Design principles → Analytical evaluation

Unit 3

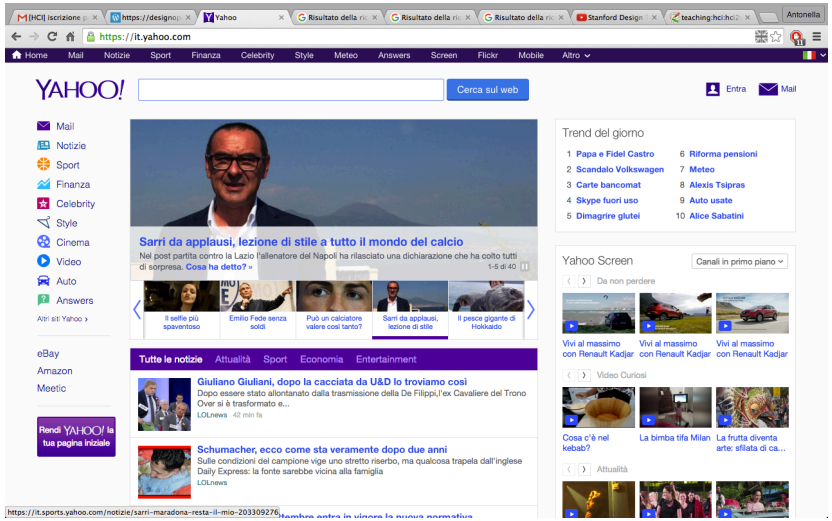
Learning outcomes

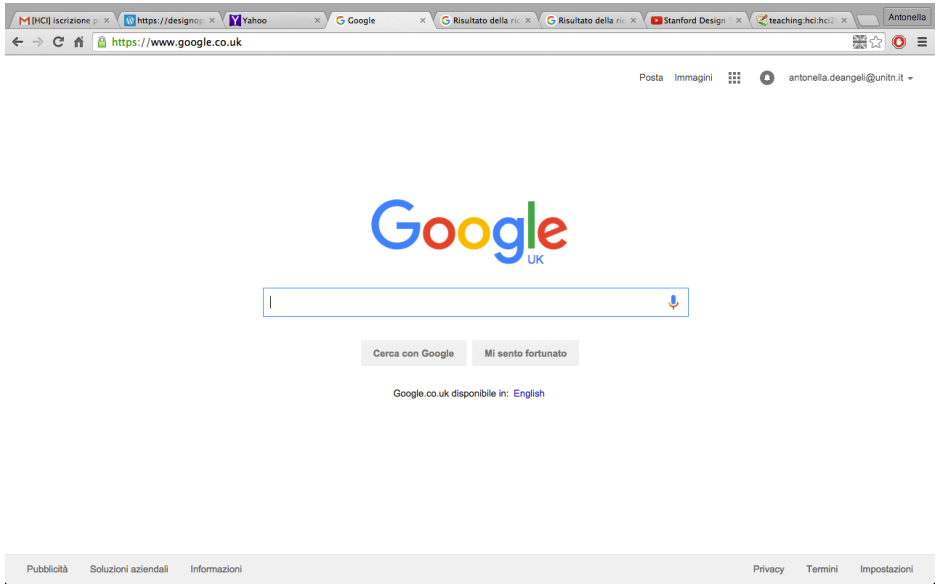
- Understand fundamental design principles
- Introduce Nielsen's Heuristics
- Develop
  - awareness of how to apply them in design
  - Critical ability to evaluate design

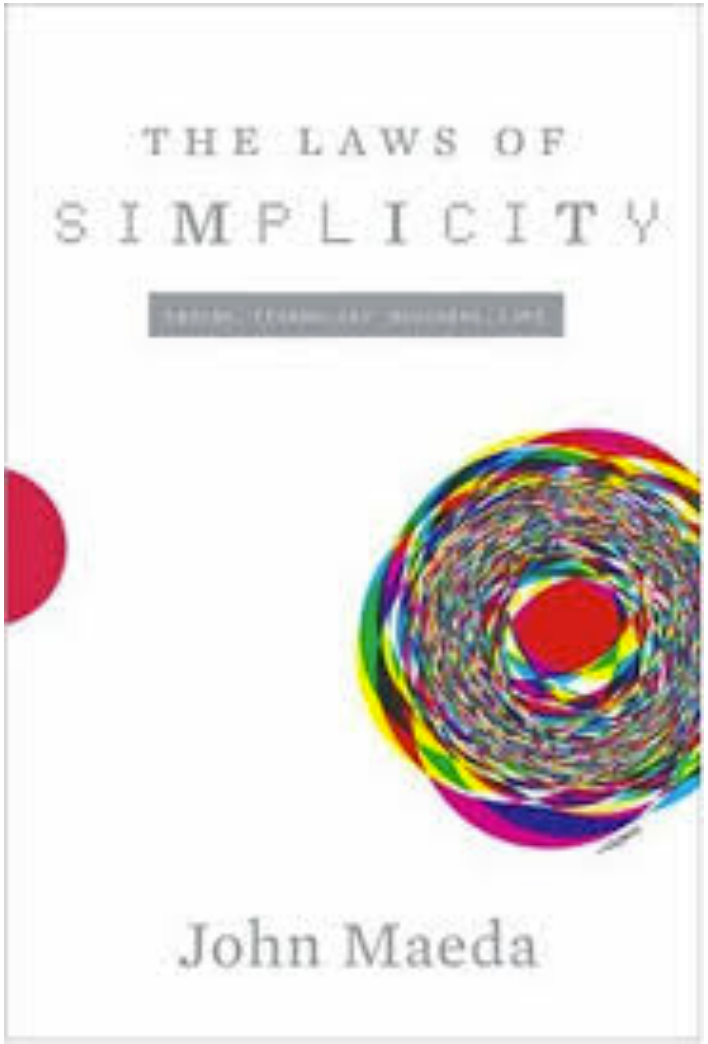
Design principles

- Generalizable abstractions for thinking about different aspects of design
- The do's and don'ts of interaction design
  - Prescriptive statements
- What to provide and what not to provide at the interface
- Derived from a mix of theory-based knowledge, experience and common-sense

Which one do you prefer?






THE LAWS OF
SIMPLICITY
John Maeda

Simplicity

- Simple things are more beautiful
  - Strong correlation between simple interfaces and aesthetic rating
- Simple things work better
  - Correlation with usability
- Processing fluency

Design factors

- Visual clutter
- Number of Colour
- Symmetry
- Figure-ground contrast

Visibility

- This is a control panel for an elevator.
- How does it work?
- Push a button for the floor you want?

- Nothing happens. Push any other button? Still nothing. What do you need to do?

It is not visible as to what to do!

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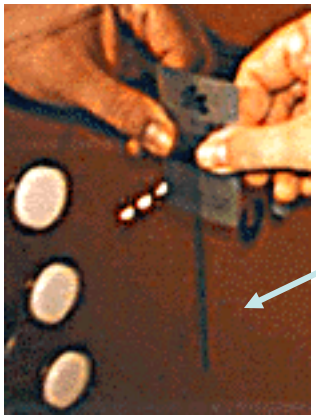
Visibility



…you need to insert your room card in the slot by the buttons to get the elevator to work!

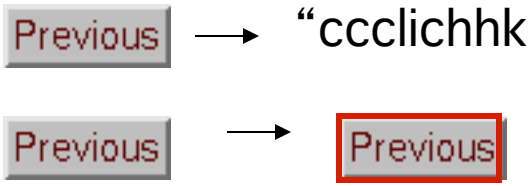
How would you make this action more visible?

- make the card reader more obvious
- provide an auditory message, that says what to do (which language?)
- provide a big label next to the card reader that flashes when someone enters

- make relevant parts visible
- make what has to be done obvious

Feedback

- Sending information back to the user about what has been done
- Includes sound, highlighting, animation and combinations of these
  - e.g. when screen button clicked on provides sound or red highlight feedback:



Constraints

- Restricting the possible actions that can be performed
- Helps prevent user from selecting incorrect options
- Three main types (Norman, 1999)
  - Physical
  - cultural
  - Logical

Physical constraints

- Refer to the way physical objects restrict the movement of things
  - E.g. only one way you can insert a key into a lock
- How many ways can you insert a CD or DVD disk into a computer?
- How physically constraining is this action?
- How does it differ from the insertion of a floppy disk into a computer?

Affordances

- Refers to an attribute of an object that allows people to know how to use it
  - e.g. a mouse button invites pushing, a door handle affords pulling
- Norman (1988) used the term to discuss the design of everyday objects
  - Learned conventions of arbitrary mappings between action and effect at the interface
  - Some mappings are better than others
- Much popularised in interaction design to discuss how to design interface objects
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on

Logical constraint

- Exploits people's everyday common sense reasoning about the way the world works
  - Where do you plug the mouse?
  - Where do you plug the keyboard?
  - Top or bottom connector?
  - Do the colour coded icons help?

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How to design them more logically

(i) A provides direct adjacent mapping between icon and connector

(ii) B provides color coding to associate the connectors with the labels

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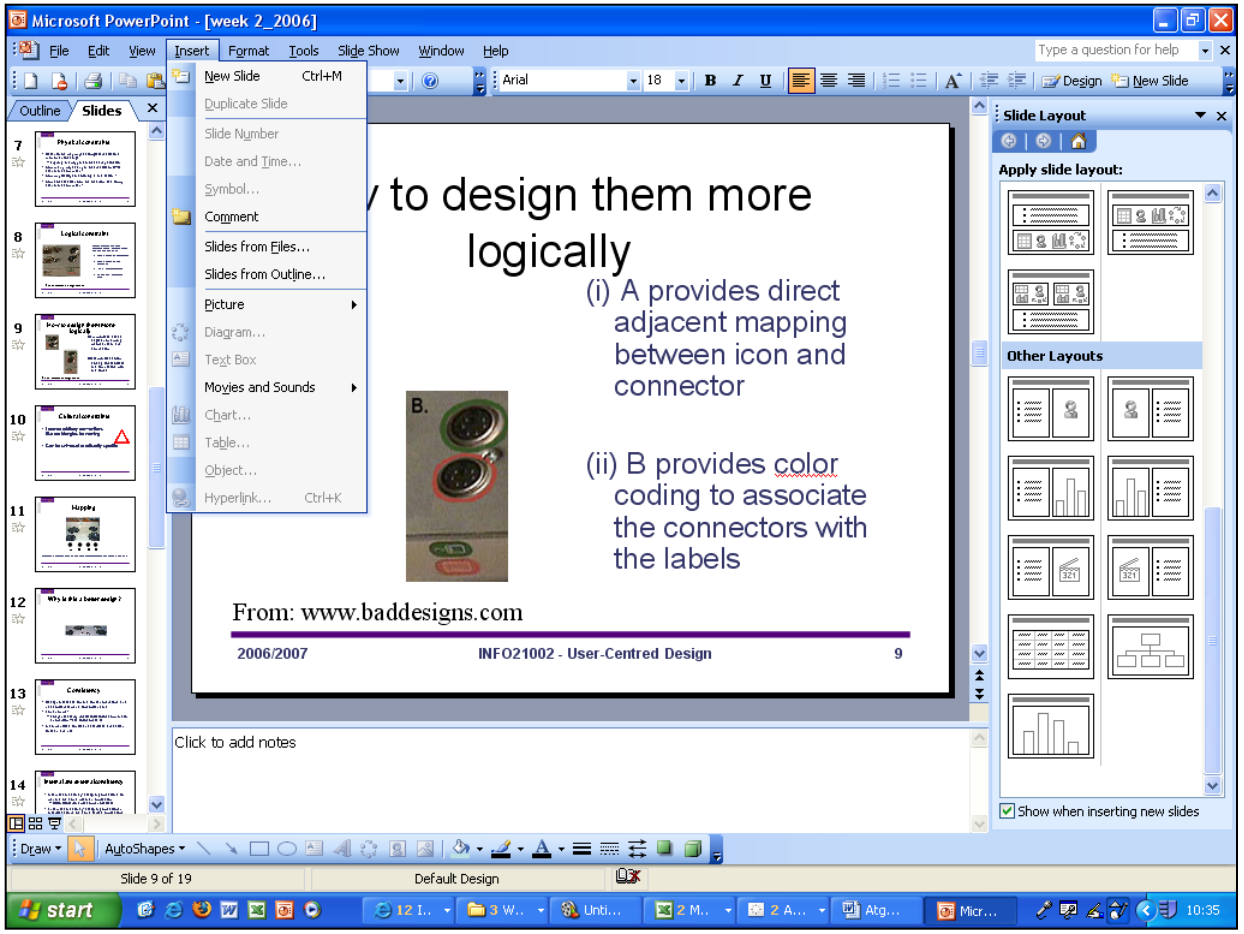
Example


Microsoft PowerPoint - [week 2_2006]
File Edit View Insert Format Tools Slide Show Window Help
New Slide Ctrl+M
Duplicate Slide
Slide Number
Date and Time...
Symbol...
Comment
Slides from Files...
Slides from Outline...
Picture
Diagram...
Text Box
Movies and Sounds
Chart...
Table...
Object...
Hyperlink... Ctrl+K
Outline Slides
to design them more logically
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B.
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From: www.baddesigns.com
2006/2007 INFO21002 - User-Centred Design 9
Click to add notes
Slide Layout
Apply slide layout:
Other Layouts
Show when inserting new slides
Draw AutoShapes
Slide 9 of 19
Default Design
start

Cultural constraints

- Learned arbitrary conventions like red triangles for warning

- Can be universal or culturally specific

Mapping

•Relationship between controls and their movements and the results in the world

Why is this a better design?

Consistency

- Design interfaces to have similar operations and use similar elements for similar tasks
- For example:
  - always use ctrl key plus first initial of the command for an operation – ctrl+C, ctrl+S, ctrl+O
- Consistent interfaces are easier to learn and use

Internal and external consistency

- Internal consistency: designing operations to behave the same within an application
  - Difficult to achieve with complex interfaces
- External consistency: designing operations, interfaces to be the same across applications and devices
  - Very rarely the case, based on different designer's preference - Brand Identity

Keypad numbers layout

- A case of external inconsistency

(a) phones, remote controls

1	2	3
4	5	6
7	8	9
	0	

(b) calculators, computer keypads

7	8	9
4	5	6
1	2	3
0		

Usability principles

- Similar to design principles, except more prescriptive
- Used mainly as the basis for evaluating systems
- Provide a framework for heuristic evaluation

Usability heuristics (Nielsen 2001)

- Visibility of system status
- Match between system and the real world
- User control and freedom
- Consistency and standards
- Help users recognize, diagnose and recover from errors
- Error prevention
- Recognition rather than recall
- Flexibility and efficiency of use
- Aesthetic and minimalist design
- Help and documentation

http://www.useit.com/papers/heuristic/heuristic_list.html

http://designingwebinterfaces.com/6-tips-for-a-great-flex-ux-part-5

0	I don’t agree that this is a usability problem at all
1	Cosmetic problem only. Need not be fixed unless extra time is available on project
2	Minor usability problem: fixing this should be given low priority
3	Major usability problem: important to fix, so should be given high priority
4	Usability catastrophe: imperitave to fix this before product can be released

http://www.useit.com/papers/heuristic/severityrating.html

Key points

- Design principles
  - Simplicity
  - Visibility
  - Feedback
  - Constraint
  - Mapping
  - Consistency
  - Affordance
  - Evaluation heuristics

Recommended reading

- Sharp et al. Chapter 1/15
- More on design principles
  - Don Norman 1988 The design of everyday things
  - Usability: http://www.useit.com

http://www.useit.com/papers/heuristic/heuristic_list.html

http://designingwebinterfaces.com/6-tips-for-a-great-flex-ux-part-5