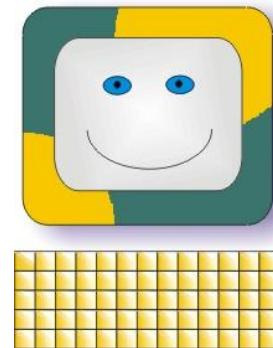




What is interaction design?

Human Computer Interaction Design
dr Kristina Lapin



Objectives

- Difference between good and poor design
- Interaction design (IxD) and human computer interaction (HCI)
- Usability and user experience
- Forms of guidelines in IxD
- Evaluate of an interactive product in terms of goals and principles of interaction design

Bad designs

- Elevator controls and labels on the bottom row all look the same, so it is easy to push a label by mistake instead of a control button



- People do not make same mistake for the labels and buttons on the top row. Why not?



From: www.baddesigns.com

Why is this vending machine so bad?



- Need to **push button first** to activate reader
- Normally **insert bill** first before making selection
- Contravenes well known convention

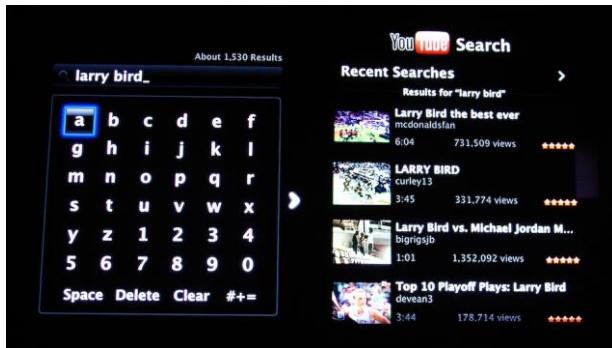
From: www.baddesigns.com

Good and bad design



- What is wrong with the remote on the right?
- Why is the TiVo remote so much better designed?
 - Peanut shaped to fit in hand
 - Logical layout and color-coded, distinctive buttons
 - Easy to locate buttons

How to interact with the Smart TV?



- How to type passwords and search terms?
 - Remote control?
 - Virtual keyboard?
 - Wiimote?
 - Game controller?
 - Minuum?

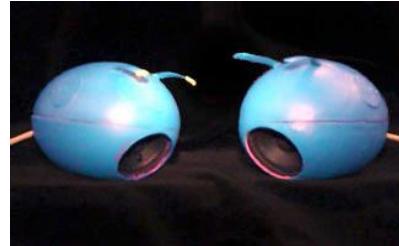


Objectives

- Difference between good and poor design
- **Interaction design (IxD) and human computer interaction (HCI)**
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What to design

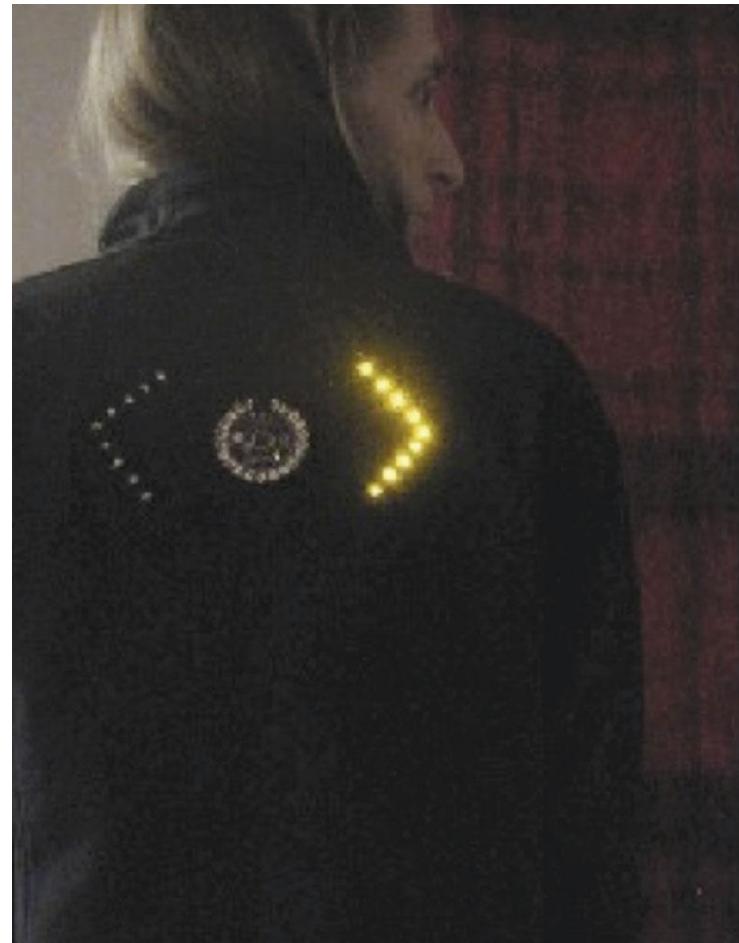
- Need to take into account:
 - Who the users are
 - What activities are being carried out
 - Where the interaction is taking place
- Need to optimize the interactions users have with a product
 - So that they match the users' activities and needs



http://opera.media.mit.edu/papers/ICMC2004_BTBB-revised.pdf

<http://www.youtube.com/watch?v=HqVIFdqNKEg>

Novel interface



Turn signal biking jacket using e-textiles
developed by Leah Beuchley

Understanding users' needs

- What people are good and bad at
- How to help people in the way they do things
- What might provide quality user experiences
- Listen to what people want
- Get people involved to the development
- Use tried and tested user-centered methods

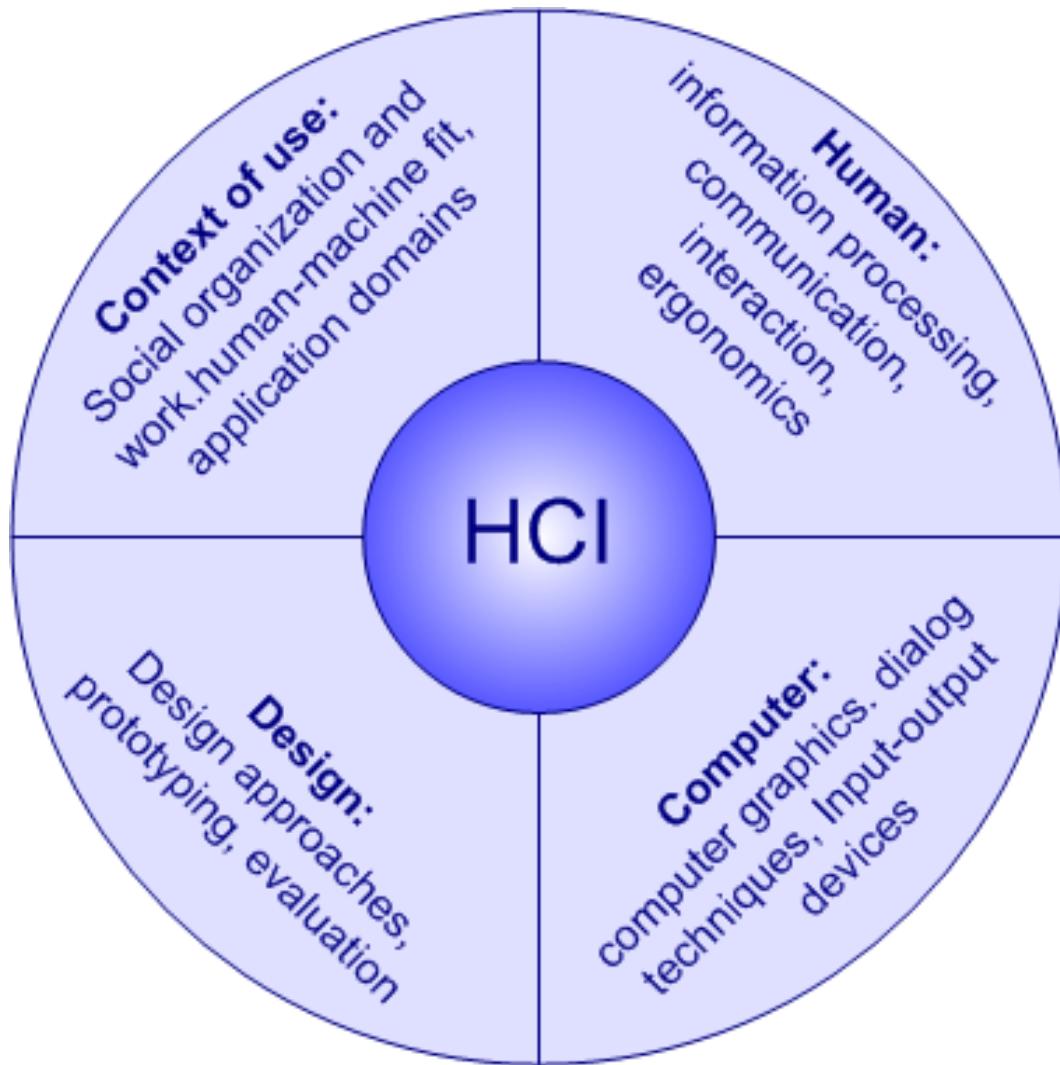
What is interaction design?

- Designing interactive products to support the way people communicate and interact in their everyday and working lives
 - Sharp, Rogers and Preece (2011)
- The design of spaces for human communication and interaction (Winograd 1997)
- The practise of designing interactive digital products, environments, systems and services
 - Alan Cooper, Robert Reimann, David Cronin (2007)
- The art of facilitating interactions between humans through products and services (Saffer, Designing for Interaction, 2010)

Digital age products

- Before the digital age
 - Oven's operation:
 - single knob turning to the correct position
 - Simple and predictable
- Digital age
 - Modern-day ovens' operations:
 - Start, cancel and program – non-cooking buttons
 - Bake and boil buttons
 - Complex and less predictable behavior

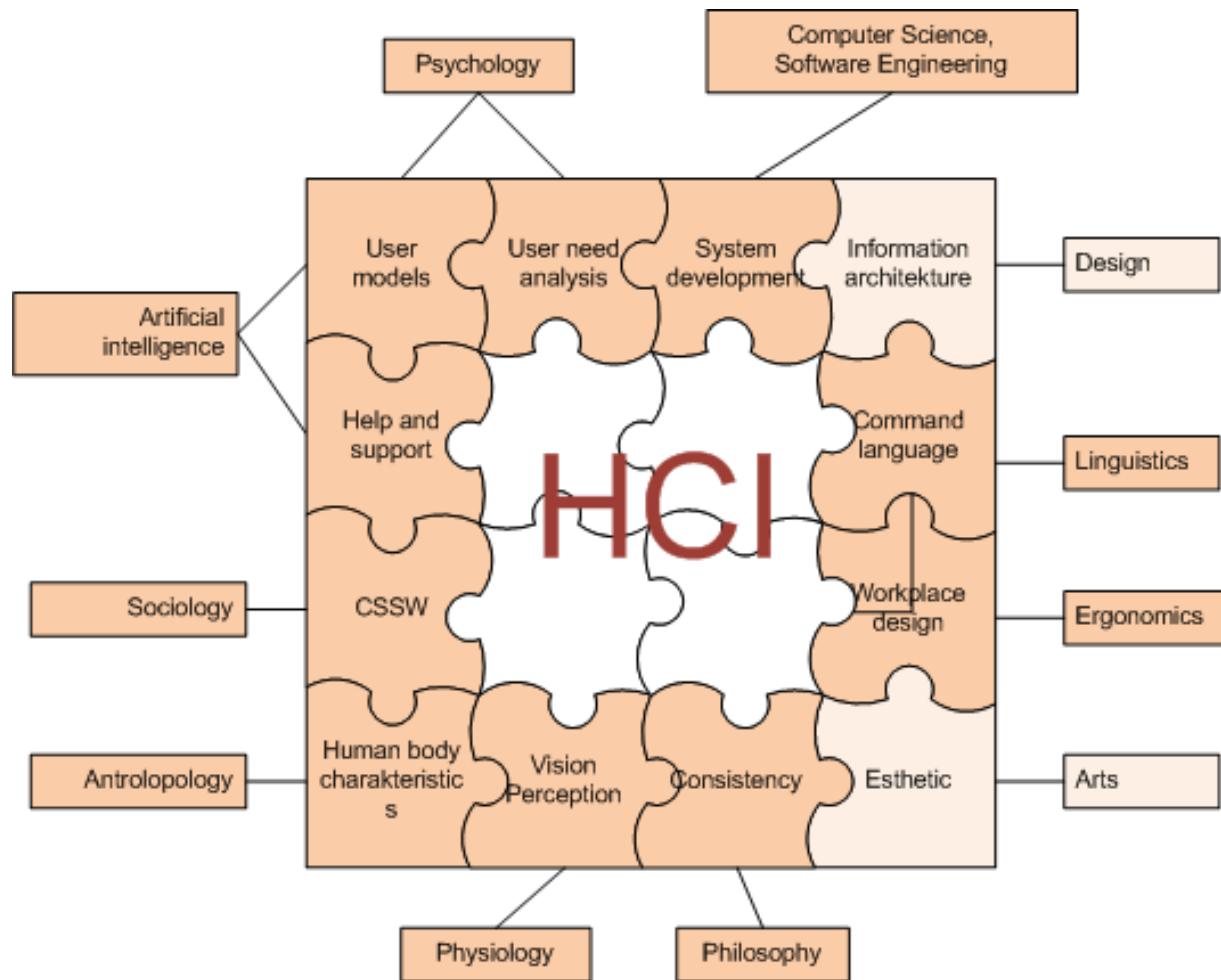
The components of interaction design



Which kind of design?

- Interaction design is the umbrella term covering all of these aspects
 - fundamental to all disciplines, fields, and approaches concerned with researching and designing computer-based systems for people
- Terms emphasize what is being designed, e.g.
 - user interface design, software design, user-centered design, product design, web design, experience design (UX)

Relationships with academic disciplines and design practices



Working in multidisciplinary teams

- Many people from different backgrounds involved
- Different perspectives and ways of seeing and talking about things
- Benefits
 - more ideas and designs generated
- Disadvantages
 - difficult to communicate and progress forward the designs being created



Who should be involved in developing?

- A public kiosk providing information about the exhibits available in a science museum?
- An interactive educational website to accompany a TV series?

Interaction Design Consultants

- Increasing number of ID consultancies
 - **Nielsen Norman Group:** “help companies enter the age of the consumer, designing human-centered products and services”
 - **Cooper:** “From research and product to goal-related design”
 - **Swim:** “provides a wide range of design services, in each case targeted to address the product development needs at hand”
 - **IDEO:** “creates products, services and environments for companies pioneering new ways to provide value to their customers”
 - **Adaptive path:** **We help companies create products and services that deliver great experiences and improve people's lives.**



cooper

I D E O



adaptive path

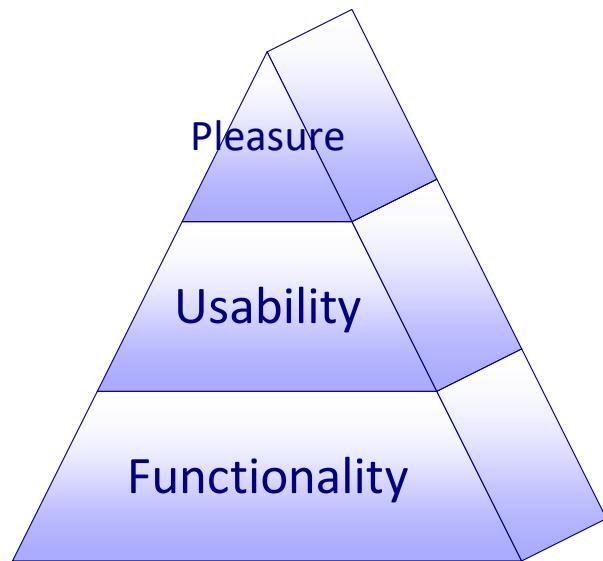
The User Experience

- How a product behaves and is used by people in the real world
 - “every product that is used by someone has a user experience: newspapers, ketchup bottles, reclining armchairs, cardigan sweaters.” (Garrett, 2003)
- Cannot design a user experience, only **for** a user experience

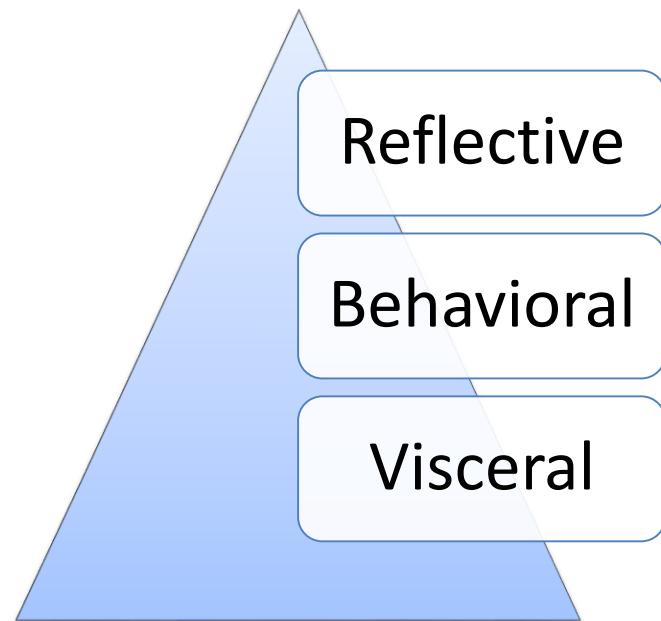


User experiences

User needs (Jordan 1997)



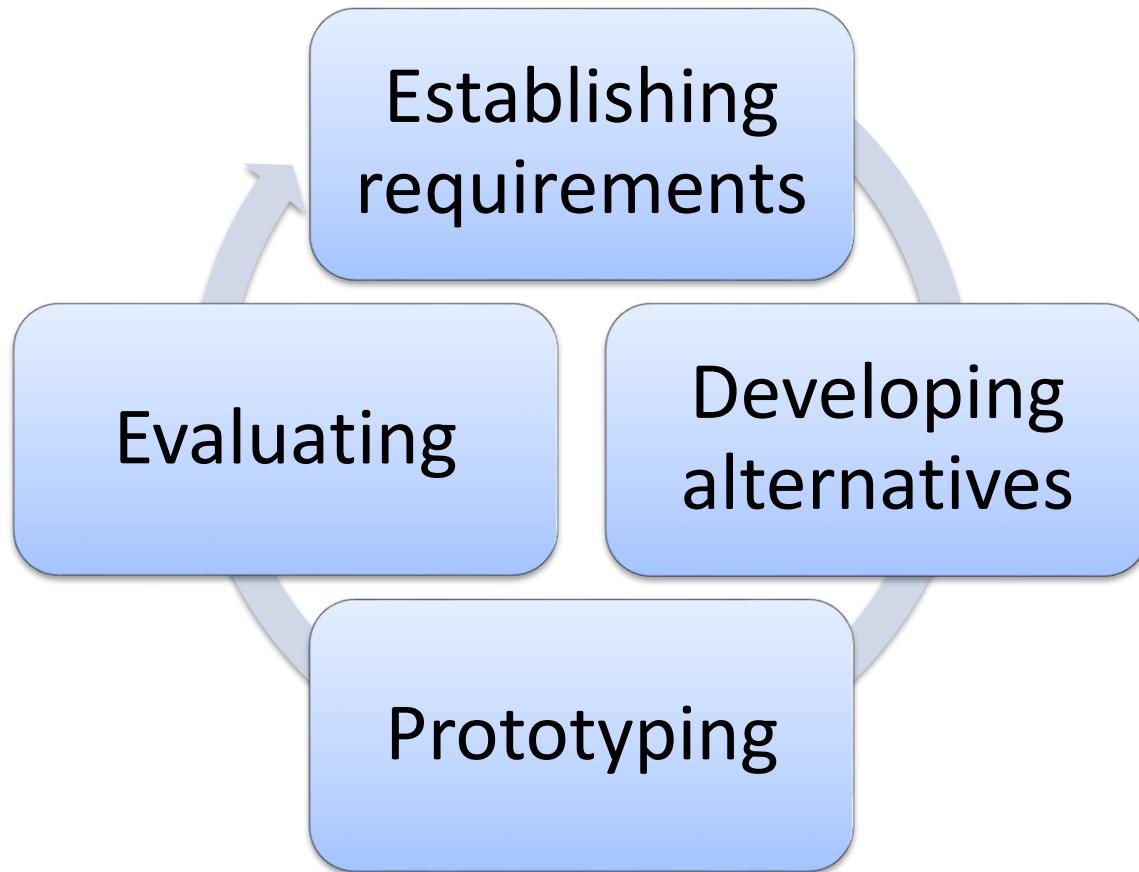
Emotional design (Norman 2004)



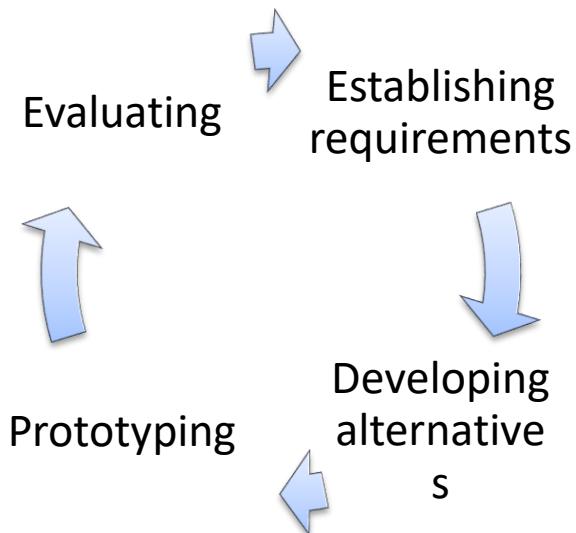
Jordan P.W. Products as personalities. Contemporary Ergonomics 1997, S.A. Robertson (Ed.), Taylor&Francis, London 1997

Norman, Donald A. *Emotional Design: Why We Love (Or Hate) Everyday Things*. New York: Basic Books, 2004

What is involved in the process of interaction design



Core characteristics of interaction design

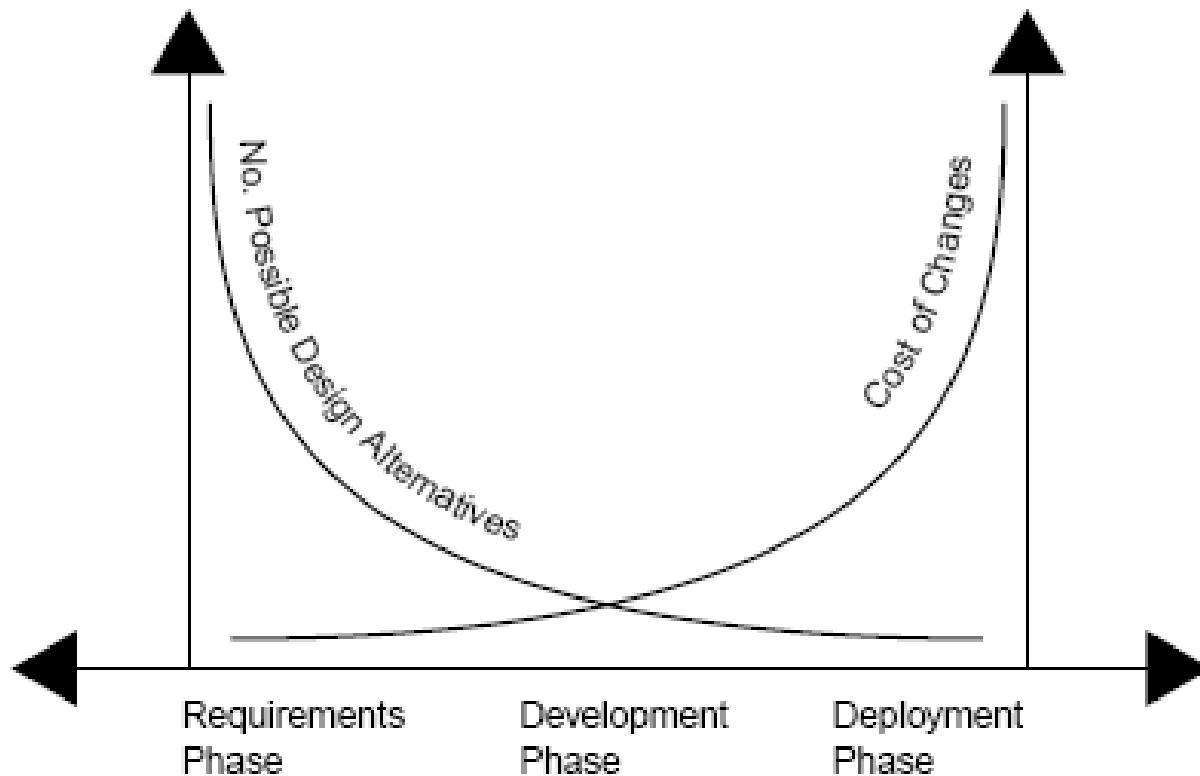


Users involved through the development

Clearly documented user goals

Iterations

Save development costs



The number of possible designs decreases as the cost to make changes increases (Erhlich and Rohn, 1994, p. 80).

Bias, Randolph G., Mayhew, Deborah J. Cost-justifying usability: an update for the internet age. Morgan Kaufman Publishers, 2005.

Why go to this length?

- Help designers:
 - understand how to design interactive products that fit with what people want, need and may desire
 - appreciate that one size does not fit all
 - e.g., teenagers are very different to grown-ups
 - identify any incorrect assumptions they may have about particular user groups
 - e.g., not all old people want or need big fonts
 - be aware of both people's sensitivities and their capabilities

Usability goals

- Effective to use
- Efficient to use
- Safe to use
- Have good utility
- Easy to learn
- Easy to remember how to use

User experience goals

Desirable aspects

| | | |
|--------------|-------------------------|------------------------|
| satisfying | helpful | fun |
| enjoyable | motivating | provocative |
| engaging | challenging | surprising |
| pleasurable | enhancing sociability | rewarding |
| exciting | supporting creativity | emotionally fulfilling |
| entertaining | cognitively stimulating | |

Undesirable aspects

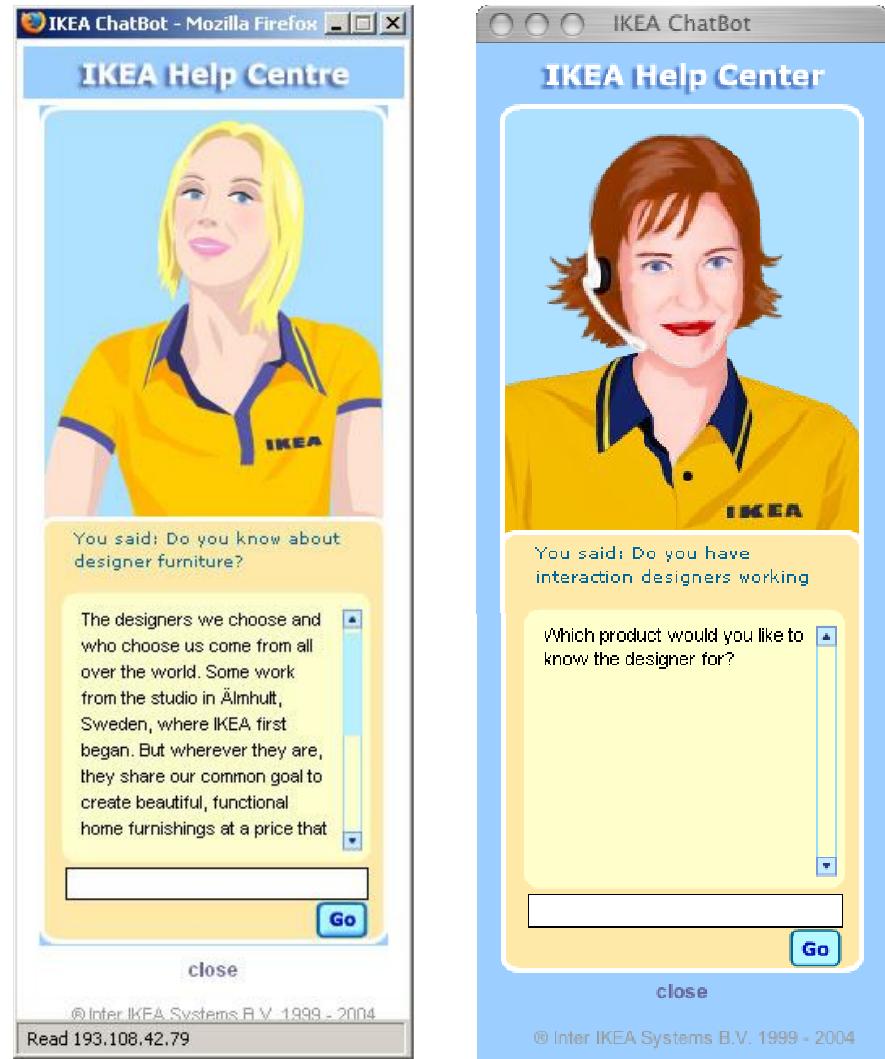
| | |
|------------------------|------------------------|
| boring | unpleasant |
| frustrating | patronizing |
| making one feel guilty | making one feel stupid |
| annoying | cutesy |
| childish | gimmicky |

Are cultural differences important?

- 5/21/2012 versus 21/5/2012?
 - Which should be used for international services and online forms?
- Why is it that certain products, like the iPod, are universally accepted by people from all parts of the world whereas websites are reacted to differently by people from different cultures?

Anna, IKEA online sales agent

- Designed to be different for UK and US customers
- What are the differences and which is which?
- What should Anna's appearance be like for other countries, like India, South Africa, or China?



Usability and user experience goals

- Selecting terms to convey a person's feelings, emotions, etc., can help designers understand the multifaceted nature of the user experience
- How do usability goals differ from user experience goals?
- Are there trade-offs between the two kinds of goals?
 - e.g. can a product be both fun and safe?
- How easy is it to measure usability versus user experience goals?

Usability design principles

- Generalizable abstractions for thinking about different aspects of design
 - The do's and don'ts of interaction design
 - What to provide and what not to provide at the interface
 - Derived from a mix of theory-based knowledge, experience and common-sense
- Norman defined 6 usability design principles:
 - Visibility, feedback, constraints, consistency, mapping, affordances

Visibility

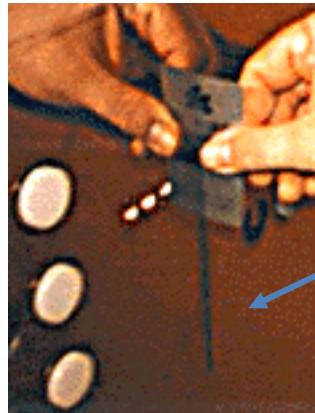


- This is a control panel for an elevator
- How does it work?
- Push a button for the floor you want?
- Nothing happens. Push any other button? Still nothing. What do you need to do?

It is not visible as to what to do!

From:
www.baddesigns.com

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

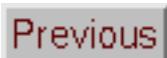
What do I do if I am wearing black?

- Invisible automatic controls can make it more difficult to use



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:

 → “ccclichhk”

 → 

Constraints

- Restricting the possible actions that can be performed
- Helps prevent user from selecting incorrect options
- Physical objects can be designed to constrain things
 - e.g. only one way you can insert a key into a lock

Logical or ambiguous design?



- Where do you plug the mouse?
- Where do you plug the keyboard?
- top or bottom connector?
- Do the color coded icons help?

From: www.baddesigns.com

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

From: www.baddesigns.com

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`
- Main benefit is consistent interfaces are easier to learn and use

When consistency breaks down

- What happens if there is more than one command starting with the same letter?
 - e.g. save, spelling, select, style
- Have to find other initials or combinations of keys, thereby breaking the consistency rule
 - e.g. ctrl+S, ctrl+Sp, ctrl+shift+L
- Increases learning burden on user, making them more prone to errors

Internal and external consistency

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

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 | | |

Affordances: to give a clue

- 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
- Since has been 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

What does ‘affordance’ have to offer interaction design?

- Interfaces are virtual and do not have affordances like physical objects
- Norman argues it does not make sense to talk about interfaces in terms of ‘real’ affordances
- Instead interfaces are better conceptualized as ‘perceived’ affordances
 - Learned conventions of arbitrary mappings between action and effect at the interface
 - Some mappings are better than others

Activity

- Physical affordances:

How do the following physical objects afford? Are they obvious?



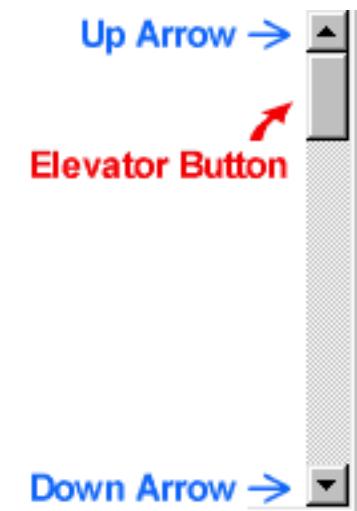
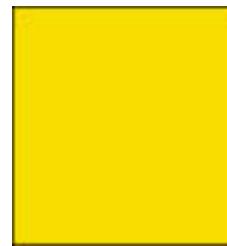
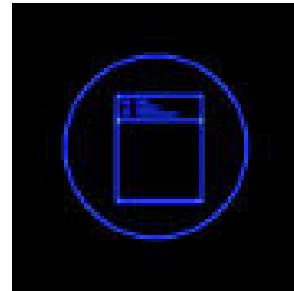
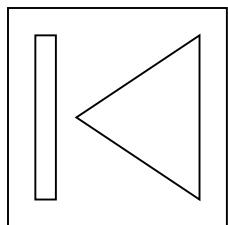
Activity

– Virtual affordances

How do the following screen objects afford?

What if you were a novice user?

Would you know what to do with them?



Key points

- Interaction design is concerned with designing interactive products to support the way people communicate and interact in their everyday and working lives
- It is concerned with how to create quality user experiences
- It requires taking into account a number of interdependent factors, including context of use, type of activities, cultural differences, and user groups
- It is multidisciplinary, involving many inputs from wide-reaching disciplines and fields

Bibliography

- Alan Cooper, Reimann Robert, Dave Croni. About face 3: the essentials of interaction design. Wiley, 2007.
- Bias, Randolph G., Mayhew, Deborah J. Cost-justifying usability: an update for the internet age. Morgan Kaufman Publishers, 2005.