

Interaction Design

CMPT 363

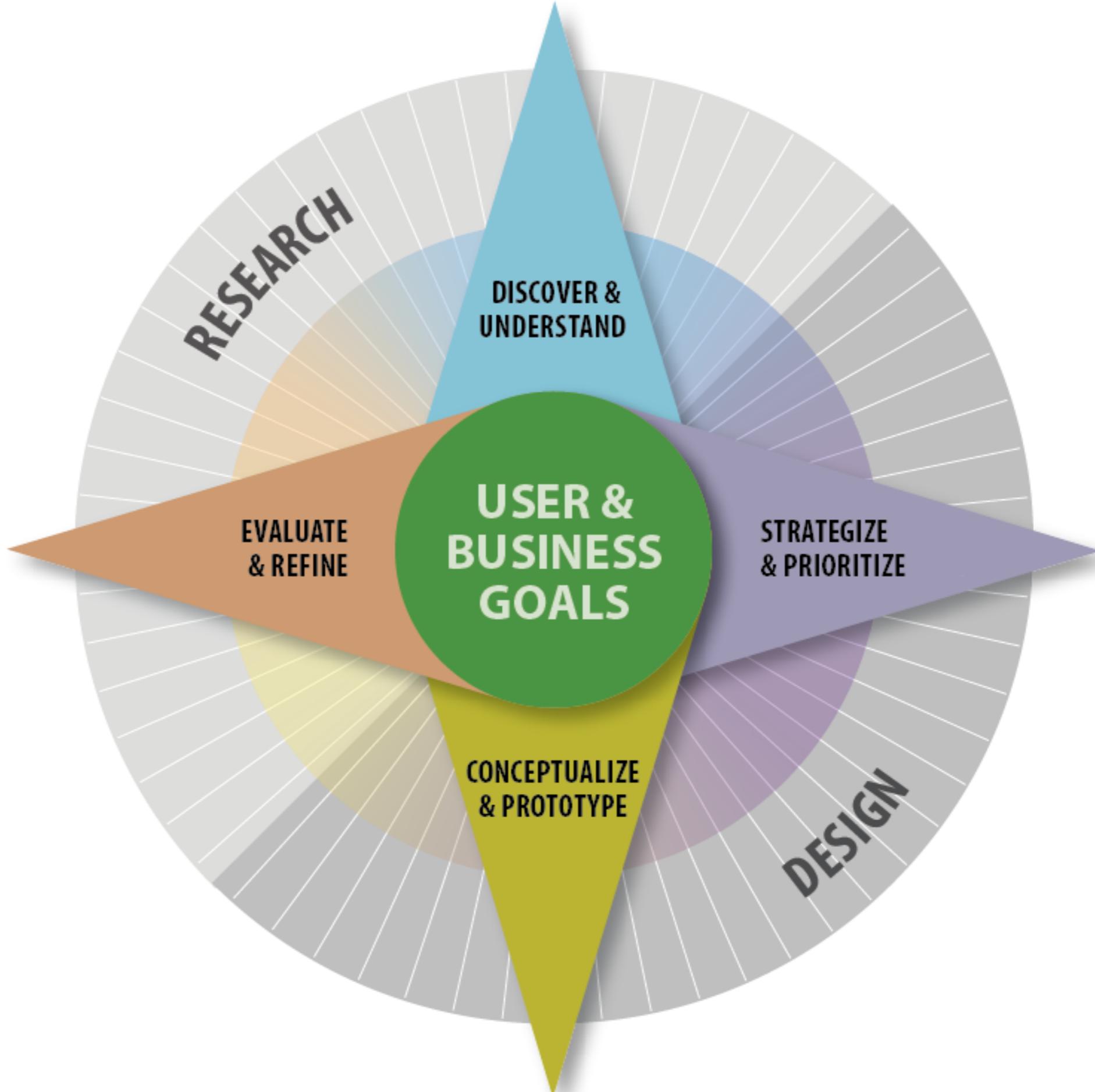
“You only use what you understand.”

— Steve Jobs

*How to design products for
how people think, learn and
feel?*



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Topics to Explore

1. Conceptual Models
2. Designing for Emotion
3. Accessible and Inclusive Design

Interaction Design

Conceptual Models

Activity: Interaction Design Case Study

Apple iOS

Apple iOS 6

Apple - iPhone

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iPod

iPhone

iPad

iTunes

Support



iPhone 6s



iPhone 5c



iPhone Accessories



Compare iPhone Models



iOS 7



iCloud



iPhone 5c

For the colorful.

Watch the keynote.



Watch the iPhone 5c video.



Watch the iPhone 5s video.



Apple - iPhone

<http://www.apple.com/iphone/>



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iPhone User Guide

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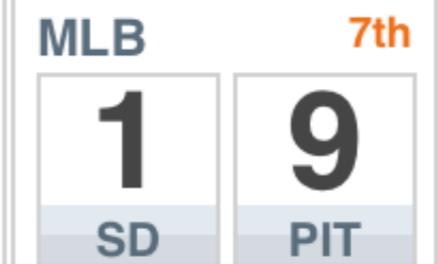


Luxe sedan gets top marks

This car is certainly a looker, with features that rival both Mercedes' and BMW's. » [Hand-stitched leather](#)

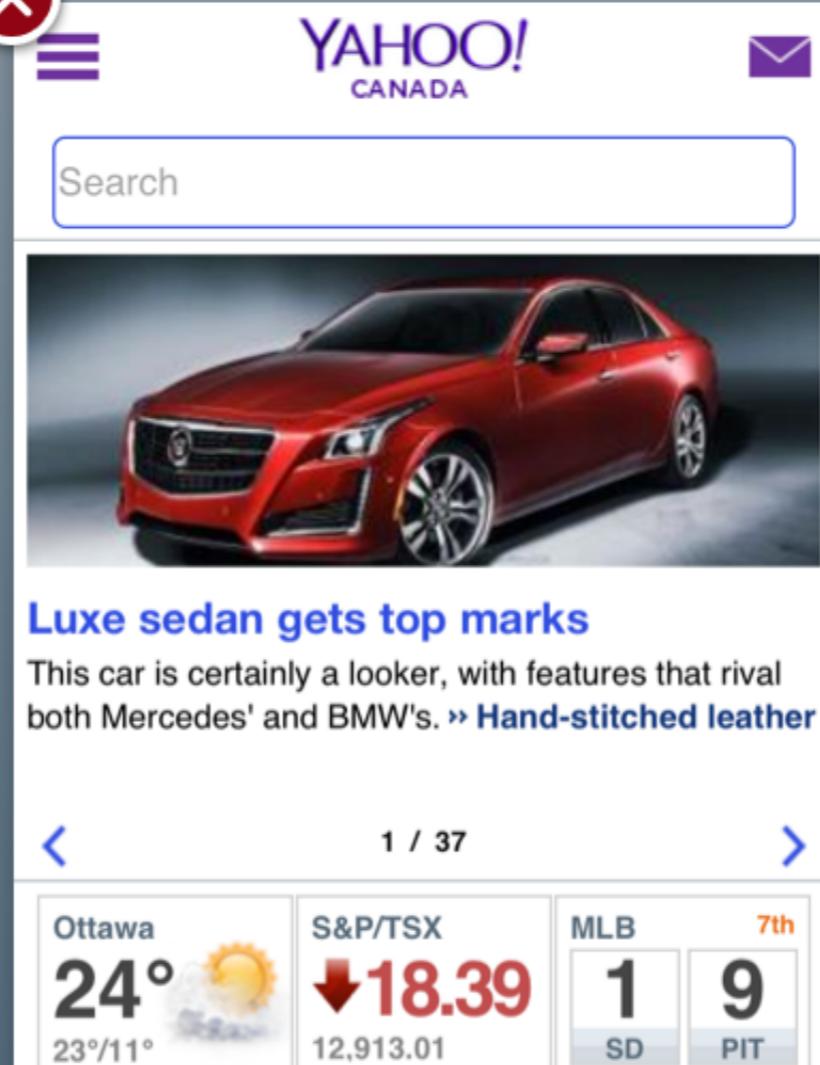


1 / 37



Yahoo!

http://ca.m.yahoo.co...ult=true#/today/main



The image shows the Yahoo! Canada mobile homepage. At the top is a navigation bar with a red 'X' button, a menu icon, the 'YAHOO! CANADA' logo, and an envelope icon. Below the bar is a search input field with the placeholder 'Search'. The main content features a large image of a red Cadillac CTS sedan. Below the image is the headline 'Luxe sedan gets top marks'. A snippet of text follows: 'This car is certainly a looker, with features that rival both Mercedes' and BMW's. » [Hand-stitched leather](#)'.

1 / 37

Ottawa 24° 23°/11°	S&P/TSX ↓18.39 12,913.01	MLB 7th 1 SD 9 PIT
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New Page

Done

Apple iOS 7

(and iOS 8, iOS9, iOS10 and yes iOS11)

apple.com

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iPhone 5C

For the colorful.

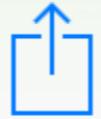


Watch the keynote

Watch the video

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Apple



Disney



ESPN



Yahoo!



YAHOO!
CANADA

Search



Don't get hurt in the U.S.

Mae Youngman is living proof that spending on travel or health insurance can go a long way.

» **Emergencies can cost thousands**



1 / 36



Ottawa

S&P/TSX

MLB

7th





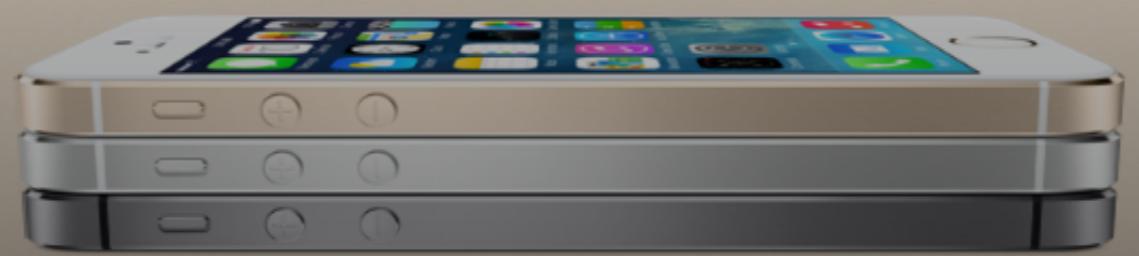
X

Apple

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iPhone 5S

Forward thinking.



X

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Done

Now, let's get into the details
of... Conceptual Models

Mental Model

A mental model is the mental representation of how a system (object) operates

Mental Model

A mental model is also sometimes called the user's conceptual model

Mental Model

We form mental models to help us understand

1. How to use an object
2. What can be done with it
3. How to recover from errors

Mental Model

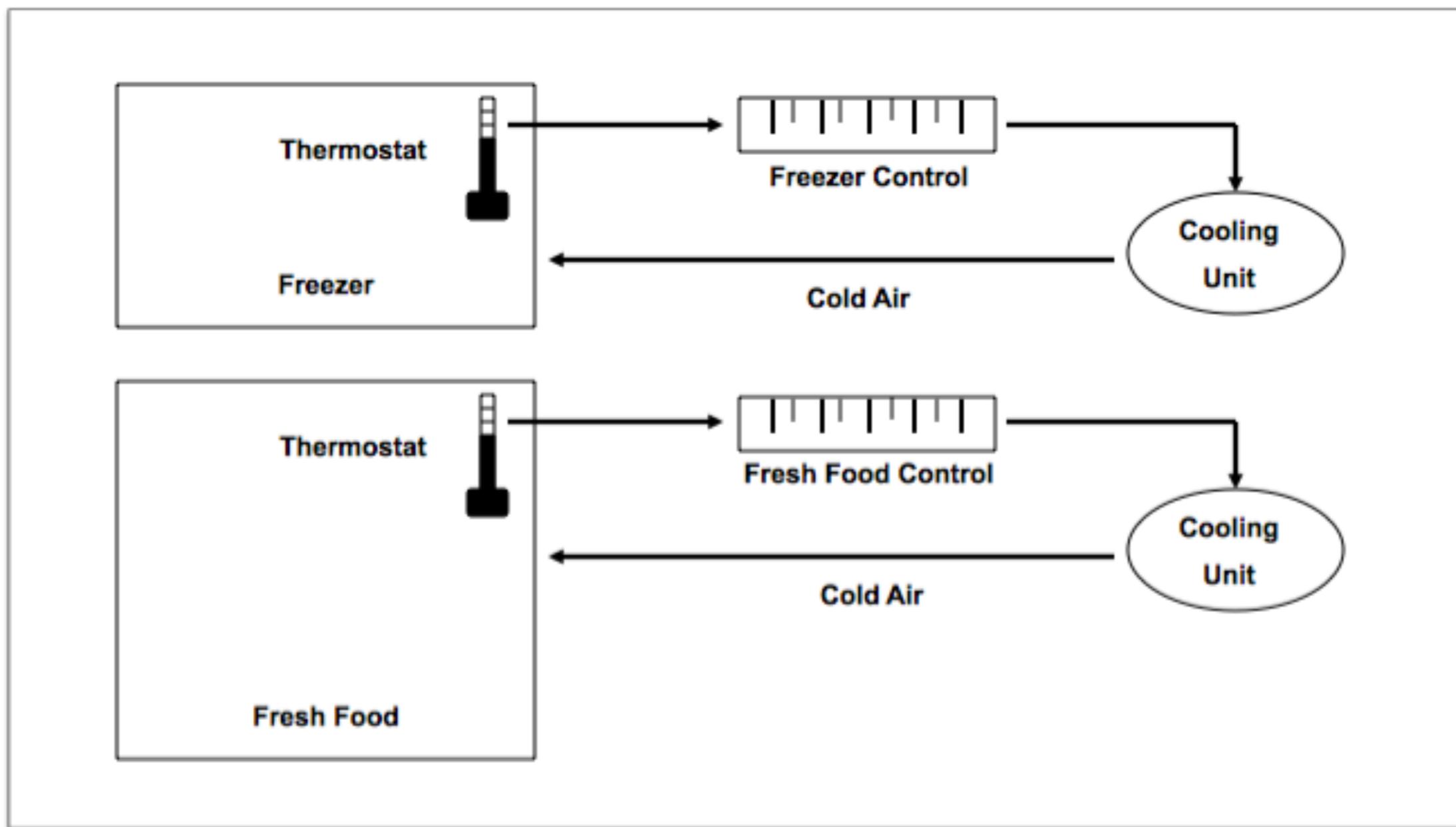
Novice users of an object often have quite different (e.g. incorrect or incomplete) mental models than more experienced users (e.g. more accurate and complete).

Mental Model

An example of a real-world conceptual model for a fridge-freezer (Norman, 1988)

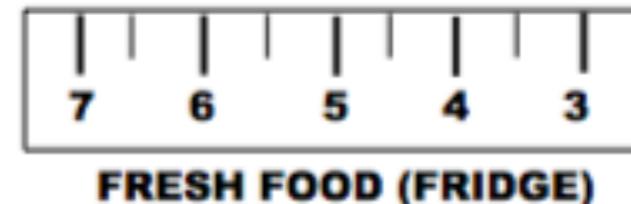
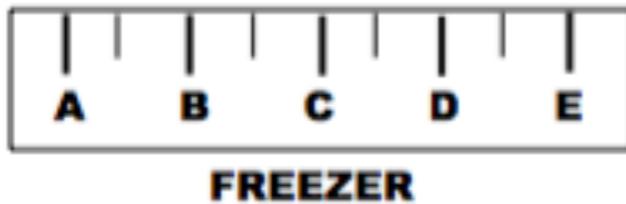
Mental Model

- Two compartments: the freezer (frozen food, top) and fridge (fresh food, bottom)
- Two controls in bottom compartment
- Task is to make the freezer warmer and keep the fresh food the same temperature

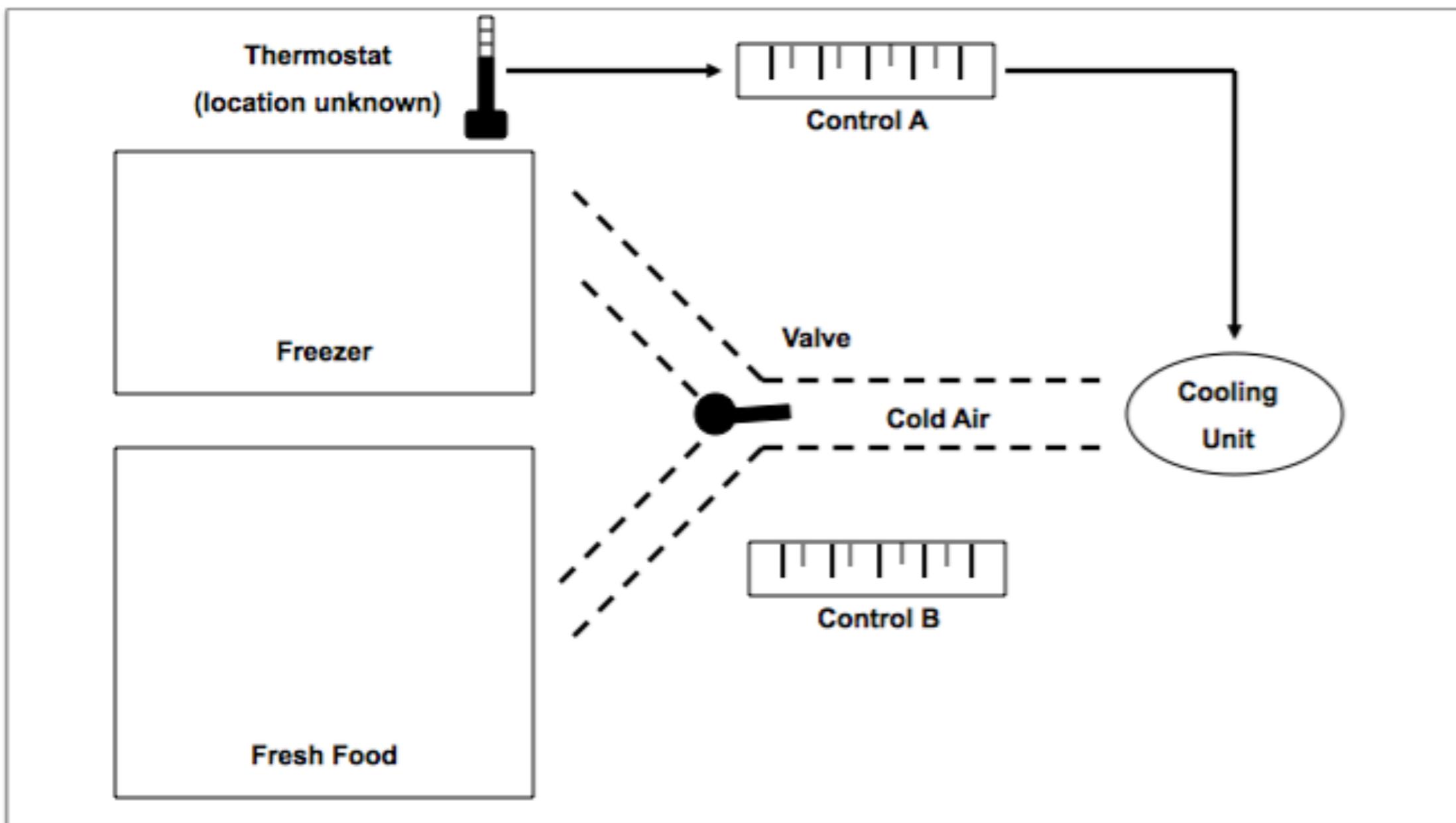


Source: The Design of Everyday Things, Donald Norman

NORMAL SETTINGS	C AND 5	1. SET BOTH CONTROLS
COLDER FRESH FOOD	C AND 6-7	2. ALLOW 24 HOURS TO STABILIZE
COLDEST FRESH FOOD	B AND 8-9	
COLDER FREEZER	D AND 7-8	
WARMER FRESH FOOD	C AND 4-1	
OFF (FRESH FD & FRZ)	0	



Source: The Design of Everyday Things, Donald Norman



Source: The Design of Everyday Things, Donald Norman

Bulk Rename Utility

File Actions Options Help

This PC

- Desktop
- Documents
- Downloads
- iCloud Photos
- Music
- Pictures
- Videos
- OS [840 Evo] (C:)
- BD-ROM Drive (D:)

Name	New Name	Sub...	Type	Size	Created	Modifi...	Acce...

RegEx (1) R

Match
Replace
 Include Ext.

Repl. (3) R

Replace
With
 Match Case

Remove (5) R

First n Last n
From to
Chars Words
Crop Before
 Digits High Trim
 D/S Accents Chars
 Sym. Lead Dots Non

Add (7) R

Prefix
Insert
at pos.
Suffix
 Word Space

Auto Date (8) R

Mode None at
Type Creation (Cur)
Fmt DMY
Sep. Seg.
Custom
 Cent. Off.

Numbering (10) R

Mode None at
Start Incr.
Pad
Break
Sep.
Type Base 10 (Decimal)
Roman Numerals None

Move/Copy (6) R

None 1 None 1 Sep.

Append Folder Name (9) R

Name Sep. Levels

Extension (11) R

Same

Selections (12)

Filter Folders Hidden Name Len Min Max
 Match Case Files Subfolders Path Len Min Max

New Location (13)

Path ... Reset Rename
 Copy not Move

** Need a new and easy way to **backup and save your files?** Try **ViceVersa PRO**. [Click Here To Find Out More ...](#)

0 Objects (0 Selected) Favourite

A Better Finder Rename 9 [Registered]

Category: Characters

Action: Replace specific characters

i This action operates on individual characters not on character strings. Use the actions in the "Text" category to perform operations on character sequences.

Replace these characters: With:

list of characters to be replaced		<input checked="" type="checkbox"/> Ignore case
list of characters to be replaced		<input checked="" type="checkbox"/> Ignore case
list of characters to be replaced		<input checked="" type="checkbox"/> Ignore case
list of characters to be replaced		<input checked="" type="checkbox"/> Ignore case

Change: The entire file name and extension
 The file name without the extension
 The file extension with the separator
 The file extension without the separator

Process: Files Folders Subfolders and their contents

Current name | Change to

Drag Your Files and Folders Here

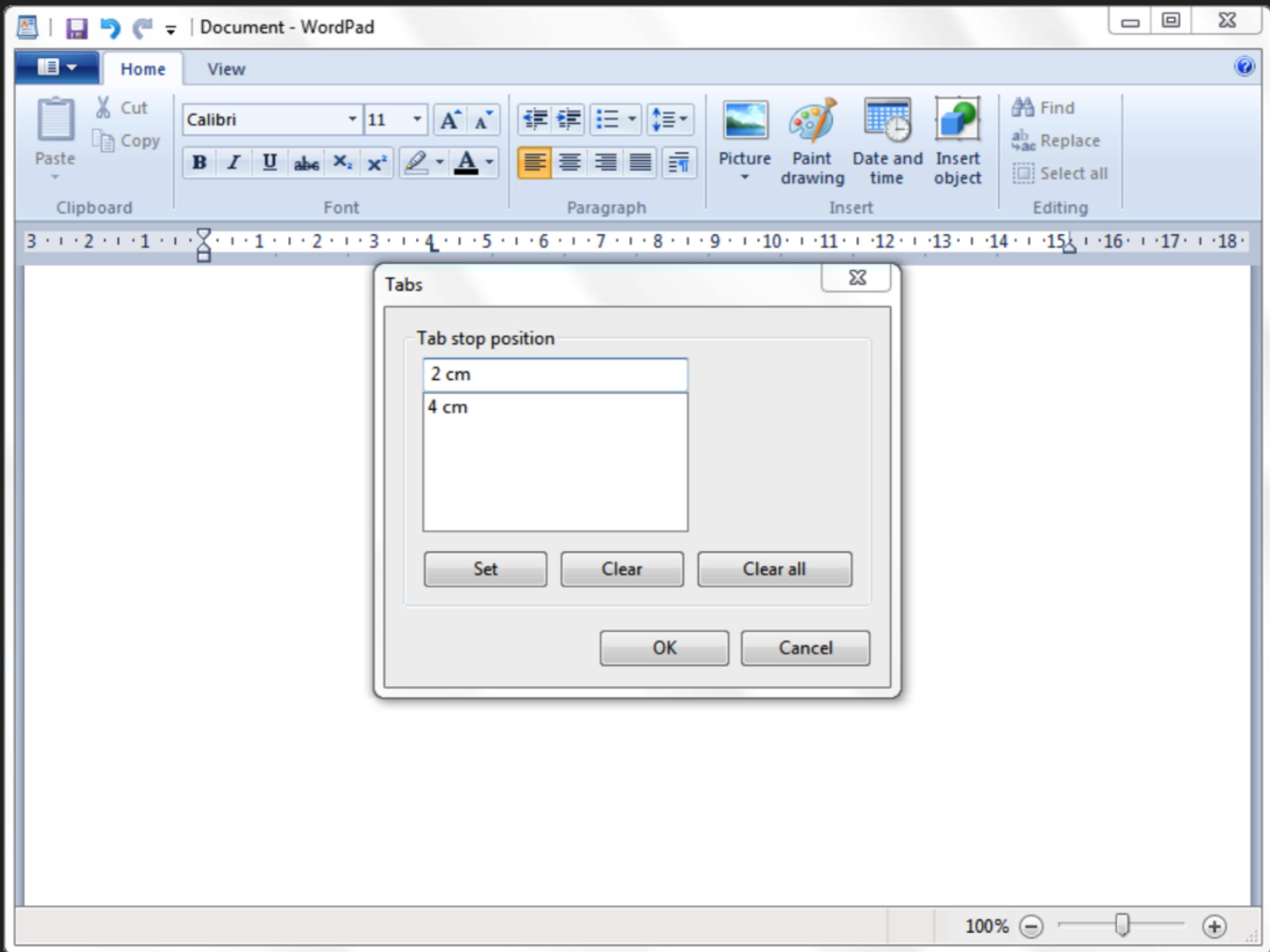
Please add files to be renamed to preview table above.

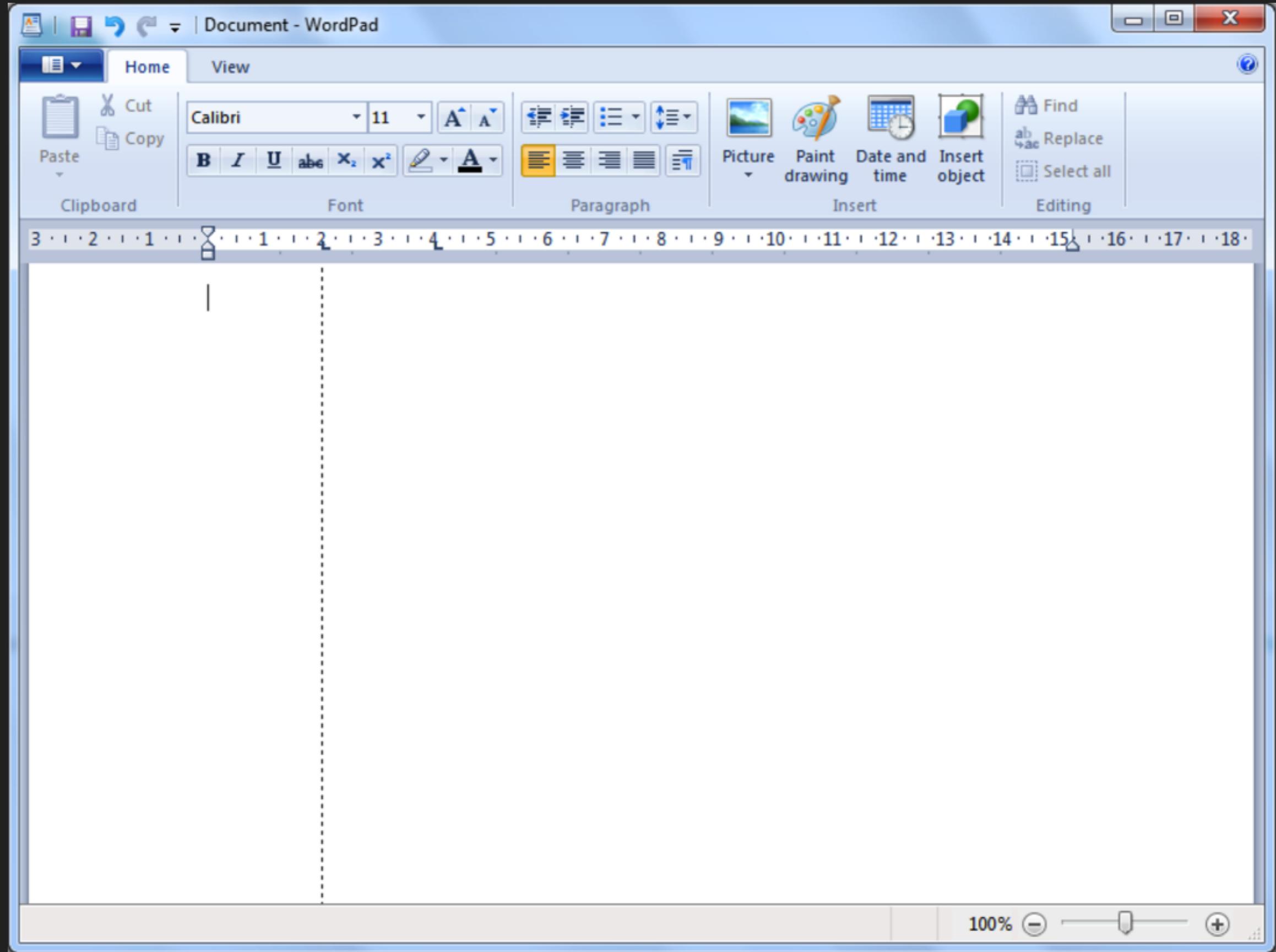
Auto Manual

Save File List... Show Multi-Step Drawer Create Droplet... Perform Renames

Design Model

The design model (sometimes referred to as the conceptual model) provides an overall framework of how users interact with a product



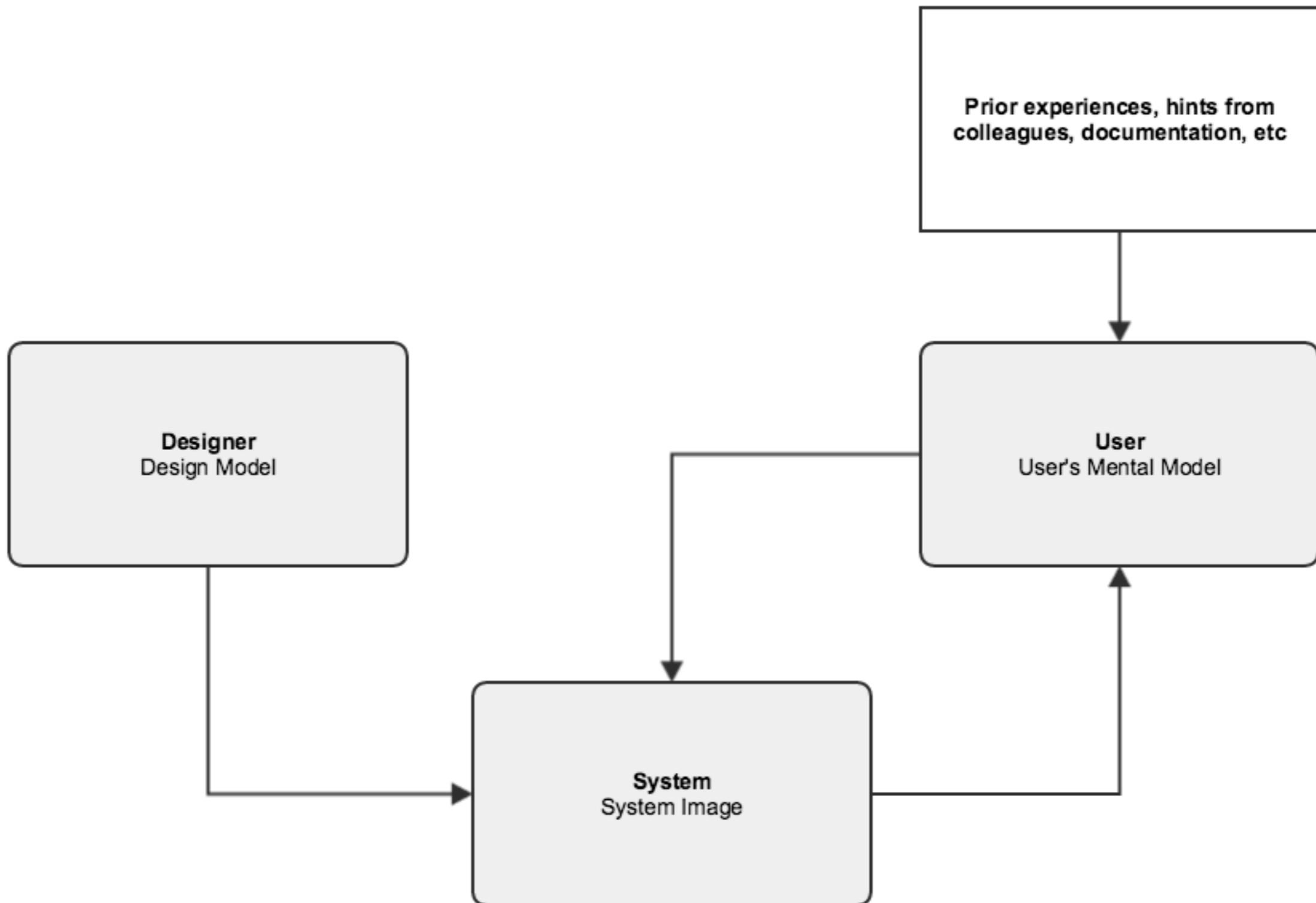


General Guidelines for Defining Design Models

- Based on the user's point of view
- Centered around the user's goals and tasks
- Easy to understand and remember
- Predictable in behaviour (consistent)

System Image

The system image is the physical appearance of a system, and its operation, responses to user's commands, and related documentation.



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Source: The Design of Everyday Things by Donald Norman

Time for Questions & Discussion

- What we've covered so far
 - Mental model
 - Design model
 - System image
- Coming up
 - Principles to communicate conceptual models

Conceptual Models

Design principles that effectively communicate the conceptual model, as originally identified by Donald Norman:

- Visibility
- Affordances
- Mapping
- Feedback
- Constraints

Visibility

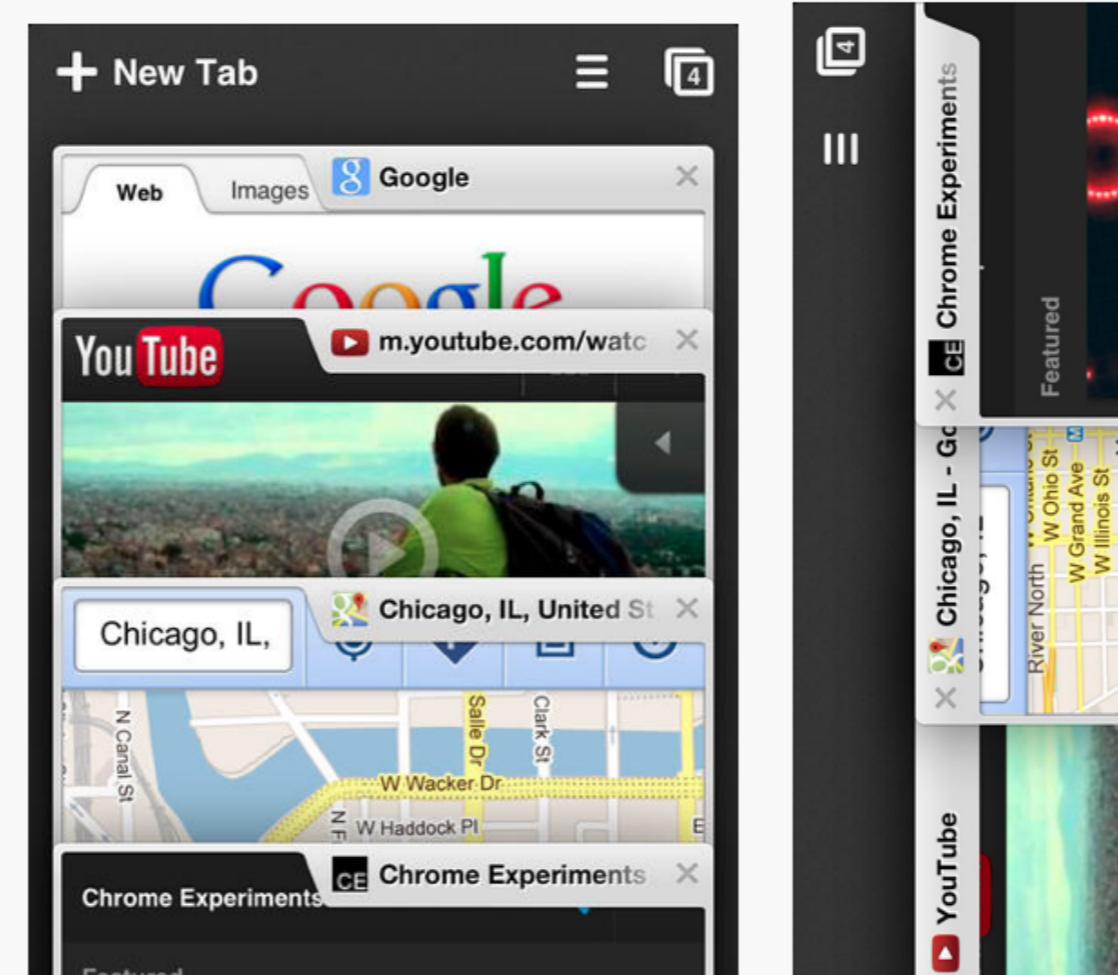
Elements of the interface, representing the various functions of a device, should be visible

Visibility

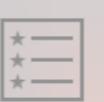
Examples of poor visibility can be found in many office phone systems and digital wrist watches

[!\[\]\(36f06f5166699f74ba8f4d48e635dcb0_img.jpg\) Search](#)Chrome 17+

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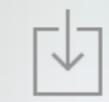
Top Charts



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Updates

Visibility

Making everything visible at once is not really feasible, as the issue of relative visibility also needs to be considered

amazon.com.



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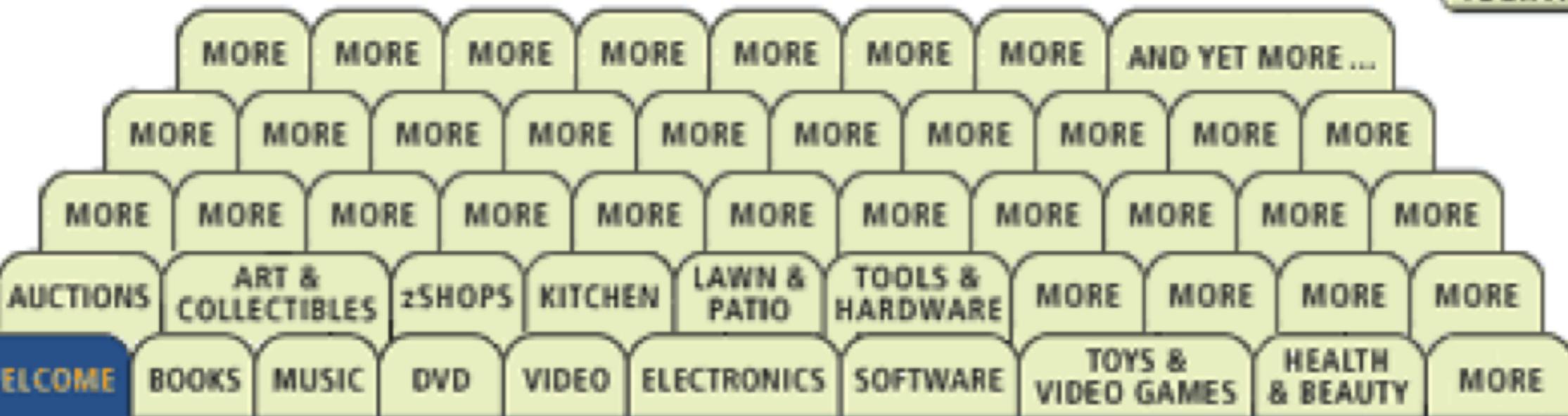
GIFT
IDEAS

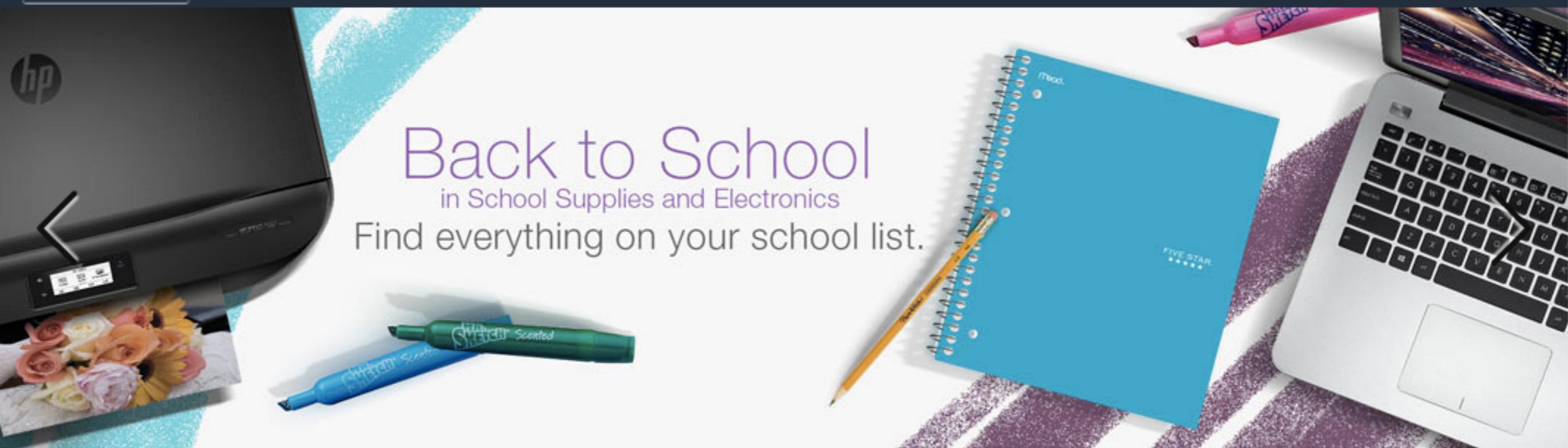
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Progressive Disclosure

Progressive disclosure is a technique where the complexities of the interface are “revealed” as related functionality is required

Effective Progressive Disclosure

- Most important/frequently used items should be immediately accessible
- Display as little, but all required, elements
- Give cues about how to find more functionality

Visibility

For today's multi-touch devices, the issue of discoverability is a related key factor to also consider



Home



Lots of people are talking on Twitter X

Import your contacts so you can find and chat with your friends

Import contacts



SFU Vancouver @SFUVan

7m

What are you doing this weekend? Find something in our weekly event listings! Find us @Rec_Can's walk this weekend! ow.ly/p1ZRO



SFU Applied Sciences @FAS_SFU

26m

Have a business idea? Drop-in today 1-2pm 2nd floor WMC at Tim Horton's to chat with an experienced entrepreneur @SFUVC Mentor Meet #FAS_SFU



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1h

Affordances

Affordances are the actual and perceived properties of an object that provide cues about how that object can be used and the results produced by that object

IAG: Faculty
Development
Centre

פְּנִימִית
TAG: Faculty
Development
Centre

PULL



Kodak



DISPLAY

MENU

RECORD

CAPTURE

REVIEW

CONNECT

INFO

W T



Perceived Affordances

For graphical user interfaces, perceived affordances come into play – a combination of what you see and what you know (conventions)

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Displays & Mounts



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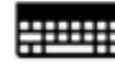
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Mapping

Mapping concerns itself with the relationship between controls and the objects that they affect

Mapping

Ideally, one control affects one object



“On our 900’s the replay function jumped back just enough to compensate for our reaction time when the commercial is over and we want to go back to watching the recording. It worked great! Now, on the Smart Control those functions are on dual function keys. **When holding the rewind button long enough to trigger the replay function** the fast forward keeps going, effectively increasing the effective reaction time so that I need at least 3 replays to get back to the portion of the program I missed. This design ‘feature’ was a really dumb idea for keys that depend on reaction time. A remote big enough for the extra 2 keys would have been much better.”

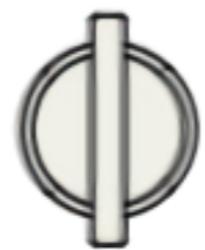
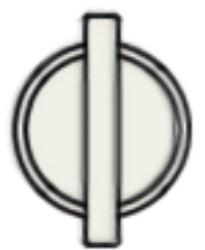
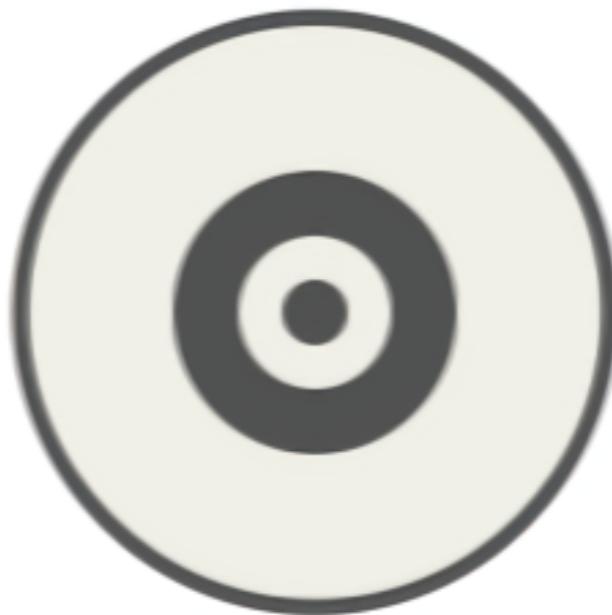
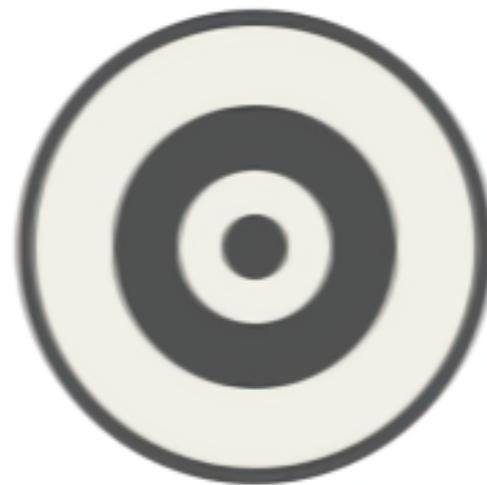
— Logitech Harmony Smart Control Reviewer

Natural Mapping

Natural Mapping is the spatial relationship between controls and the objects that they affect

Natural Mapping

This may involve both control layout and movement

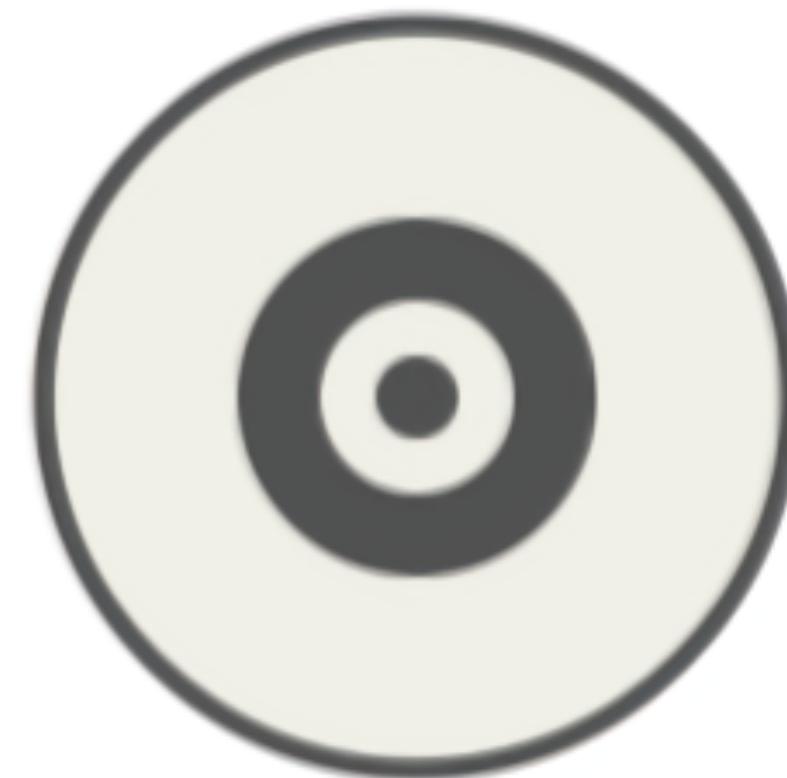
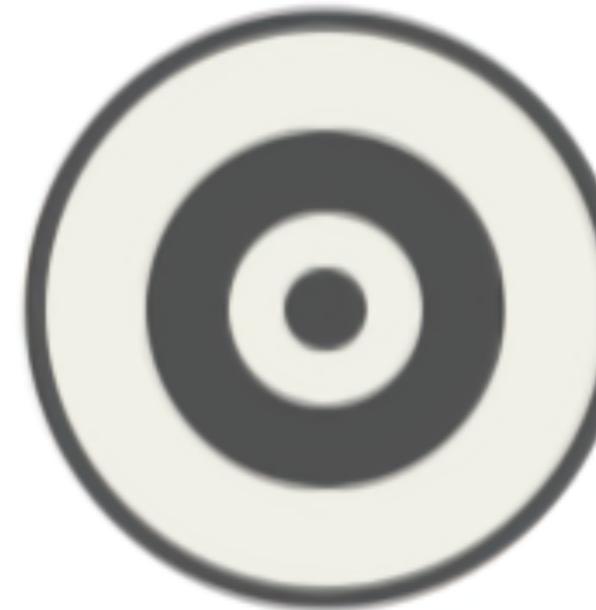
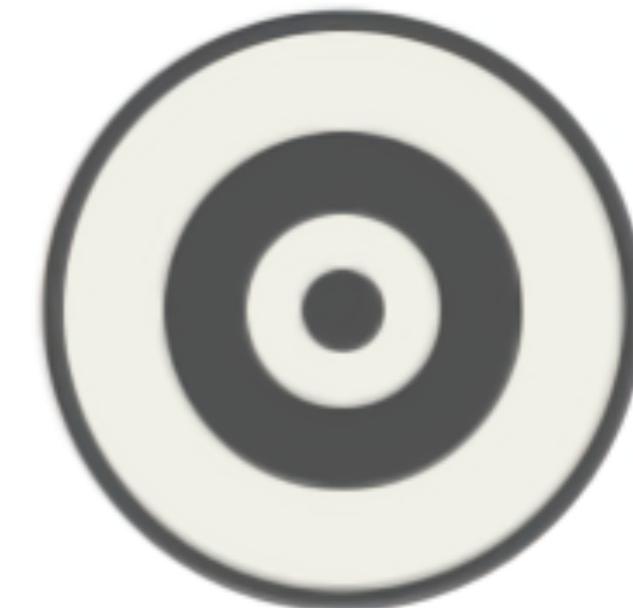
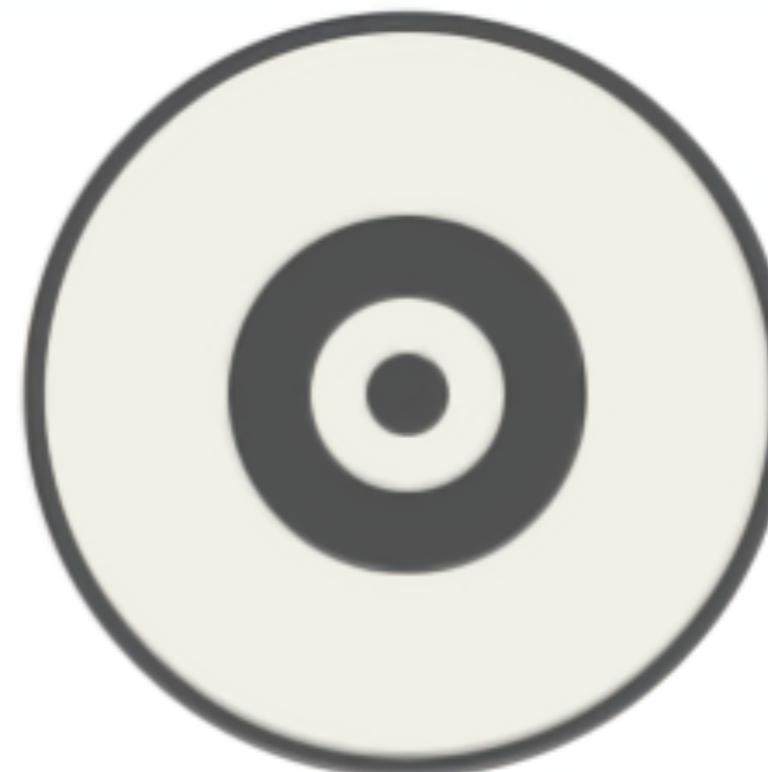


Back

Front

Front

Back







Summary

Ready to start installing Postbox Express



Postbox Express will be installed to the following location:

C:\Program Files (x86)\Postbox Express

Postbox Express will be set as your default mail application.

Click **Install** to continue.

< Back

Install

Cancel

Internet Options



General Security Privacy Content Connections Programs Advanced

Select a zone to view or change security settings.



Internet



Local intranet



Trusted sites



Restricted sites

Internet



This zone is for Internet websites,
except those listed in trusted and
restricted zones.

Sites

Security level for this zone

Allowed levels for this zone: Medium to High

Medium-high

- Appropriate for most websites
- Prompts before downloading potentially unsafe content
- Unsigned ActiveX controls will not be downloaded



Enable Protected Mode (requires restarting Internet Explorer)

Custom level...

Default level

Reset all zones to default level

OK

Cancel

Apply



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Windows®. Life without Walls™. Dell recommends Windows 7.



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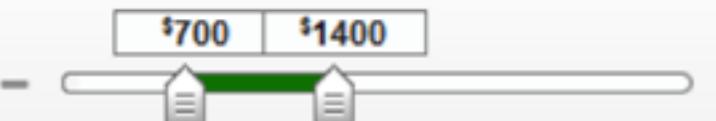
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This Week In Web Videos: "How to
Make a Situation About You"
splitsider.com/?p=14239



The Verge @verge

2m

Wow: Microsoft's transparent
desktop lets you explore a 3D UI
with your hands vrge.co/HjPUzS



The Poke @ThePoke

3m

This may be the most pretentious



Home



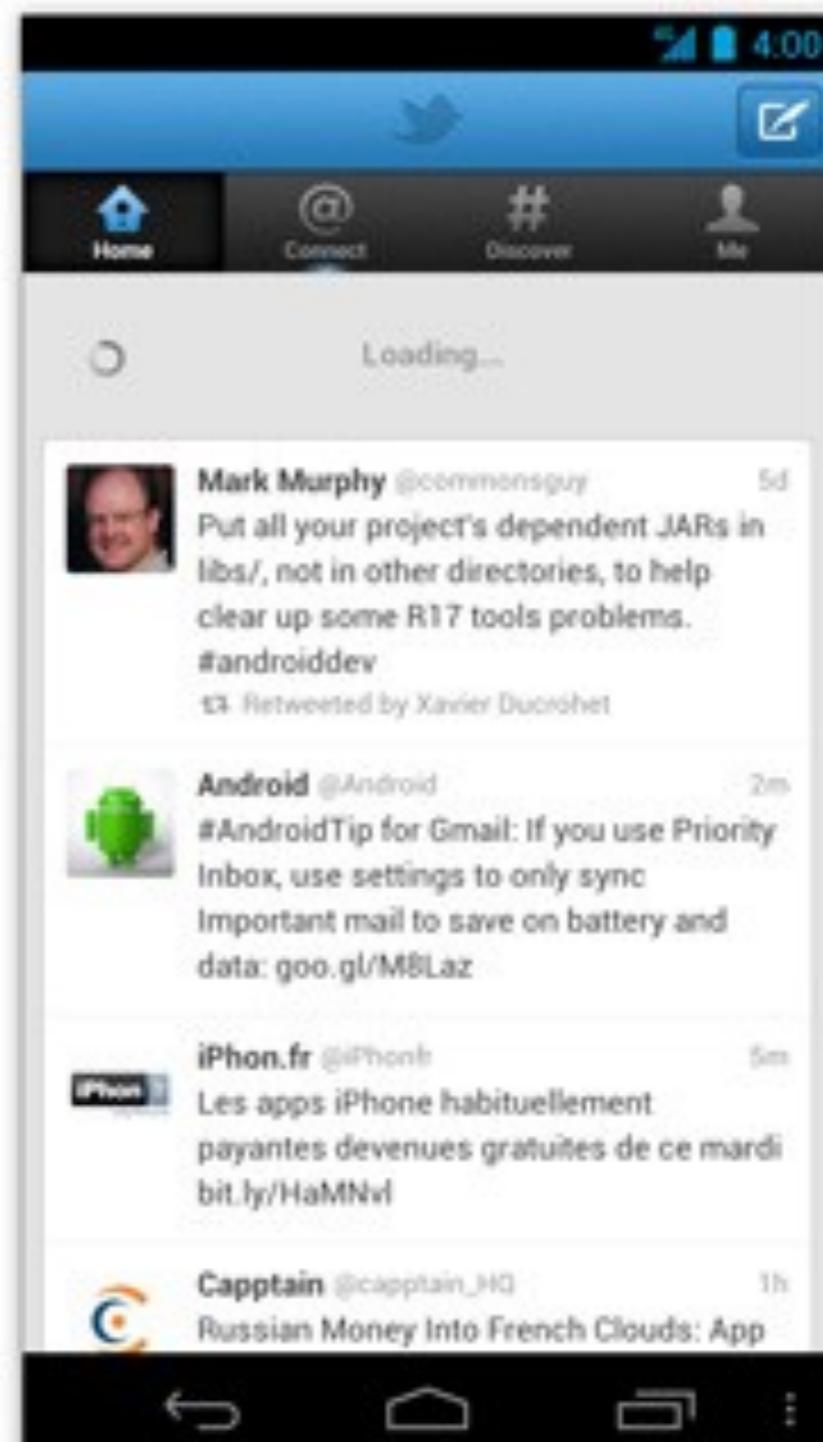
Connect



Discover



Me



Pinch

Touch surface with two fingers and bring them closer together

Spread

Touch surface with two fingers and move them apart

Press

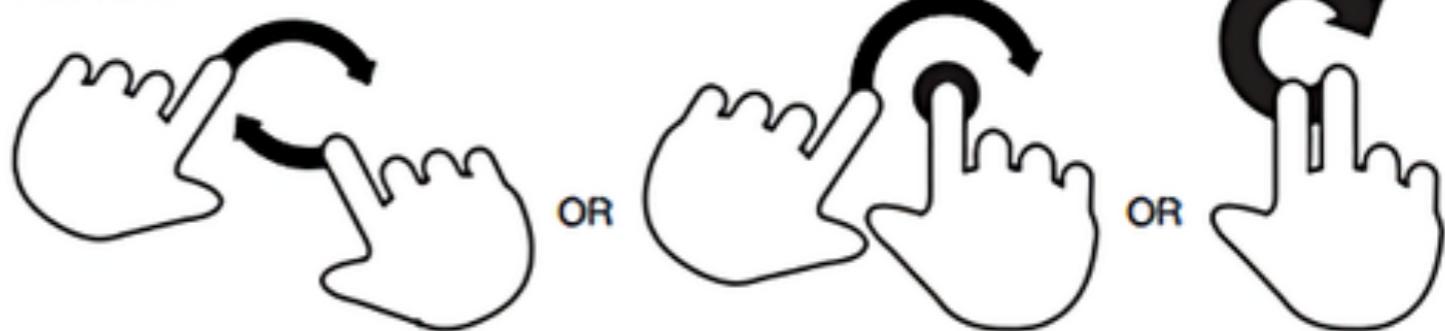
Touch surface for extended period of time

Press and tap

Press surface with one finger and briefly touch surface with second finger

Press and drag

Press surface with one finger and move second finger over surface without losing contact

Rotate

Touch surface with two fingers and move them in a clockwise or counterclockwise direction

Feedback

Information reported to the user indicating that an action has been performed and what its result has been

Feedback

Common techniques with regard to software interfaces include cursor changes, progress meters, message boxes, and previews



Enter this verification code if prompted
during account sign-in:

alice@gmail.com

246174



alice.work@gmail.com

093158



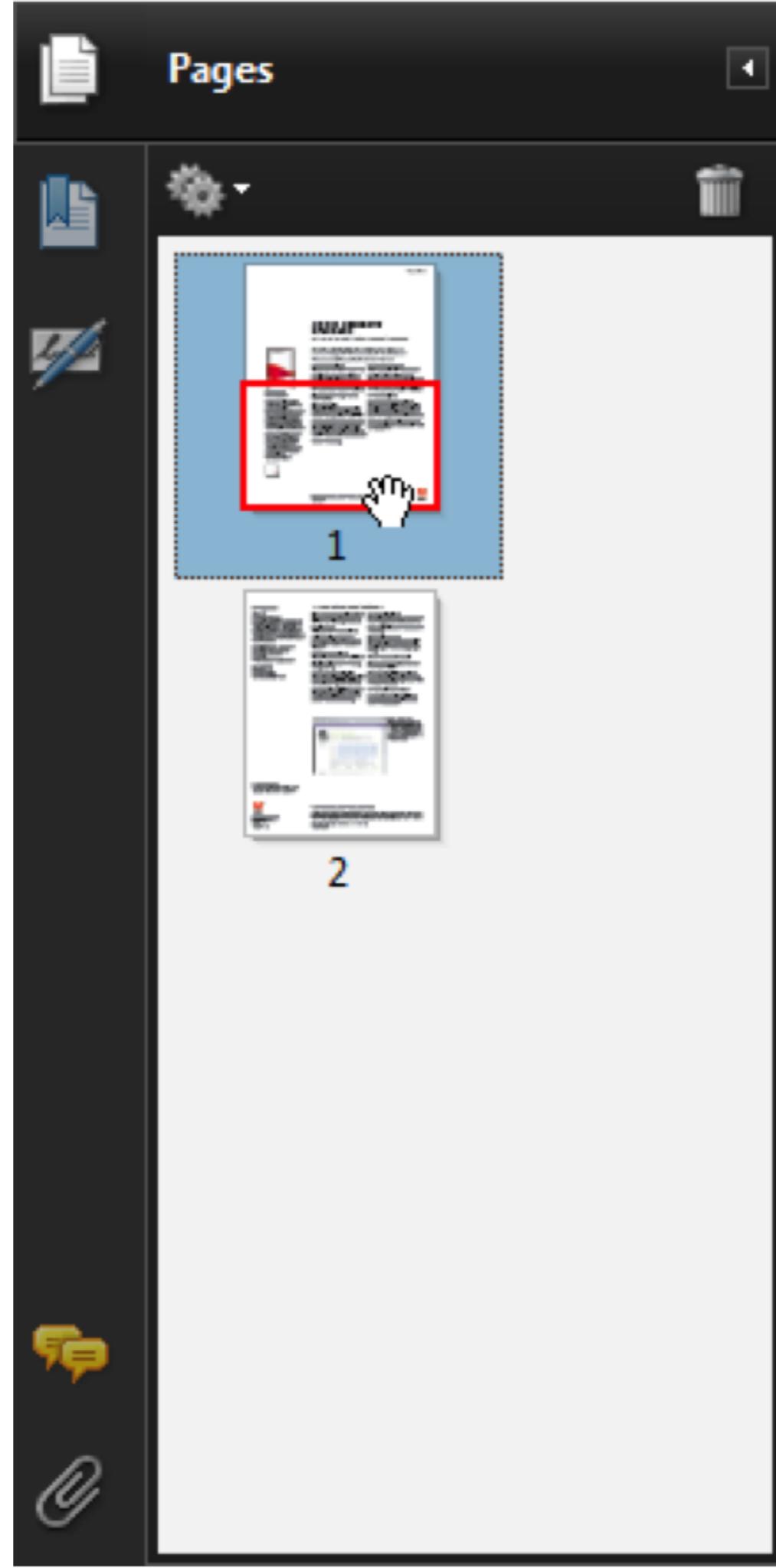
Constraints

Constraints limit the number of ways that something can be used

Constraints

- Physical
- Cultural
- Logical

Pages



Security Settings



Digital IDs

Directory Servers

Time Stamp Servers

Adobe LiveCycle Rights



Add ID



Usage Options



Certificate Details



Export



Refresh



Remove ID

Exp

Name

Issuer

Storage Mechanism

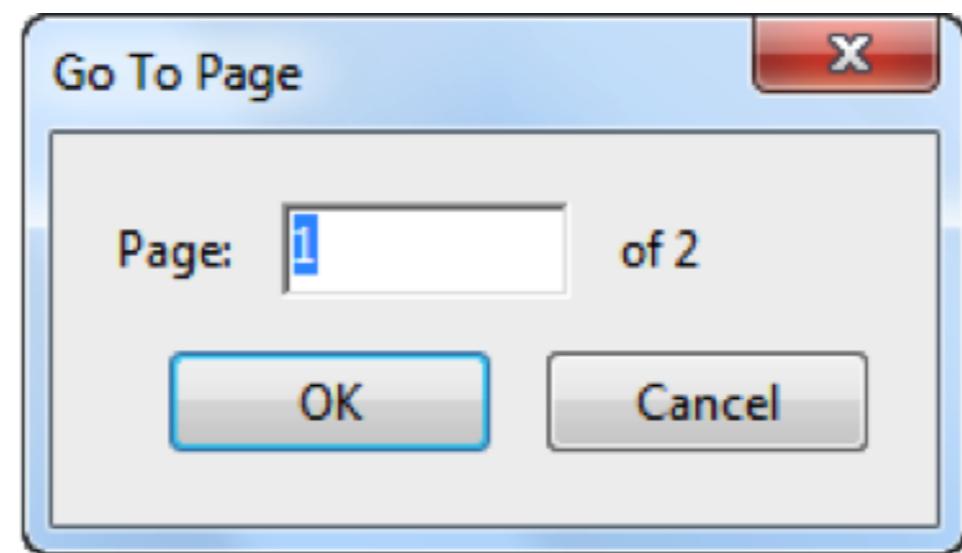


Manage My Digital IDs

This is a list of the **digital IDs** that are available for your use on this computer. Digital IDs are *private* and should not be shared. They are used when you create a digital signature or when you decrypt documents that are encrypted for you using *Certificate Security*.

Each digital ID has a corresponding *public* certificate which contains identifying information about you and which you can share with others. This certificate is used by others to encrypt documents for you, or to validate your digital signatures. Select one of the entries above and click *Certificate Details* to view information from your certificate. Use *Export* to share your certificate with others.

Use *Set Default* to set or clear which digital ID is used by default when you sign or encrypt documents. Use *Add ID* to add a new digital ID or to find an existing digital ID and add it to this view. Use *Remove ID* to permanently remove a digital ID from this list and wherever it is stored.



Good Design

- Provides a good conceptual model
- Makes things visible
- Provides (perceived) affordances
- Gets the mappings right
- Supports interaction through feedback
- Exploits the power of constraints

Activity: Conceptual Model Analysis

PROJECT GROUP

Review the current myExperience Web app, and consider the following aspects of the design:

Is a good conceptual model provided?

Are things visible? Is relative visibility considered?

Are (perceived) affordances utilized?

Are the mappings right?

Is interaction through feedback supported?

Are the power of constraints utilized?

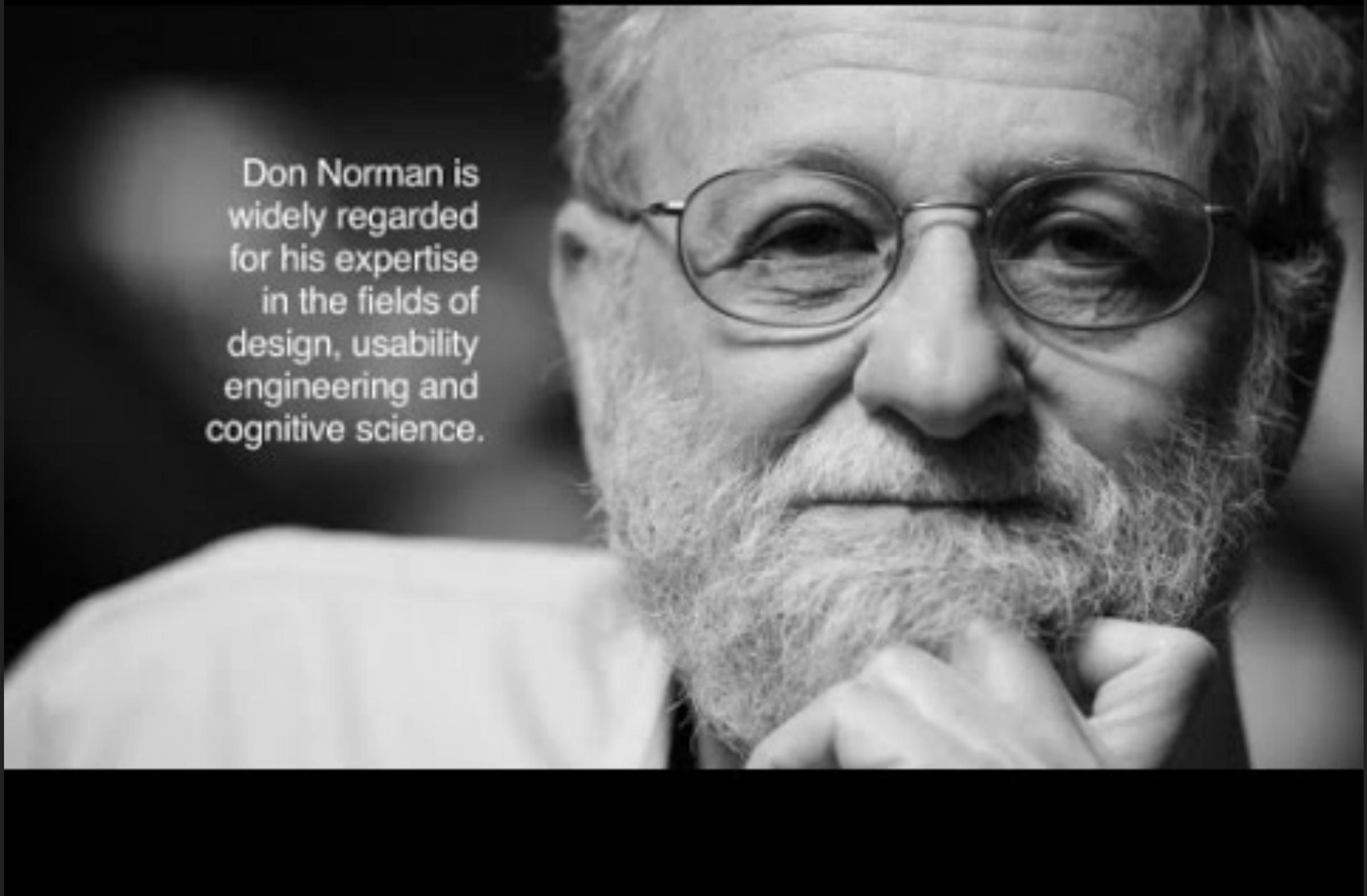
Interaction Design

Designing for Emotion

Why Design for Emotion?¹

- Emotion is experience
- All design is emotional design
- Emotion dominates decision-making
- Emotion commands attention and affects memory
- Emotion communicates personality, forms relationships, and creates meaning

¹ <https://www.microsoft.com/design/inclusive/>



Don Norman is widely regarded for his expertise in the fields of design, usability engineering and cognitive science.

<https://www.youtube.com/watch?v=G7MeRkDkRN4>

DON NORMAN'S
3 Levels of Design Appeal



Three levels of Emotional Design

- Visceral
 - Look
 - Feel
 - Sound
- Behavioral
 - Function
 - Understandability
 - Usability
 - Physical feel
- Reflective
 - Message
 - Meaning of product
 - Culture

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The thrill of surfing.
The agony of choosing a color.

Hop on an iMac® and in just ten minutes you could be surfing the internet and e-mailing everyone and their brother. Now for the hard part: what color will it be? www.apple.com Think different.



MEANINGFUL

Has personal significance

PLEASURABLE

Memorable experience worth sharing

CONVENIENT

Super easy to use, works like I think

THIS IS THE "CHASM" THAT IS DIFFICULT
FOR ORGANIZATIONS TO CROSS

USABLE

Can be used without difficulty

RELIABLE

Is available and accurate

FUNCTIONAL (USEFUL)

Works as programmed

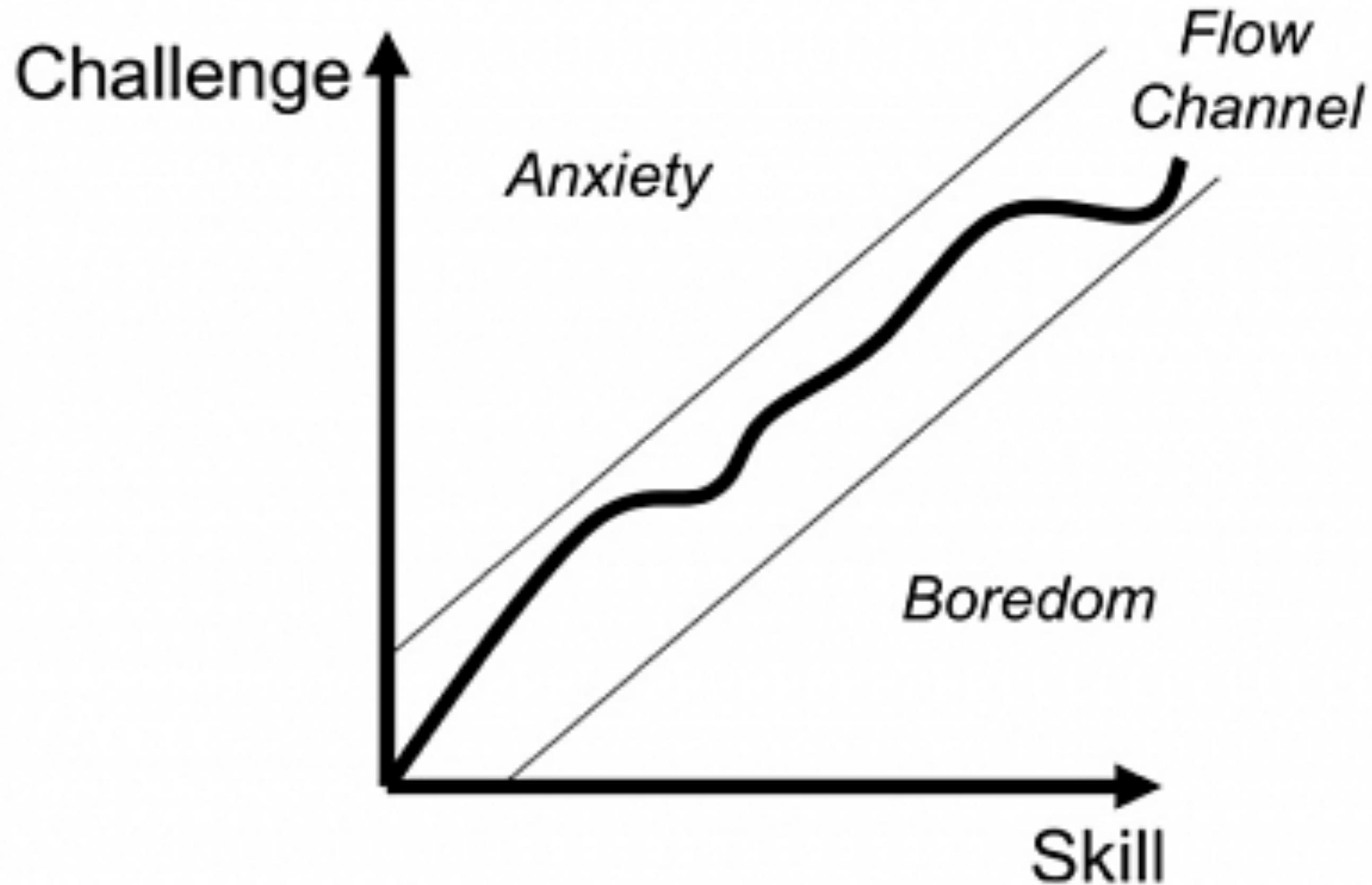






Enjoyable Web Sites

- Easy to Use
- Aesthetically pleasing
- Needed information
- Fun and entertaining
- Provides engagement
- Supports “flow”



"Flow" concept by Mihaly Csikszentmihalyi. Drawn by Senia Maymin.

Case Study: Designing for Emotion

Wufoo.com

Time for More Questions & Discussion

- What we've covered so far
 - Why design for emotion
 - Three levels of emotional design:
 - Visceral
 - Behavioral
 - Reflective
- Coming up
 - Accessible and Inclusive Design

Interaction Design

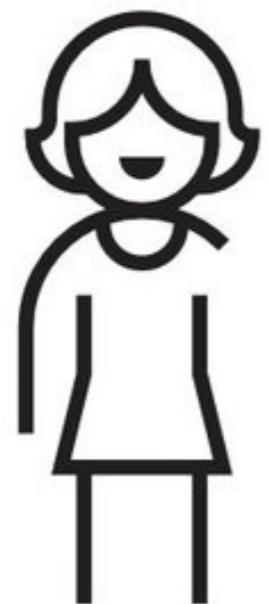
Accessible and Inclusive Design

What is Accessible Design?

Accessibility is the practice of removing barriers that prevent interaction or access to websites by people with disabilities

What is Accessible Design, in Plain Language

Content and functionality should be available to everyone!



one arm



arm injury



new parent

permanent



situational

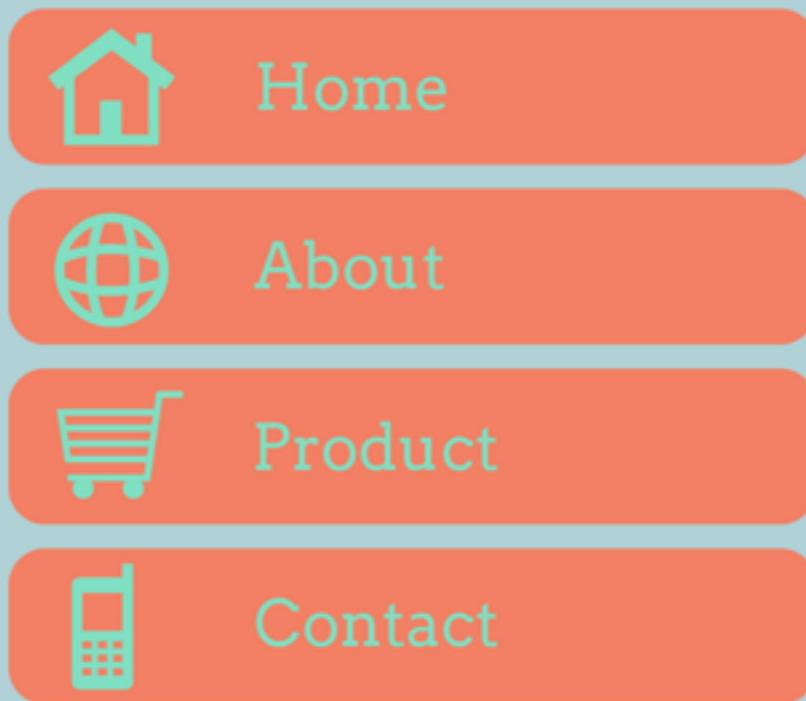
Aspects of Accessibility (a.k.a. ally)

- Visual
- Audio
- Mobility
- Cognition

An introduction to Digital Accessibility



https://www.youtube.com/watch?v=8Ik_LHmZx8Y



Low-contrasting text versus high-contrasting text

First name

Last name

Birthdate

First name (required)

Last name (required)

Birthdate

Using color versus using text to indicate required fields

Example Web Accessibility Issues

- Contrast
- Color-only coding
- Text size/scaling
- Clean presentation
- Page structure
- Link labels
- Image tags
- Mouse-only interaction
- Small touch targets



Web Content Accessibility Guidelines (WCAG)

<https://www.w3.org/WAI/intro/wcag>

WCAG Principles

- Perceivable
- Operable
- Understandable
- Robust

Perceivable

Information and user interface components must be presentable to users in ways they can perceive

Operable

User interface components and navigation must be operable

Understandable

Information and the operation of user interface must be understandable

Robust

Content must be robust enough that it can be interpreted reliably by a wide variety of user agents, including assistive technologies

By improving accessibility, we
can make things better for
everyone

Activity: Accessibility Audit

PROJECT GROUP

Perform an accessibility audit on the myExperience Web app, considering the aspects of accessibility highlighted in today's handout.

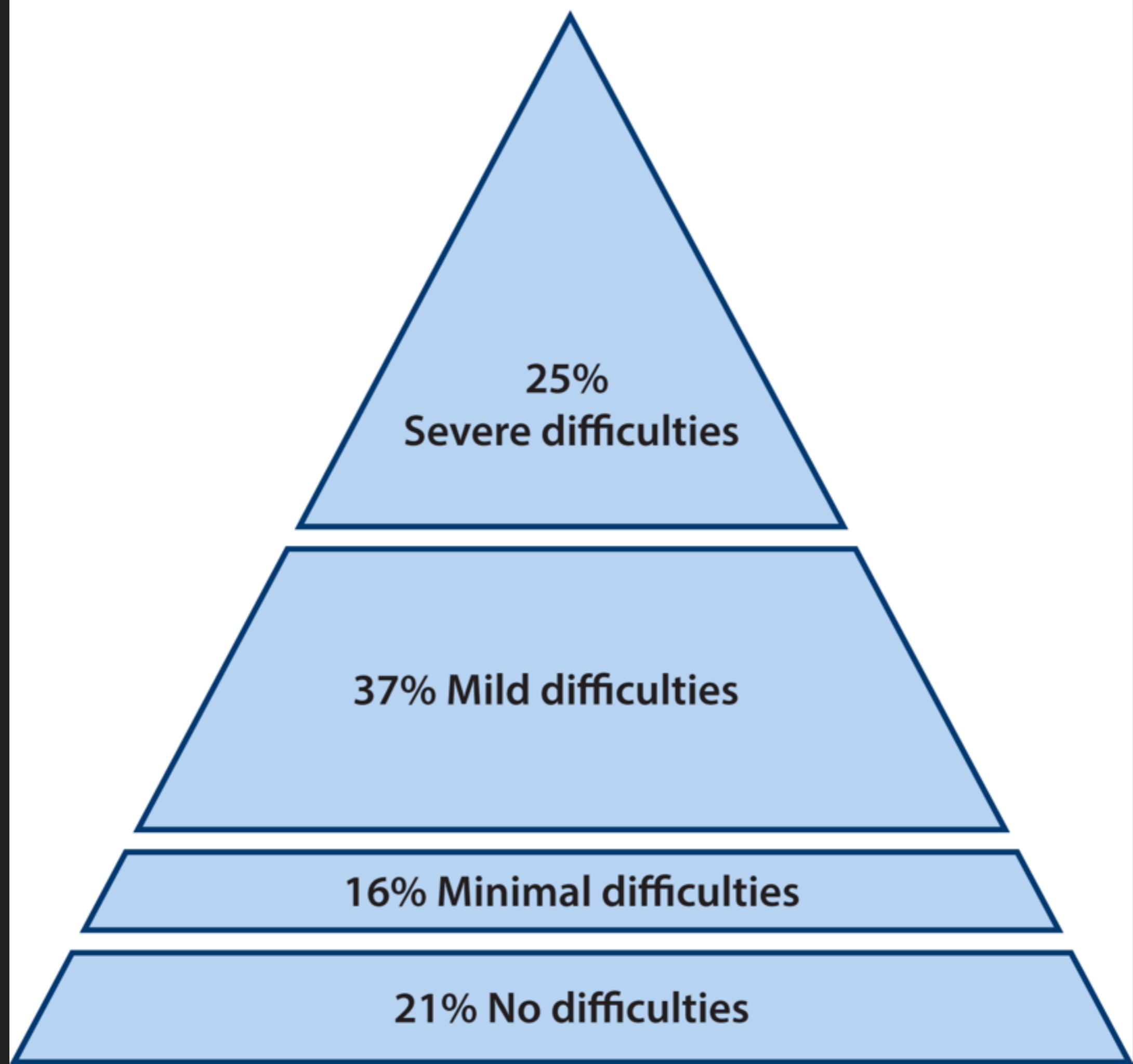
What is Inclusive Design?

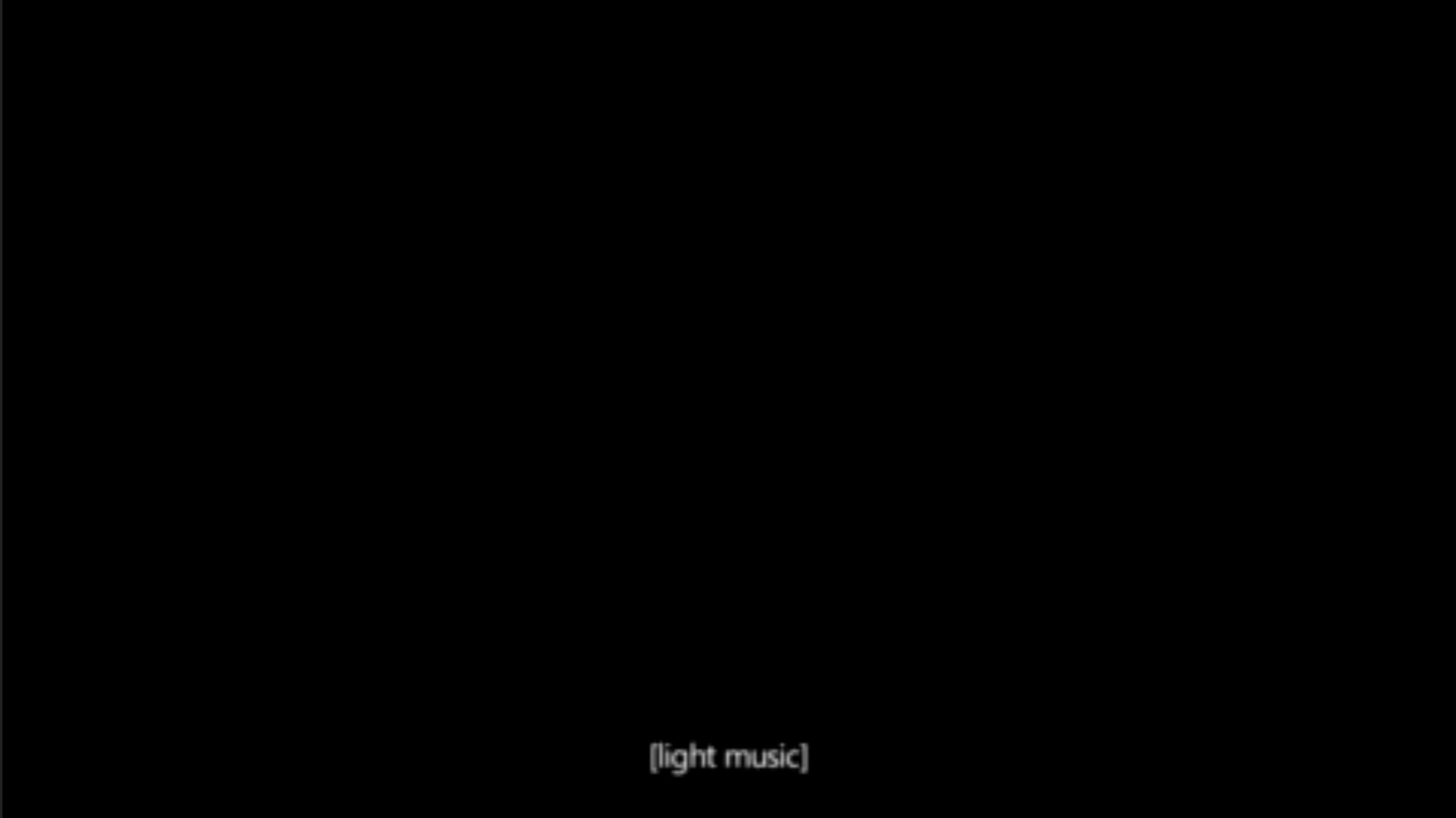
The design of products and services that consider the full range of peoples ability, age, culture and language

Example Inclusive Design Principles (Microsoft¹)

- Recognize exclusion
- Learn from diversity
- Solve for one, extend to many

¹ <https://www.microsoft.com/design/inclusive/>





[light music]

<https://vimeo.com/138670685>

Summary

1. Conceptual Models
2. Designing for Emotion
3. Accessible and Inclusive Design

References and Suggested Books

- Design for Emotion by Trevor van Gorp and Edie Adams
- A Web for Everyone: Designing Accessible User Experiences by Sarah Horton and Whitney Quesenberry
- Understanding WCAG 2.0, <https://www.w3.org/TR/UNDERSTANDING-WCAG20/intro.html>
- Designing User Interfaces for an Aging Population by Jeff Johnson and Kate Finn
- Emotional Design by Donald Norman
- The Design of Everyday Things by Donald Norman
- The Usability Engineering Lifecycle by Deborah Mayhew

Image Credits

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Amazon Design Team

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