interaction between users and interactive products requires consideration of a number of interdependent factors, including context of use, types of activity, UX goals, accessibility, cultural differences, and user groups.
- ▶ Design principles, such as feedback and simplicity, are useful heuristics for informing, analyzing, and evaluating aspects of an interactive product.

REFERENCES

- ▶ Whitney Hess examines Design Principles here:
<https://uxmag.com/articles/guiding-principles-for-ux-designers>
- ▶ An insightful, example-laced look into Design Principles:
<https://www.smashingmagazine.com/2018/01/universal-principles-ux-design/>
- ▶ A helpful piece addressing Design Principles' importance in mobile experiences: <https://uxplanet.org/mobile-ux-design-key-principles-dee1a632f9e6>