User Centred Web Engineering COMP1650

Designing for the Small Screen

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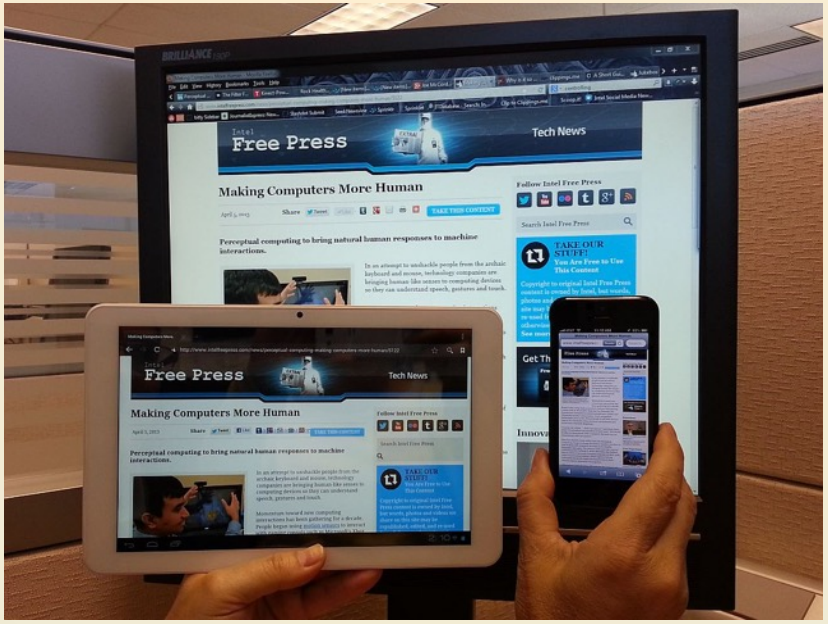


Learning Outcomes

The activities and content in this lecture are linked to the learning outcomes

- Understand the issues involved in developing user interfaces for interactive applications.
- Apply the principles, concepts and models of user-centred design methods to the development and evaluation of interactive system interfaces.
- Apply the concepts of colour theory, font terminology, layout and graphical design elements in terms of visual user interface design.

Lecture Overview

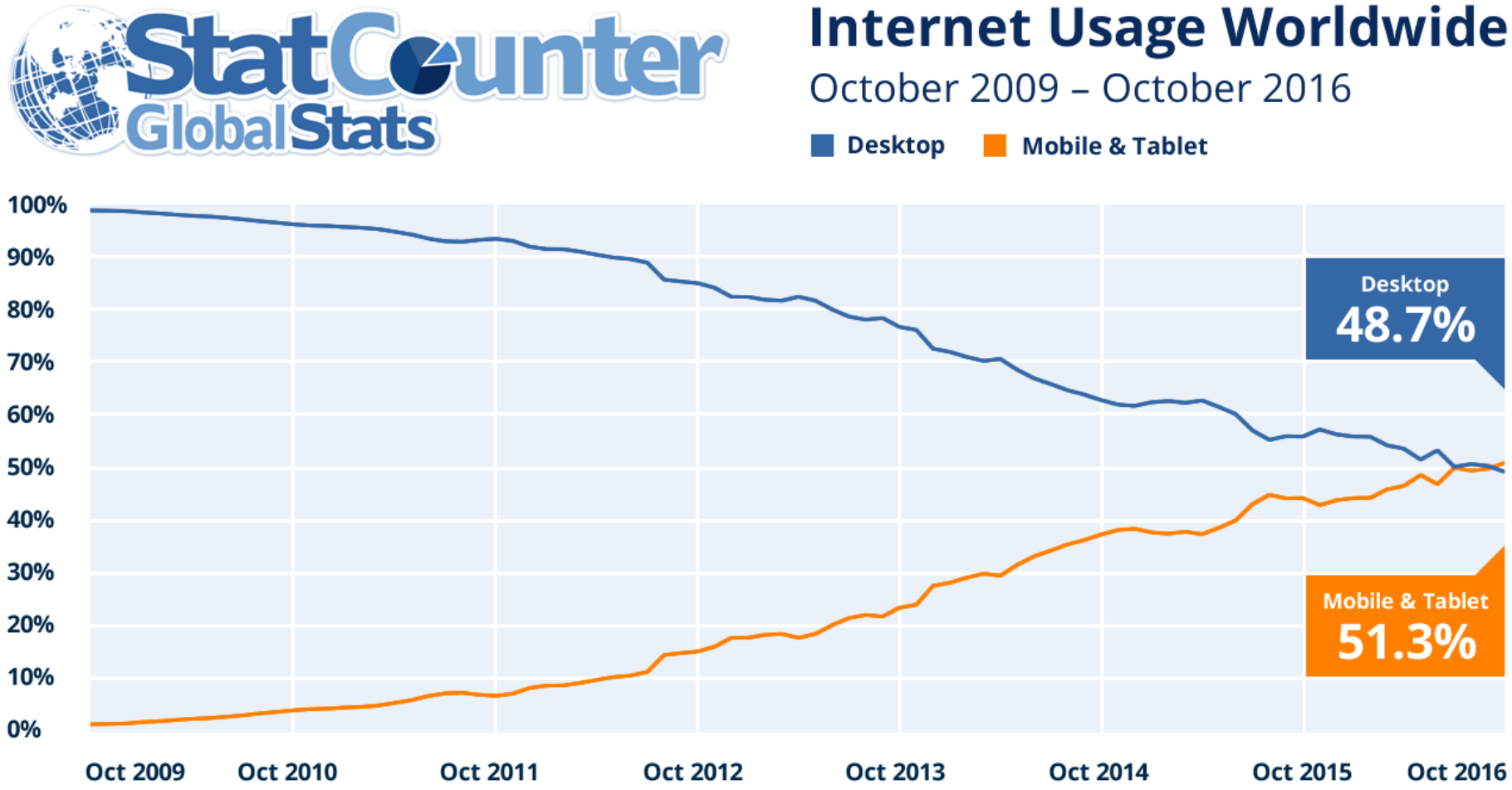
- Designing for the small screen - why does it matter?
- Mobile First Design
- Responsive and Adaptive Design
- Designing for navigation, content and interaction in mobile devices
- Standards and best practices

What do we mean by mobile?

- Is the user mobile or are the devices mobile?

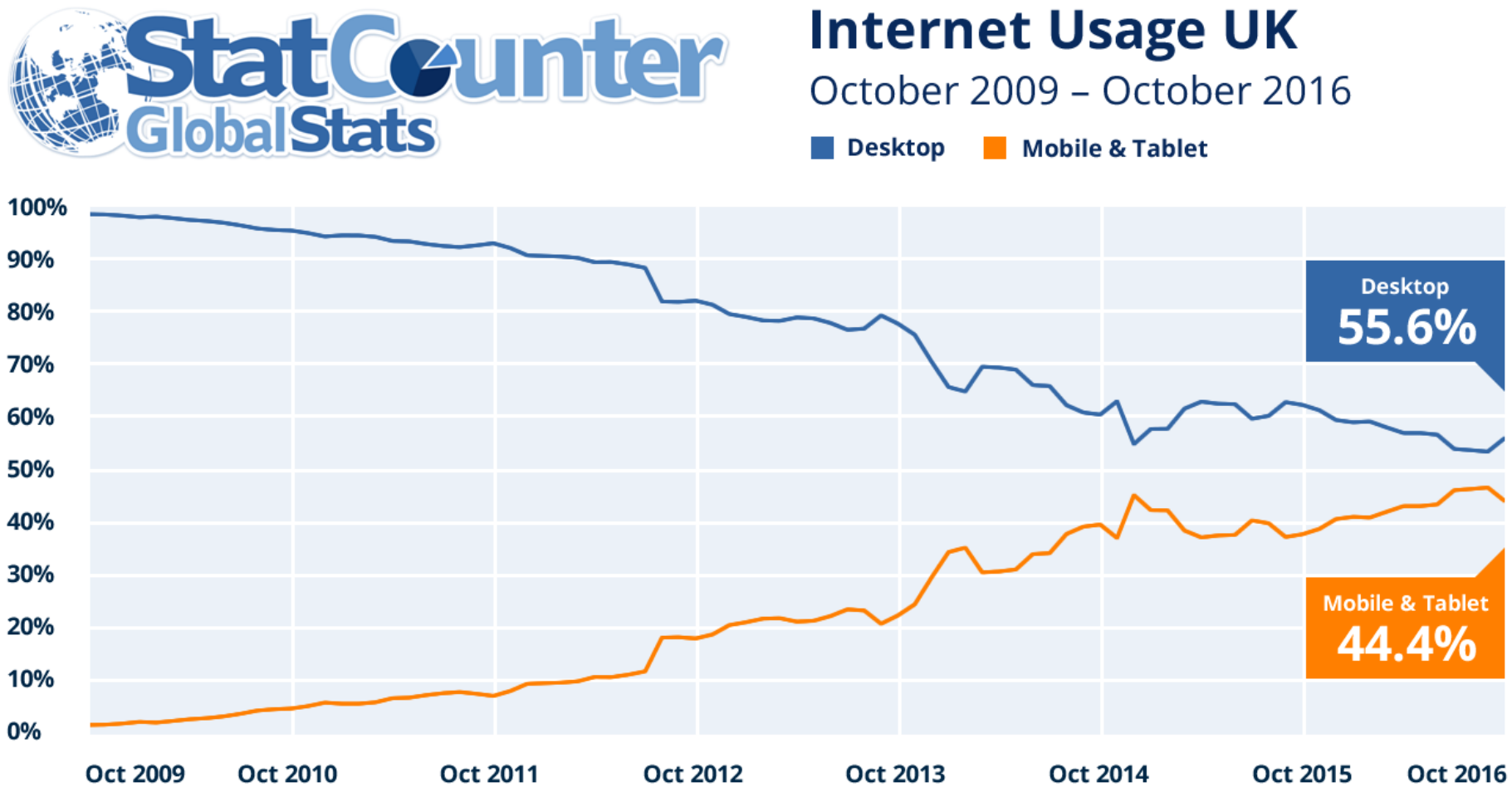
- Mobile devices: Smartphones, tablets, portable game consoles, handheld navigation devices, eReaders, wearables (e.. smart watches)….

Mobile Internet Usage



Source: http://gs.statcounter.com/press/mobile-and-tablet-internet-usage-exceeds-desktop-for-first-time-worldwide

Mobile Internet Usage



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The importance of UI design for mobile devices….

User Satisfaction is essential!

- **Quality of use** - the extent to which a product used by specified users to achieve specified goals in a specified context of use with:
  - effectiveness
  - efficiency
  - satisfaction

Context of use == characteristics of the users, task and the organisational and physical environments

Mobile First Design

"Great mobile products are created, never ported. Start by understanding your users and the benefits the medium has to offer."

Brian Fling (Author)

Mobile First Design

- “Mobile First” design strategy - design the mobile user experience first before designing for the desktop and other devices
- Mobile subscriber growth is high and more an more people read, shop and create with mobile devices
- Even at their homes people use less desktops and more mobiles and tablets
- Mobile first requires new approaches to planning and designing user experiences

Designing Web Sites - Mobile First

- Mobile first imposes design constraints which can help to focus on what is really important for a web site or application

- Mobile First - enables the use of new capabilities such as location specific functions

Mobile First Design

Design for use contexts such as:

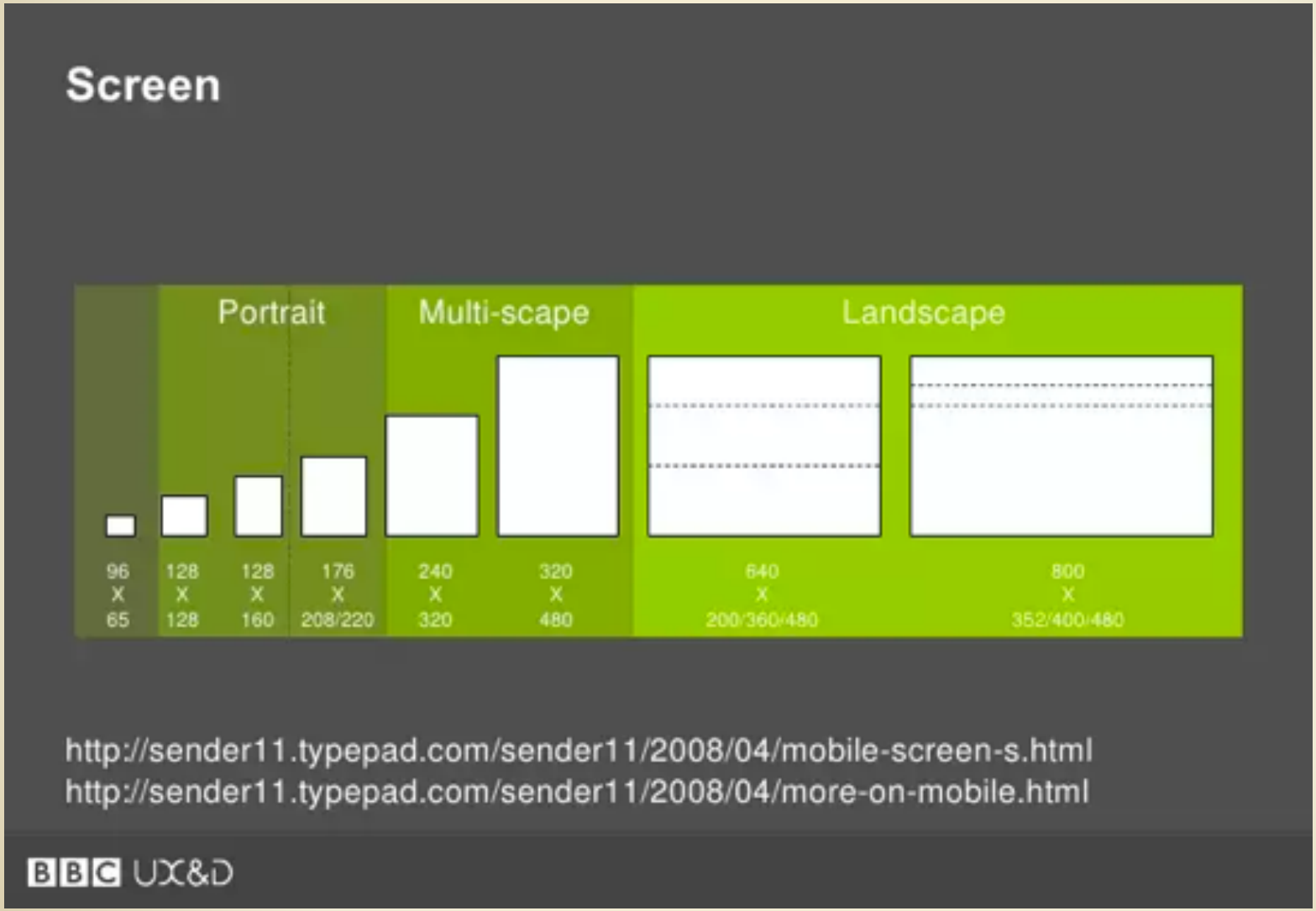
- “I need to know this fact right now, quickly.”
- “I have a few minutes to spare, entertain me.
- “Connect me socially.”
- “If there’s something I need to know right now, tell me.”
- “What’s relevant to the place I’m in right now?”

Key challenges

Mobile user interfaces are drastically different to desktop user interfaces:

- Smaller screen sizes
- Variable screen widths
- Performance
- Physical interaction e.g. touch screens
- Difficulty of typing text
- Challenging physical environment
- Social influences and limited attention

Screen sizes and width



Web resolutions on mobile devices

	Low Density (120), ldpi	Medium Density (160), mdpi	High Density (240), hdpi	Extra High Density (320), xhdpi
Small Screen	QVGA (240 × 320)		480 × 640	
Normal Screen	WQVGA400 (240 × 400)	HVGA (320 × 480)	WVGA800 (480 × 800)	640 × 960
	WQVGA432 (240 × 432)		WVGA854 (480 × 854)	
			600 × 1024	
Large Screen	WVGA800 (480 × 800)	WVGA800 (480 × 800)		
	WVGA854 (480 × 854)	WVGA854 (480 × 854)		
		600 × 1024		
Extra Large Screen	1024 × 600	WXGA (1280 × 800)	1536 × 1152	2048 × 1536, 2560 × 1536
		1024 × 768	1920 × 1152	2560 × 1600
		1280 × 768	1920 × 1200	

Performance best practices

Design the interface for maximum readability:

- Ensure that **content is suitable** for use in a mobile context.
- **Mobile-friendly sites and accessible sites** common features include: ALT text, single column layout, no frames, no pop-ups, no JavaScript, and no dynamic menus.
- **Don't use large background images** on your mobile pages.
- **Add skip anchors**. 'Skip to content' and 'Back to top' anchor links are vital when using a mobile device.
- **Be consistent**.

Adaptive and Responsive Webdesign

- Both approaches aim to provide a good mobile user experience and help designing user interfaces that are optimised for different device and screen sizes
- Both approaches differ in their implementation
- Responsive design is the newer approach to designing mobile experiences and advocated by companies like Google
- Both approaches have their place

Responsive Webdesign (RWD)

- What is responsive design?

Responsive Webdesign (RWD)

- Based on fluid proportion-based grids
- Flexible Images
- CSS3 Media Queries
- Client-based
- One template for all devices
- All assets in one file

RWD Advantages and Disadvantages

+ One template is easier to maintain (e.g. SEO)
+ Does not require scripting
+ Seamless User Experience
+ Approach most widely used in industry
+ Clean URL space

- Page loads slower (e.g. full-size images are downloaded)
- Existing websites need rebuilding

Adaptive Webdesign (AWD)

- What is adaptive web design?

Adaptive Webdesign (AWD)

- Server detects device and loads a version of the website that is optimised for the device
- Different Image sizes based on device
- Several layered templates for different devices and screen sizes

AWD Advantages and Disadvantages

+ Page loads faster (optimised file sizes, only needed information gets send)
+ Able to adapt user experience to different needs for mobile and desktop version of a site

- Requires more maintenance due to multiple version of a site
- Multiple URL's for the same content

Group activity (3-4 per group)

- Please visit the Course Moodle Site, the GRE University Portal start site , the Guardian and Turkish Airlines web sites. Try to find out if these sites use responsive or adaptive design approaches (~10 minutes).

- Write down for each site why you think a particular approach has been chosen (~5 minutes)

- Presentation and discussion of results

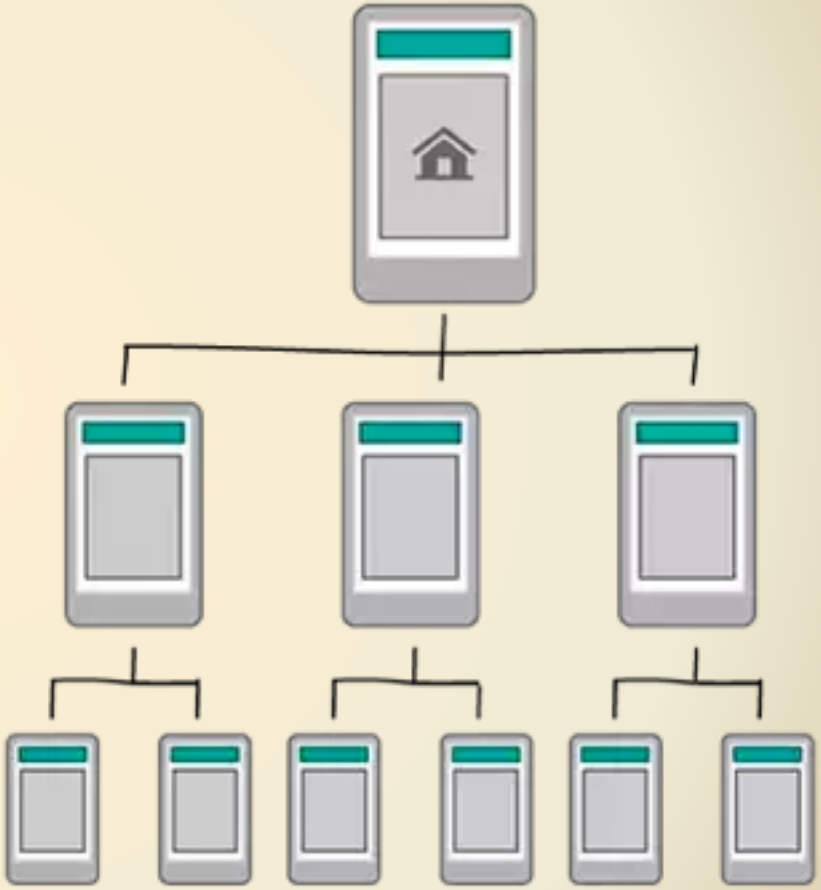
Ways to navigate a mobile web site or application

Main Navigation

Hierarchy

- Good for organising complicated site structures that need to follow a desktop site's structure.

- Watch for navigation. Hierarchical navigation can present a problem to people using small screens.

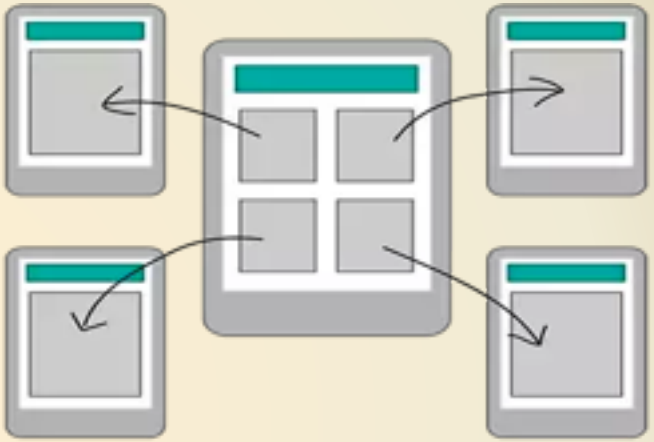


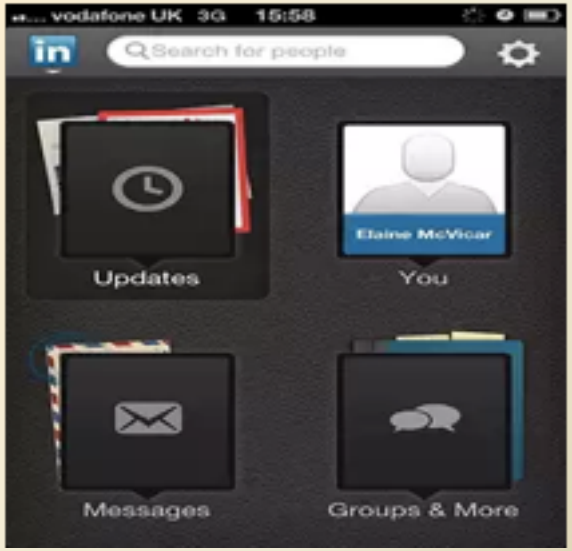
Main Navigation

Hub & Spoke

- Good for quickly exposing an app's features

- Watch for users that want to multi-task; frustrating to return to home page/screen



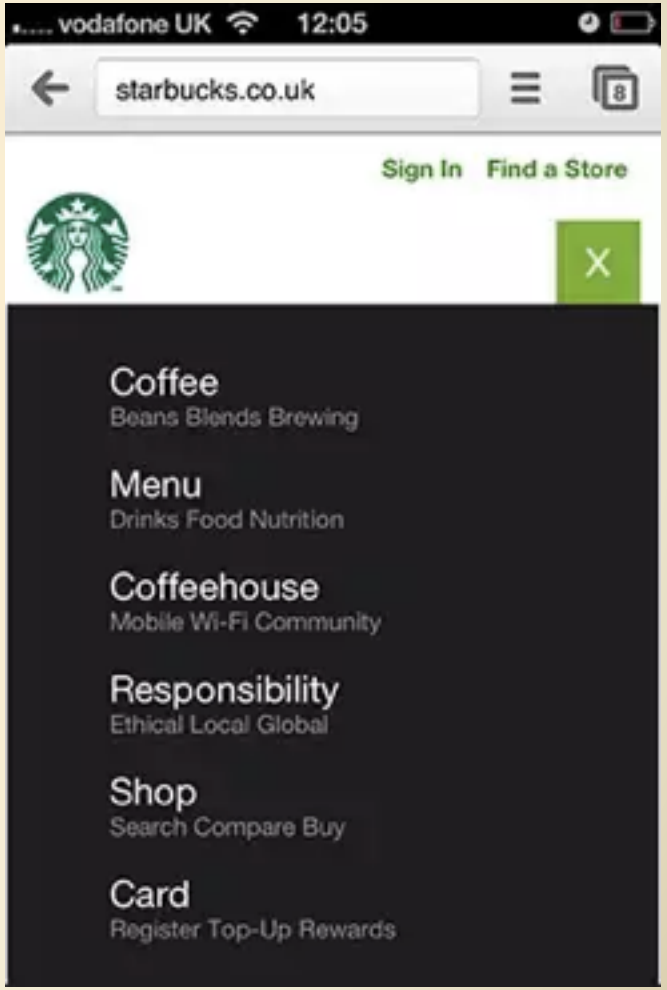


Main Navigation

Expanding menu

- Good for responsive websites

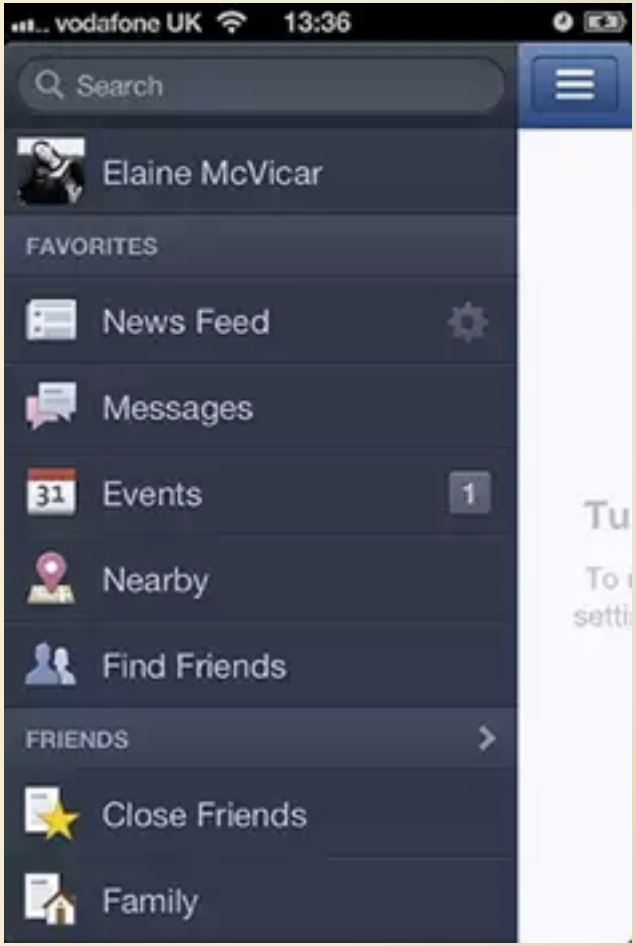
- Watch for too many menu and sub menu options; could push the content further down the screen making it frustrating and awkward to use



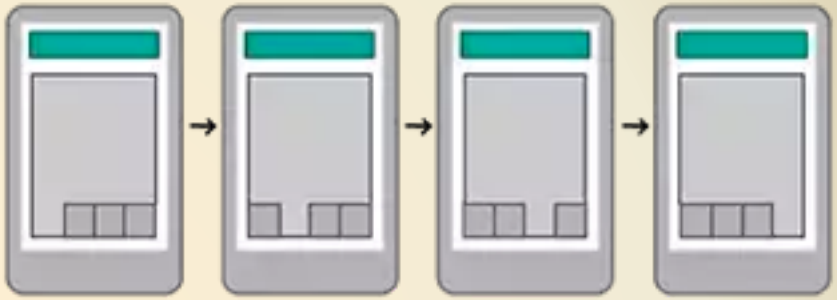
Main Navigation

Side menu

- Good for apps with a high number of menu options.
- Watch for clashing with any other navigation or interaction patterns



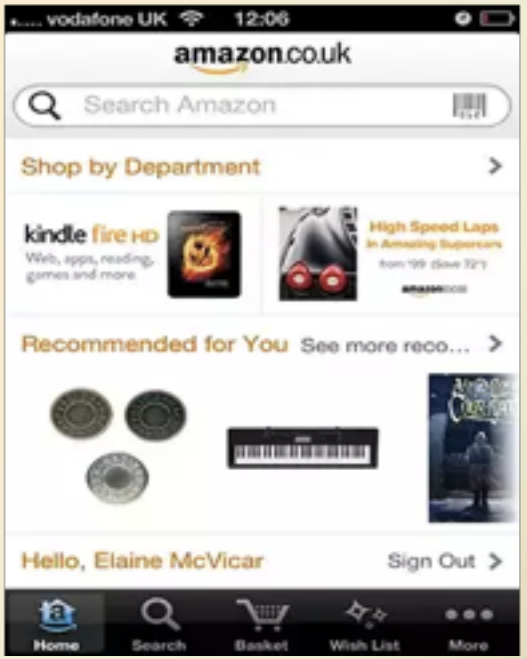
Main Navigation



Tabbed view

- Good for tools based apps with a similar theme and fewer menu options

- Watch out for complexity;

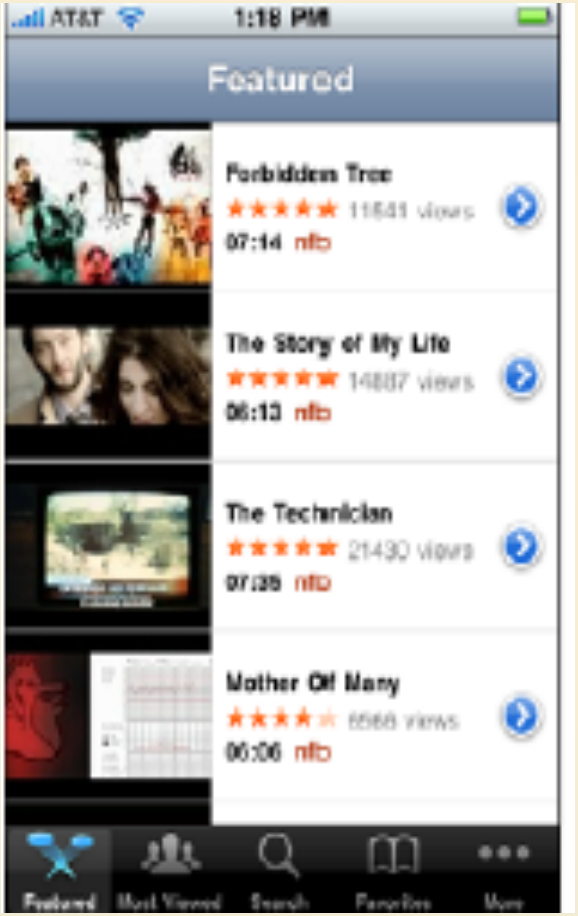


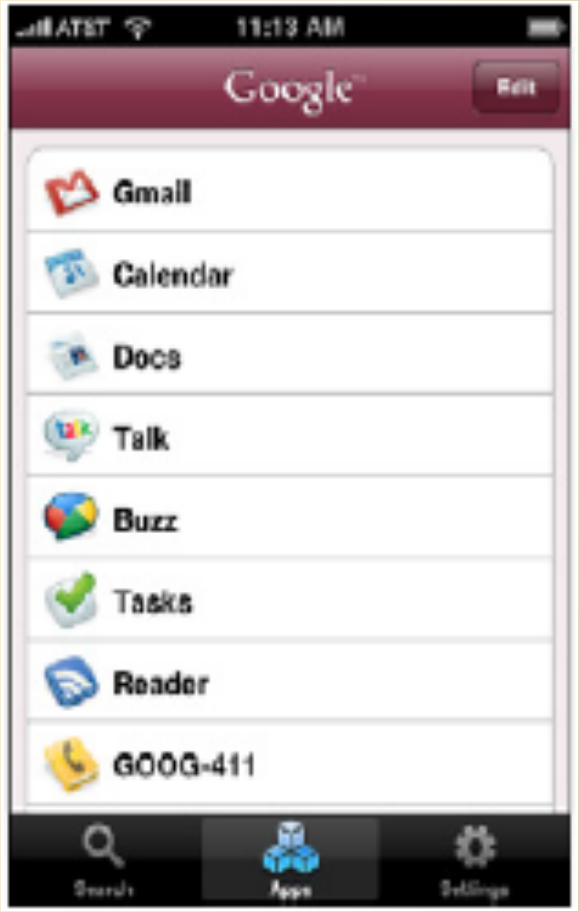
Ways to best display content…

Vertical stacking

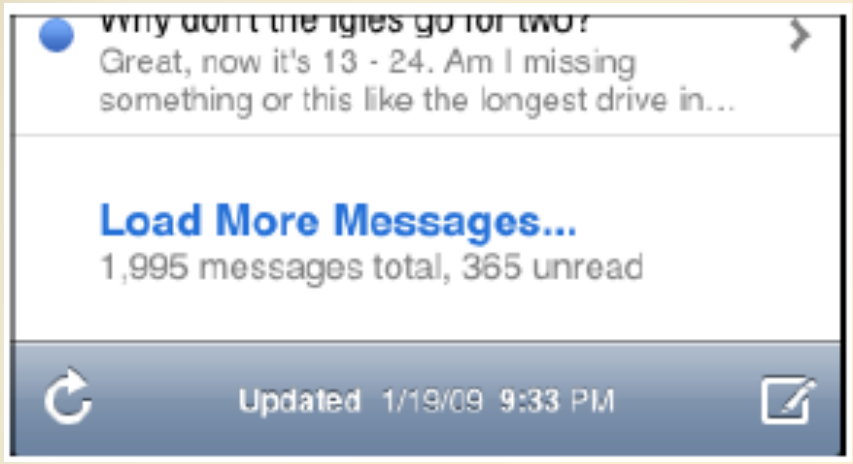
Carousel and filmstrip

Thumbnail and text lists





Infinite Lists



Group task (max. 4 per group)

Design a 1-2 screen mobile app for the local weather! (~10 min)

- Based on the discussion so far, consider the navigation design for the UI of this app
- Think also how to best display the content
- Feedback to wider group and discussion (~5 min)

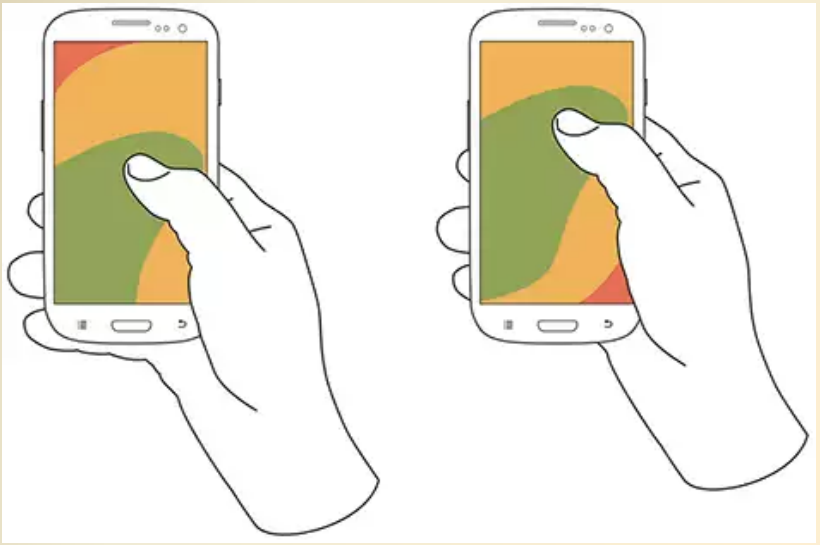
Content best practises

- Use **clear** and **simple** language
- **Align** content to the **left.**
- Place non-essential links and other marginal content at the **bottom** of the page.
- **Limit text size.** Large type should not be larger than twice the size of paragraph text.
- **Use text rather than images for navigation labels and headers.** Keep textual descriptions as short as possible.
- Minimise **white space** on the page.
- Limit the number of different **colours** used on a page.
- Offer users a **choice** of interfaces

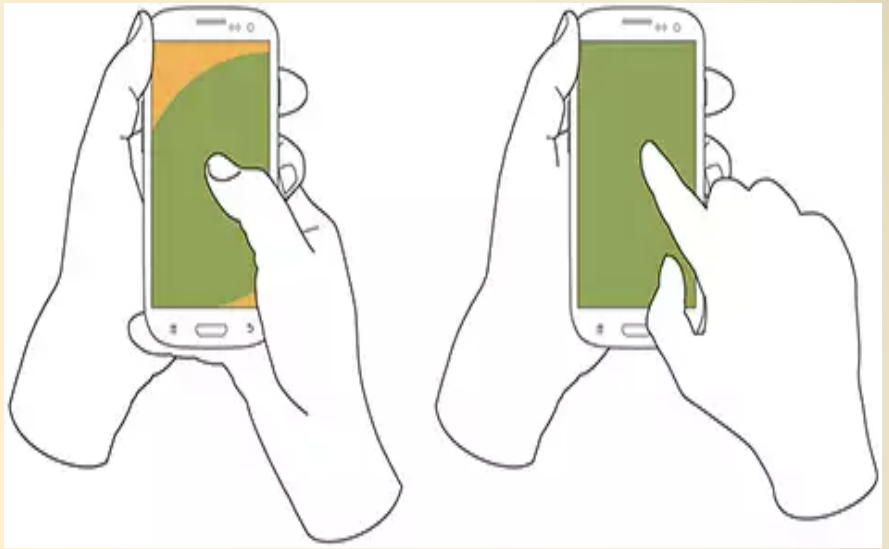
The design of interactions and input

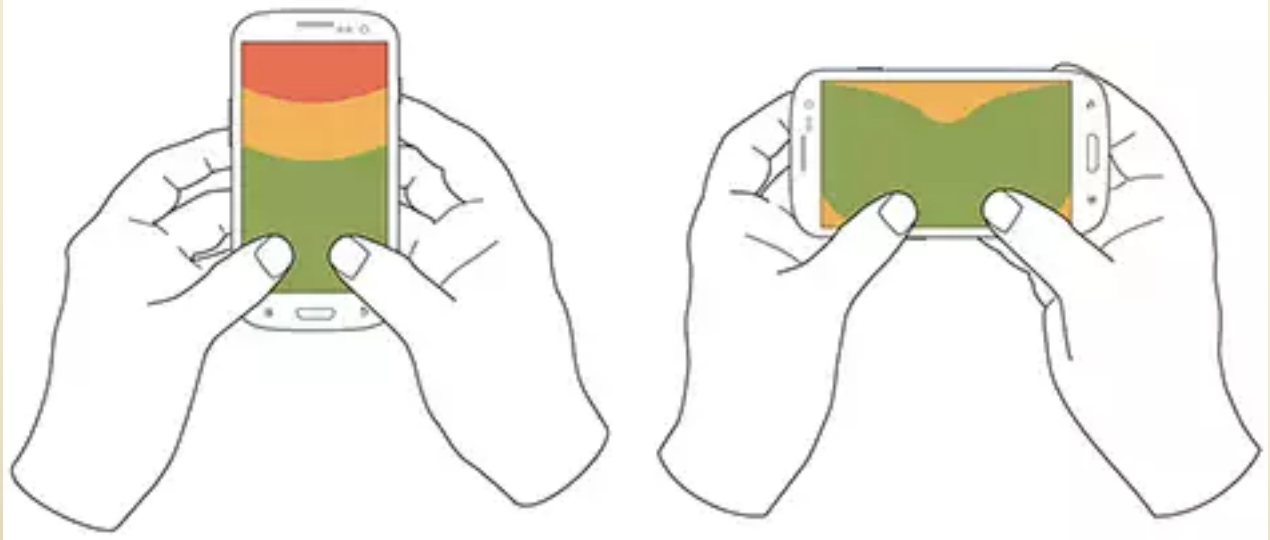
Mobile ergonomics

One-handed use



Cradling





Two-handed use

Adapted from http://www.uxmatters.com/mt/archives/2013/02/how-do-users-really-hold-mobile-devices.php

Gesture patterns(1)

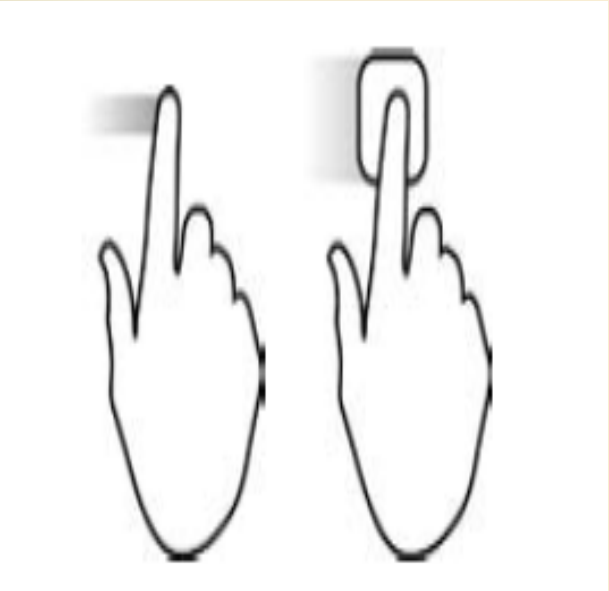
Tap or press to open/ activate

Example

- A natural replacement for clicking with a mouse

Gesture patterns(2)

Drag/swipe to move object

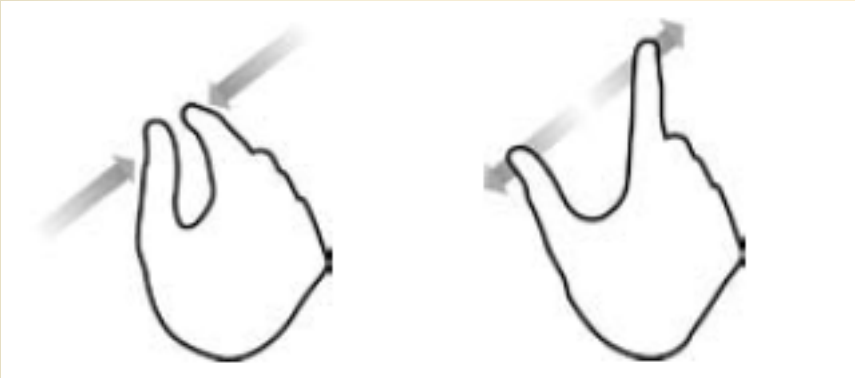


Example

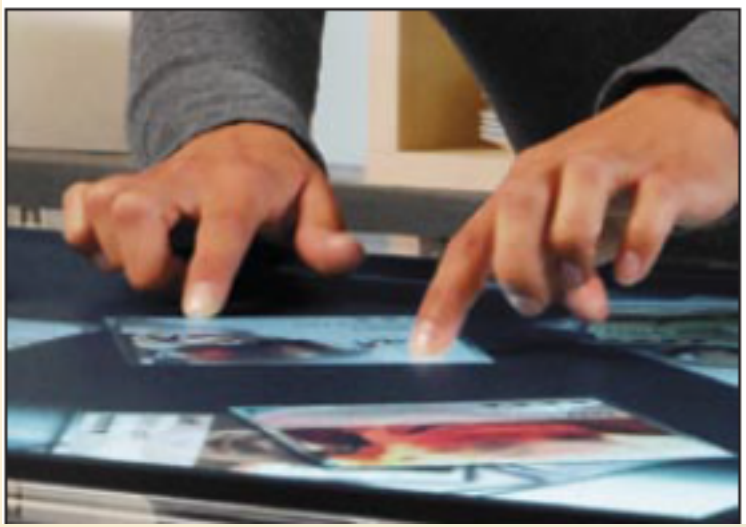
- Users still need a way to move objects; replaces grasp and pick up an object

Gesture patterns(3)

Pinch to shrink/spread to enlarge



Example



- Users may need to zoom in and out to see an object at the correct level of fidelity and detail
- Eliminates need to increase font size

Some more gesture patterns…

- Flick to nudge
- Hold
- Slide to scroll
- Spin to scroll
- Tap to stop
- Ghost fingers
- etc.

Gestures across different platforms

Gesture	Standard Action	Exception
 Tap or Touch	Selects item or menu; Stops content from moving	
 Drag	Moves item to new location or snaps to closest state	WP7: called "Pan"
 Flick or Slide	Scroll or pan quickly (individual items or canvas)	
 Swipe	*Not common across platforms	iPhone: reveals Delete in table WP7: Moves to different pivot
 Double Tap	Zoom in or Zoom out from a selected area of content	
 Pinch Open	Controlled Zoom in	WP7: called "Pinch"
 Pinch Close	Controlled Zoom out	WP7: called "Pinch and Stretch"
 Touch and Hold	Display context menu or options page for an item	iPhone: magnify editable text for cursor placement
Shake Phone	Initiate an undo or redo action	iPhone: just on iPhone
Rotate the Screen	Changes orientation to portrait or landscape	

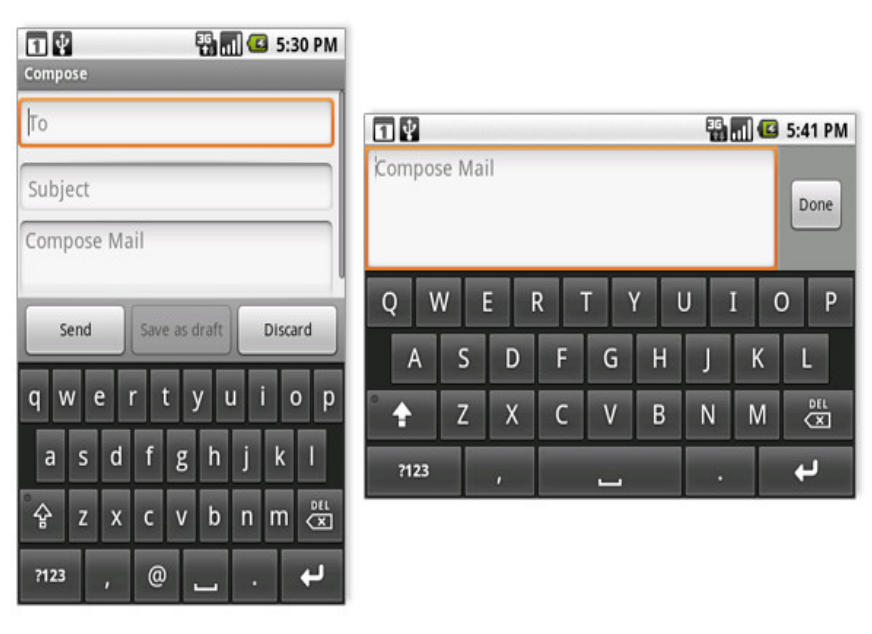
Interaction best practices

Design for Multiple Interaction Methods

- **Focus Based:** The browser focus "jumps" from element to element;
- **Pointer Based**: Key-based navigation controls a pointer that can cover any part of the screen;
- **Touch Based**: Events are related directly to a finger or stylus touch position on the screen.
  - Selectable elements may be (but don't have to be) widely spaced since the user can select them directly;
  - Selectable elements must be large enough to be easily selected (e.g. list items should have a screen height of at least around 1cm);
  - No elements are in focus until they are selected so extra information cannot be passed to the user (e.g. rollovers will not work).

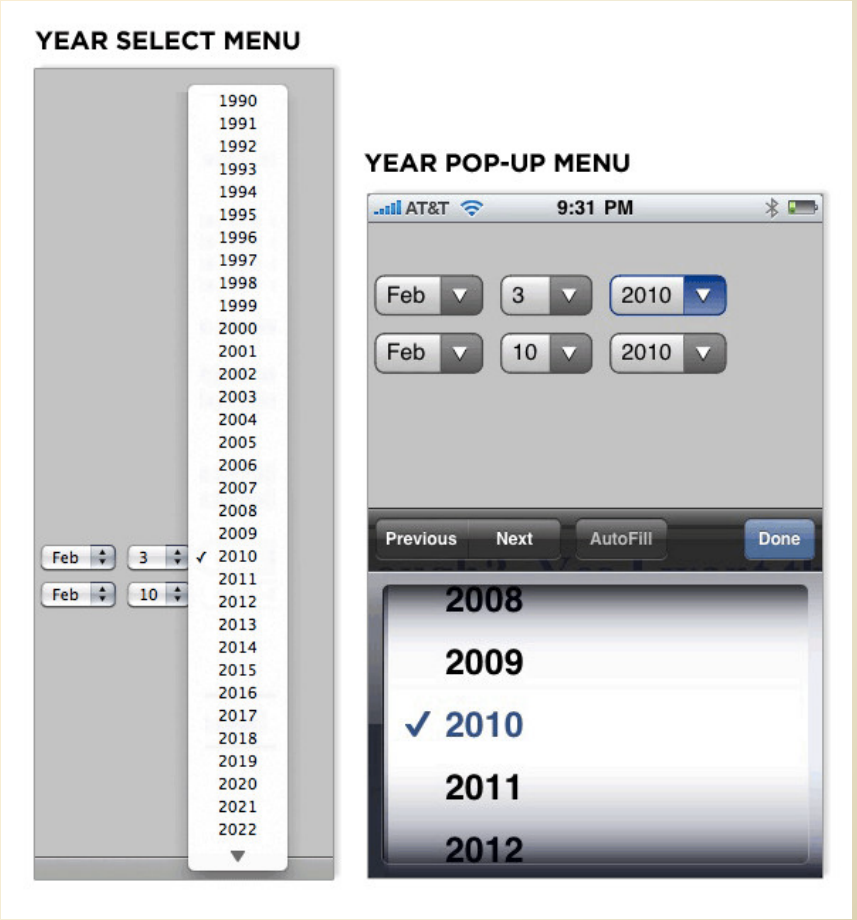
Virtual Keyboards and keypads

- Key components of all interactive devices
- Can be built into the device hardware or provided by the OS
- Always provide the right keyboard



Using forms in the small screen

- Radio buttons, checkboxes, lists work better
- Pop-up menus work MUCH better!
- Reduce errors in forms



Forms best practices

- **Limit the use of forms (particularly text elements).** It is difficult for mobile users to input many characters.
- Make Telephone Numbers **"Click-to-Call"**
- **Enable automatic sign in.** This is important on a mobile device where data input is more difficult than on a desktop.

Voice input

- Can control some functions without handling device
- Speech recognition e.g. Siri, Alexa

Additional Resources

- Responsive Web Design Tutorial (video ~20minutes)
- Adaptive vs. Responsive Web Design (website)
- Browser Behaviour Examples (Adaptive, Responsive, Fluid, Static Designs)
- SEO Tutorial (article about search engine optimisation)

Helpful tips and resources

- Avoid these 10 mistakes
- Jakob Nielsen – Full sites vs Mobile sites
- This example uses the old Ikea mobile site – also check out the new site which won an award for innovation
- Mobile apps design patterns [iPhone]
- Mobile web standards
- Mobile Web Application Best Practices
- http://www.w3.org/Mobile/
- Mobile friendliness

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