

Human Computer Interaction (HCI)

Week 4: Accessibility + HCI Concepts and Principles

Dr Tara Capel and Dr Uta Hinrichs



THE UNIVERSITY
of EDINBURGH

Today

- Accessibility
 - Accessibility factors
 - Inclusive and accessible design
- HCI Concepts and Principles
 - Human factors
 - Nielsen's usability heuristics
 - Morville's UX honeycomb
- Next steps

Accessible systems help everyone.

Accessibility Factors

- User Impairments – issues in body function or alteration in body structure.
- Activity Limitations – difficulties in executing activities.
- Participation Restrictions – problems exist in taking part in activities due to issues such as discrimination.
- Environmental Factors – facilitators or barriers in the environment impact on the user.
- Personal Factors – aspects such as motivation and self-esteem can influence an individual's participation.

Accessibility Factors

- User Impairments – issues in body function or alteration in body structure.
- Activity Limitations – difficulties in executing activities.



<https://www.businessofapps.com/insights/fat-finger-design-for-better-mobile-ux/>

Accessibility Factors

- Participation Restrictions – problems exist in taking part in activities due to issues such as discrimination.



<https://www.livescience.com/54692-why-bathrooms-are-gender-segregated.html>

Accessibility Factors

- Participation Restrictions – problems exist in taking part in activities due to issues such as discrimination.

Gender *

- ☐ Female
- ☐ Male
- ☐ Rather not to say

Accessibility Factors

- Participation Restrictions – problems exist in taking part in activities due to issues such as discrimination.

How do you currently describe yourself? (mark all that apply)

- ☐ Male
- ☐ Female
- ☐ Genderqueer / genderfluid
- ☐ Nonbinary
- ☐ Transgender
- ☐ Two-spirit
- ☐ Prefer to self-describe: _____
- ☐ Prefer not to say

<https://www.intellisurvey.com/blog/how-to-ask-gender-questions-online-surveys>

Accessibility Factors

- Environmental Factors –
facilitators or barriers in the environment impact on the user.



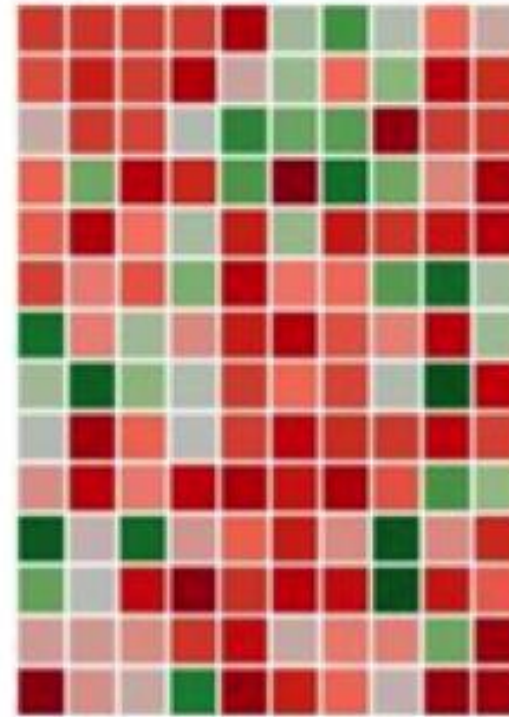
Accessibility Factors

- Personal Factors – aspects such as motivation and self-esteem can influence an individual's participation.



User Impairments

- Visual impairment
- Hearing impairment
- Physical impairment
- Speech impairment
- Dyslexia
- Autism
- Learning disability
- Age group related impairments



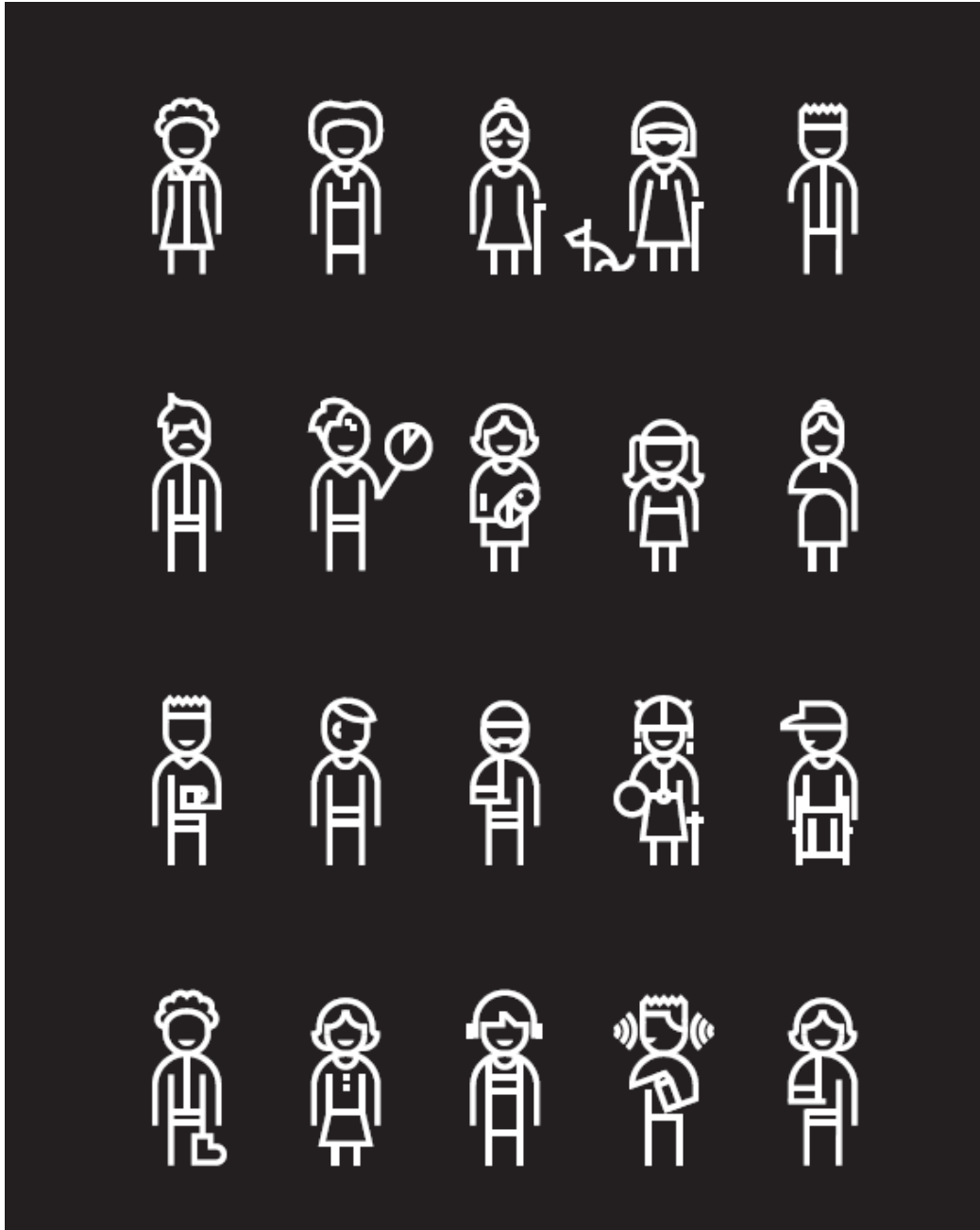
<https://www.tableau.com/en-gb/blog/examining-data-viz-rules-dont-use-red-green-together>

Inclusive and Accessible Design

Inclusive and Accessible Design

- **Inclusive Design** –
a design methodology that enables and draws on the full range of human diversity
- **Accessibility** –
the qualities that make an experience open to all
- If we start the design process from our own abilities and biases, we end up with products designed for people of a specific gender, age, language ability, tech literacy and physical ability
- Designing for inclusivity opens up products and experiences to more people with a wider range of abilities

<https://inclusive.microsoft.design/>



When it comes to people, there is no such thing as “normal”.

Microsoft Inclusive 101 Guidebook, p. 16

Inclusive Design Principles

- **Recognise Exclusion** –
exclusion can occur when we design from our own biases, we are responsible for knowing when our designs cause exclusion
- **Learn from Diversity** –
people adapt to different situations, understanding these adaptations is the key to real insights
- **Solve for one, extend to many** –
inclusive design connects different people who have similar circumstances, consequently benefitting a wider range of people

Inclusive Design Principles

- **Recognise Exclusion –**
exclusion can occur when we design from our own biases, we are responsible for knowing when our designs cause exclusion



Inclusive Design Principles

Increased
Mobility of
Technology



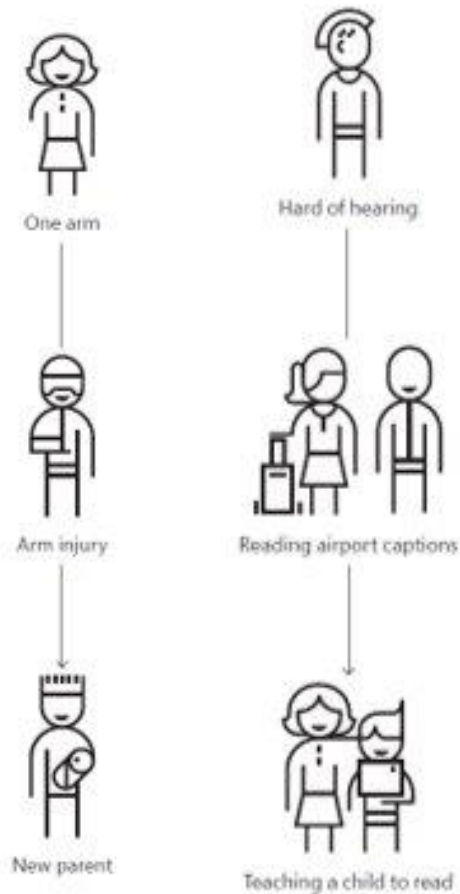
Increased
Moments of
Disability

- **Learn from Diversity** – people adapt to different situations, understanding these adaptations is the key to real insights

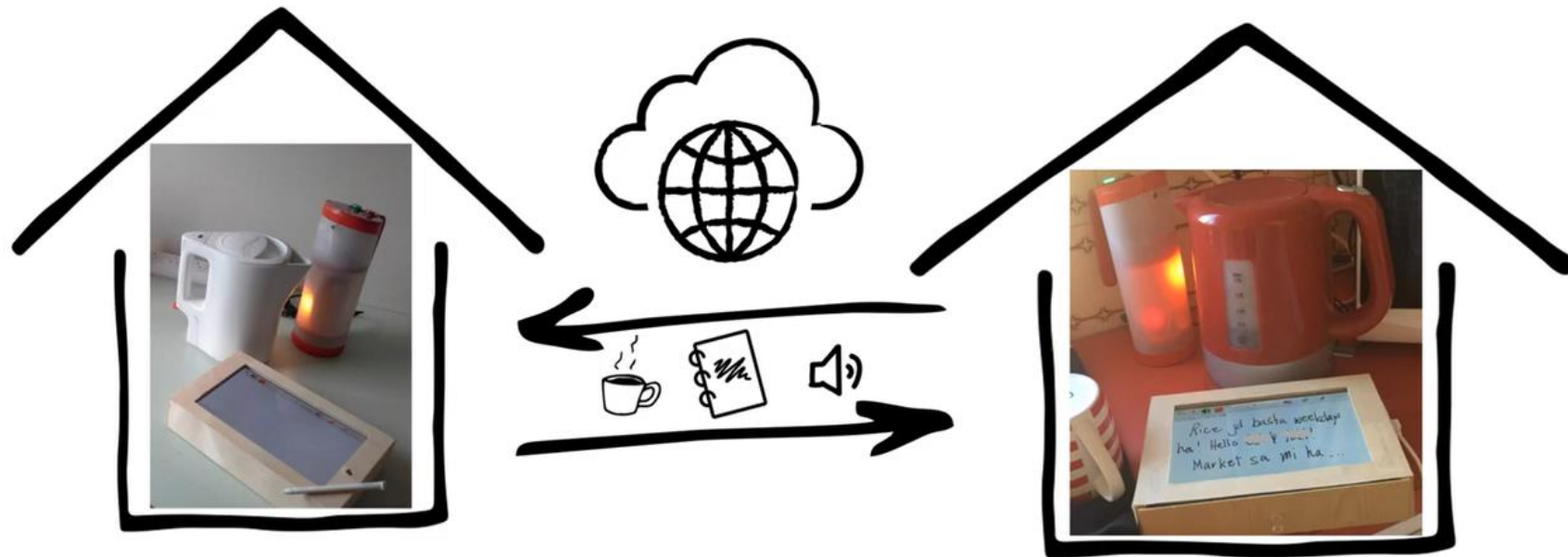
Mobile technologies can make situational limitations highly relevant to many people today. Mobile puts in focus questions like: Are we forced to adapt to technology, or is technology adapting to us?

Microsoft Inclusive 101 Guidebook

Inclusive Design Principles



- **Solve for one, extend to many** – inclusive design connects different people who have similar circumstances, consequently benefitting a wider range of people



Margot Brereton, all rights reserved

Example: The Messaging Kettle

Ambe, Aloha Hufana, Alessandro Soro, Daniel Johnson, and Margot Brereton. "From collaborative habituation to everyday togetherness: a long-term study of use of the messaging kettle." *ACM Transactions on Computer-Human Interaction (TOCHI)* 29, no. 1 (2022): 1-47.

The Messaging Kettle

- Designing technology with older adults
- Problem
 - Maintaining long-distance social connection
 - Frustrations with existing technologies
- Method
 - Contextual interviews
 - Object interviews with older adults in their homes
 - Discussion of social routines, activities with others and alone, technology use, favourite things, values and culture



Photos from Margot Brereton, all rights reserved

Tea Making Habits



Photos from Margot Brereton, all rights reserved



The Role of HCI

- Inclusive and accessible design highlights the importance of user research to gain insights into diverse user groups
- Through methods such as interviews, diaries and usability and user experience testing we can understand users' needs and challenges
- Encourages empathy to design with end-users in mind, considering their diverse backgrounds, abilities and preferences
- Emphasises the role of user testing and iterative design to ensure inclusivity
- Encourages collaboration and feedback from diverse user groups throughout the design process

Methods and Resources

- Raising awareness of accessible policies and guidelines
<https://www.w3.org/TR/WCAG21/>
<https://www.ideasforears.org.uk/hearing-access-protocol/>
- Developing tools to assist in accessible design
<https://www.semanticscholar.org/paper/Using-Automated-Tools-to-Improve-Web-Site-Usage-by-Ivory-Mankoff/7bb9856bb44e56fb117efa9625ae728986adf1ba>
- Coordinating with the (disabled) community
<https://dl.acm.org/doi/10.1145/2661334.2661361>
- Conducting accessibility self assessment
<https://g3ict.org/publication/g3ict-ict-accessibility-self-assessment-framework>
- Microsoft Inclusive Design: <https://inclusive.microsoft.design/>
- Google Material Design: <https://m3.material.io/>
- Colour Contrast Checker: <https://webaim.org/resources/contrastchecker/>

Any questions?

HCI Concepts and Principles

Understanding People, Usability and User Experience

- HCI draws on a wide range of theories, concepts and principles to understand how people interact with technology and inform the design of better experiences
- We will discuss three perspectives that provide a foundation for understanding and improving human-technology interactions:
 - **Human Factors:** exploring how human capabilities, limitations and contexts influence interactions with technology
 - **Nielsen's Usability Heuristics:** applying principles to identify usability problems and improve interactive systems
 - **Morville's UX Honeycomb:** considering the broader qualities that make technology useful, meaningful and valuable

Human Factors

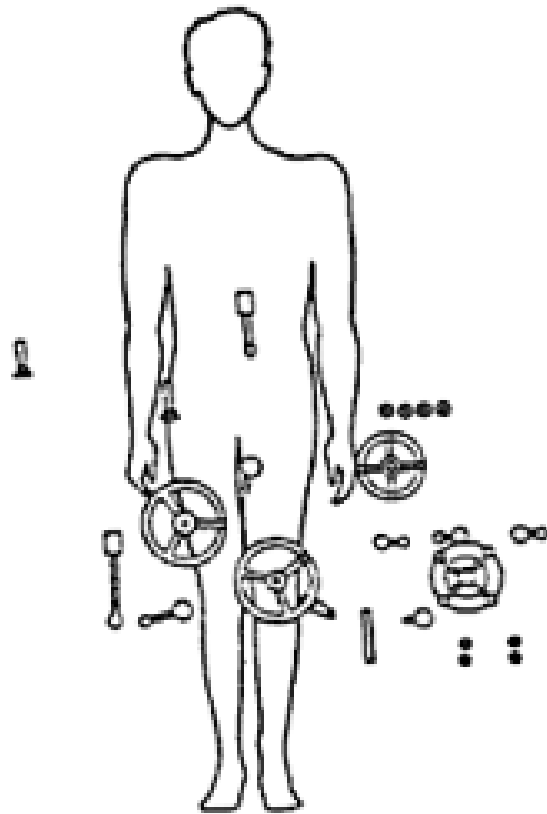
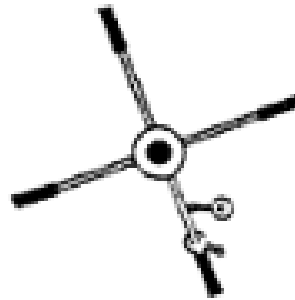
Human Factors

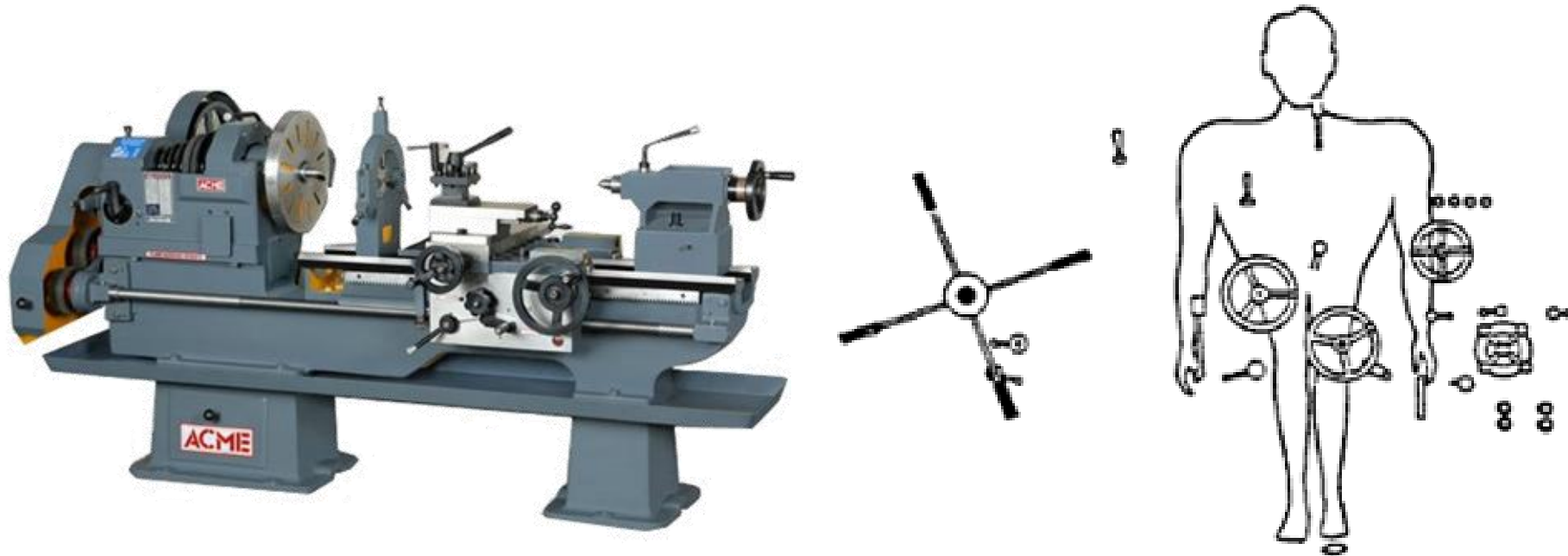
The factors that impact the way in which a person would interact with a piece of technology

- Anthropometric factors: physical, anatomical and physiological aspects
- Behavioural factors: what can users see, perceive and act on?
- Cognitive factors: what cognitive processes are involved when someone uses a system?
- Social factors: what is the social context in which a system is used? (Refer to week 3 lecture for social factors)

What is Anthropometrics?

- Anthropometrics is the study of the physical measurements of the human body and how these influence the way people interact with technology
- Includes:
 - Height
 - Arm reach
 - Hand size
 - Strength
 - Range of motion
 - Posture





The controls of a lathe in are not within easy reach of the average man, but are so placed that the ideal operator should be 137 cm (4.5ft) tall, 61cm (2 ft) across the shoulders and have an arm span of 234cm (8ft). (Pheasant, 1986)

Technology-centric design --> **human-centred design**

Why it matters

- Poor anthropometric design leads to:
 - Discomfort
 - Fatigue
 - Injury
 - Strain
 - Reduced performance
 - Exclusion
- Good anthropometric design leads to:
 - Comfort
 - Improved safety
 - Enhanced efficiency
 - Inclusion

Human Variation

- Humans vary in height, arm length, hand size, reach and strength
- Important to avoid “one-size-fits-all”
- Use percentile data to ensure most people can interact comfortably

Human Variation: VR Headsets

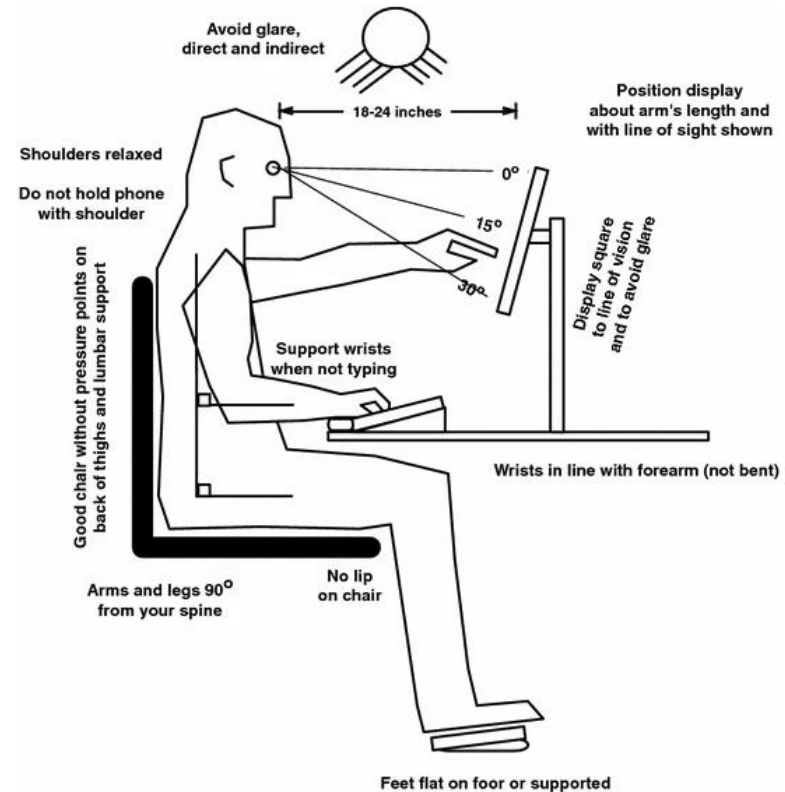
- VR headsets are largely designed and tested on male-average body measurements
- Leading to higher rates of discomfort, injury and motion sickness for others



Heinrich-Böll-Stiftung/flickr

Physical Setup and Workspace Design

- Importance of setup:
 - The physical placement of keyboards, monitors, mice, screens, seats, etc
- Examples:
 - Monitor height
 - Keyboard position
 - Seating and support



Touch and Haptics

- Touch Interaction:
 - Mobile and touch-screen devices are common
 - Important to consider touch zones, gesture, button spacing, thumbing
- Haptic Feedback:
 - Tactile feedback such as vibrations, textures or resistance to help users confirm or avoid actions
 - Smartphone/smartwatch vibrations, video game controller rumble, VR suit sensations



<https://osxdaily.com/2019/12/15/how-lock-screen-orientation-iphone-ipad/>
<https://blog.hubspot.com/marketing/how-to-use-instagram>

Implications

- Measure: use data on human body dimensions where possible
- Design for variability: consider variations in height, arm length, reach, strength, etc
- Adaptivity: systems should be adjustable
- Test with users: validate your designs with people of varied body types

What is cognition and behaviour?

Working definitions for today:

Cognition: *mental actions or processes through that support knowledge building and understanding*

Behaviour: *how we act on the world, based on our understanding, perception and experience of it*

Why do cognition and behaviour matter in technology design?

1. Form reasonable expectations on users: What they can and cannot be expected to do.
2. Help us explain the nature and causes of problems that users encounter
3. Provides theories, modeling tools, guidance, and methods that can lead to the design of better interactive products

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

What's wrong with
these stairs?



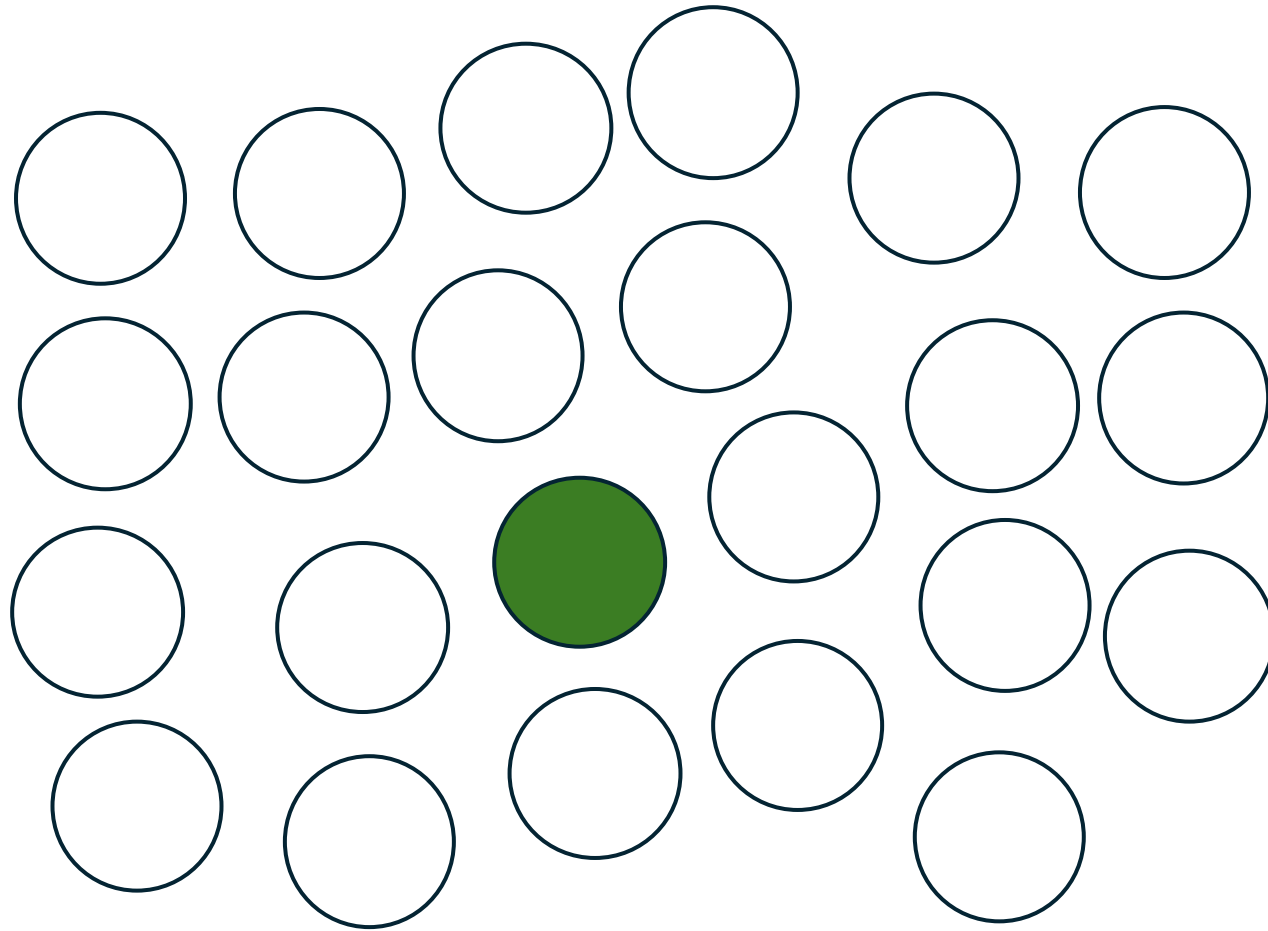
[https://usabilitygeek.com/
the-bad-design-of-
everyday-things/](https://usabilitygeek.com/the-bad-design-of-everyday-things/)

Visual cognition/
Perception/attention

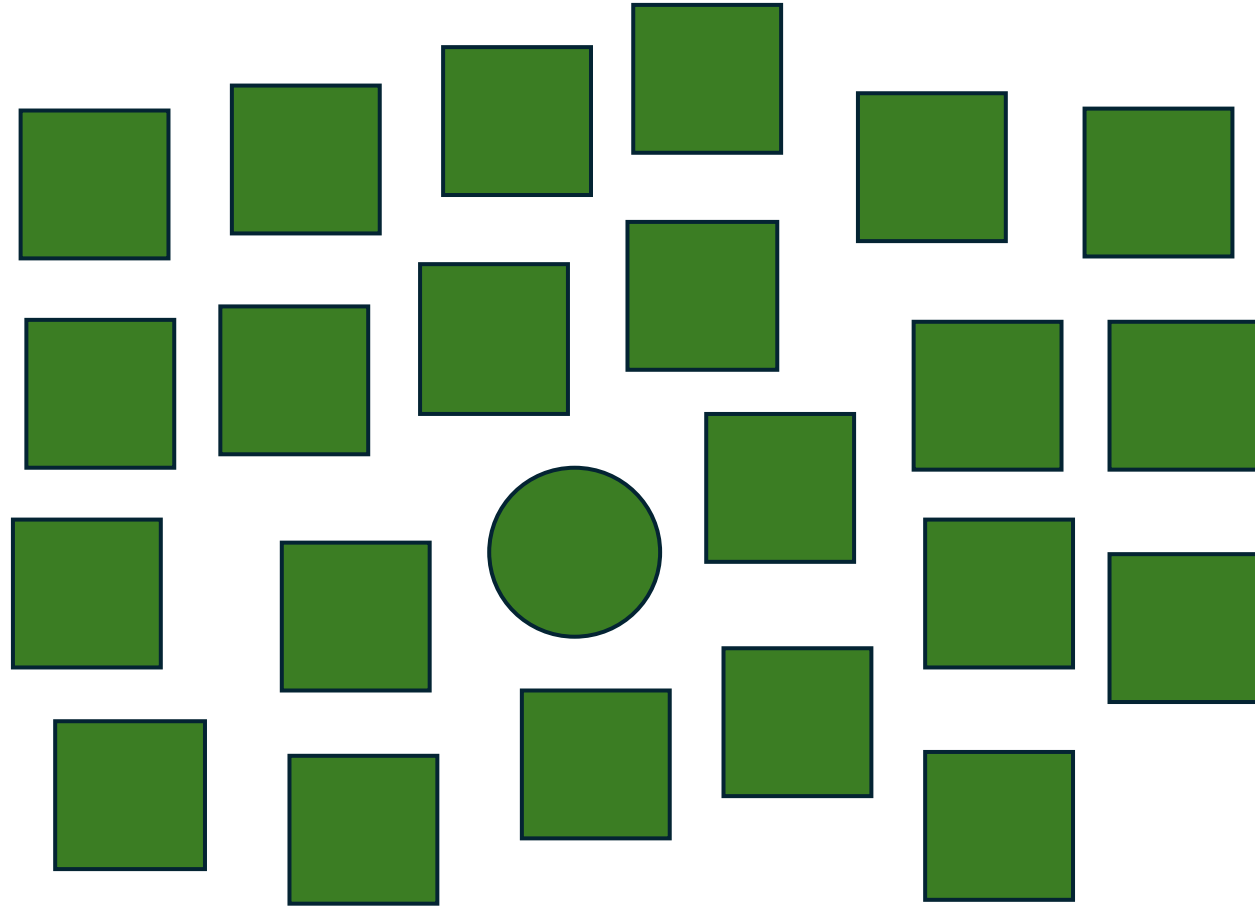


[https://usabilitygeek.com/
the-bad-design-of-
everyday-things/](https://usabilitygeek.com/the-bad-design-of-everyday-things/)

Visual cognition & pre-attentive processing



Visual cognition & pre-attentive processing



What's wrong with this password setting feature?



Password must contain 8–16 characters, a number (0–9), a lowercase letter (a–z) and an uppercase letter (A–Z). Special characters, except periods (.), commas (,) tildes (~) and brackets (< >), are allowed.

Email

example@example.com

Password

••••••••



Sign up

Cognitive load / Memory



Password must contain 8–16 characters, a number (0–9), a lowercase letter (a–z) and an uppercase letter (A–Z). Special characters, except periods (.), commas (,) tildes (~) and brackets (< >), are allowed.

Email

example@example.com

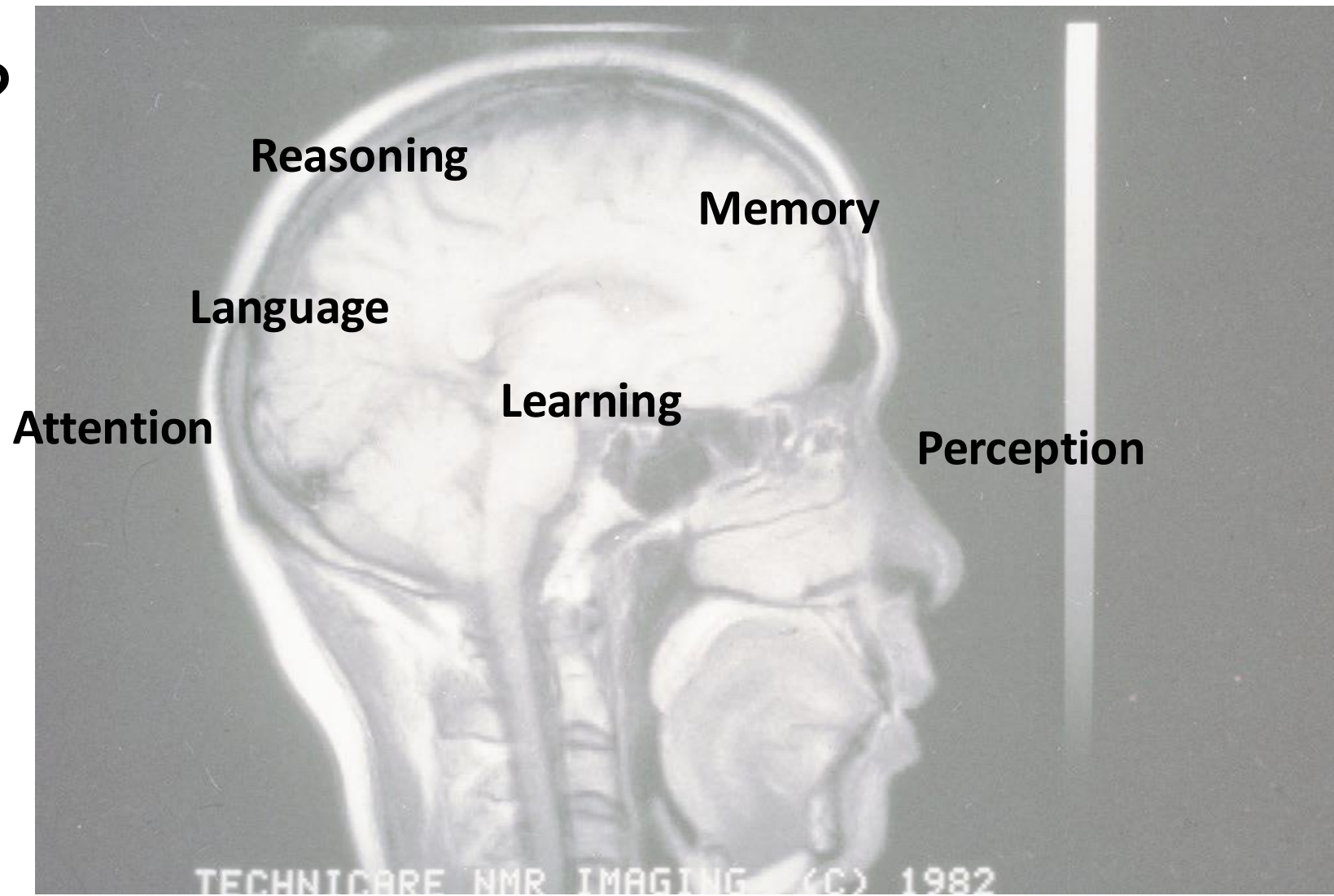
Password

.....



Sign up

What is cognition?



Each aspect of human cognition is interlinked with others; each filters information to make cognition efficient and *useful*; this also leads to limitations!

Attention

- Selecting things on which to concentrate at a point in time from the mass of stimuli around us
- Allows us to focus on information that is relevant to what we are doing
- Involves sensory information
- Goal-oriented (driven by the task at hand) and saliency-based (what is particularly noticeable)

Attention

Prices of double rooms

Pennsylvania

Bedford Motel/Hotel: Crinaline Courts

(814) 623-9511 S: \$118 D: \$120

Bedford Motel/Hotel: Holiday Inn

(814) 623-9006 S: \$129 D: \$136

Bedford Motel/Hotel: Midway

(814) 623-8107 S: \$121 D: \$126

Bedford Motel/Hotel: Penn Manor

(814) 623-8177 S: \$119 D: \$125

Bedford Motel/Hotel: Quality Inn

(814) 623-5189 S: \$123 D: \$128

Bedford Motel/Hotel: Terrace

(814) 623-5111 S: \$122 D: \$124

Bradley Motel/Hotel: De Soto

(814) 362-3567 S: \$120 D: \$124

Bradley Motel/Hotel: Holiday House

(814) 362-4511 S: \$122 D: \$125

Bradley Motel/Hotel: Holiday Inn

(814) 362-4501 S: \$132 D: \$140

Breezewood Motel/Hotel: Best Western Plaza

(814) 735-4352 S: \$120 D: \$127

Breezewood Motel/Hotel: Motel 70

(814) 735-4385 S: \$116 D: \$118

South Carolina

City	Motel/Hotel	Area code	Phone	Rates	
				Single	Double
Charleston	Best Western	803	747-0961	\$126	\$130
Charleston	Days Inn	803	881-1000	\$118	\$124
Charleston	Holiday Inn N	803	744-1621	\$136	\$146
Charleston	Holiday Inn SW	803	556-7100	\$133	\$147
Charleston	Howard Johnsons	803	524-4148	\$131	\$136
Charleston	Ramada Inn	803	774-8281	\$133	\$140
Charleston	Sheraton Inn	803	744-2401	\$134	\$142
Columbia	Best Western	803	796-9400	\$129	\$134
Columbia	Carolina Inn	803	799-8200	\$142	\$148
Columbia	Days Inn	803	736-0000	\$123	\$127
Columbia	Holiday Inn NW	803	794-9440	\$132	\$139
Columbia	Howard Johnsons	803	772-7200	\$125	\$127
Columbia	Quality Inn	803	772-0270	\$134	\$141
Columbia	Ramada Inn	803	796-2700	\$136	\$144
Columbia	Vagabond Inn	803	796-6240	\$127	\$130

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

Attention

Design implications:

- Context: Make information salient when it needs to be attended to at a given stage of a task
- Use techniques to achieve this:
 - For example, color, ordering, spacing, underlining, sequencing, and animation
- Avoid cluttering visual interfaces with too much information

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

Memory

- Memory is not complete - we filter what our brains think is important
- We first *encode* then *retrieve* knowledge - this is tied to attention
- The more attention paid to something...The more it is processed in terms of thinking about it and comparing it with other knowledge...The more likely it is to be remembered
- Context is important as to how we remember (that is, where, when, how and so on)
- We recognize things much better than being able to recall things

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

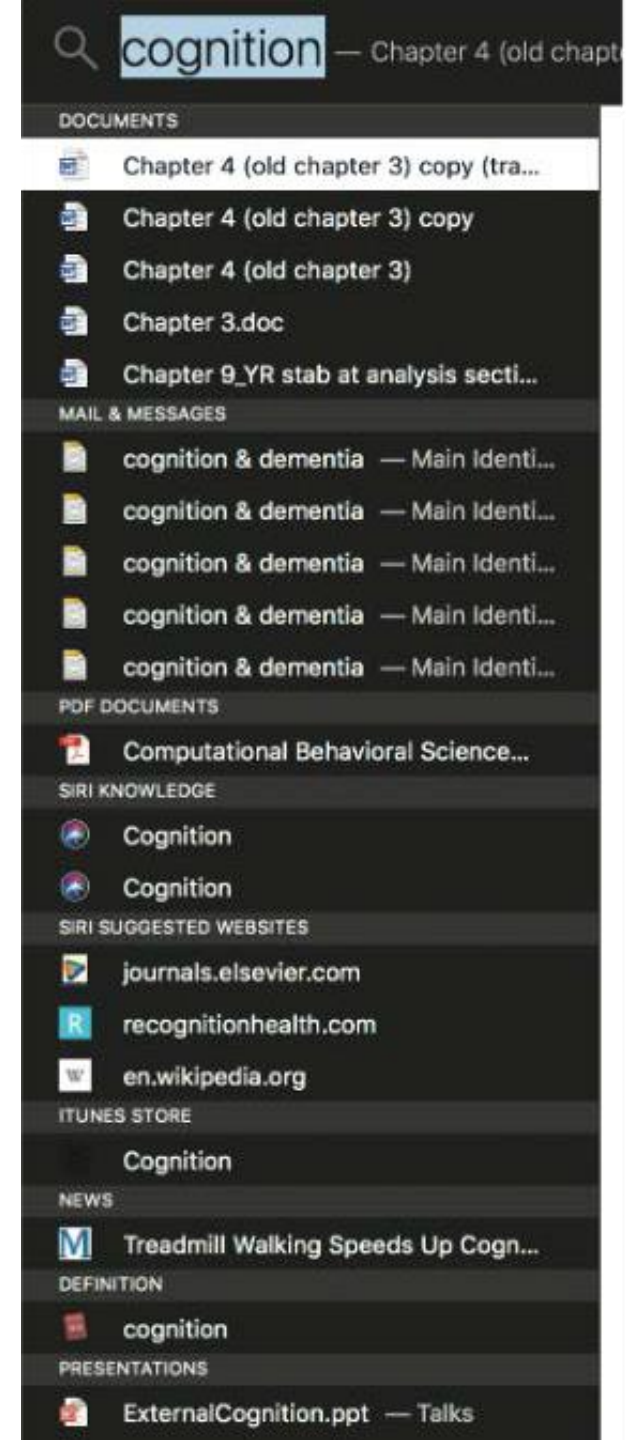
Memory

Design implications:

- Reduce cognitive load by avoiding long and complicated procedures for carrying out tasks
- Design interfaces that promote recognition rather than recall
- Provide users with various ways of labelling digital information to help them easily identify it again
- For example, folders, categories, color, flagging, and time stamping

Key Reference

Sharp, Helen, Yvonne Rogers, and Jenny Preece. Chapter 4, Interaction Design : Beyond Human-Computer Interaction.



Learning and mental models

- Question: How much can we expect people to learn/know about how technology works?
- How much do *you* know about how contactless card payment works?
- How much do you know about how a thermostat works?
- How much do you know about how a smart speaker works?

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

Learning and mental models

- As technology designers and developers, we may assume people have a more complete understanding of technology; however, as people we our mental models are often “poor, often incomplete, easily confusable, based on inappropriate analogies and superstition” (Norman, 1983)
- People prefer to "learn-by-doing" rather than following manuals

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.

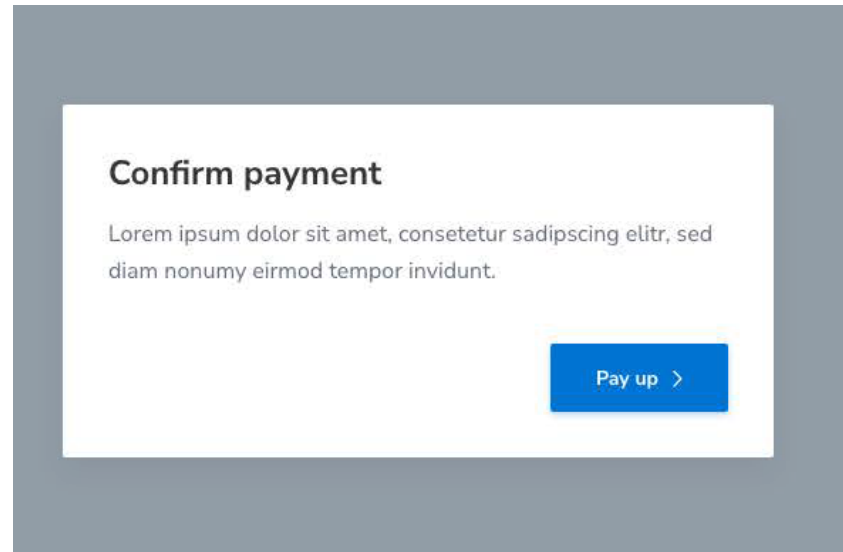
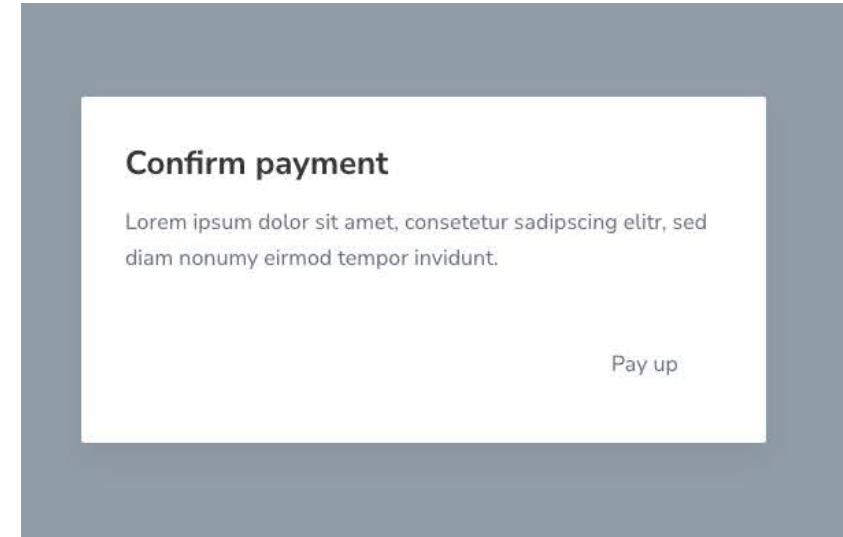
Learning and mental models

Design implications:

- Clear and easy to use instructions
- Appropriate tutorials and contextual sensitive guidance
- Provide online videos and chatbot windows when needing help
- Transparency: to make interfaces "intuitive" to use
- Affordances of what actions an interface allows
- For example, swiping, clicking, or selecting

Key Reference

Sharp, Helen, Yvonne
Rogers, and Jenny
Preece. Chapter 4,
Interaction Design : Beyond
Human-Computer
Interaction.



Nielsen's Usability Heuristics

Nielsen's Usability Heuristics

- 1: Visibility of System Status
- 2: Match Between the System and the Real World
- 3: User Control and Freedom
- 4: Consistency and Standards
- 5: Error Prevention
- 6: Recognition Rather than Recall
- 7: Flexibility and Efficiency of Use
- 8: Aesthetic and Minimalist Design
- 9: Help Users Recognize, Diagnose, and Recover from Errors
- 10: Help and Documentation

1. Visibility of System Status

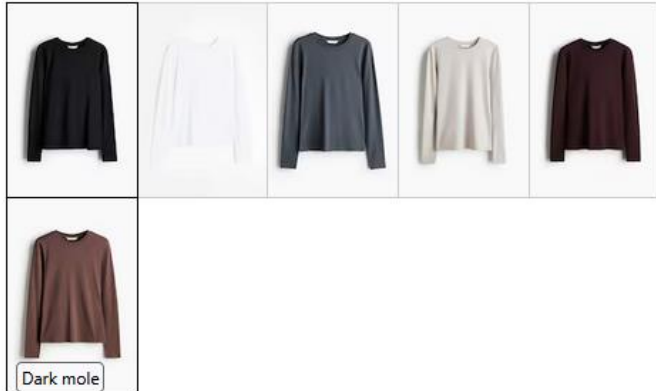
“Communicating the current state allows users to feel in control of the system, take appropriate actions to reach their goal, and ultimately trust the brand” or the system.



<https://www.nngroup.com/articles/visibility-system-status/>

1. Visibility of System Status

COLOUR: Dark mole



SELECTED SIZE: M

~~XXS~~	XS	S	M	L
XL	XXL	~~3XL~~	~~4XL~~	

[SIZE GUIDE](#)

ADD

Find in store

[CHECK AVAILABILITY](#)

COLOUR: Black



SELECTED SIZE: 3XL

~~XXS~~	XS	S
XL	XXL	~~3XL~~

SIZE 3XL IS OUT OF STOCK

Get notified if it comes back in stock. [Notify me!](#)

Similar products available in size 3XL



LONG-SLEEVED COTTO...
£9.99



LONG-SLEEVED JERSE...
£12.99



Find in store

NOTIFY

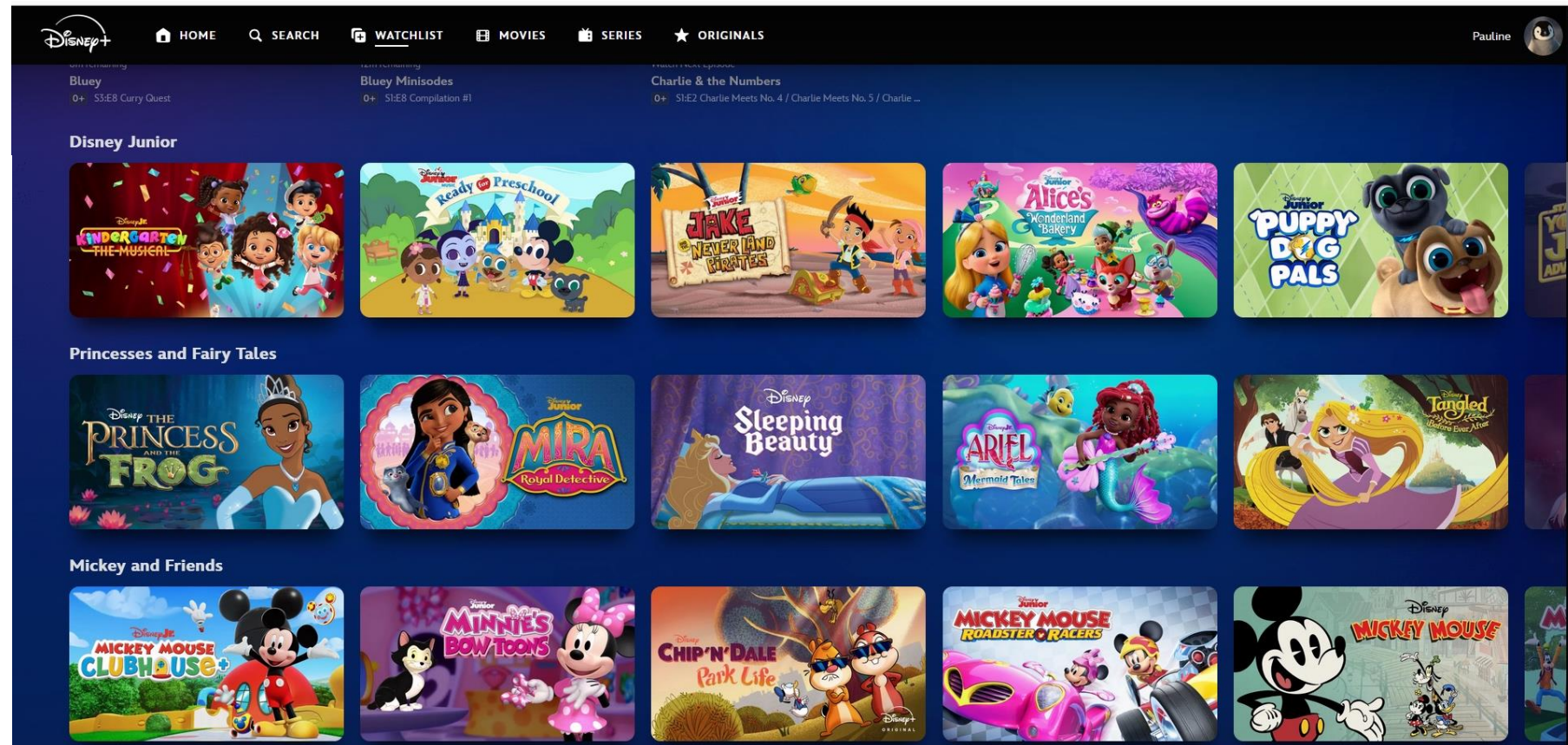
2. Match Between the System and the Real World

- Systems should speak the users' language with familiar words, phrases, and concepts rather than system-oriented terms.
- Interfaces that follow real-world conventions and make information appear in a natural and logical order demonstrate empathy and acknowledgement for users.

2. Match Between the System and the Real World



Volume buttons on ear phones.

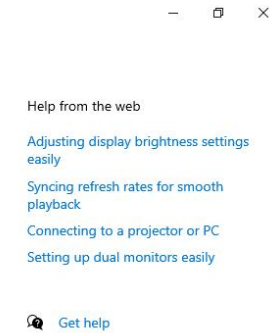
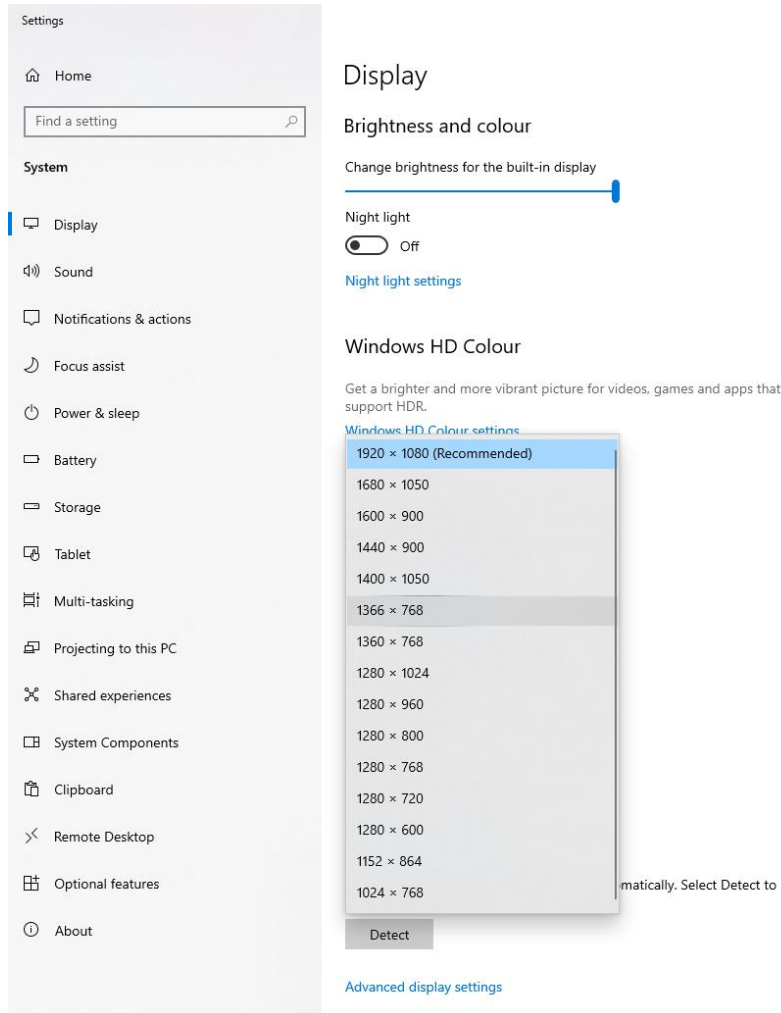


Overview of digital music, video or book collections

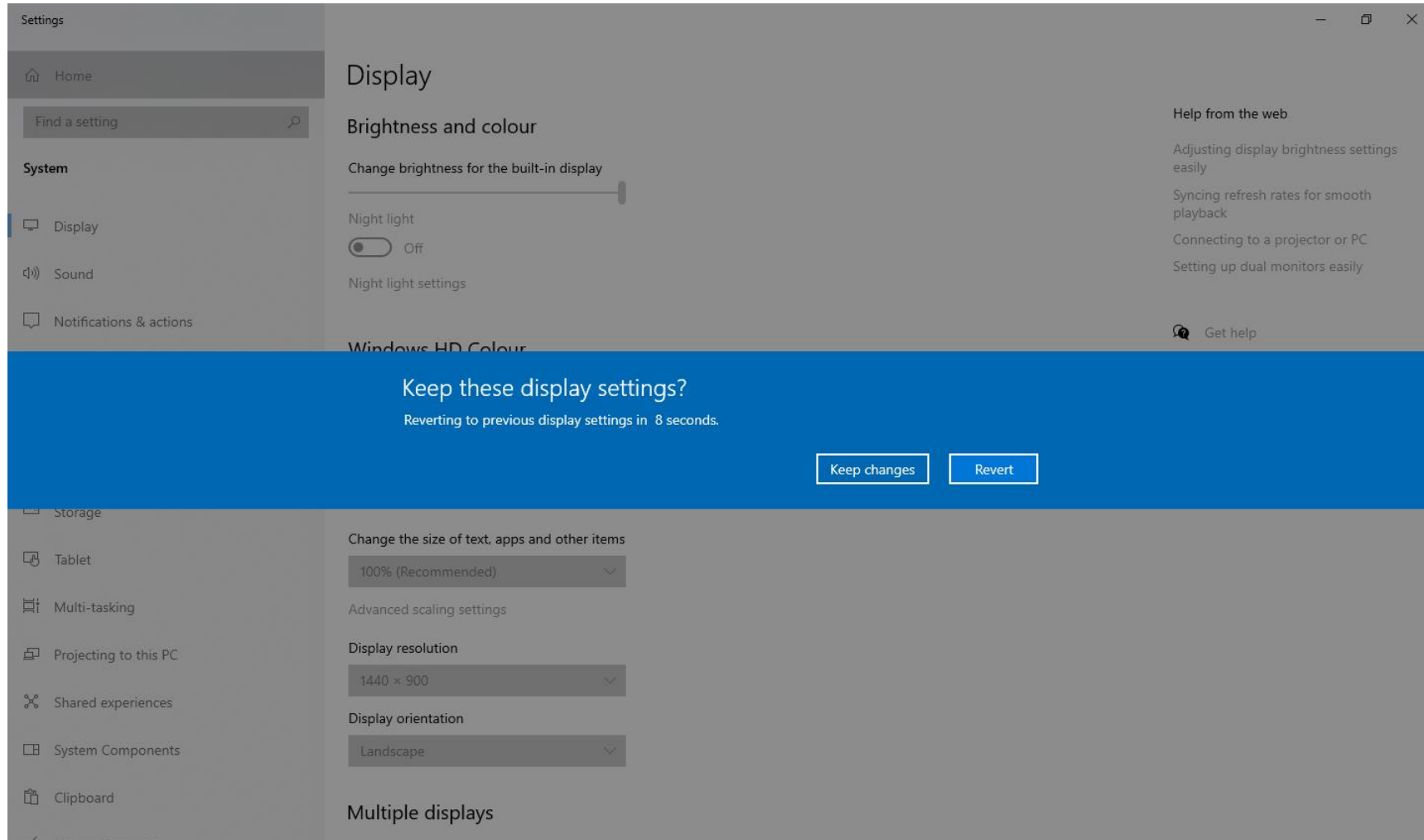
3: User Control and Freedom

- Users often make mistakes or change their minds. Allow them to exit a flow or undo their last action and go back to the system's previous state.
- Always have a way out
 - Undo
 - Exit
 - Cancel

3: User Control and Freedom



3: User Control and Freedom

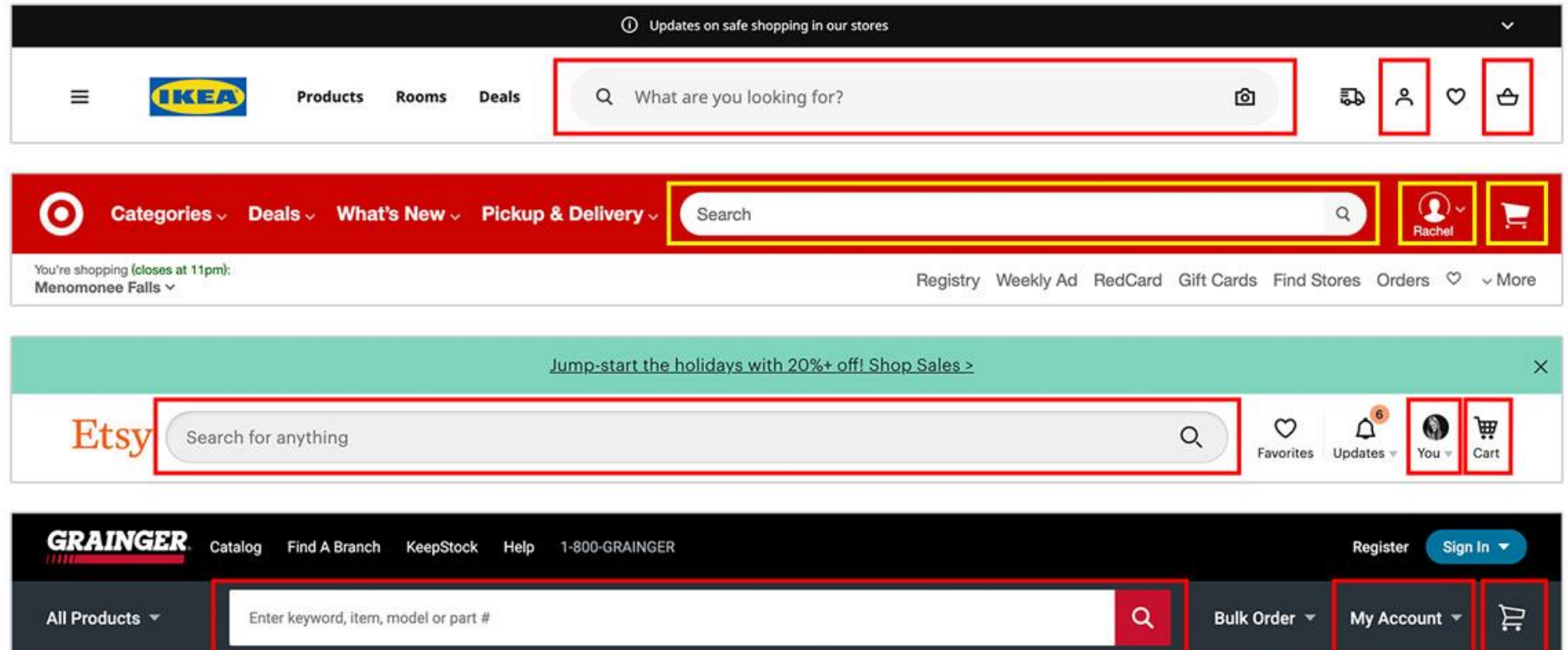


3: User Control and Freedom

- Users often make mistakes or change their minds. Allow them to exit a flow or undo their last action and go back to the system's previous state.
- Always have a way out
 - Undo
 - Exit
 - Cancel
- Adjustability
 - Sound
 - Input modality
 - Display settings

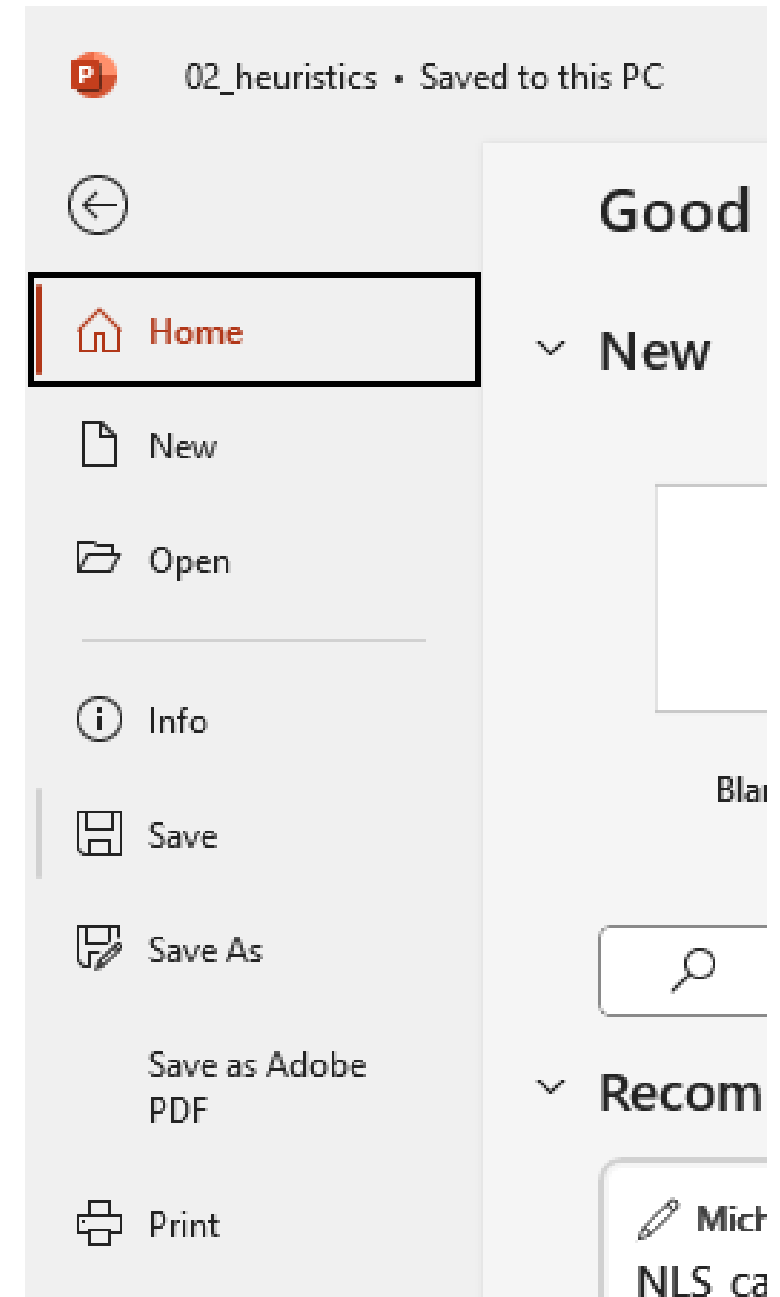
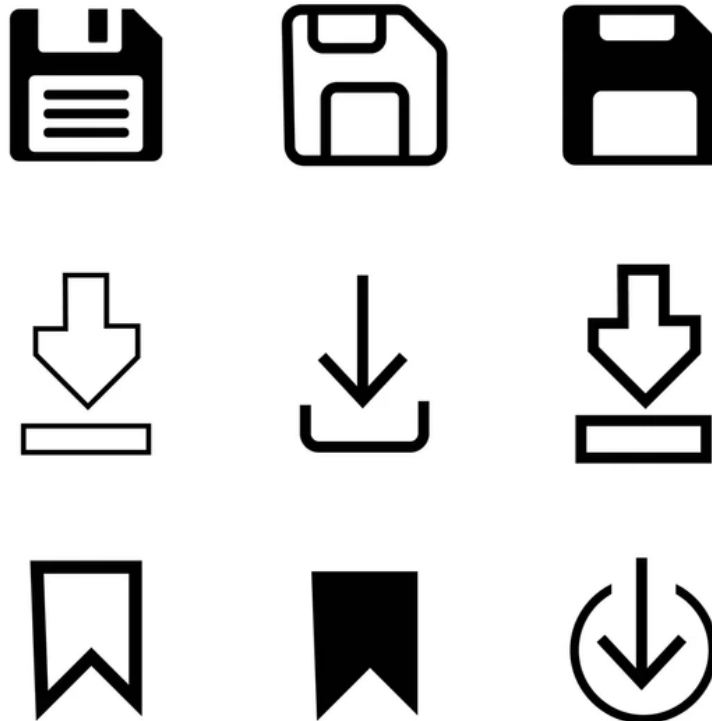
4: Consistency and Standards

- When things look and behave the same, we know what to expect
 - Less cognitive load
 - Eases adaption to new systems



4: Consistency and Standards

- Note that standards can change
 - See “save” icon



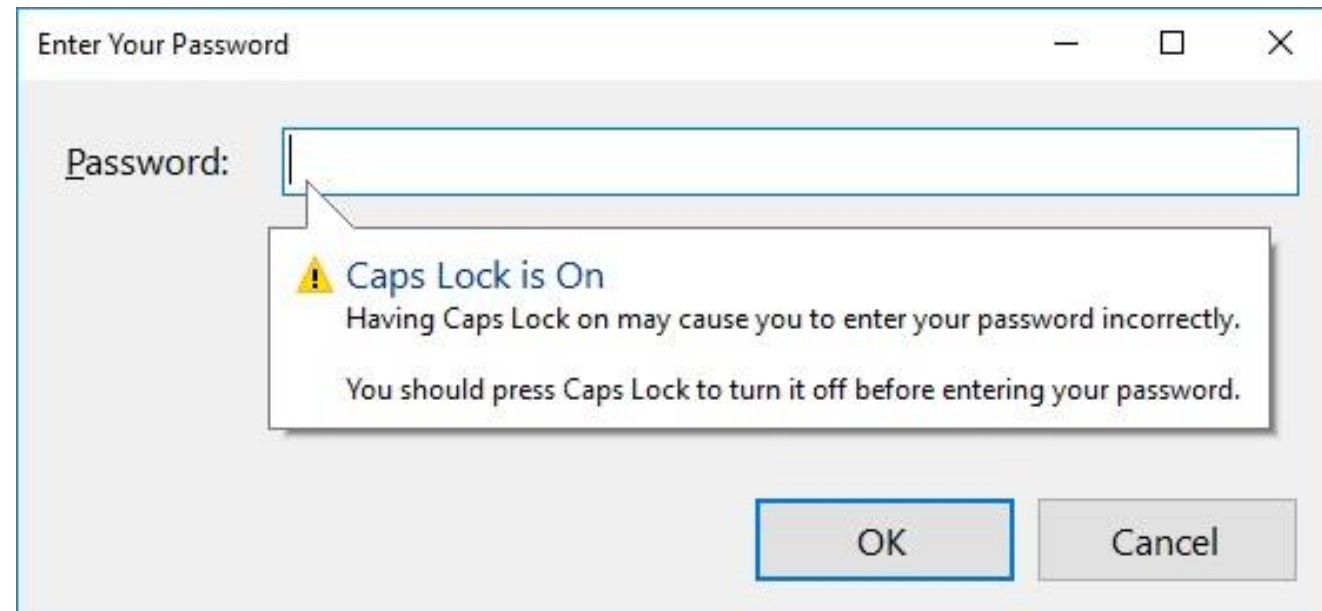
5: Error Prevention

- Prevent unconscious errors by offering suggestions, utilizing constraints, and being flexible.
- Error types
 - Mistakes
 - Slips
- Mistakes
 - Conscious errors; often the user has incomplete or incorrect information about the task and develops a mental model that does not match how the interface actually works

<https://www.nngroup.com/articles/user-mistakes/>

5: Error Prevention

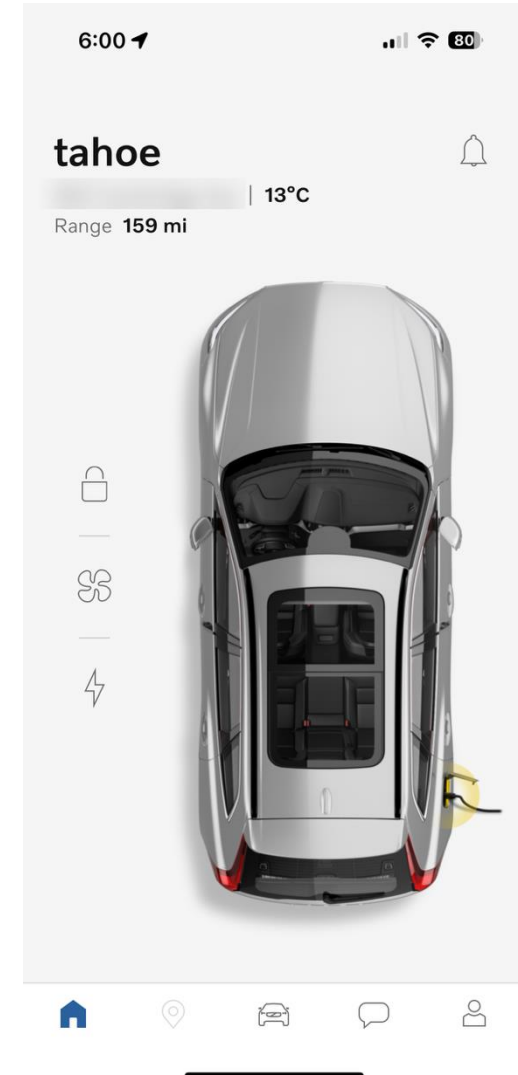
- Slips
 - User intends to perform an action but does something else by accident.
- Preventing slips
 - Include helpful constraints
 - Offer suggestions
 - Choose good defaults
 - Use forgiving formatting



<https://www.nngroup.com/articles/slips/>

6: Recognition Rather than Recall

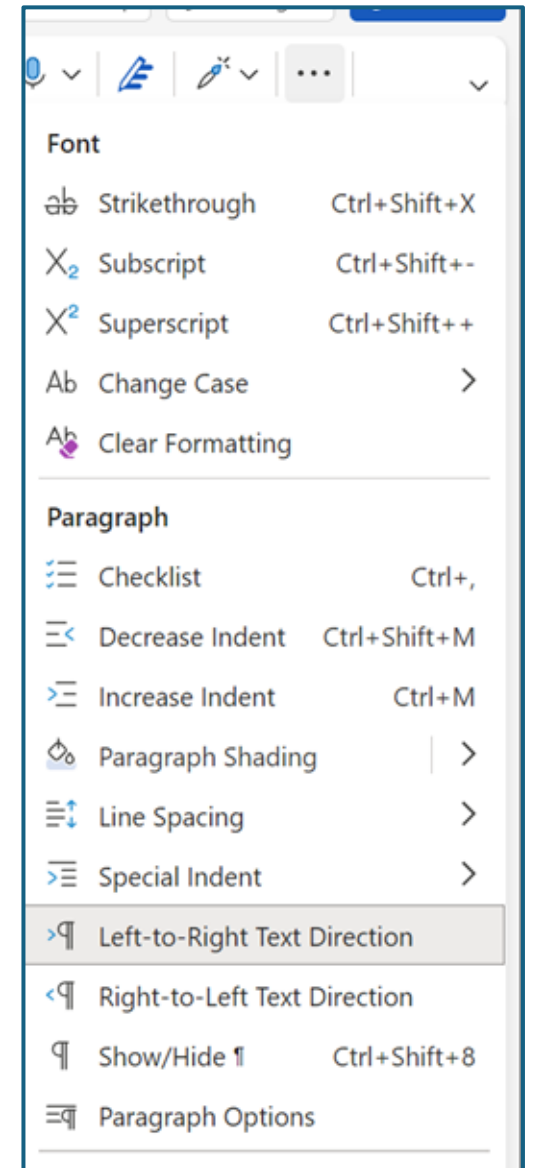
- Minimize the user's memory load by making elements, actions, and options visible
- Recalling items from scratch is harder than recognizing the correct option in a list of choices
- Example: menus
- More problematic examples
 - Direct-touch interfaces (see Mindy app)



<https://www.nngroup.com/articles/recognition-and-recall/>

7: Flexibility and Efficiency of Use

- Make it work for different abilities and needs
 - Expert User vs Novice
- Offer multiple ways to accomplish popular options
 - e.g. keyboard shortcuts
 - List options but offer search



8: Aesthetic and Minimalist Design

- Aesthetically pleasing designs can provide memorable experiences
- However, interfaces should only include necessary elements, with high informational value
- Clarity “usually” wins over visual flourish
- Recommendation
 - Avoid clutter and (visual) noise
 - Apply a good layout



Convert visitors into customers with Hello Bar

Enter your website URL

Create free account



Explore This Type

Introduction

[Strengths & Weaknesses](#)[Romantic Relationships](#)[Friendships](#)[Parenthood](#)[Career Paths](#)[Workplace Habits](#)

Introduction

WHO IS AN ARCHITECT (INTJ)?

An **Architect (INTJ)** is a person with the [Introverted](#), [Intuitive](#), [Thinking](#), and [Judging](#) personality traits. These thoughtful tacticians love perfecting the details of life, applying creativity and rationality to everything they do. Their inner world is often a private, complex one.

"Thought constitutes the greatness of man. Man is a reed, the feeblest thing in nature, but he is a thinking reed"

New Here?

[Take the Test](#)

Already have your results? [Log in.](#)

9. Help Users Recognize, Diagnose, and Recover from Errors

- Error messages should be expressed
 - in plain language (no error codes),
 - precisely indicate the problem, and
 - constructively suggest a solution

[Back](#)

[See examples](#)

Create a Multiple Choice Question

Enter the question you want to ask your audience

Question title

Which heuristics would you like to discuss more?

e.g.: What is the capital of Uganda?

Answers

Enter the answers and pick at least one correct answer

- ☐

Choice 1

1: Visibility of System Status

e.g.: Kampala




- ☐

Choice 2

2: Match Between the System and the Real World

e.g.: Brussels




- ☐

Choice 3

3: User Control and Freedom




- ☐

Choice 4

4: Consistency and Standards




- ☐

Choice 5

5: Error Prevention




- ☐

Choice 6





+ New choice

Cancel

 Save

 Display now

 Multiple choice ▾

- 1
- 2
- 3

- ☒ Bar chart 
- ☐ Word Cloud 

Multiple answers ☒
Participants can select more than one answer

Allow comments ☐
Allow participants to add comments to explain their answer

Timer ☐
If checked, a timer will automatically start when a question is displayed.

?

[Back](#)

Create a Multiple Choice Question

Enter the question you want to ask your audience

Question title

Which heuristics would you like to discuss more?

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- ☐

Choice 1

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- ☐

Choice 2

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e.g.: Brussels


- ☐

Choice 3

3: User Control and Freedom


- ☐

Choice 4

4: Consistency and Standards


- ☐

Choice 5

5: Error Prevention


- ☐

Choice 6

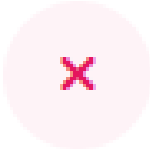


+ New choice

Cancel

 Save

 Display now



No correct answer

You have to check at least one correct answer. If you do not want to specify a correct answer, you should create a Poll instead.



Multiple answers

☒

Participants can select more than one answer

Allow comments

☐

Allow participants to add comments to explain their answer

Timer

☐

If checked, a timer will automatically start when a question is displayed.



Create a Poll

Enter the question you want to ask your audience

Question title

Which heuristics would you like to discuss more?



e.g.: Do you think we need to do more to fight climate change?

Answers

Enter the answers your audience can vote for

Choice 1

1: Visibility of System Status





e.g.: Yes

Choice 2

2: Match Between the System and the Real World





e.g.: No

Choice 3

3: User Control and Freedom





Choice 4

4: Consistency and Standards





Choice 5

5: Error Prevention





Choice 6





+ New choice

Poll

 Multiple choice

 Word Cloud

 Open question

 Framework

 Spin the wheel

 Poll

 Timer

 Slide

 Brainstorming

 Matching

 Find on image

 Fill in the Blanks

 Label an image

 Drag and drop

 Rating

 Audio / Video

 Sorting

 Find a number

 Prioritization

?

10. Help and Documentation

- Ensure that the help documentation is easy to search.
- Whenever possible, present the documentation in context right at the moment that the user requires it.
- List concrete steps to be carried out

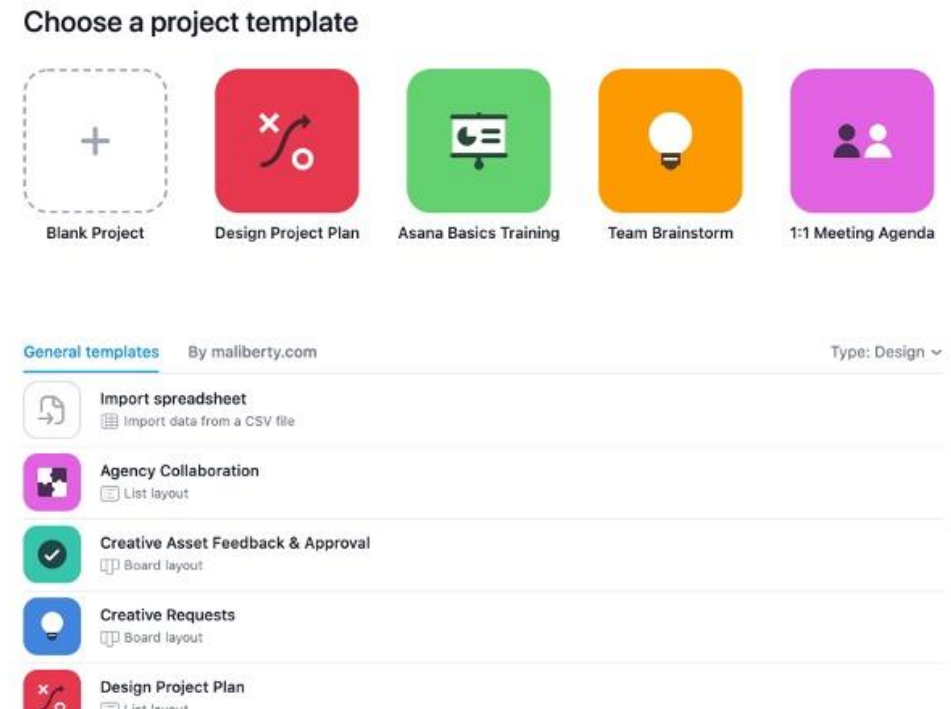
- Proactive help

- Templates
- Tooltips
- Wizards

- Reactive help

- Documentation

<https://www.nngroup.com/articles/help-and-documentation/>



Morville's UX Honeycomb

User Experience Honeycomb by Peter Morville



- Focuses on information and tasks
- http://semanticstudios.com/user_experience_design/

User Experience Honeycomb by Peter Morville

- **Useful:** the technology meets users' needs and serves a meaningful purpose
- **Usable:** the technology is easy to learn, understand and use effectively
- **Desirable:** the technology creates positive emotional experiences through its design, aesthetics and interactions
- **Findable:** users can easily locate the information, features or functionality they need
- **Accessible:** the technology can be used by people with diverse abilities and needs
- **Credible:** users perceive the technology and the information it provides as trustworthy and reliable
- **Valuable:** the technology delivers meaningful benefits to both users and the organisations providing it

Any questions?

Next steps

- Week 5 lecture: data analysis and report writing
- Obtain ethics and prepare study materials
 - You **must** receive ethics approval from your tutor before beginning participant recruitment or data collection
 - Prepare participant information sheets and consent forms
 - By **Friday Oct. 16** submit these forms to your tutor for approval