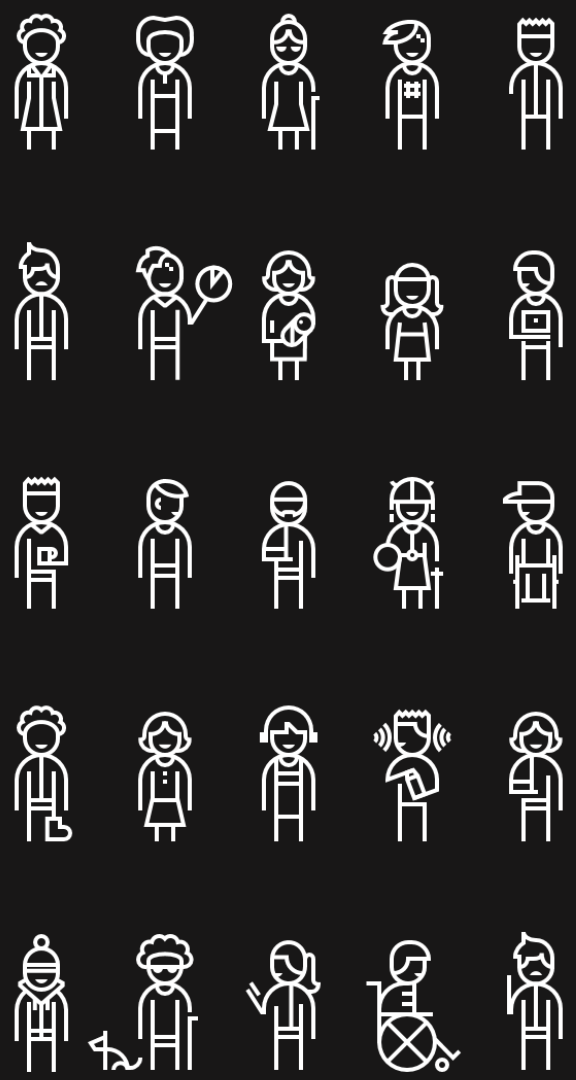
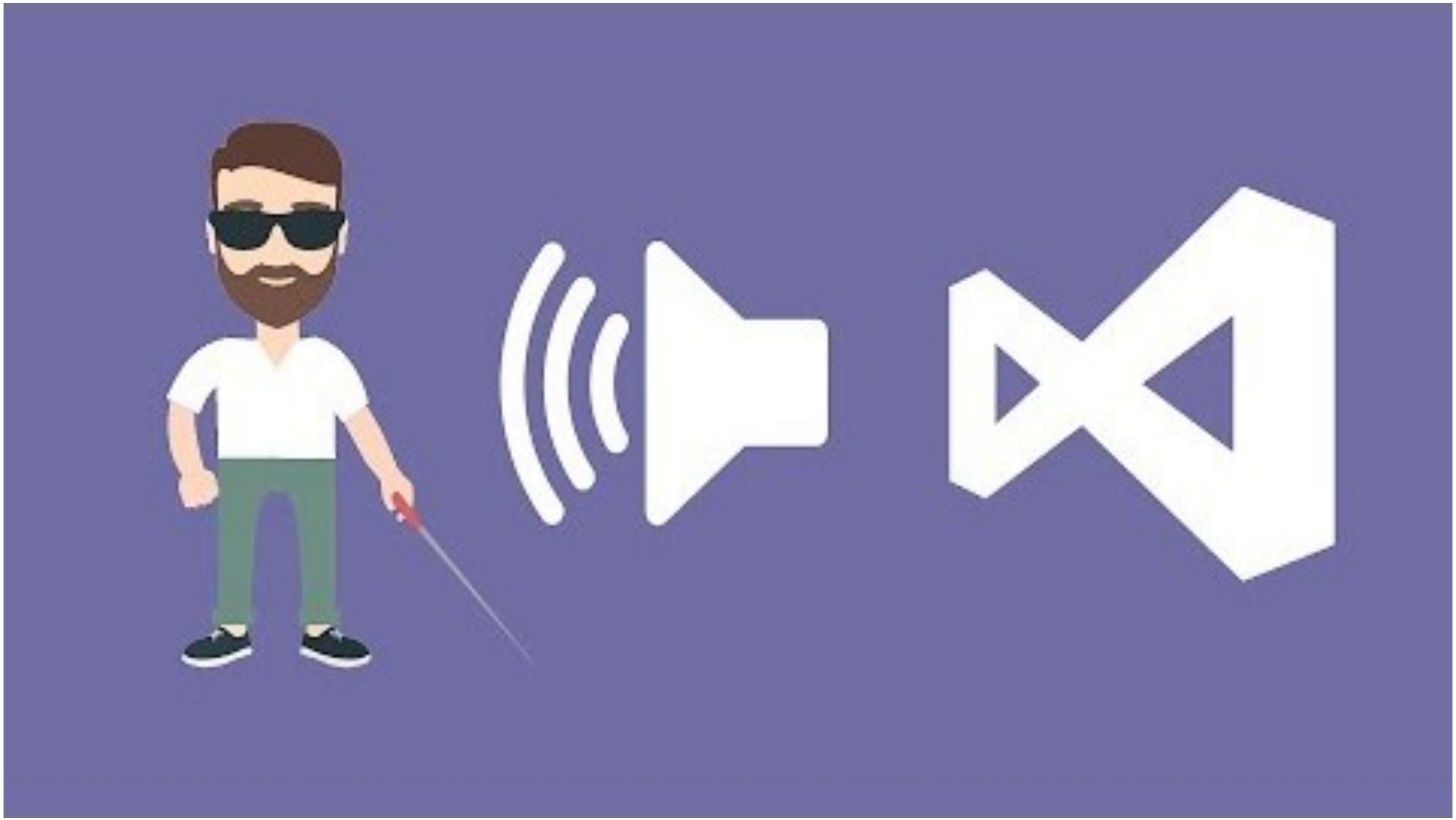
Introduction to

Accessibility and Inclusive Design

Tracy Tran | Microsoft Program Manager | tracyt@microsoft.com





Agenda

- Understand why: disability and accessibility
- Understand how: 3 principles of Inclusive Design
- Understand who: people who use assistive technology
- Apply it: designing accessible mobile interfaces


What is disability?

Disability:

a context dependent mismatched interaction

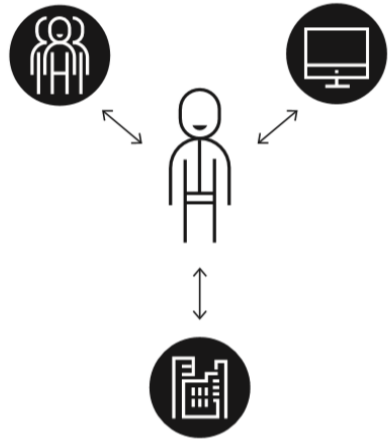
1980

Disability as personal attribute

"In the context of health experience, a disability is any restriction or lack of ability (resulting from an impairment) to perform an activity in the manner or within the range considered normal for a human being."

–World Health Organization

Today

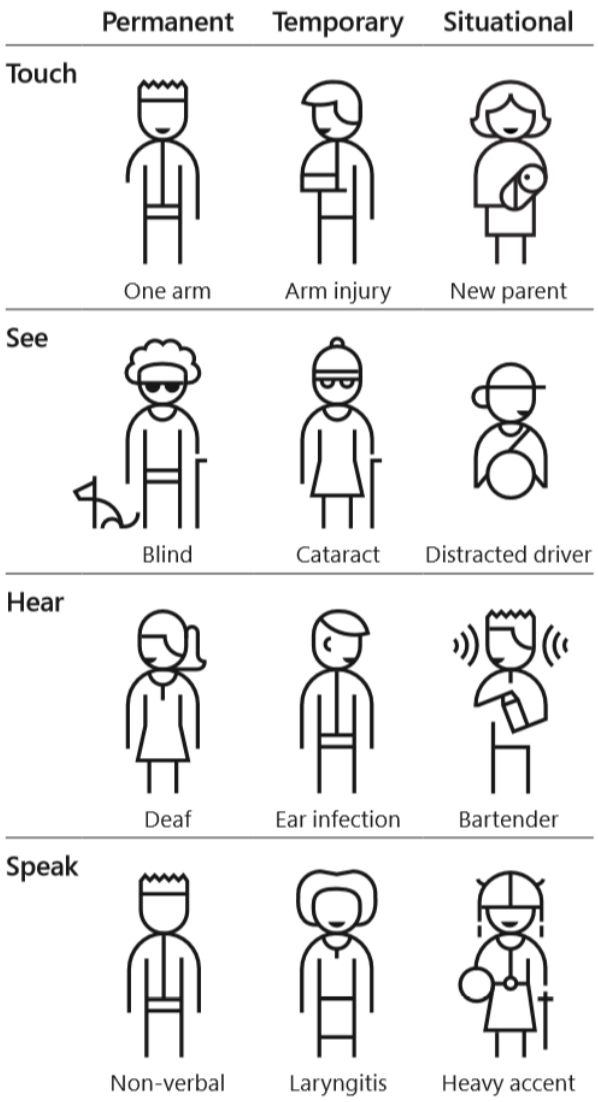


Disability as context dependent

"Disability is not just a health problem. It is a complex phenomenon, reflecting the interaction between features of a person's body and features of the society in which he or she lives."

–World Health Organization

Disability is a spectrum



Understand the impact

Accessibility

Disability is a mismatched interaction between someone and their context

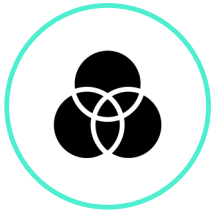
Accessibility is a broad term for tools that help people navigate mismatched interactions and provides options for people of all ability

Inclusive design is a framework that helps us design more accessible products

Inclusive design

A design methodology that enables and draws on the full range of human diversity

Principles of inclusive design



Recognize exclusion

Learn from diversity

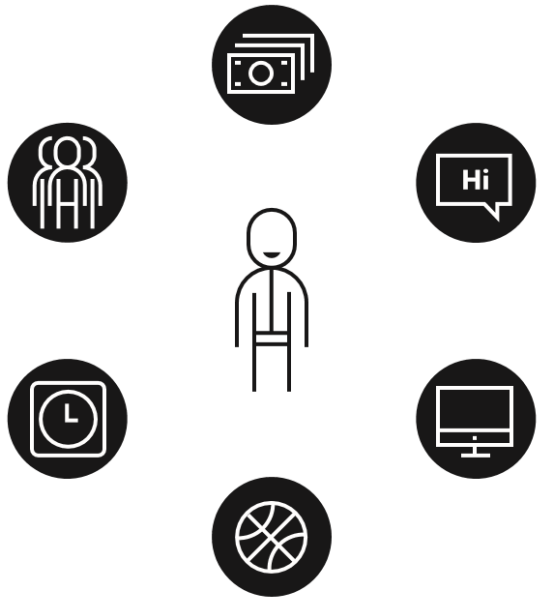
Solve for one,
extend to many

Principle 1

Recognize exclusion

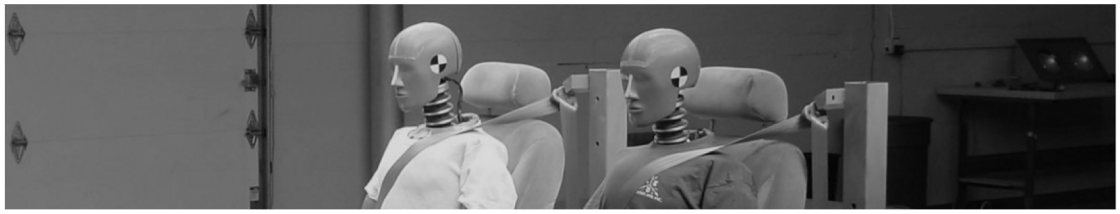
If we use our own abilities as a baseline, we make things that are easy for some people to use, but difficult for everyone else

If we fail to intentionally include, we will unintentionally exclude

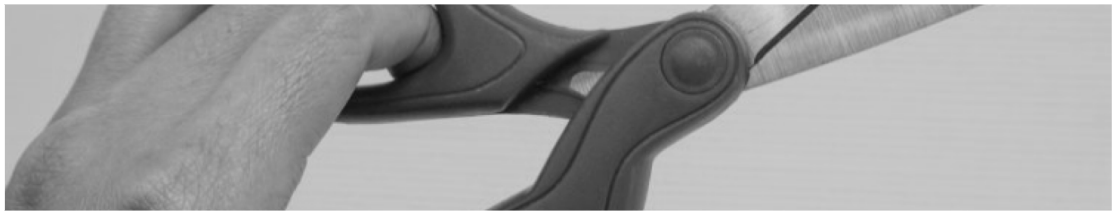


What happens when we exclude?

Motion tracking technology that only works for users of a certain race because initial training set excluded other skin tones.



The standard crash test dummy is a 50th percentile male. Female drivers are 47% more likely to be injured in a car crash.

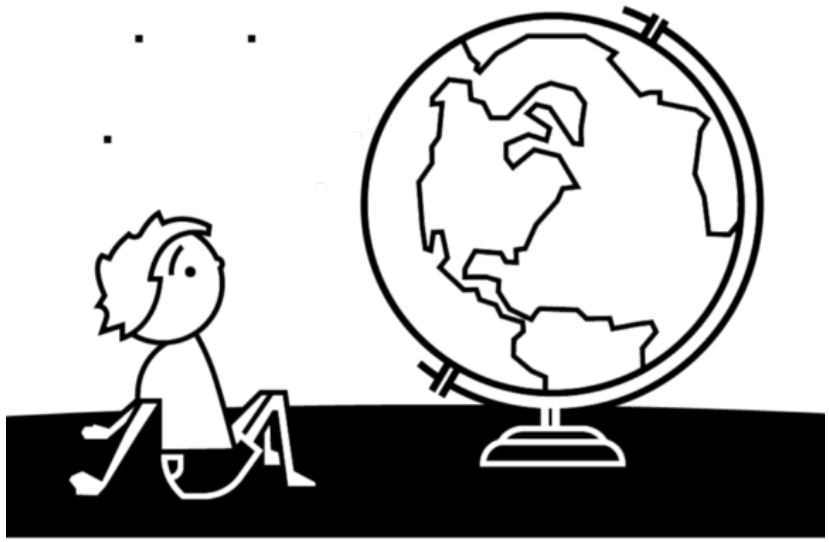


The struggle of being left handed in a right handed world: scissors, lecture hall fold out desks….

Principle 2

Learn from diversity

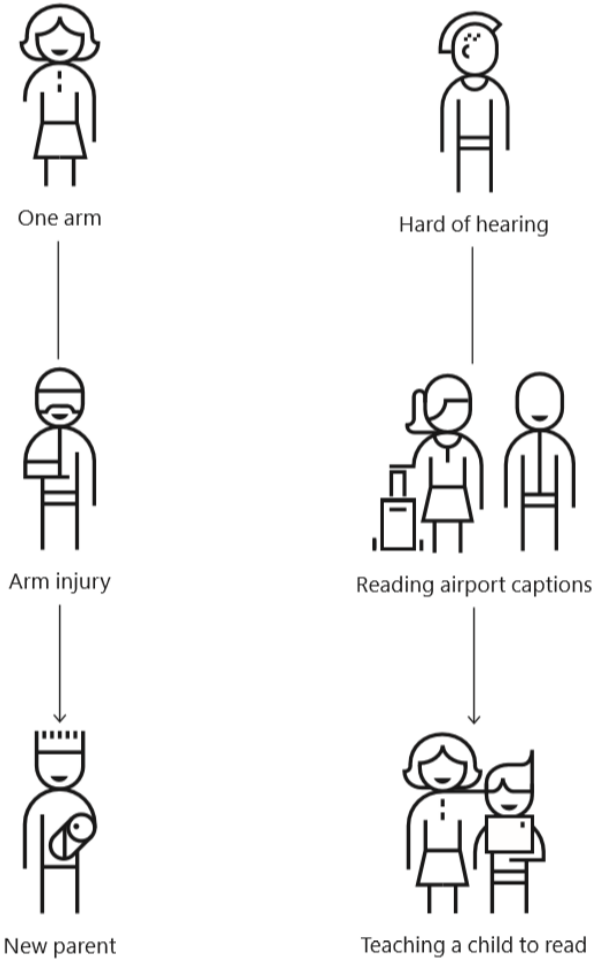
Build empathy. Learning how people adapt to the world around them means spending time understanding their experience from their perspective.



Principle 3

Solve for one, extend to many

Designing for the most extreme case results in designs that benefit people universally.



Inclusive design leads to innovation

Typewriter

In 1808, Pellegrino Turri built the first typewriter, so that his blind lover, could write letters more legibly.

Email

In 1972, Vint Cerf programmed the first email protocols because electronic messaging was the only seamless way to communicate with his deaf wife while he was at work.

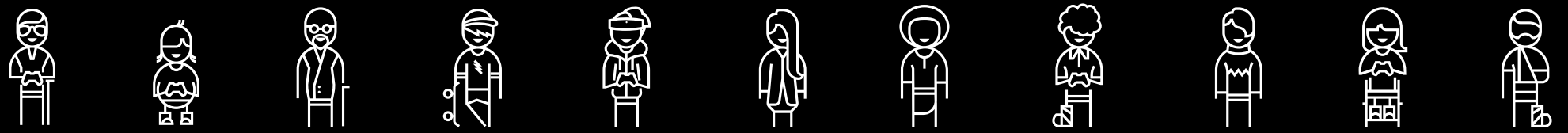
The bendy straw

In 1937, Joseph Friedman created the first bendy straw to help his young daughter drink from a cup on a counter that was too high for her.

~~Accessibility is a collection of laws and regulations – "checkboxes."~~

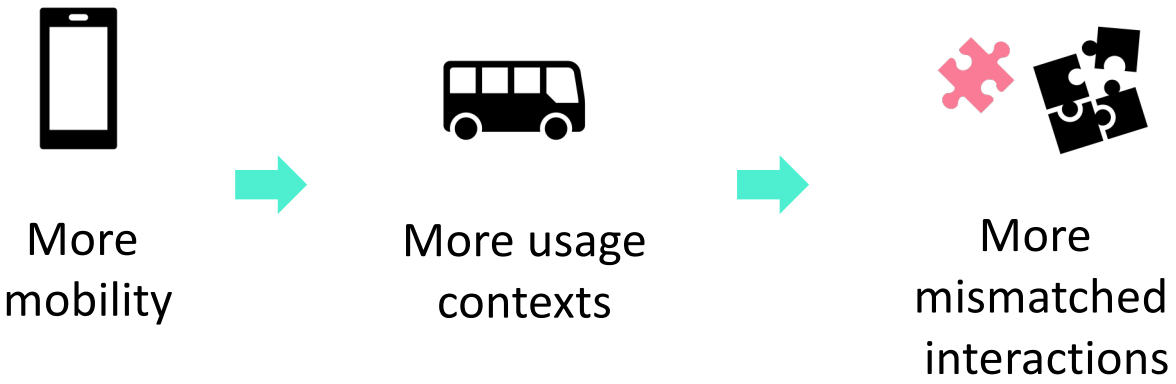
Accessibility is a design problem.

If we use inclusive design, the products we build will be not only usable but delightful to all people.



Assistive technology and the people who use it

Technology is everywhere



Assistive technology

How people with disabilities navigate computing

Screen readers

Narrator, VoiceOver, JAWS, Window Eyes, NVDA, TalkBack

Screen adjustment

ZoomText, Magnifier, Zoom, High Contrast

Speech input

Dragon Naturally Speaking, Dictation, Speech Recognition

Keyboarding

Sticky Keys, Mouse Keys, Filter Keys, Keyboard Shortcuts

Many more

Joysticks, scrollbars, the Xbox Adaptive Controller….

Building empathy: screen readers

Demo

Three core interaction patterns:

- Swipe to navigate linearly
- Touch to navigate spatially
- The first “hit” of an interface element will focus, double tap to select/activate that interface element

Hands on with a screen reader

 3 mins

1. Get out your phone and plug in earphones.
2. Open up a Google home page with search bar.
3. Turn on respective screen reader.
   - iOS: Settings > Accessibility > VoiceOver > On
   - Android: Settings > Accessibility > TalkBack > On

With your eyes closed* and without using voice search *(e.g.* Siri*),* find the answer to this question:

What is a group of parrots called?

*Building empathy for visual impairments requires much more than closing your eyes. See principle 2 of inclusive design.

Designing accessible mobile interfaces

Think about the three core interaction patterns + your experience on the previous exercise.

What is important for you, as the designer and engineer,
to get right when it comes to interfaces accessible with a screen reader?

Tab order

Content must be navigable in a meaningful sequence

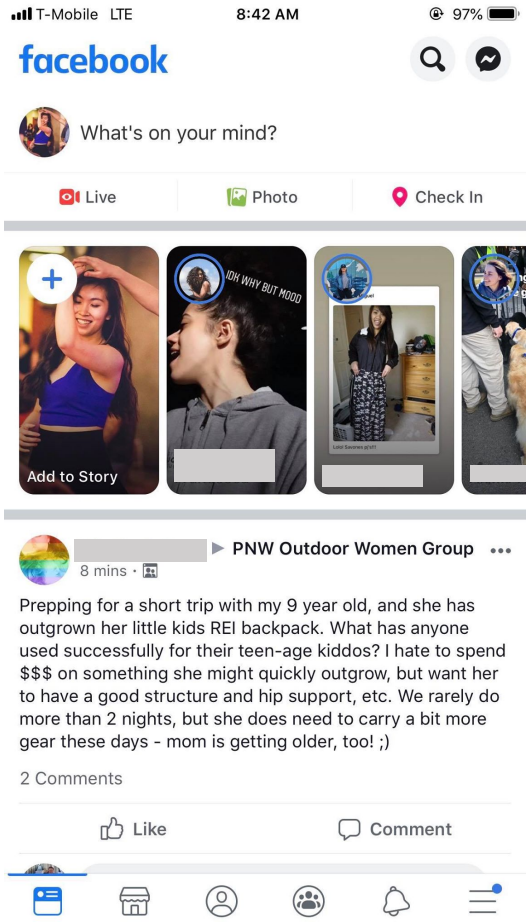
Three core interaction patterns:

- Swipe to navigate linearly
- Touch to navigate spatially
- The first “hit” of an interface element will focus, double tap to select/activate that interface element

Example

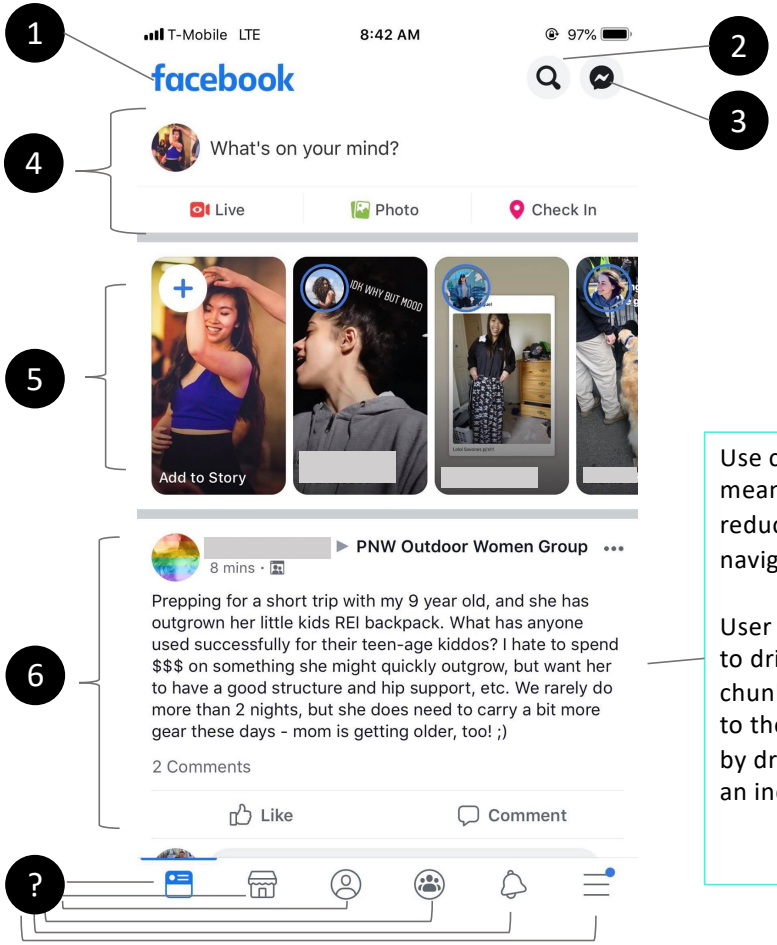
What tab order makes sense for the Facebook newsfeed?

Does this match the actual tab order?



Designing accessible mobile interfaces: **tab order**

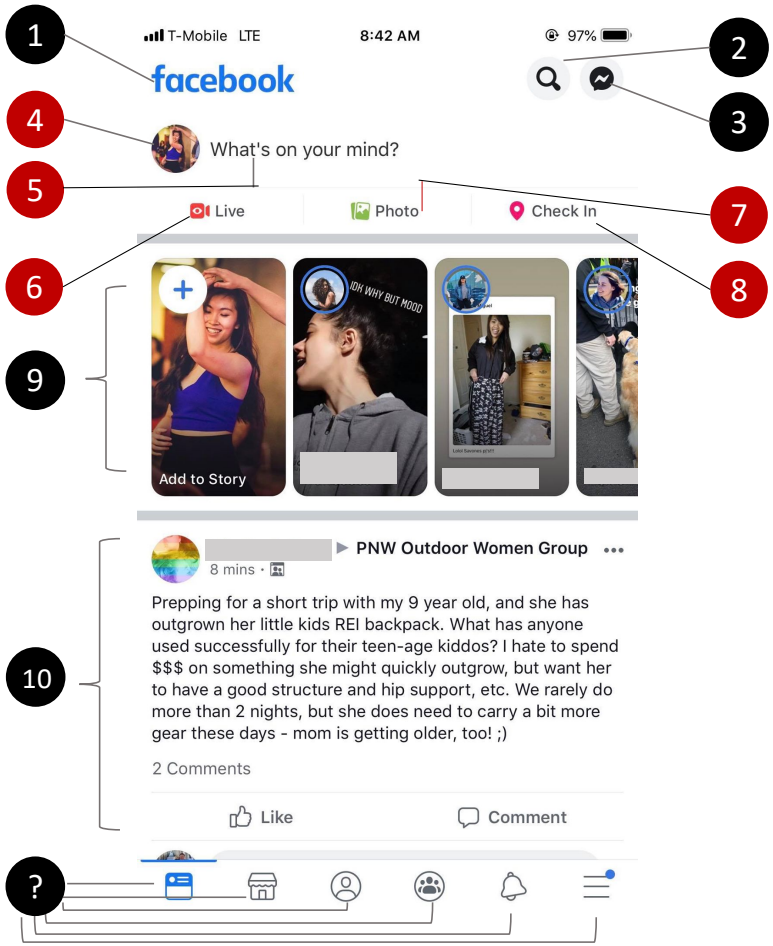
Expected



Use chunks to group meaningful info and reduce number of navigation steps.

User can double tap to drill down into chunk *(e.g.* navigate to the "like" button by drilling down into an individual post).

Actual

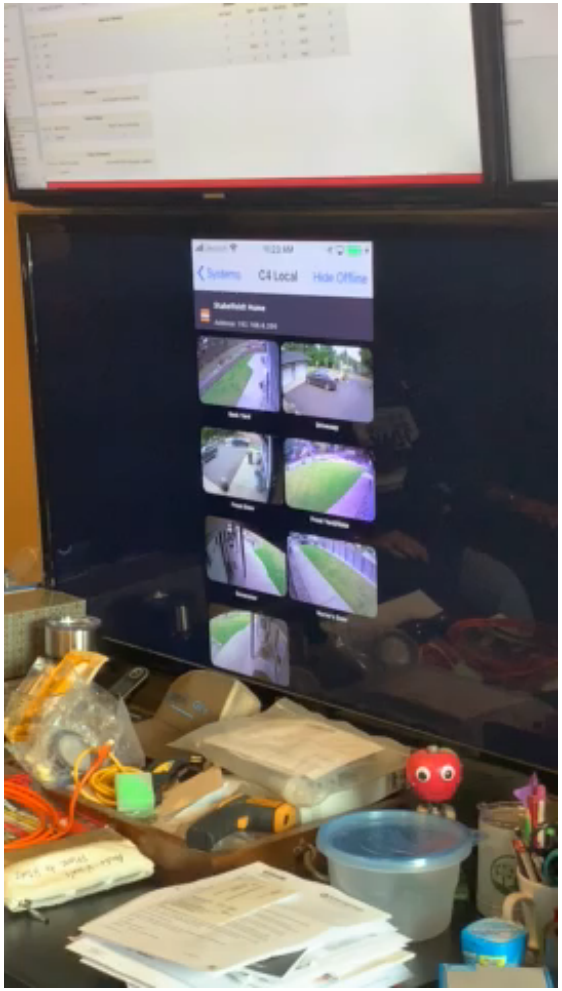


What happens when tab order is incorrect?

This is Todd.

He's paralyzed from the neck down. He runs his own company through the help of assistive technology.

Here, he tries to navigate his home security app. He shows how using his switch control (which swipes through linearly), **he actually gets stuck and can't open any of the camera feeds – because someone messed up the tab order.**

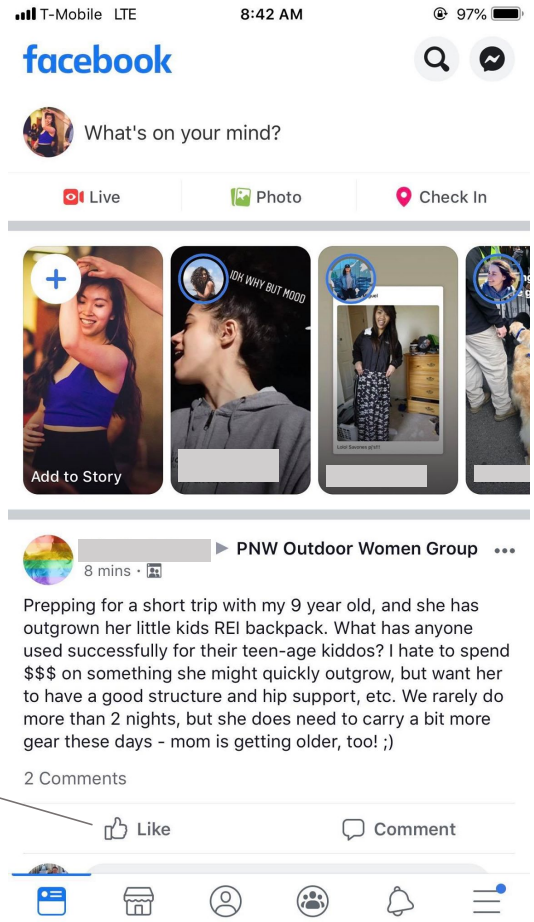


Filmed and shared with permission

Labels

Name, role, value, state, …

Enable the user to understand the name of the control they have navigated to, what type of control it is, what value it has, what state it has.



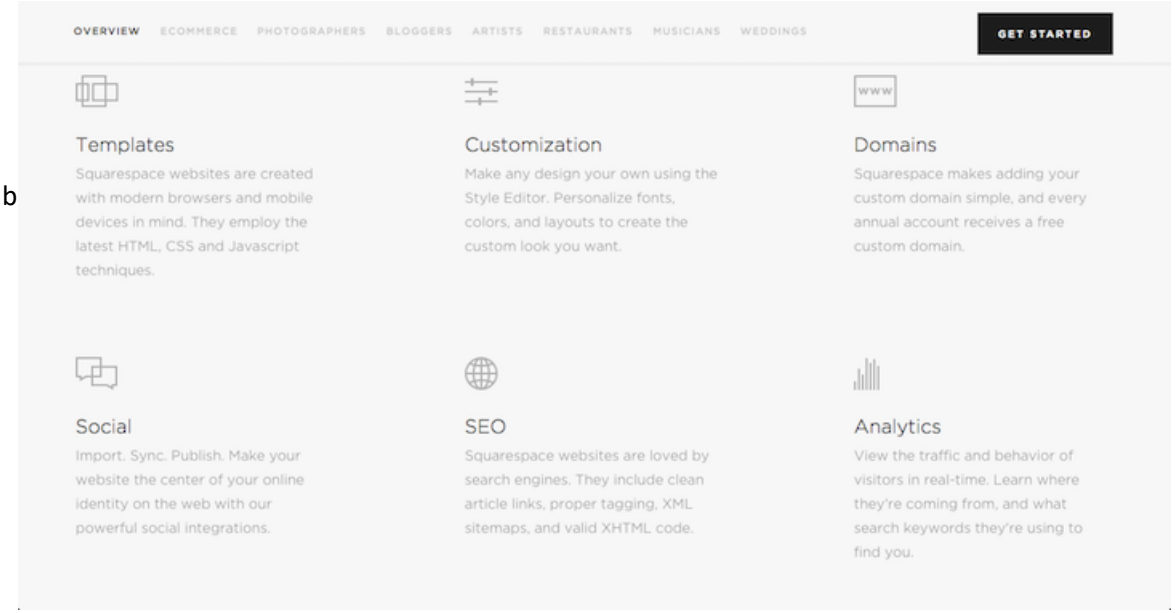
Example
Name: “Like”
Role: Button (or toggle)
State: Not selected

Contrast

Choose colors that provide enough contrast between content and the background so that anyone with low-vision impairments and color deficiencies can perceive the content.

Old Squarespace UI
Is the light grey text readab

Solve for one, extend to many
Proper text contrast helps when someone without a vision impairment is using their phone in the sun.

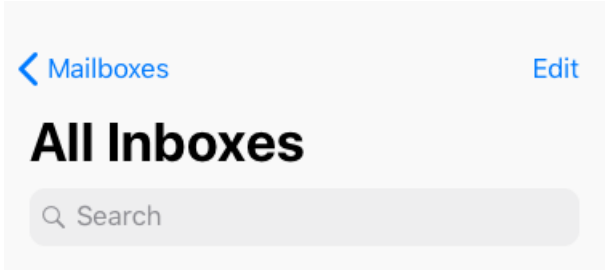


Target size

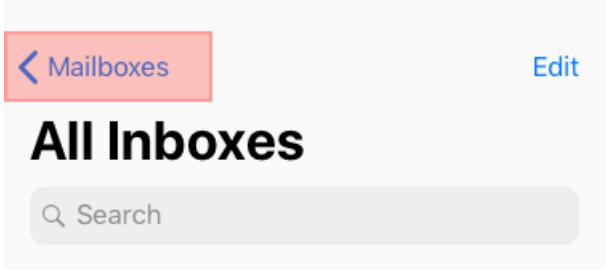
Ensure targets are big enough and provide enough white space for users to locate and activate them.

Three core interaction patterns:

- Swipe to navigate linearly
- Touch to navigate spatially
- The first “hit” of an interface element will focus, double tap to select/activate that interface element



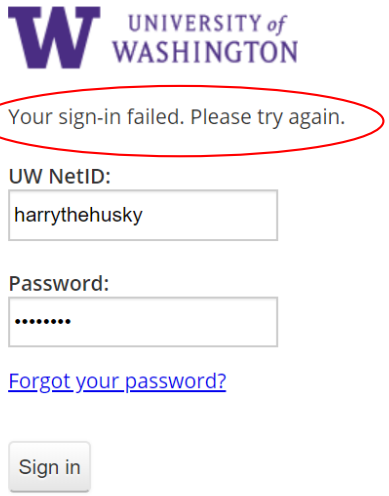
Even if the user misses the Text Label on the screen, they will still be able to trigger the desired action because the touch target (red) is larger than what appears, resulting in less user error.



Event notification

Any UI change should be announced. Dialog boxes, success notifications, errors.

Entering the wrong login credentials triggered an error message. If you couldn't see the UI and the error wasn't announced, you would have no idea if login succeeded or not.



More resources

Web Content Accessibility Guidelines (WCAG)

Article: Color and Accessible Design

Article: Mobile Application Accessibility

Takeaways

Theory

Disability is a mismatched interaction between someone and their context.

Accessibility describes tools that help people navigate mismatched interactions.

Inclusive design is a framework that helps us design more accessible products.

Application

Who might be excluded from using my design?

How will my design work with assistive technologies?

Accessibility is a design problem.

Thank you

Slide content

- Microsoft Design, particularly Bryce Johnson
- Elise Livingston

Mentorship

- Elise Livingston
- Emily Tran
- Anita Mortaloni
- Peter Frem
- Jennifer Mankoff
- James Fogarty
- Xiaoyi Zhang

Resources

- Microsoft Inclusive Design
- Adobe: Inclusive vs Universal Design
- Microsoft: Recognizing Exclusion in AI
- Kat Holmes: The No. 1 thing you're getting wrong about inclusive design
- Web Content Accessibility Guidelines (WCAG)
- Article: Color and Accessible Design
- Mobile Application Accessibility

Human Centered &
Inclusive &
Universal
Design

Let’s make this more concrete

What does accessibility look like today in computing?

&

How can we apply inclusive design to build more accessible products?