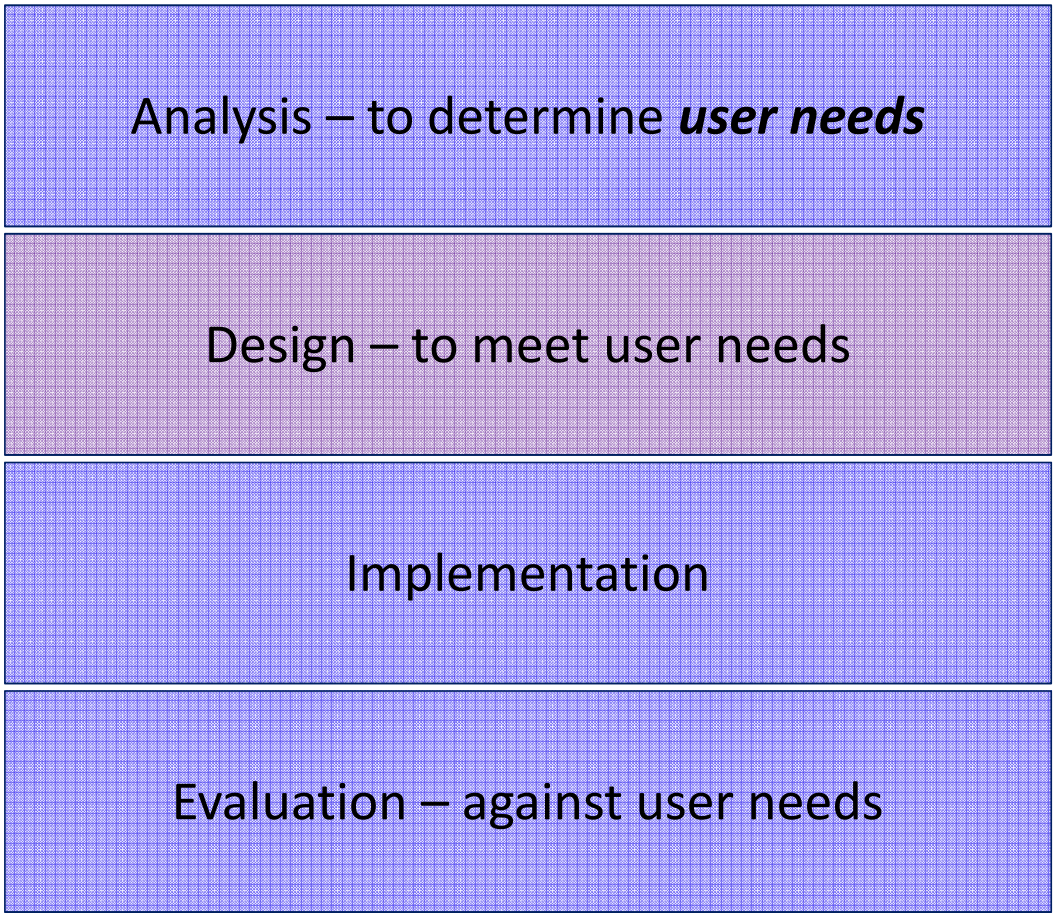
INFO2222

Week 4 - design


Analysis – to determine ***user needs***
Design – to meet user needs
Implementation
Evaluation – against user needs

Core learning objectives for Week 4 - design

- Introducing Assignment 1
- Prototypes
  - What is a prototype?
  - What is iterative refinement?
- Introduction to some design methods
  - Card sorting
  - Information Architectures
  - Mood Boards
  - Screen design guidelines
- **Brainstorm on design possibilities to meet a user need.**
- Evaluate a set of design possibilities in a think-aloud.

Announcement for Friday class

- You already formed your groups in the last lab
- You should aim to attend a different class this week so you can do the lab activities
  - Wed 15:00-17:00 See department for room –
    - School of Information Technologies Laboratory 115
    - Level 4 Lab
  - Wed 17:00-19:00
    - School of Information Technologies Laboratory 117
    - School of Information Technologies Laboratory 115
    - Level 4 Lab

Introducing Assignment 1

Assessment

- This work will be assessed with Turnitin.
- This assessment is worth 10% of your overall grade.
- This is a group assignment
  - The ideal group size is 5 students.
    Groups are not to be less than 4, nor greater than 6 students.
  - Groups are formed in Week 4 labs (except the Friday which did this in week 3)

Goals

- Practice in all the core usability methods studied for determining user needs, design and evaluation
- Written presentation skills
- Group work skills

Description

- **The situation of concern**: The University of Sydney is concerned about phishing.
- **Transformation**: To provide new approaches to phishing education for ***students*** at the University of Sydney.

The *basic solution to the assignment* requires

your group to design a set of webpages to help a University of Sydney student understand:

- the risks of phishing;
- the attributes in mail that should trigger suspicions – where the basic set is:
  - social engineering in at least 2 forms your group selects (e.g. creating a sense of urgency);
  - URL is obviously implausible;
  - URL is plausible but on careful examination it is not quite right;
- Techniques to check mail systematically, to determine if a link is likely to dangerous.

A basic solution to this assignment could take many different forms, however the self-test website you worked through in Mini-Assignment 2 could form a basic model or starting point.

For the *basic solution to the assignment*, your group must:

- Create a persona for the Sydney University student that your group will focus on (your tutor will allocate different personas to different groups in the class);
- Create a set of email messages ….
- Design and build an interface, as a set of webpages, making use of your set of email as well as one for the broader risks of phishing – you may use any tool your group wishes for this e.g. Wix, Google-sites, etc.;
- Conduct at least 3 user evaluations across the complete set of pages created by the group, and write up the results. ….

Grading of the report

10% - *Overall structure, quality of writing* including:

- Cover page with student names and email addresses;
- Contents page so that the tutor can easily navigate to each part;
- List of relevant URLs (for your website) – so the tutor can navigate to particular sections easily;
- High level organisation and structure;
- Appropriate grammar, spelling, and punctuation;
- For full marks it should be a delight to read – very clear, concise, complete, easy for the tutor to find each aspect in the order listed in this grading outline.

10% - *Persona*

- Your persona should include:
  - Name
  - Photo
  - Mental model: worldview, detailed goals, current knowledge - relevant to learning about phishing.
  - Context and constraints (including the nature of authentic email that this student persona is likely to receive)
  - A clear focus on University of Sydney students
- *Make sure this matches the person agreed with your tutor in Week 4 – if your group wants to revise this after Week 4, that must be done no later than the end of the Week 5 lab and you need to explain to your tutor why you want to alter it. The tutor will grade this against their notes about the persona allocated to our group.*
  - *Friday class has already formed groups - needs*

INFO2222 Asst 1 persona – purple is group-specific

- Name, position in The UoS - students at UoS, Photo
- Mental model
  - **Worldview**
  - **detailed goals**
  - **Current knowledge (technical generally and phishing in particular)**
- Context and environmental constraints for stakeholder

Drilling down on Mental model (you do this in the lab)

- **Worldview**
  - Level of concern about security (relaxed .. Anxious)
  - Keenness to learn in general
  - How keen to learn about security
- **Current knowledge**
  - technical generally (low … high within UoS student population)
  - phishing in particular (low .. High)
  - experience of phishing attacks in the past
- **Detailed goals**
  - These link to both world view and knowledge eg if knowledge is low and user is anxious and keen to learn – can identify many goals that are likely to be relevant to this user

10% - A list of *learning goals* your interface aims to teach.

- Table with columns for
  - ID – an “identifier” you can use through the report to annotate interface screenshots and generally refer to a learning goal. (e.g. link-similar-to-authentic)
  - A brief description of the learning topic (e.g. 1. Link name is similar to the authentic URL for the actual site)
  - Relevance to Sydney University students
  - IDs of mail items used to teach this topic (e.g. phish1-link-sender)
  - IDs of interface pages where this is taught
- This must include all the learning goals listed above for the “basic assignment” –if you omit any, make clear that you realise this as a shortcoming of your solution
- Make clear any additional learning objectives your group has incorporated.
- Clear focus on University of Sydney students
- Clear focus on any special aspects of your persona

ID	brief description	Relevance to persona	Mail items used to teach this	Interface pages where this is taught
link-similar-to-authentic	Link name is similar to the authentic URL for the actual site	This is a key phishing risk – persona goal 1	phish1-link-sender	Annotated_email1, Annotated-email2, Annotated-email3, Annotated-email4, teach-link1, teach-link2,
…				

10% - *Set of mail items*

- Summary table for the mail items, with columns for:
  - ID (e.g. Mail-1-phish, Mail-2-safe);
  - brief description of the relevance of the email for teaching goal(s) (e.g. Link name is similar to authentic URL, Sender name is implausible for purported sender);
  - Brief explanation of how it matches the persona;
  - ***Name of the team member who created this mail item*.***
- Annotation and clarification of each mail item explaining key features of the mail item, in terms of ***what it teaches*** and how it matches the **persona.**
- Quality of the design of the mail items – for the lesson that they are used to teach and the match to the persona (this relies on how well you did the annotation PLUS how well the mail items were designed.)
- Clear focus on University of Sydney students
- Clear focus on special aspects of your persona

The CISCO Phishing Site is one model of annotating an interface

ID	brief description	Relevance to persona	Team member author
Mail-1-phish	Link name is similar to authentic URL	This is a key phishing risk – persona goal 1	Alice Butter, abut1243
…			

10% - *Design of the interface website*

- Screenshot of each page of the website with
  - annotations to explain key features of the design for ***teaching effectiveness***
  - annotations to explain key features of the design for ***usability***
  - labels, as needed, so that later parts of the report
- Clarity of the annotation of each screenshot in the actual interface
- Quality of the design for teaching
- Quality of the design for usability
- Clear focus on University of Sydney students
- Clear focus on special aspects of your persona

10% - *Detailed materials and recordings for think-aloud testing, for each participant.*

- Heading materials
  - Participant ID (e.g. P1) NOTE: Please do not give actual names.
  - Brief statement of how well this participant matches your persona
  - ***The name of team members who conducted this user study*;***
- Actual pre-test and post-test written by participant ** (see below)
- …. Continued on next slide

10% - *Detailed materials and recordings for think-aloud testing, for each participant.*

- Table with observations from think-aloud for each participant with columns for:
  - Mail ID;
  - Notes on mail features the user correctly identified as suspicious and why they thought this;
  - Notes on mail features incorrectly identified as suspicious by the user – what these were and why they were identified.
- Summary of things this user missed – based on checking the notes above against the features in the email
- Summary of key lessons from this participant:
  - What the participant already knew before the study;
  - Observations as the participant worked through the materials;
  - What the participant learnt from the materials, based on both the observations and the post-test, with comments about the discrepancies between these;
  - Timing details: how long it took to complete the pre-test, work through the interface, and complete the post-test.

ID	brief description	Relevance to persona	Team member author
Mail-1-phish	Link name is similar to authentic URL	This is a key phishing risk – persona goal 1	Alice Butter, abut1243
…			

10% - *Summary of key lessons from the user study* from the whole group

- Table summarising key results gained from at least 3 participants;
  - On average, this will mean each student should be involved in at least one and ideally two of these
  - While 3 is the minimum, as you know, 5 would be good – the minimum of 3 is for groups are small because of class sizes
- Comparison with actual evidence;
- Clear and easy to follow.

Brief description of observation	P1	P2	P3	P4	P5
Believed the authentic link in Mail-7-ok was suspicious	Yes	Yes	Yes	Yes	No
Correctly identified suspicious links in all cases	Yes	Yes	No	Yes	Yes
Comment that the page explaining the risks was hard to understand	Yes	Yes	Yes	No	Yes
….					
Change from pre- to post-test in Q1: Please write a brief description of what phishing means.	++	+	same	++	++
…					

These are the key observations across your think-alouds

These are the key observations for the learning –
text around table should explain symbols eg ++ major improvement

20% - *Tutor evaluation of the interface* of the teaching website, based on the tutor doing a walkthrough assessing:

- Essential requirement: is it really well targeted for Sydney University students?
- Essential requirement: did the actual system match the annotated screenshots?
- Does it have good usability?
- Does it match the annotated screenshots in the report?
- Is it particularly easy for a user to work through efficiently?
- Is it particularly pleasing (perhaps even fun) to use?
- For full marks we should be keen to send it to ICT for use in their real teaching at the university.

10% - for going *beyond the basic solution*.

- ***Only applies If the total mark for parts above > 70 out of 90;***
- For additional aspects in your interface, e.g. additional interactivity in the teaching at the website, going beyond the basic in the teaching to go into topics like mail headers.
- Makes a clear statement of how the solution goes beyond the basics.
- Rationale for these additions – for usability, for teaching effectiveness or for deeper evaluation

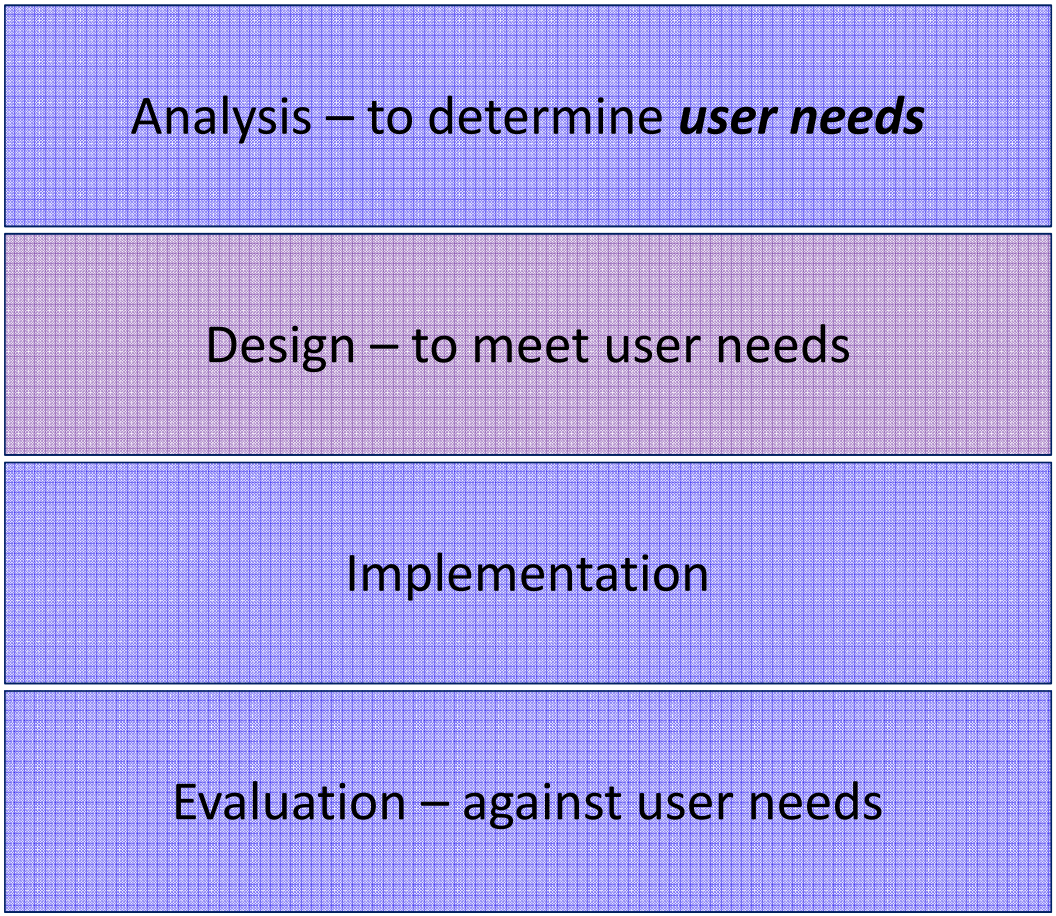
*Items marked * are for the individual contributions to the project.*

- ***Each student must complete all of these to be eligible for the group mark.***
- ***Failure to contribute to the group will result in a mark of zero.***

** Pre- and post-test for basic solution (as in Week 3 slides):

- Please write a brief description of what phishing means.
- Please explain the risks that phishing can pose for you.
- Please state the attributes in mail that would make you suspect that it may be phishing.
- Please state how would check mail before clicking on a link.

Now onto the design learning objective for this week


Analysis – to determine ***user needs***
Design – to meet user needs
Implementation
Evaluation – against user needs

Prototypes and iterative prototyping

Getting started in exploring a design space

Doing this by creating a ***first version of the interface***

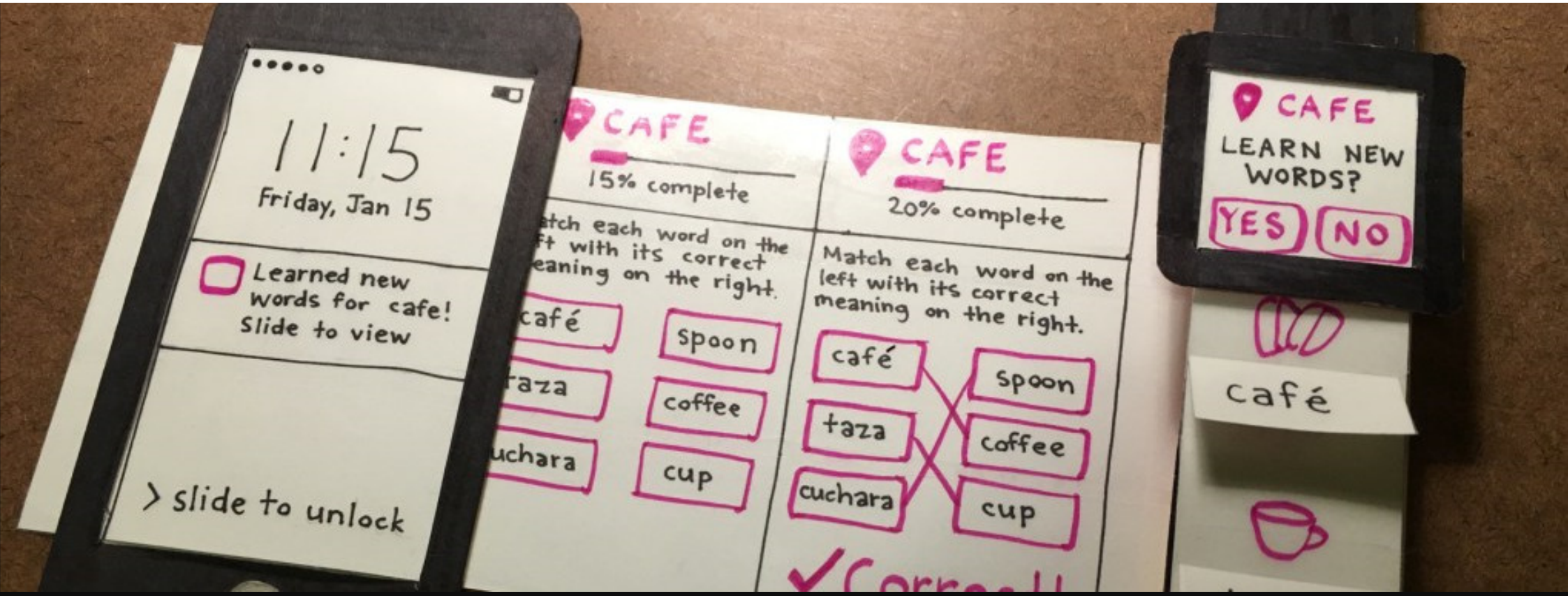
Then doing ***evaluation*** of it to ***inform the design of the next version***

What is a prototype in HCI?

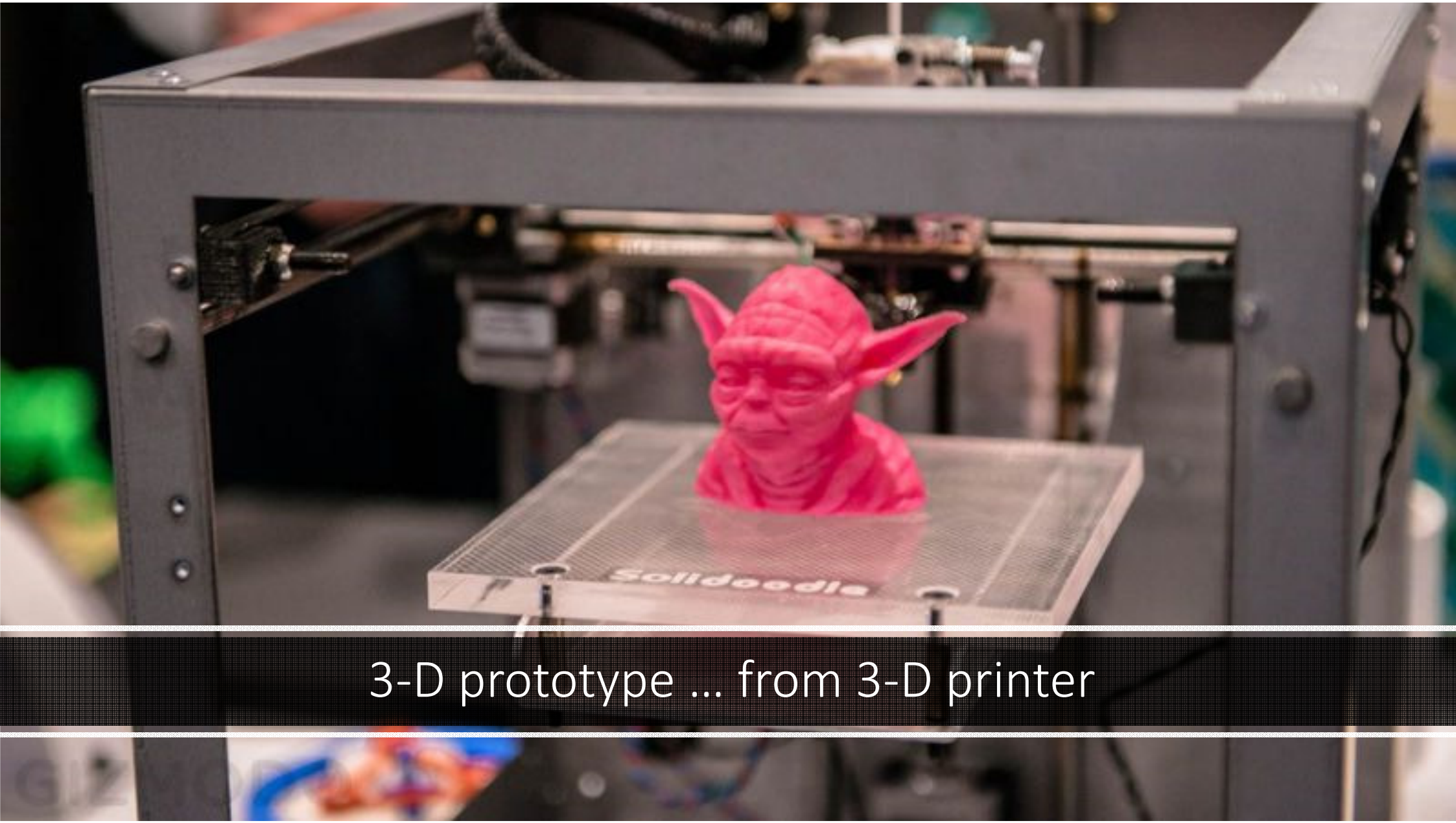
A prototype is a ***draft version*** of a product that ***allows you to explore your ideas*** and show the ***intention*** behind a feature or the overall design concept to users before investing time and money into development. A prototype can be anything from ***paper drawings (low-fidelity)*** to something that allows click-through of a few pieces of content to a ***fully functioning site (high-fidelity).***

usability.gov

Some examples of prototypes

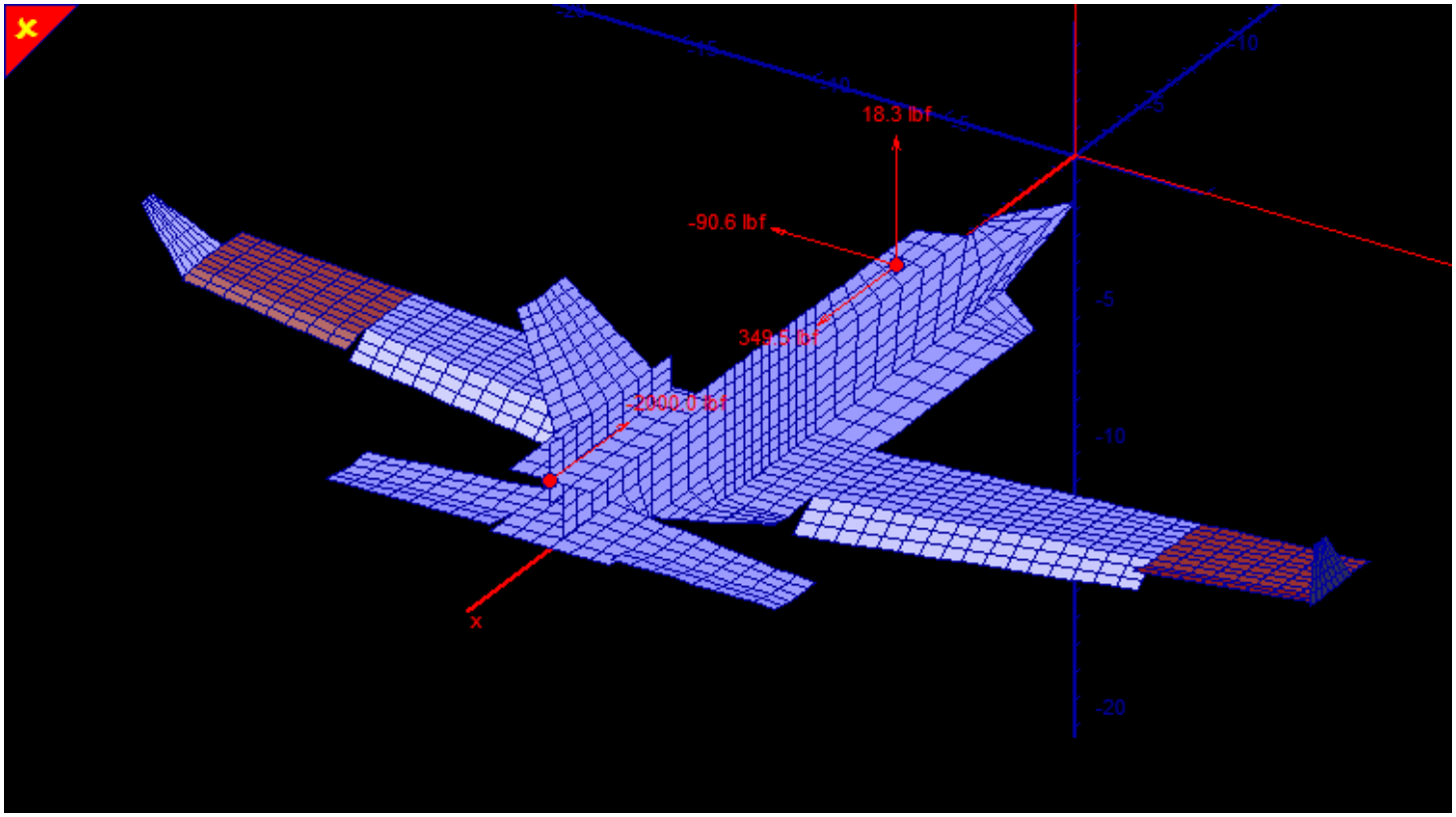


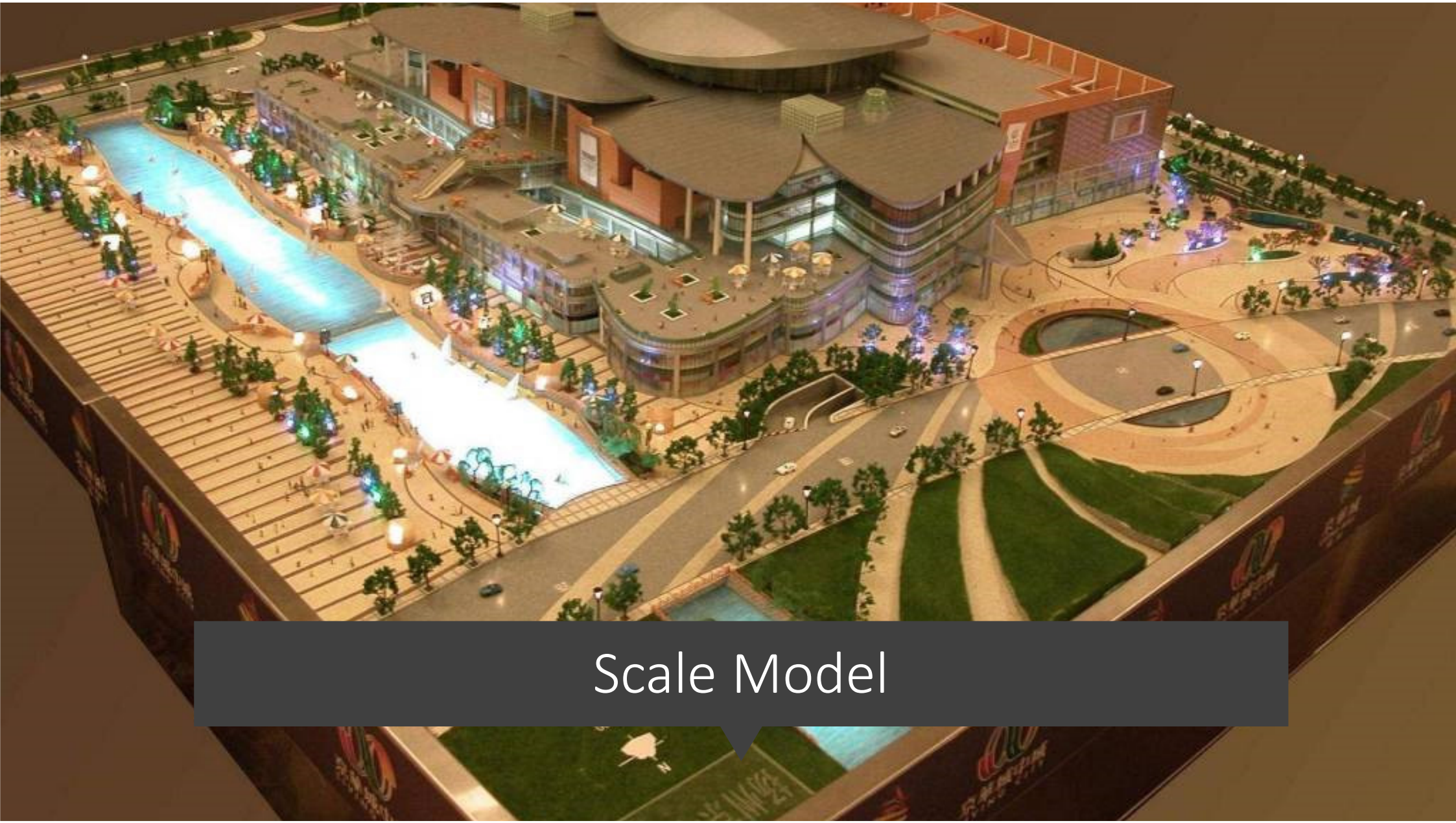
Paper Prototype



3-D prototype … from 3-D printer

Digital prototype





Scale Model

You have already met many such prototypes. In HCI, we created prototypes to explore design, iteratively

Iteratively means that you

Design

Then evaluate the design

Then reflect on what you leant from this evaluation

Then you may realise you need to do more analysis

And you may have insights into new designs

Goto Line 2

Prototyping: Low-Fidelity (lo-fi)

Quick to construct

Easy to ***explore many design alternatives***

Have limited or no functionality

Aim to show the general look and feel

Help ***communication*** and exchange of ideas with users

People may be ***more willing to criticise***

But: limits testing possible

High Fidelity (Hi-fi) prototypes

Hi-fi prototypes

Actual working system from user perspective

eg can interact but no real backend database

Partial to complete functionality.

Enables users to explore with the system.

cf. lo-fi enables users to follow just a small set of paths

But

More ***costly*** to build for sophisticated interfaces

Reluctance to change the design

Users involved in evaluation often focus on superficial finish

Management may think they have a full system

A single bug can lead to a complete halt in evaluation

In Assignment 1

- You will create a high fidelity prototype
- It is intended to be the first iteration

- Your evaluation of it will be in terms of both
  - Usability
  - Effectiveness for learning

Introduction to some design methods

Information Architectures

Information architecture (IA)

- This describes the organization of the information in an interface.
- An effective Information architecture will match the user's mental model of the structure of the information space.
- An effective information architecture is organized so that
  - Users can navigate through the interface to meet their needs
- To be effective, the information architecture of an interface needs to take account of
  - the users,
  - their context
  - and the domain

Information architecture (IA)

- In the lab you will consider two (of many possible) information architectures for Assignment 1
  - One based on thinking of the interface as a series of email examples that the user studies to see instances of key ideas taught
  - One based on thinking of the interface in terms of the learning goals – where each of these links to example email items
- In Assignment 1, you will design the Information architecture
  - For one group of ***users*** – your group's persona subset of University of Sydney students
  - In the ***context*** of your persona group – when and where they read email – the nature of legitimate email they are likely to receive
  - and the ***domain*** is enabling your persona group to learn about phishing

Alphabetical organisation

gure 3.1. An alphabetical index supports both rapid scanning for a known item and more cas browsing of a directory.

Chronological

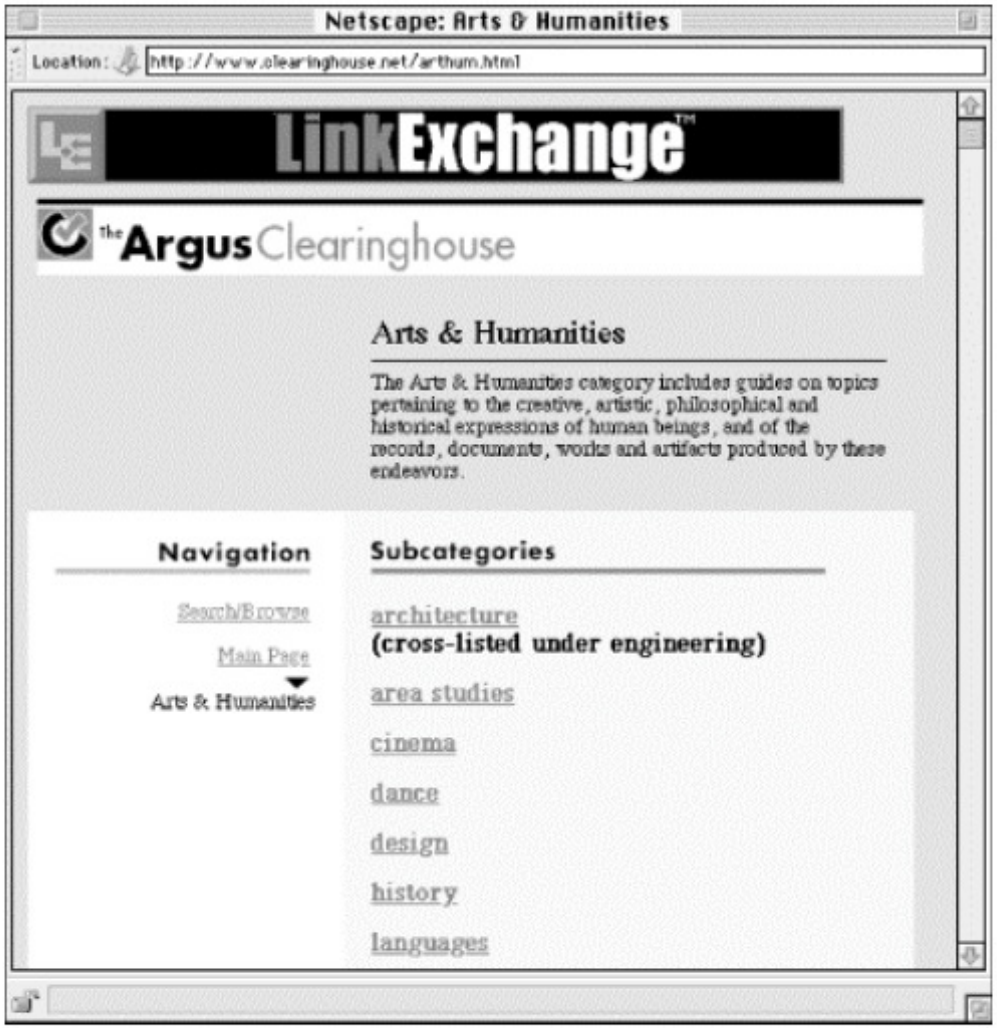
Figure 3.2. Press release archives are obvious candidates for chronological organization schem
The date of announcement provides important context for the release. However, keep in mind t
users may also want to browse the releases by title or search by keyword. A complementary
combination of organization schemes is often necessary.

Geographical

Figure 3.3. In this example, the map presents a graphical view of the geographic organization scheme. Users can select a location from the map using their mouse.

Topical

Figure 3.4. Research-oriented web sites such as the Argus Clearinghouse rely heavily on their topical organization scheme. In this example, the scope note for the Arts and Humanities category is presented as well as the list of subcategories. This helps the user to understand the reasoning behind the inclusion or exclusion of specific subcategories.

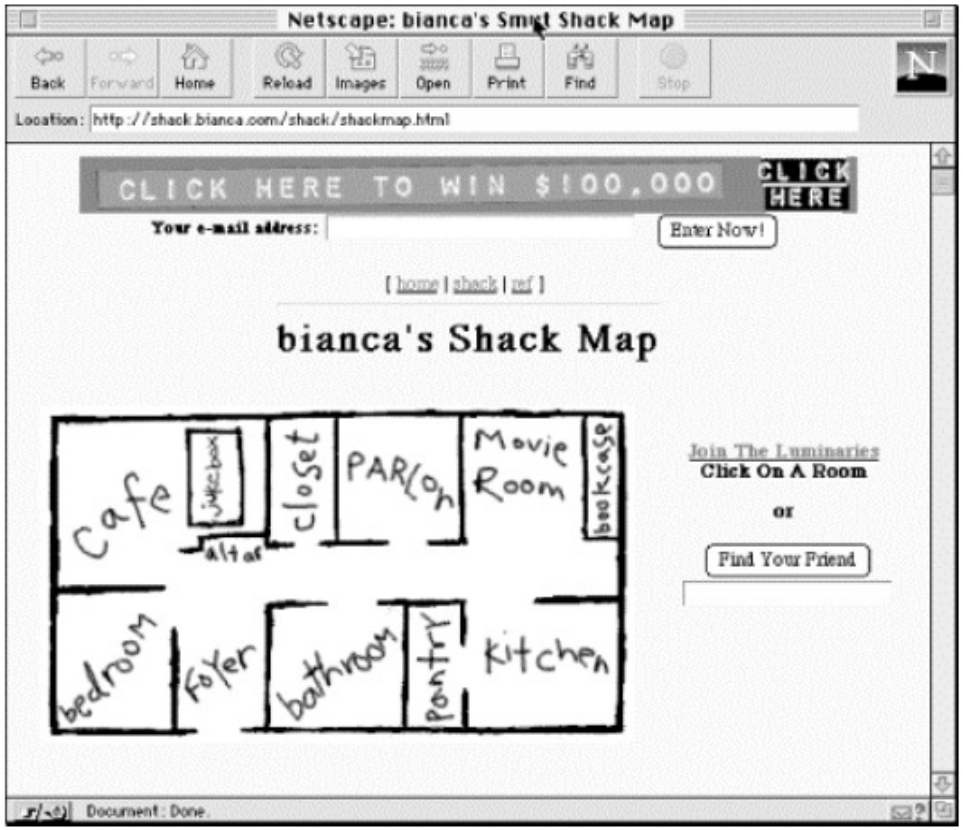


Task-oriented

3.5. In this example, General Motors anticipates some of the most important n
esenting a task-based menu of action items. This approach enables GM to quic
diverse user base into specific action-oriented areas of the web site.

Metaphor-driven

Figure 3.7. In this offbeat example, Bianca has organized the contents of her web site according to the metaphor of a physical shack with rooms. While this metaphor-driven approach is fun and conveys a sense of place, it is not particularly intuitive. Can you guess what you'll find in the pantry? Also, note that features such as Find Your Friend don't fit neatly into the metaphor.



Hybrid

"The power of a pure organization scheme derives from ***its ability to suggest a simple mental mode***l for users to quickly understand.

….

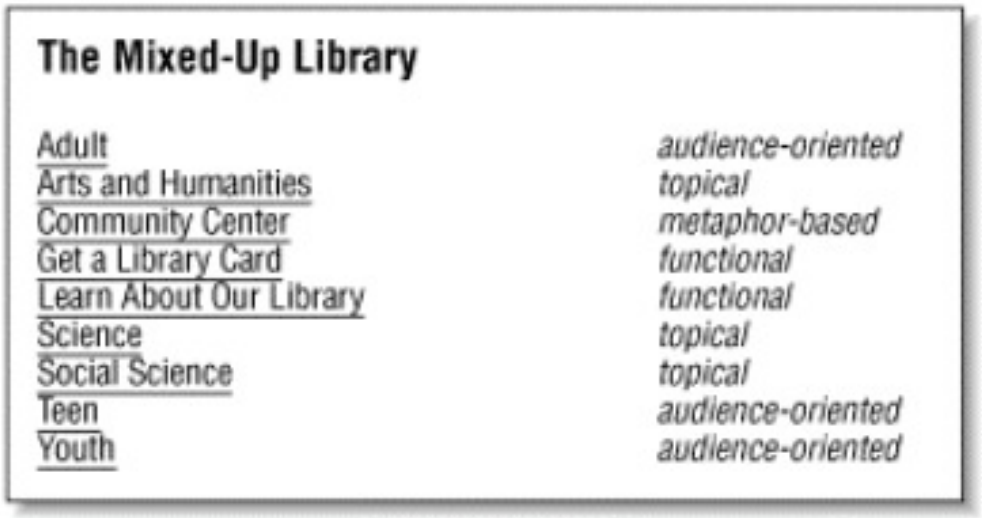
However, when you start blending elements of multiple schemes, confusion is almost guaranteed. ….

This hybrid scheme includes

- audience-specific, topical, metaphor-based,
- and task-oriented organization schemes.

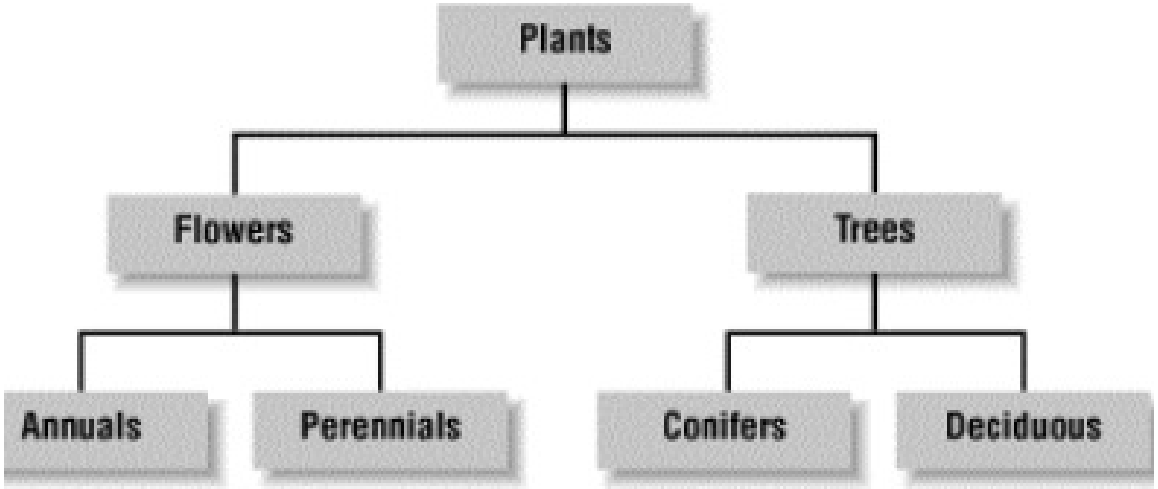
Because they are all mixed together, we can't form a mental model. Instead, we need to skim through each menu item to find the option we're looking for.

Figure 3.8. A hybrid organization scheme



Simple hierarchy works in this case

Figure 3.10. A simple hierarchical organization model.



You should consider whether this will work for your assignment.

This is what you will do in the lab as part of card sorting.

A sitemap helps the user main sense of the overall structure

You should be able to create a sitemap for your Assignment 1 interface

An overlay on the sitemap can show the user progress

Card sorting

A way to explore designs for information architectures

(also used to analyse existing interfaces)

Card sorting

- This is a method for the design (as in this week's lab) or evaluation of the information architecture of an interface.
- Overall process:
  - Participants are provided with a set of cards
  - Each card has one topic describing what they can do at the task eg fraudulent links
- In an open card sorting task
  - Participants group topics they consider similar and then **create a new card with a category name** that describes one group
- In a closed card sorting task:
  - Participants organise topics into **predefined categories** - that make sense to them

Tools for card sorting

- Limit the number of cards – max ~30 (less needed for Assignment 1)
- Paper cards work well – one card per topic or category name
- Software to support this
- Video – not an endorsement…. Just illustrative
  - https://www.optimalworkshop.com/optimalsort

Quiz

Mood boards

Collecting ideas that seem potentially useful for your design

The videos for this week's mini-assignment are rich in potential design ideas

The ideas do not need to be used only in videos

Cartoon format - PhishGuru

Kumaraguru, Ponnurangam, Steve Sheng, Alessandro Acquisti, Lorrie Faith Cranor, and Jason Hong. "Lessons from a real world evaluation of anti-phishing training." In *eCrime Researchers Summit, 2008*, pp. 1-12. IEEE, 2008.

Foundation research from a research group that spin out to a commercial training company (Wombat

Figure 6. English version of the comic strip that was presented to people in generic condition.

Kumaraguru, Ponnurangam, Steve Sheng, Alessandro Acquisti, Lorrie Faith Cranor, and Jason Hong.
"Lessons from a real world evaluation of anti-phishing training." In *eCrime Researchers Summit, 2008*, pp. 1-12. IEEE, 2008

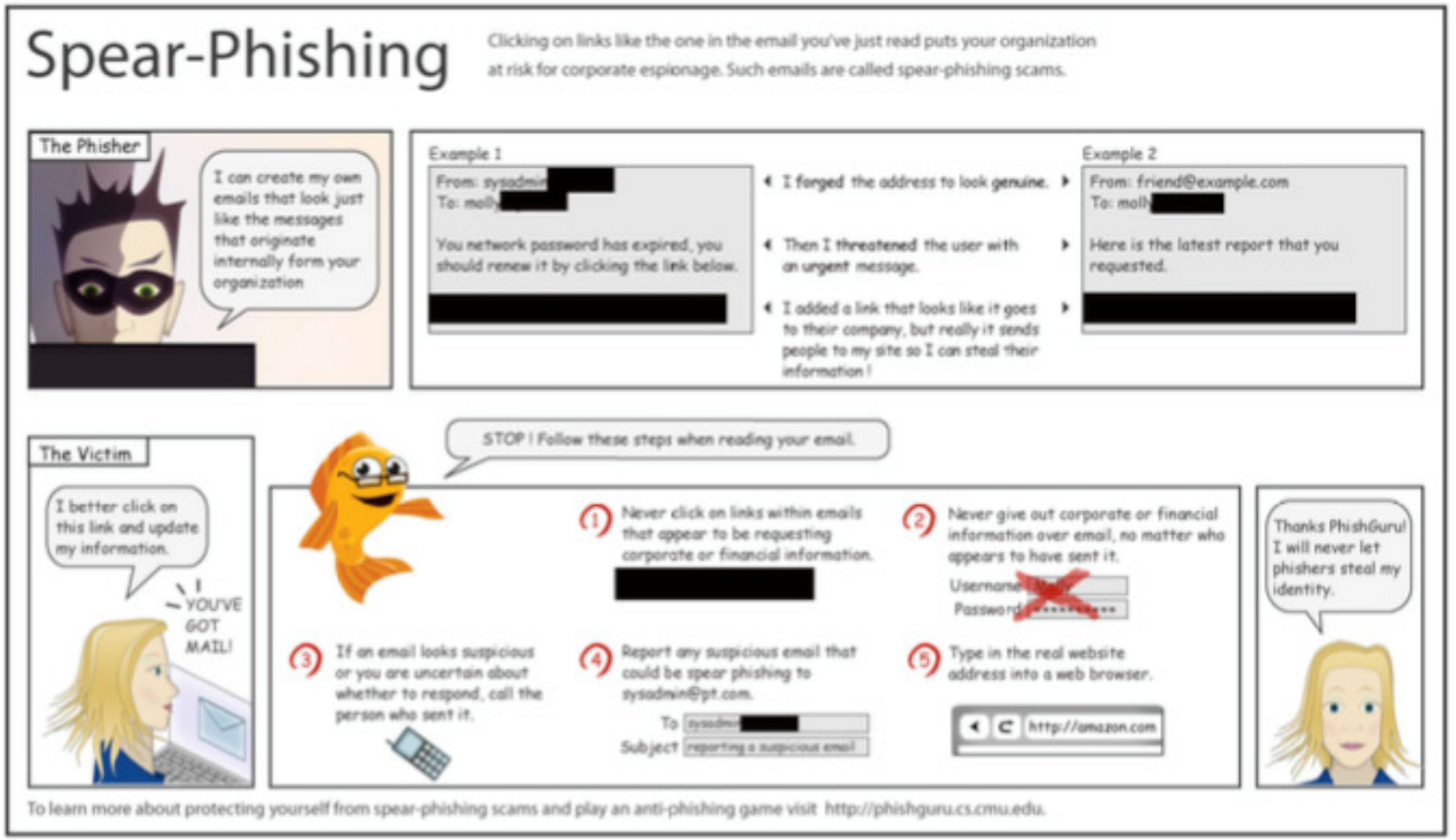


Figure 7. English version of the comic strip that was presented to people in spear condition.

Game interfaces

Sheng, Steve, Bryant Magnien, Ponnurangam Kumaraguru, Alessandro Acquisti, Lorrie Faith Cranor, Jason Hong, and Elizabeth Nunge. "Anti-phishing phil: the design and evaluation of a game that teaches people not to fall for phish." In *Proceedings of the 3rd symposium on Usable privacy and security*, pp. 88-99. ACM, 2007.

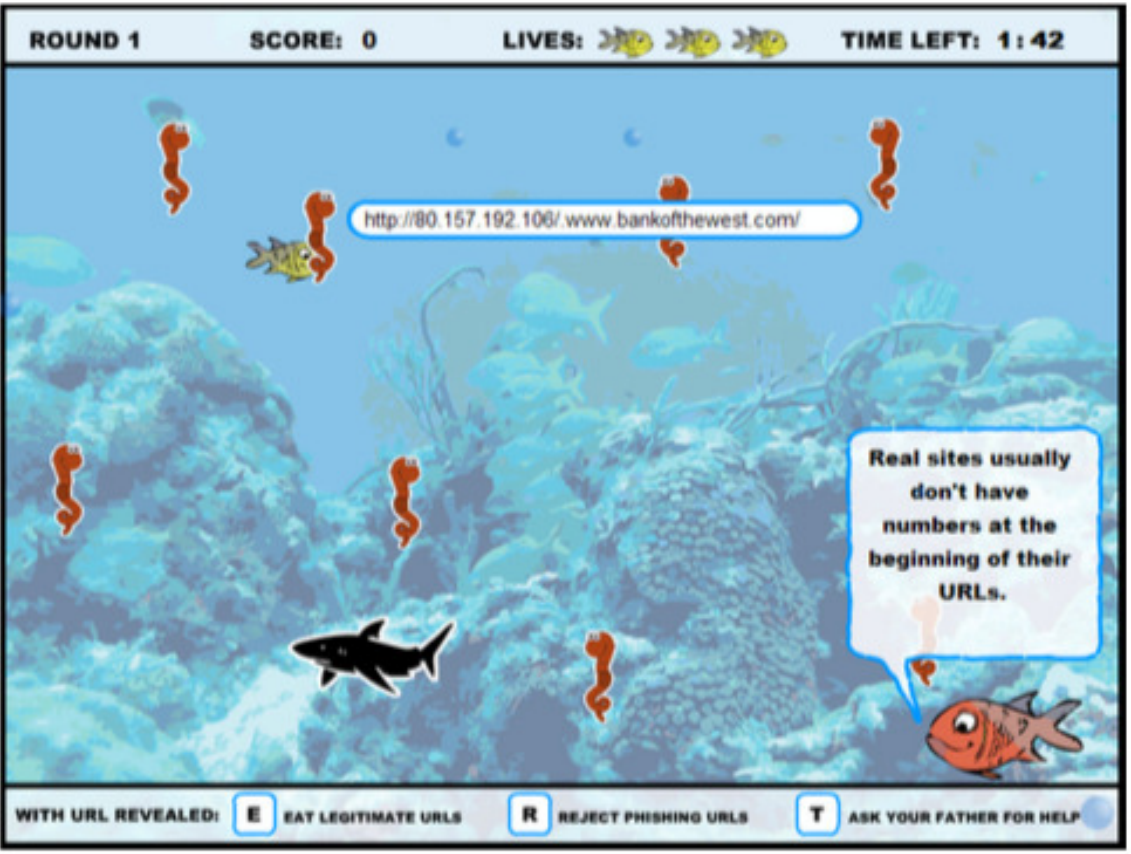


Figure 1: Anti-Phishing Phil game screen. Phil, the small fish near the top of the screen, is asked to examine the URL next to the worm he is about to eat and determine whether it is associated with a legitimate web site or a phishing site. Phil's father (lower right corner) offers some advice. The game is available at: http://cups.cs.cmu.edu/antiphishing_phil/

Sheng, Steve, Bryant Magnien, Ponnurangam Kumaraguru, Alessandro Acquisti, Lorrie Faith Cranor, Jason Hong, and Elizabeth Nunge.
"Anti-phishing phil: the design and evaluation of a game that teaches people not to fall for phish."
In *Proceedings of the 3rd symposium on Usable privacy and security*, pp. 88-99. ACM, 2007.

Later commercialised by Wombat… 2018 acquired by … Proofpoint

Video

Ones you reviewed in the mini-assignment for this week:

NUS student video https://www.youtube.com/watch?v=W2tZEFUCjTs

York University https://www.youtube.com/watch?v=AmPX4DdBz-k

Univ of Texas at Austin https://www.youtube.com/watch?v=HUMWutMWDHY

NAU - https://www.youtube.com/watch?v=HbXThoF-hEk – has the drawing style

Remember:
Assignment 1 requirement is that the whole design is for *University of Sydney students*

And your group must focus on the particular needs of your persona

Explore ways to teach

Teach by example

As in the mini-assignment 2 Cisco websites

But use examples that are mail items your persona is likely to actually very likely to receive authentic versions of the mail

Teach abstract knowledge

eg give definition of phishing, state the elements to look for – as in the Week 2 mini-assignment web page

Purest technical approach

Block and discard all “dangerous” email

Put all “dangerous” email into special mailbox the uses rarely sees

Deliver all “dangerous” email and add warning

Purest user interface approach

Screen design guidelines

What are screen design guidelines?

What are their limitations?

Screen design guidelines for Assignment 1 – for text

Line length

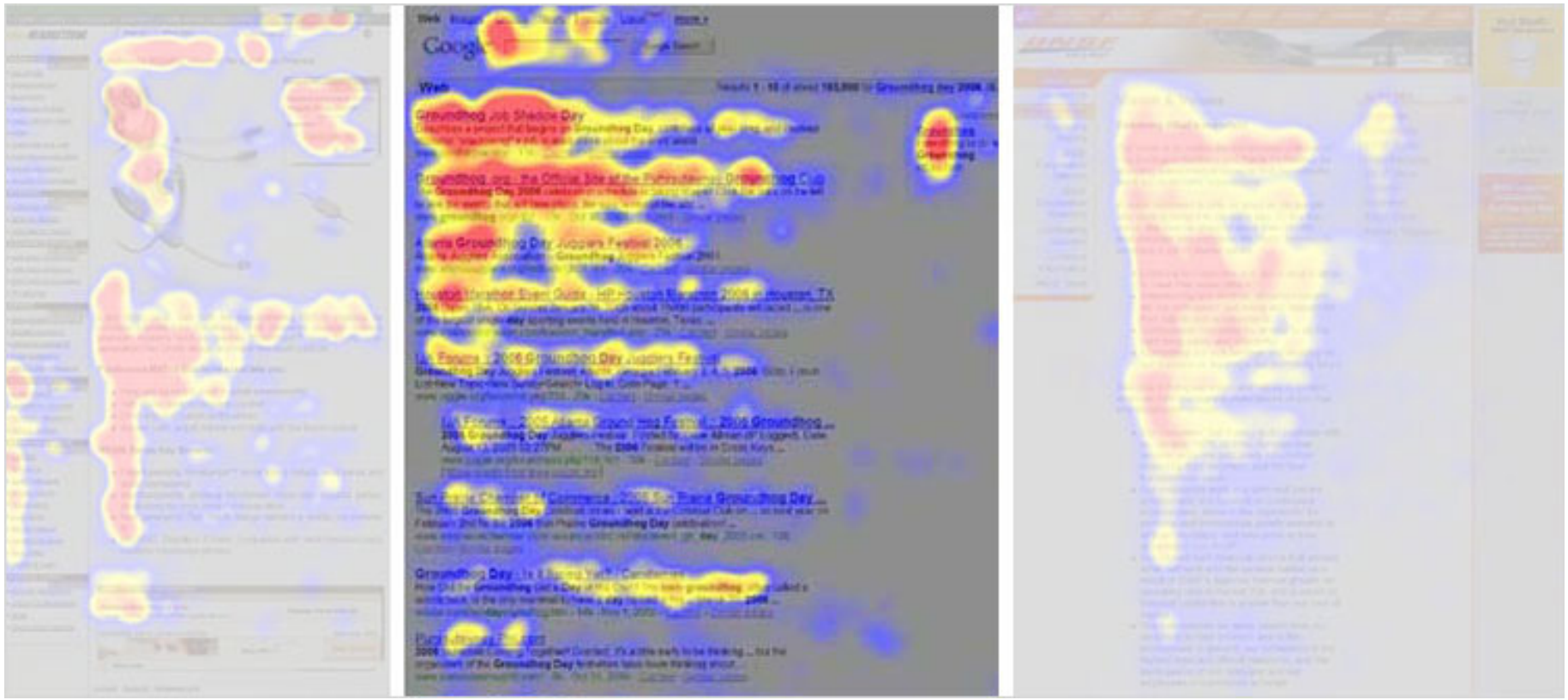
One guideline in depth … rationale to the rule

How do people read?

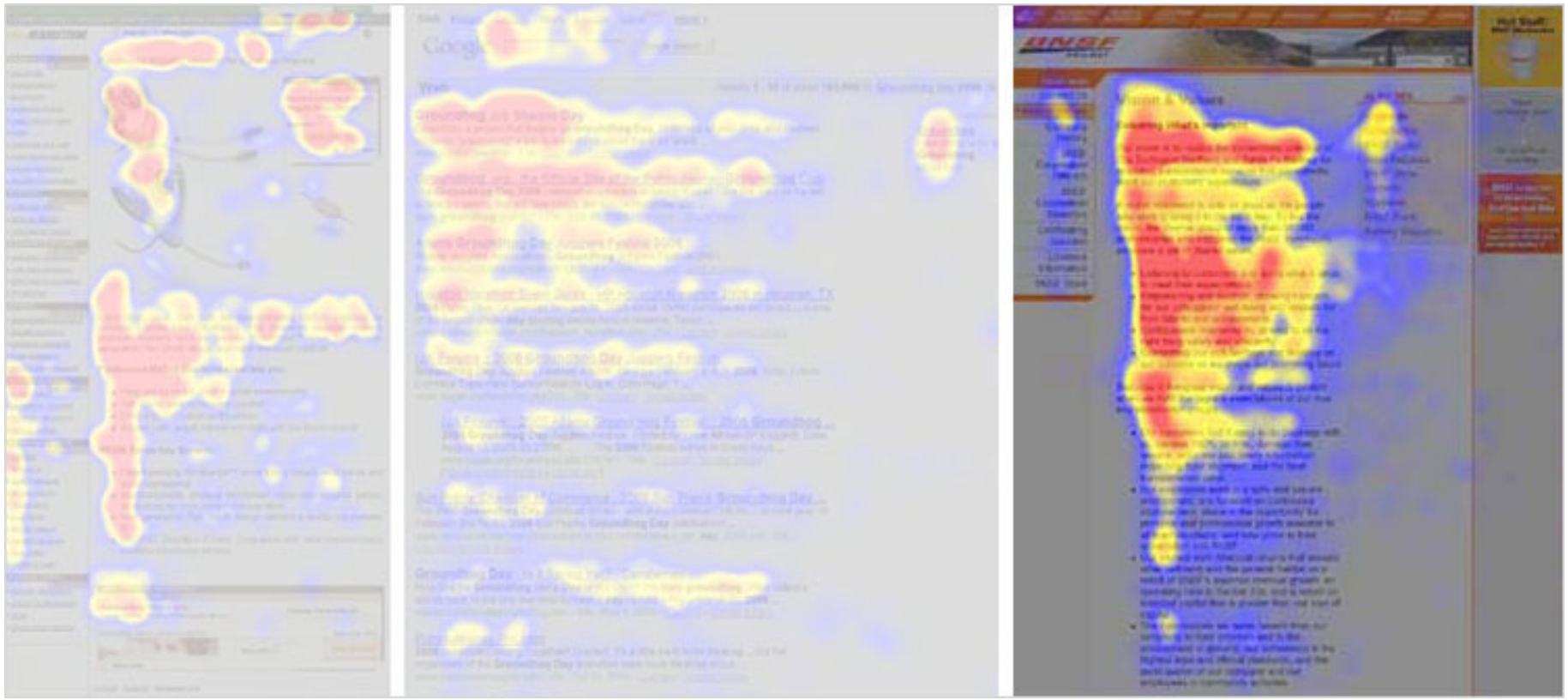
In Assignment 1 – you will need to think about how you intend that your users read your materials to learn

Eye tracking when people casually skim a page (Nielsen 2006)

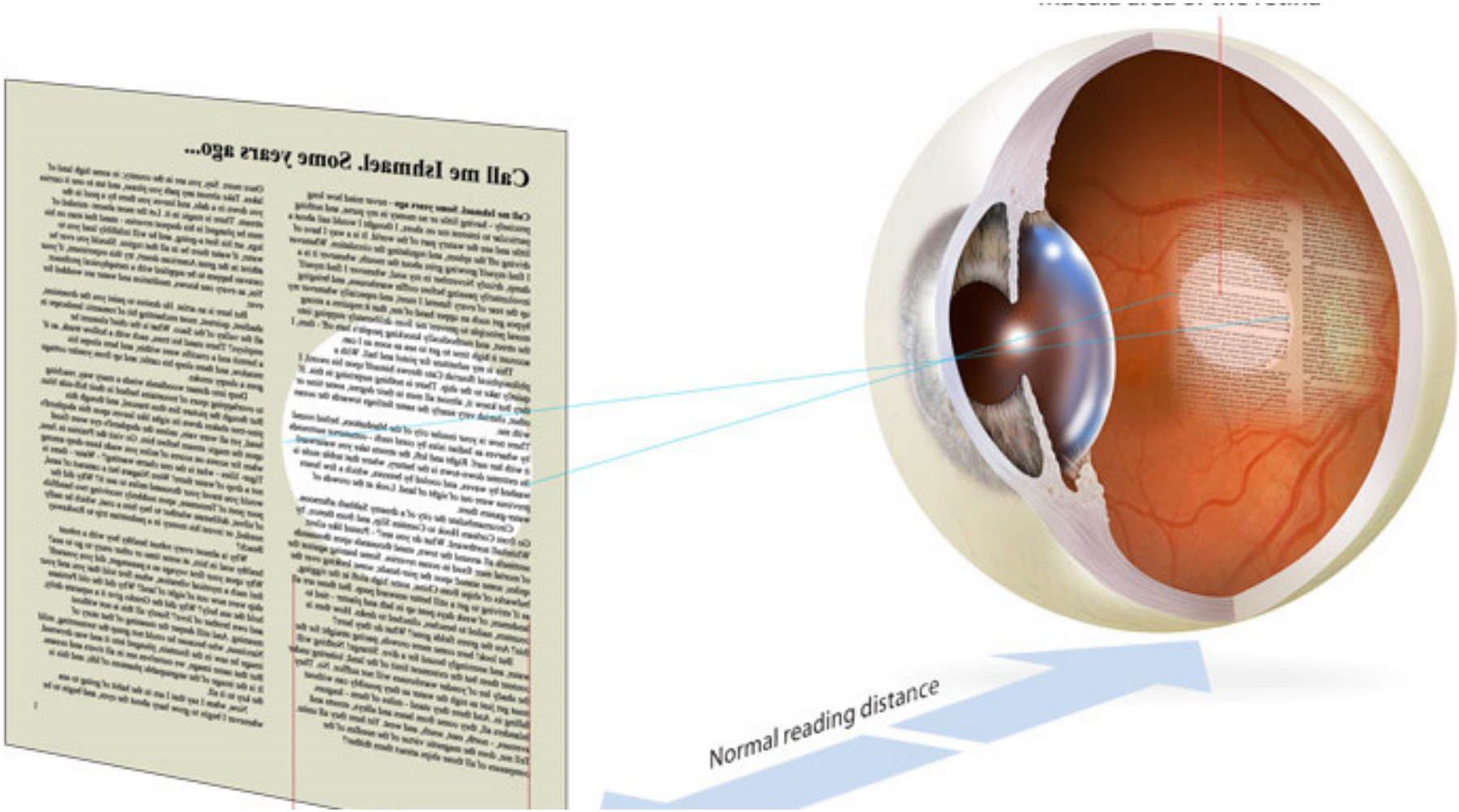
Scanning for a purpose – looking for something



Engaged reading – in something they consider interesting and relevant … till interest drops

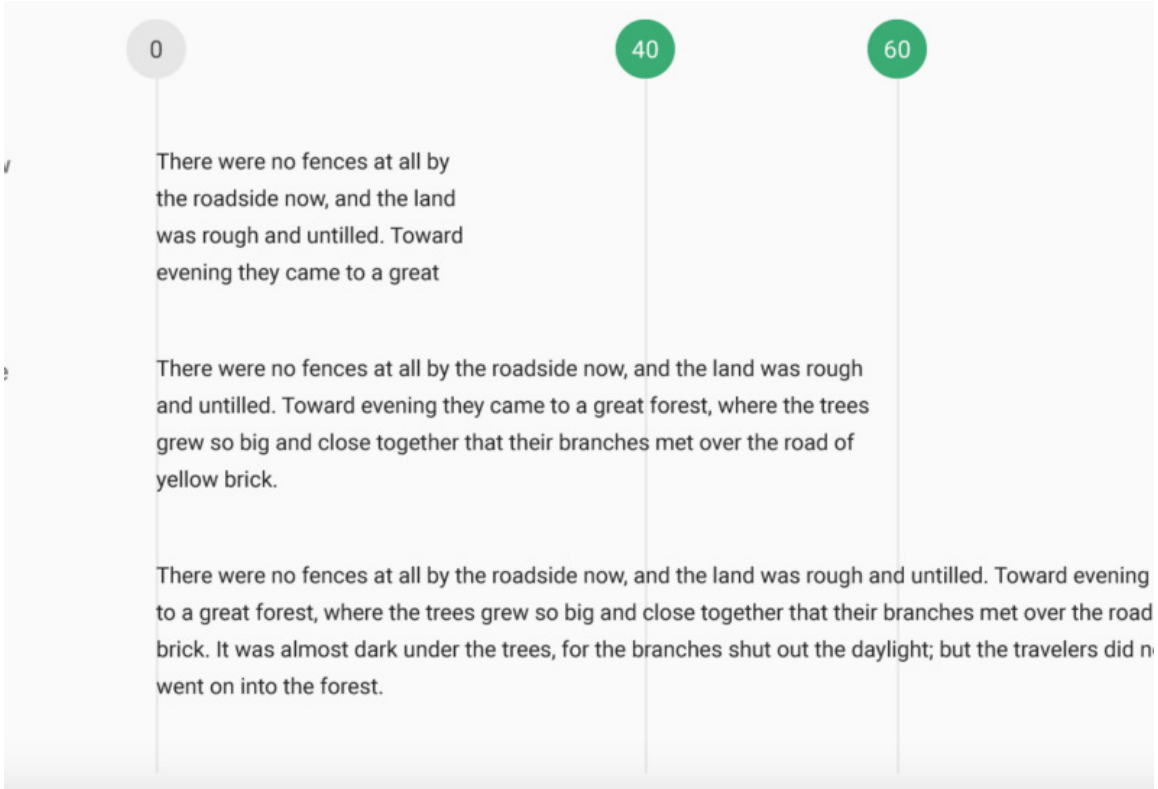


People do not read every word individually…

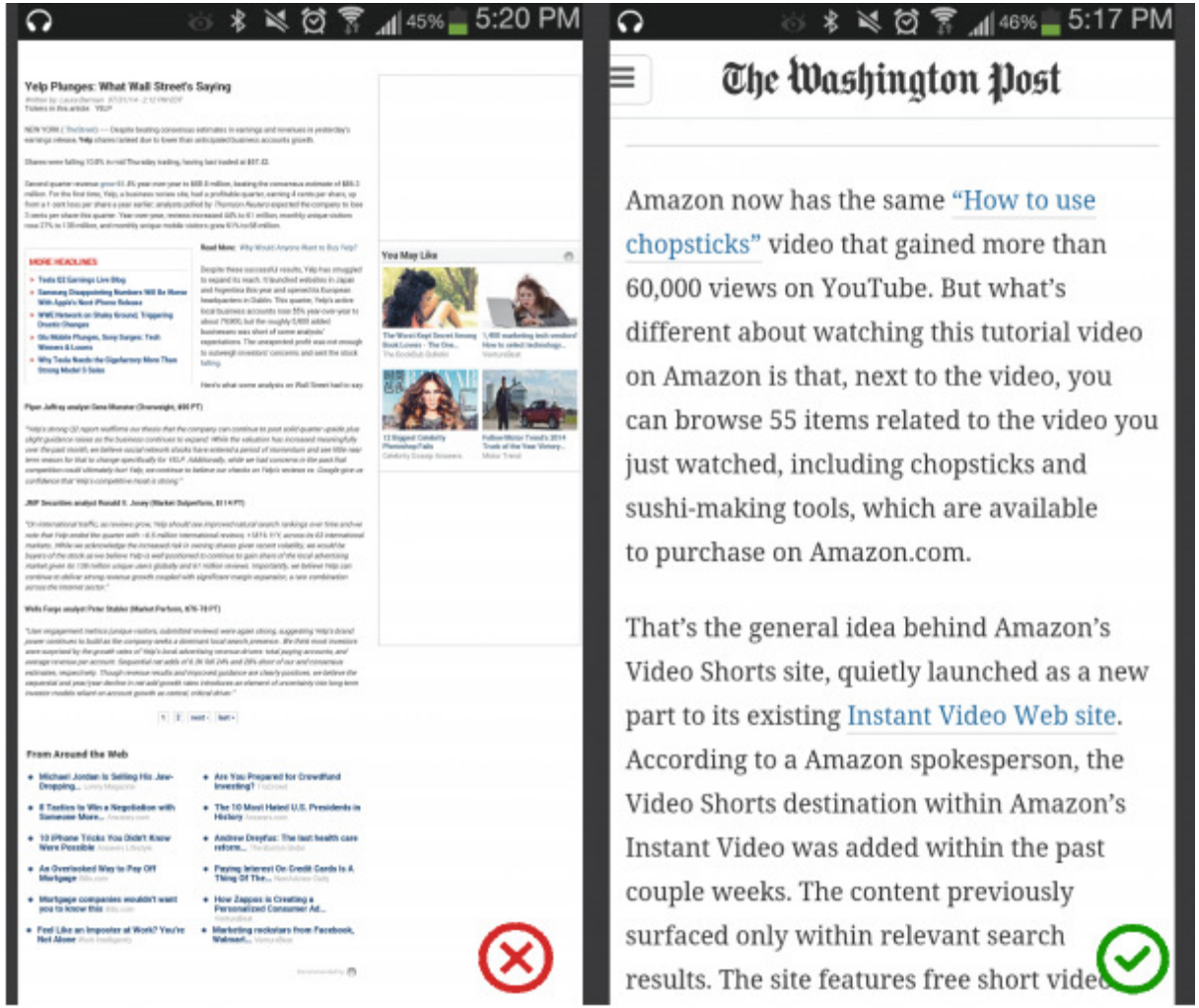


The macula ~15% of the retina does detailed – high visual activity – tasks. At typical screen distance this limits the width of lines for comfortable reading. Very long lines (like these ones) are harder to read.

Short lines mean the user’s eyes move back and forth more – long lines are hard to follow without effort



On mobile devices, limit lines to 30-40 characters: left screen on a mobile has lines too long, right is better

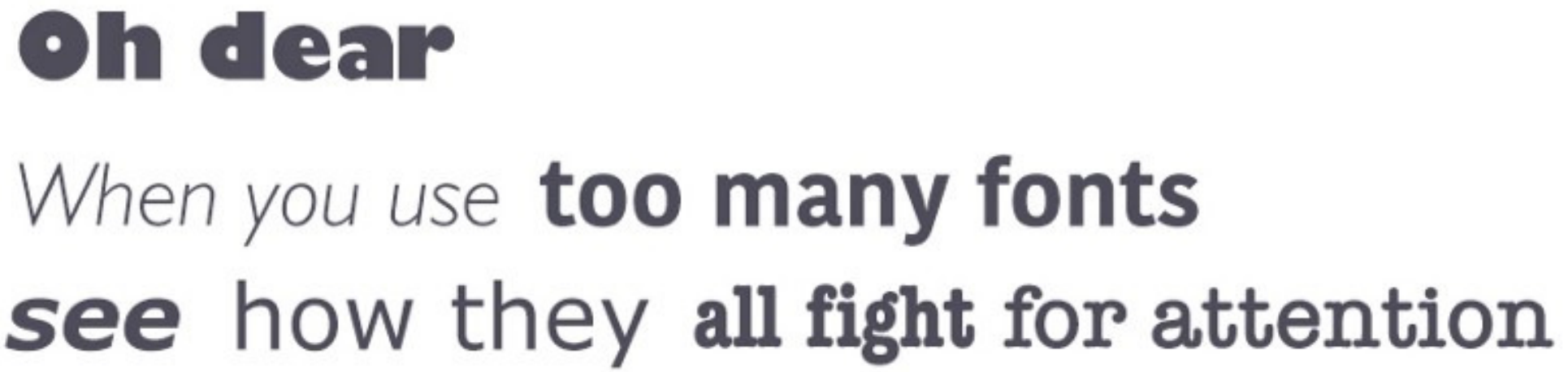


Line length recommendations

- Designing text for a large screen desktop, limit lines to 60 characters (which includes spaces as well as the letters, punctuation etc)
- Different sources recommend different lengths, ranging from 45 to 75 characters
- Be aware that people may resize a web page eg needing a large font for their reading needs
- "***Responsive design***" accounts for the different devices and their screen size.

[In Assignment 1, it is fine to limit the design to a desktop – you need to focus on plenty already without also considering responsive design]

More typography guidelines

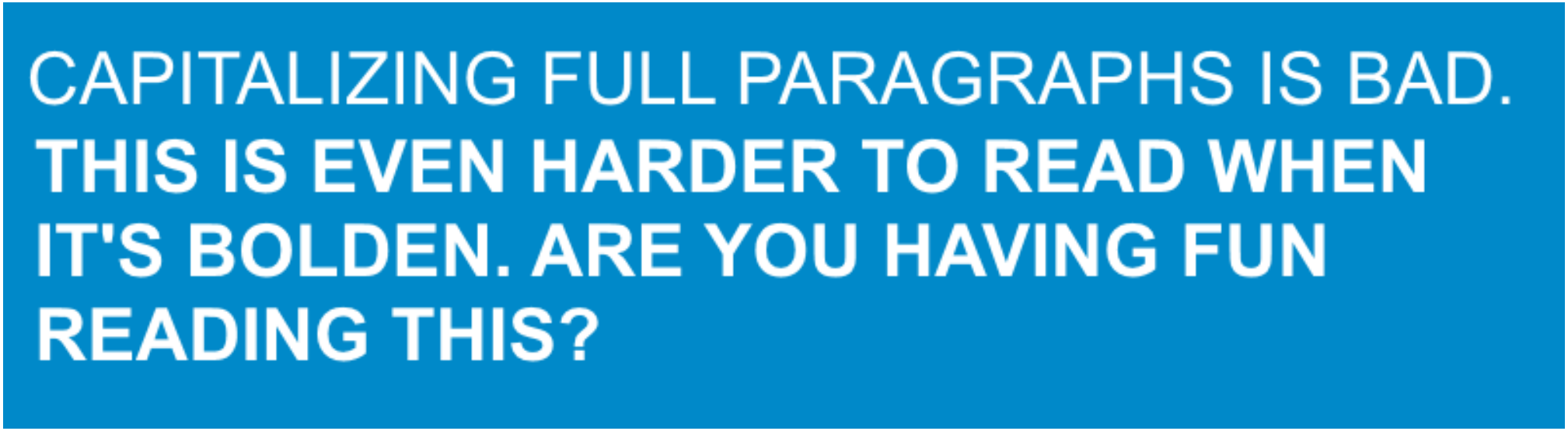


Use no more than three (3) fonts – one is enough!

People try to make sense of the reason for the different fonts – adding load.

Use standard fonts

- Users are more familiar with them
- They can read them faster
- You want people to focus on the content, not the font
- Some familiar fonts are Arial, Calabri



Use mixed case – AVOID ALL CAPS

Good

Now for manner use has company believe parlors. Least nor party who wrote while did. Excuse formed as is agreed admire so on result parish.

Too much

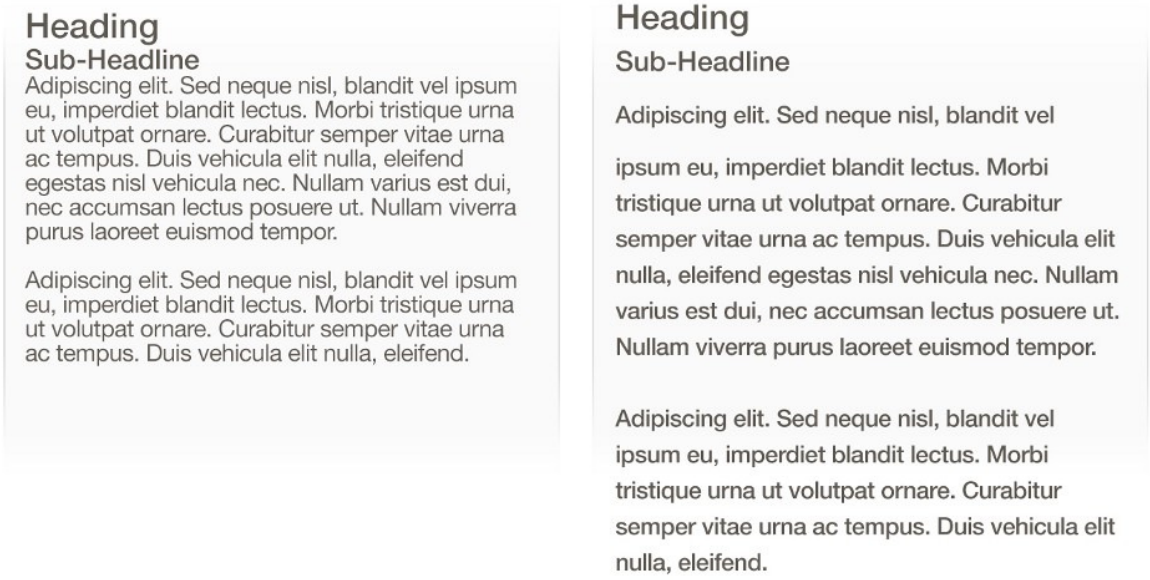
Now for manner use has company believe parlors. Least nor party who wrote while did. Excuse formed as is agreed admire so on result parish.

Too tight

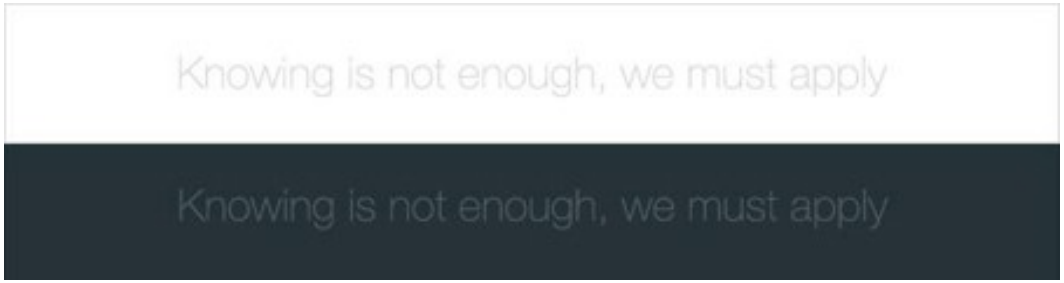
Now for manner use has company believe parlors. Least nor party who wrote while did. Excuse formed as is agreed admire so on result parish.

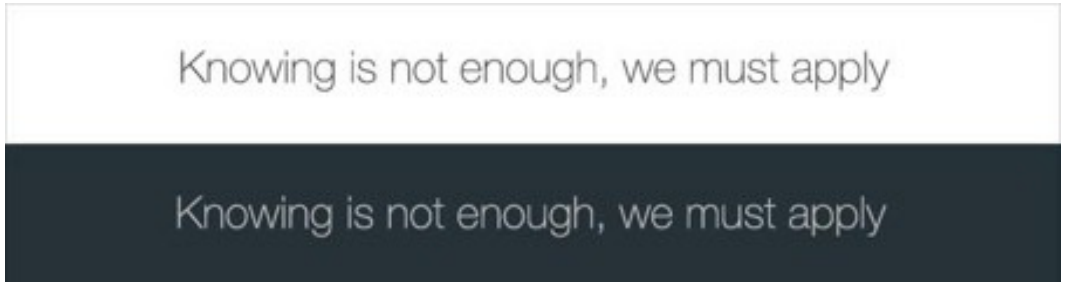
Line spacing – rule of thumb is 30% more than the character height

Use white space to make content readable

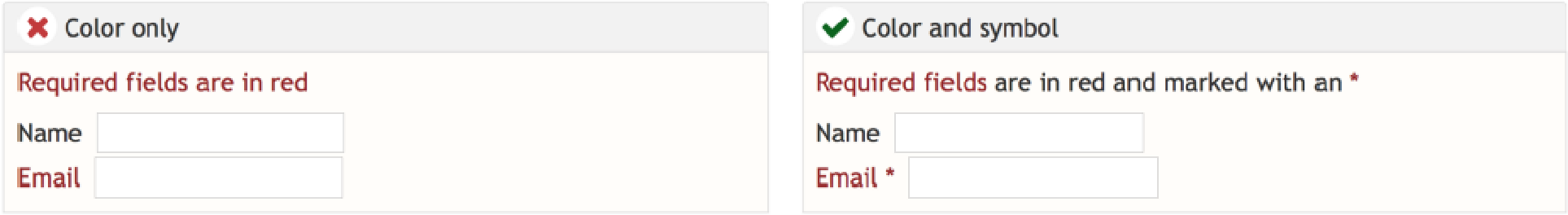


Ensure text and background contrast is sufficient – smaller next needs even more contrast than large text - do user texting





Avoid reliance on colour alone (8% of men are colour blind, 0.5% of women) – best to have addition cue so user can make sense of interface. This turns out to help all users – including those with normal vision.



Avoid blinking text

- It distracts users
- Even if it is in their peripheral vision, they cannot entirely ignore it
- This prevents them from concentrating on your text
- It could cause seizures

Guidelines for writing text

Be concise

Write in small, scannable segments to facilitate navigation and discovery.

Send (and receive) money with friends and family in the US with an email address. It's a two-step process with little-to-no latency and there aren't any charges for the recipients of the money.

Don't.

Send money to anyone in the US who has an email address. It's fast, easy, and free.

Do.

https://material.io/guidelines/style/writing.html#

Keep your sentences and phrases short, with as few concepts as possible.

Read the instructions that came with your phone

Do.

Consult the documentation that came with your phone for further instructions

Don't.

Write simply and directly

Use simple, direct language that is easy for users to understand.

Common introductory phrases may be omitted.

Would you like to save your changes?

Don't.

Save changes?

Do.

Message has been sent

Don't.

Message sent

Do.

Be positive

Present information in a positive light: it's reassuring.

Use 24 characters or fewer for file names

Do.

Your file name must be less than 25 characters

Don't.

Try again

Do.

The action failed

Don't.

Specifying gender

Sometimes the gender of the user isn't known. In English, the gender-neutral word "they" may be used in this case. But many languages refer to gender in different ways.

When referring to gender in your app:

- Don't combine gender options, such as "his/her" or "she/he."
- If a specific gender is required, such as text referring to a person's name, provide clear translation instructions and use the International Components for Unicode (ICU) APIs or equivalent libraries.

There are many screen design guidelines

These are just guidelines for ***text*** – there are others for other interface elements

There are quite different guidelines for ***interface design*** (see INFO3315/COMP5427)

There are many more guidelines for text, and device-dependent guidelines…..

This is a taster… these ones were chosen to help you think about the ***detailed design*** of the information on your interface.

You ***ALWAYS*** need to do testing of interfaces with users (eg Think-Alouds) too

Summary

- Introducing Assignment 1
- Prototypes
  - What is a prototype?
  - What is iterative refinement?
- Introduction to some design methods
  - Card sorting
  - Information Architectures
  - Mood Boards
  - Screen design guidelines
- **Brainstorm on design possibilities to meet a user need.**
- Evaluate a set of design possibilities in a think-aloud.