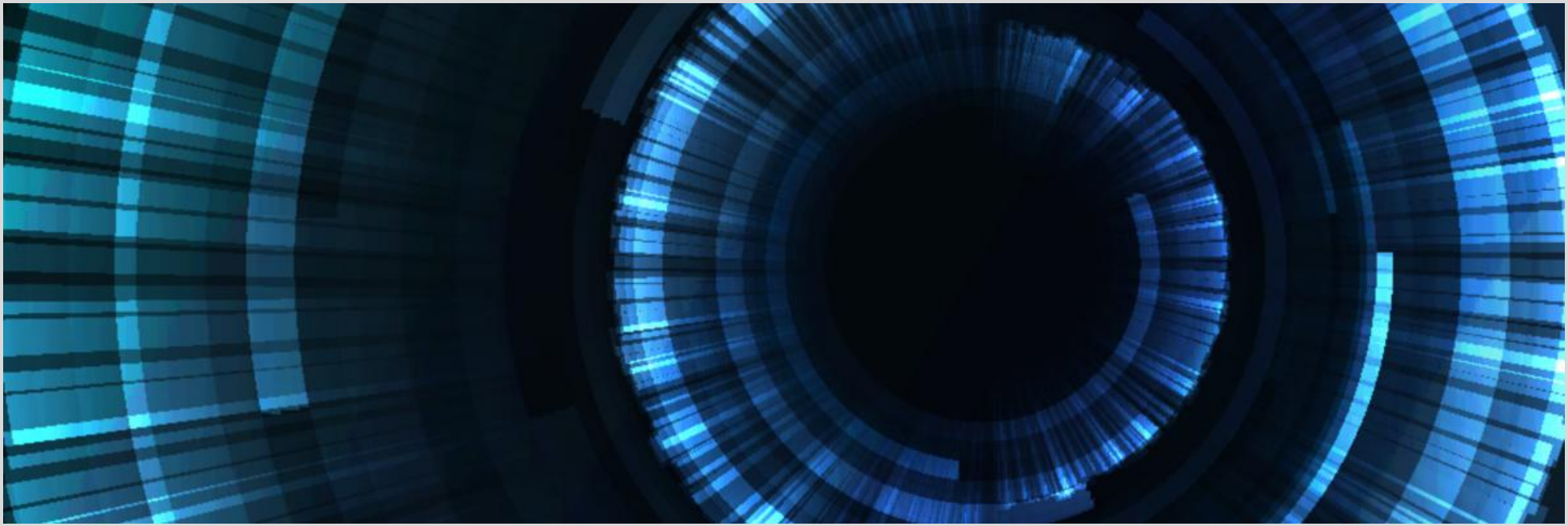
Human Computer Interaction



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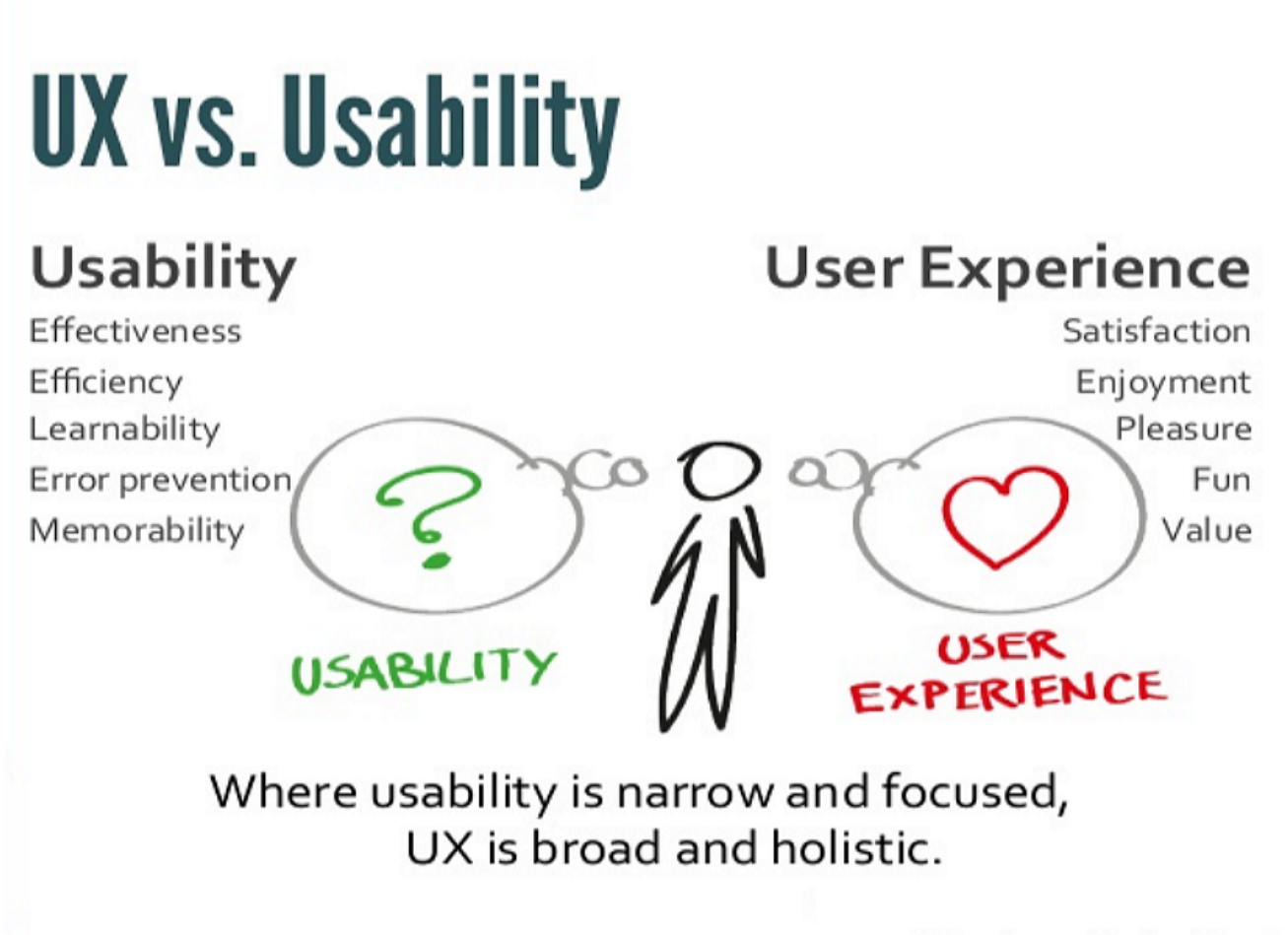
HUMAN CENTERED DESIGN

Agenda – 10 January 2022

- Chapter 1:
  - Introduce five design principles
    - *Visibility, Consistency, Constraints, Feedback, Affordance*
- Chapter 2:
  - What is design
  - Practical issues



https://hackernoon.com/the-ultimate-guide-difference-between-usability-and-user-experience-e926c11eac7a

Usability Goals

1. Effective to use *(effectiveness)*
   - How well does it do what it is supposed to
2. Efficient to use *(efficiency)*
   - Does it support productivity
3. Safe to use *(safety)*
   - How can users recognize and recover from errors
4. Have good utility *(utility)*
   - Does it provide the right functionality
5. Easy to learn *(learnability)*
   - Is it easy to understand how to use
6. Easy to remember how to use *(memorability)*
   - Is there support for infrequent use

(Interaction Design: Beyond Human-Computer Interaction, 5th Ed.)

User Experience Goals

Desirable aspects

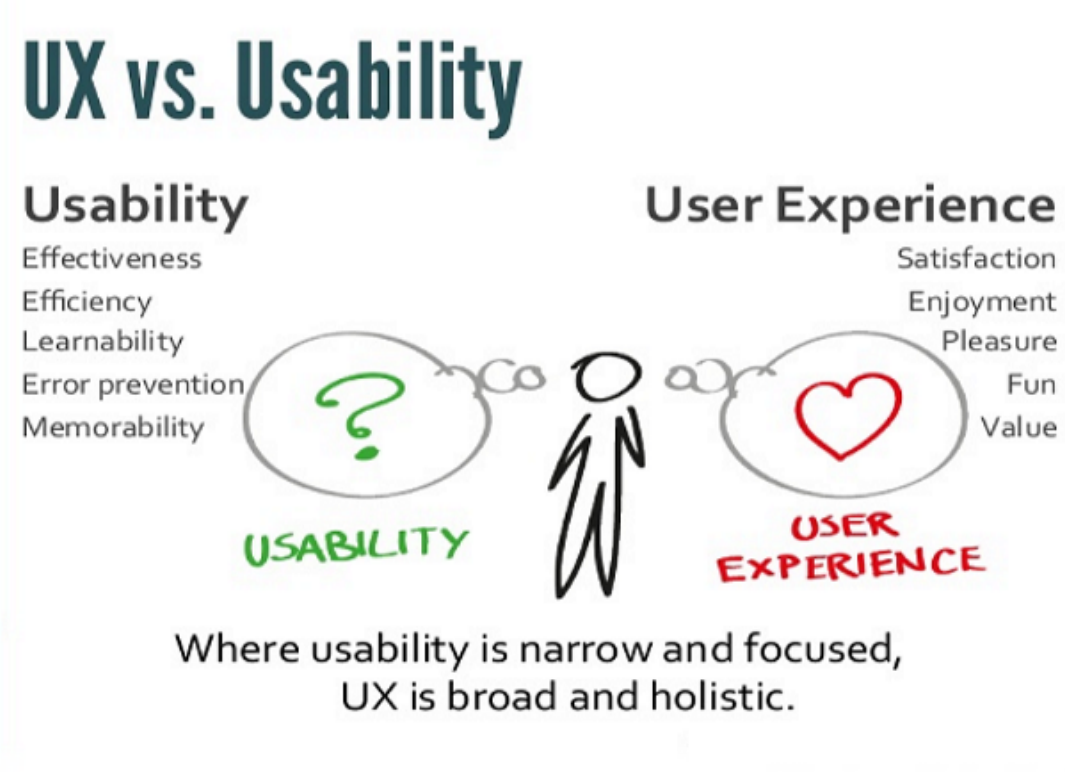
satisfying
enjoyable
engaging
pleasurable
exciting
entertaining
helpful
motivating
challenging
enhancing sociability
supporting creativity
cognitively stimulating
fun
provocative
surprising
rewarding
emotionally fulfilling

Undesirable aspects

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

(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

Usability & User Experience



Design Principles

- 'Rules of thumb' 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

– Visibility – Consistency – Constraints – Feedback – Affordances

(Interaction Design: Beyond Human-Computer Interaction, 5th Ed.)

Visibility

- Make functions obvious

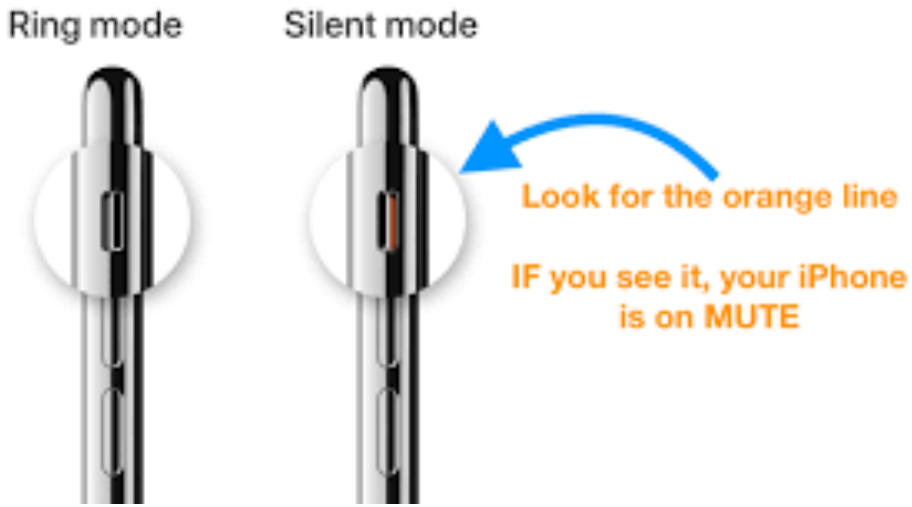
How would you make this action more visible?

http://www.baddesigns.com

(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

Feedback

- Sending information back to the user about what has been done
- Includes sound, highlighting, animation and combinations of these

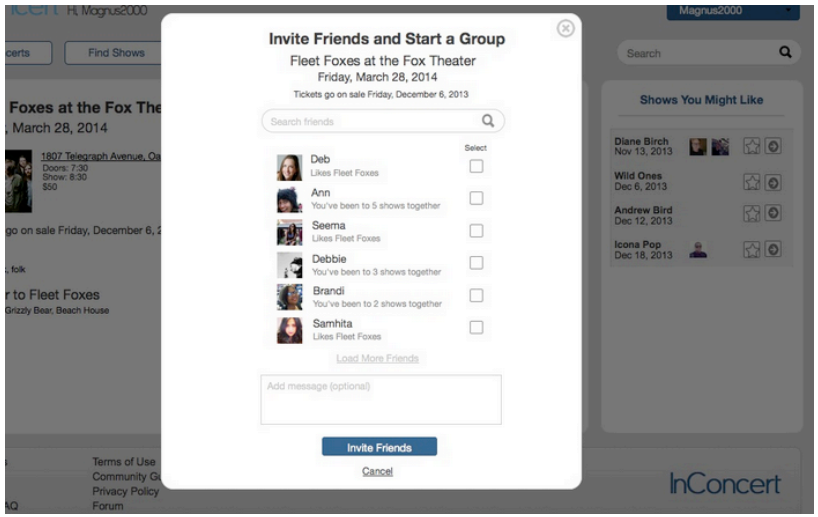


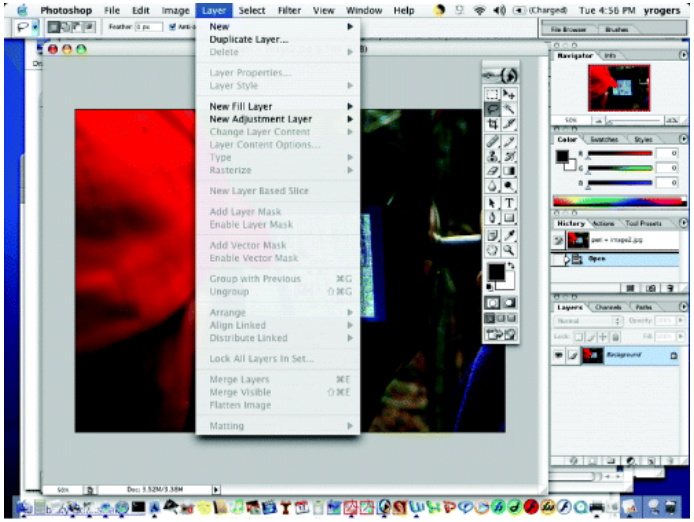
(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

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

modal pop-up



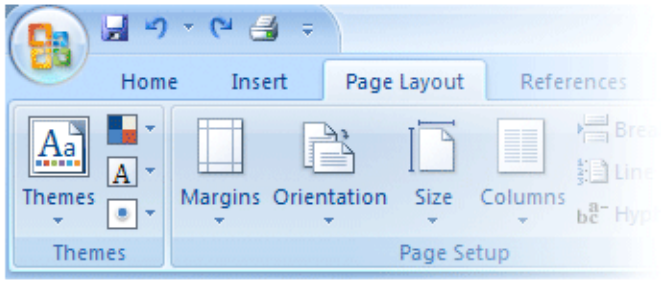


(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

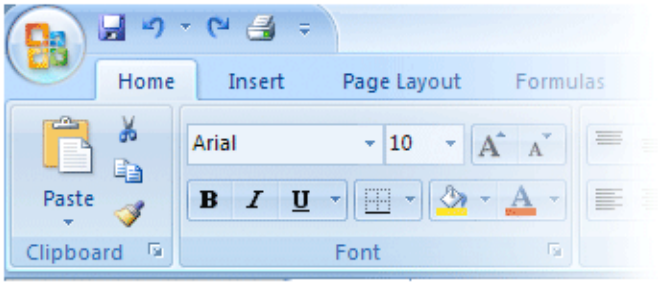
Consistency

- Design interfaces to have similar operations and use similar elements for similar tasks
- For example:
  - keep the menus in the same position across sites
- Main benefit is that consistent interfaces are easier to learn and use

Microsoft Word



Microsoft Excel



Microsoft Powerpoint

(https://usabilitypost.com/2009/04/15/8-characteristics-of-successful-user-interfaces)

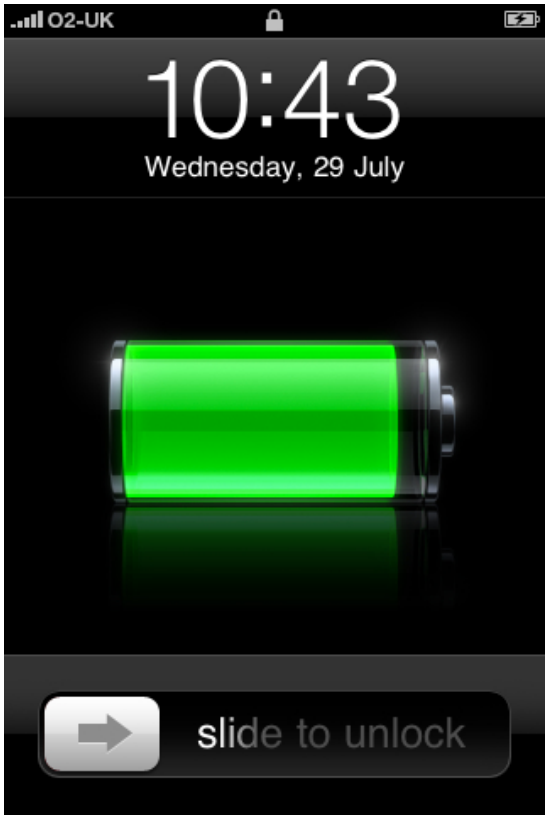
(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

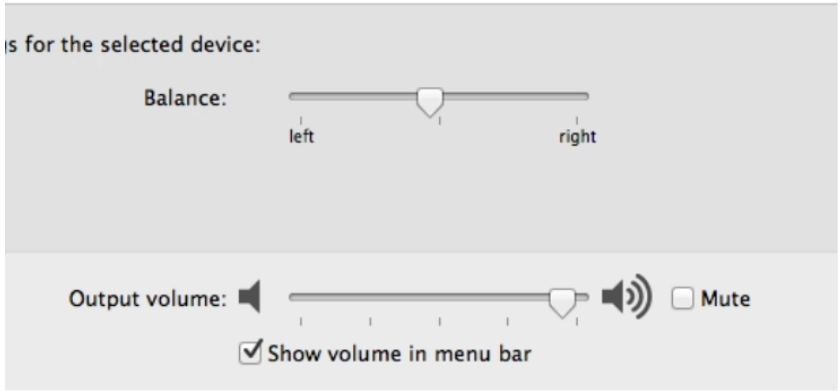
Affordances

- An attribute of an object that allows people to know how to use something

(Interaction Design: Beyond Human-Computer Interaction, 4th Ed.)

Affordances





Five Design Principles

- Visibility ⇢ can I see it?
- Consistency ⇢ this looks familiar?
- Constraints ⇢ why can't I do that?
- Feedback ⇢ what is it doing now?
- Affordance ⇢ how do I use it?

(Interaction Design: Beyond Human-Computer Interaction, 5th Ed.)

Review

- User Experience & Usability differences
- Five design principles

Summary: Chapter 1

- Designing interactive products to support how people communicate and interact in their everyday and working lives
- It is concerned with how to create quality user experiences for services, devices, and interactive products
- It is multidisciplinary, involving many inputs from wide-reaching disciplines and fields
- Interdependent factors, including context of use, types of activity, UX goals, accessibility, cultural differences, and user groups.
- Design principles, such as feedback and simplicity, are useful heuristics for informing, analyzing, and evaluating aspects of an interactive product.

Overview: Chapter 2

What is involved in Design?

- Understanding the problem space
- Importance of involving users
- Degrees of user involvement
- What is a user-centered approach?
- Four basic activities of interaction design
  - Discovering requirements for the interactive product
  - Designing alternatives that meet those requirements
  - Prototyping the alternative designs so that they can be communicated and assessed
  - Evaluating the product and the user experience it offers throughout the process
- A simple lifecycle model for interaction design

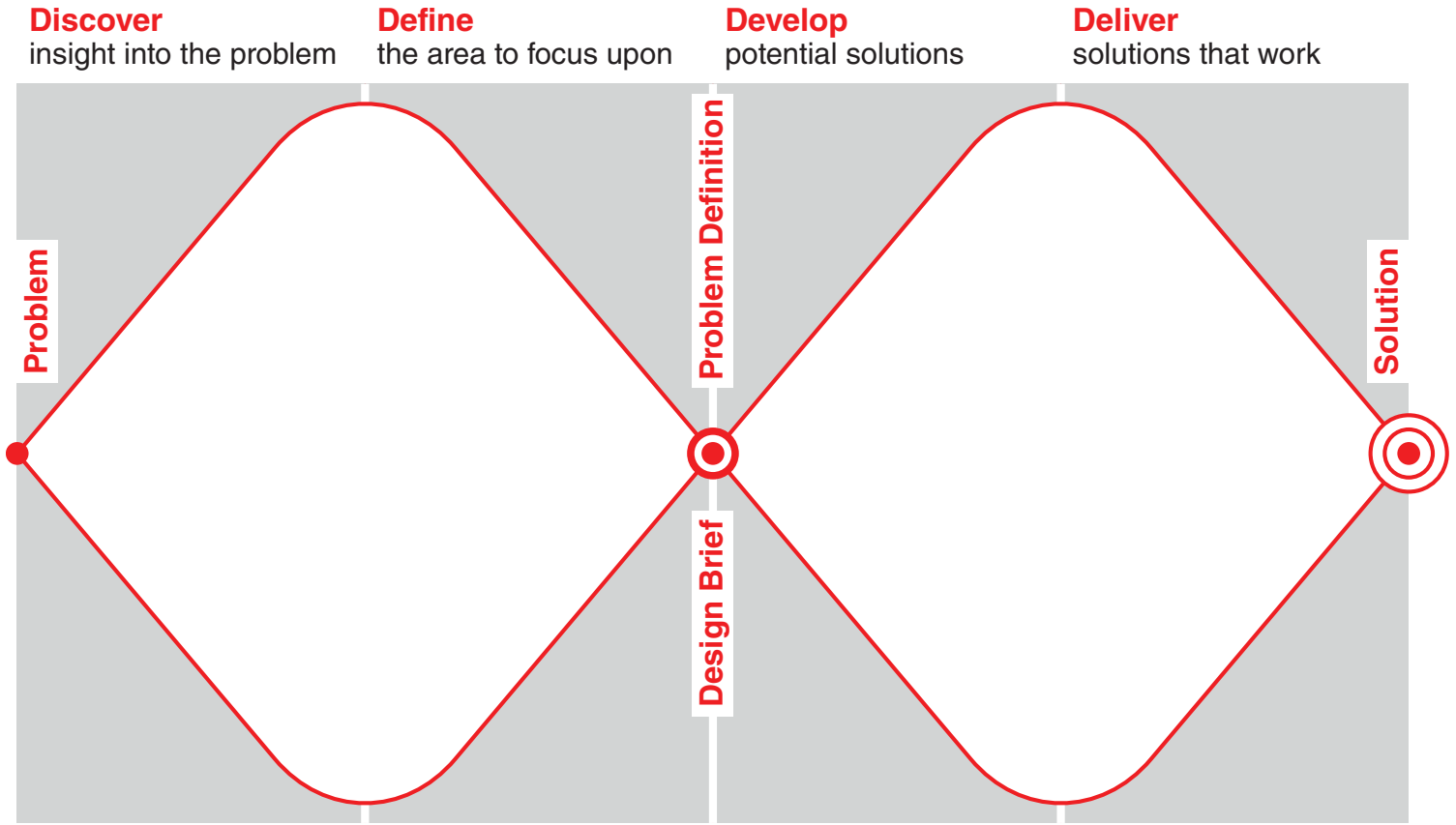
Some practical issues

- Who are the users?
- What are the users' needs?
- How to generate alternative designs
- How to choose among alternative designs
- How to integrate interaction design activities within other lifecycle models

What is involved in Design?

- It is a process:
  - Focused on discovering requirements, designing to fulfil requirements, producing prototypes and evaluating them
  - Focused on users and their goals
  - Involves trade-offs to balance conflicting requirements
- Generating alternatives and choosing between them is key
- Four approaches: user-centered design, activity-centered design, systems design, and genius design (rapid expert design)

The double diamond of design



Source: Adapted from The Design Process: What is the Double Diamond?

Understanding the problem space

Explore

- What is the current user experience?
- Why is a change needed?
- How will this change improve the situation?

Articulating the problem space

- Team effort
- Explore different perspectives
- Avoid incorrect assumptions and unsupported claims

Importance of involving users

- Expectation management
  - Realistic expectations
  - No surprises, no disappointments
  - Timely training
  - Communication, but no hype
- Ownership
  - Make the users active stakeholders
  - More likely to forgive or accept problems
  - Can make a big difference to acceptance and success of product

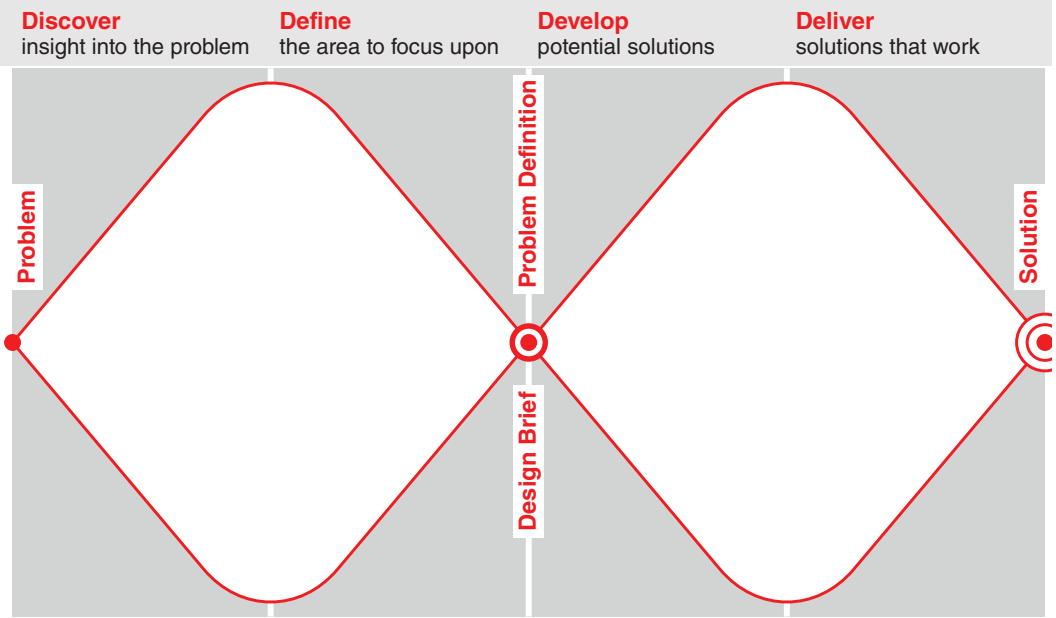
Degrees of user involvement

- Member of the design team
  - Full time: constant input, but lose touch with users
  - Part time: patchy input, and very stressful
  - Short term: inconsistent across project life
  - Long term: consistent, but lose touch with users
- Newsletters and other outreach devices
  - Reach wider selection of users
  - Need communication both ways
- User involvement after product is released
- Combination of these approaches

User-centered approach

- User-centered approach is based on:
  - Early focus on **users and tasks**: directly studying, activities behaviour, attitudes, the setting of use (ecosystem)
  - **Empirical** analysis: users' reactions and performance with prototypes, scenarios, & simulations are observed, recorded and analysed
  - **Iterative** design: when problems are found in user testing, fix them and carry out more tests

Four basic activities in Interaction Design



- Establishing requirements
- Developing alternatives
- Prototyping alternative designs
- Evaluating its user experience throughout

Interaction design lifecycle model

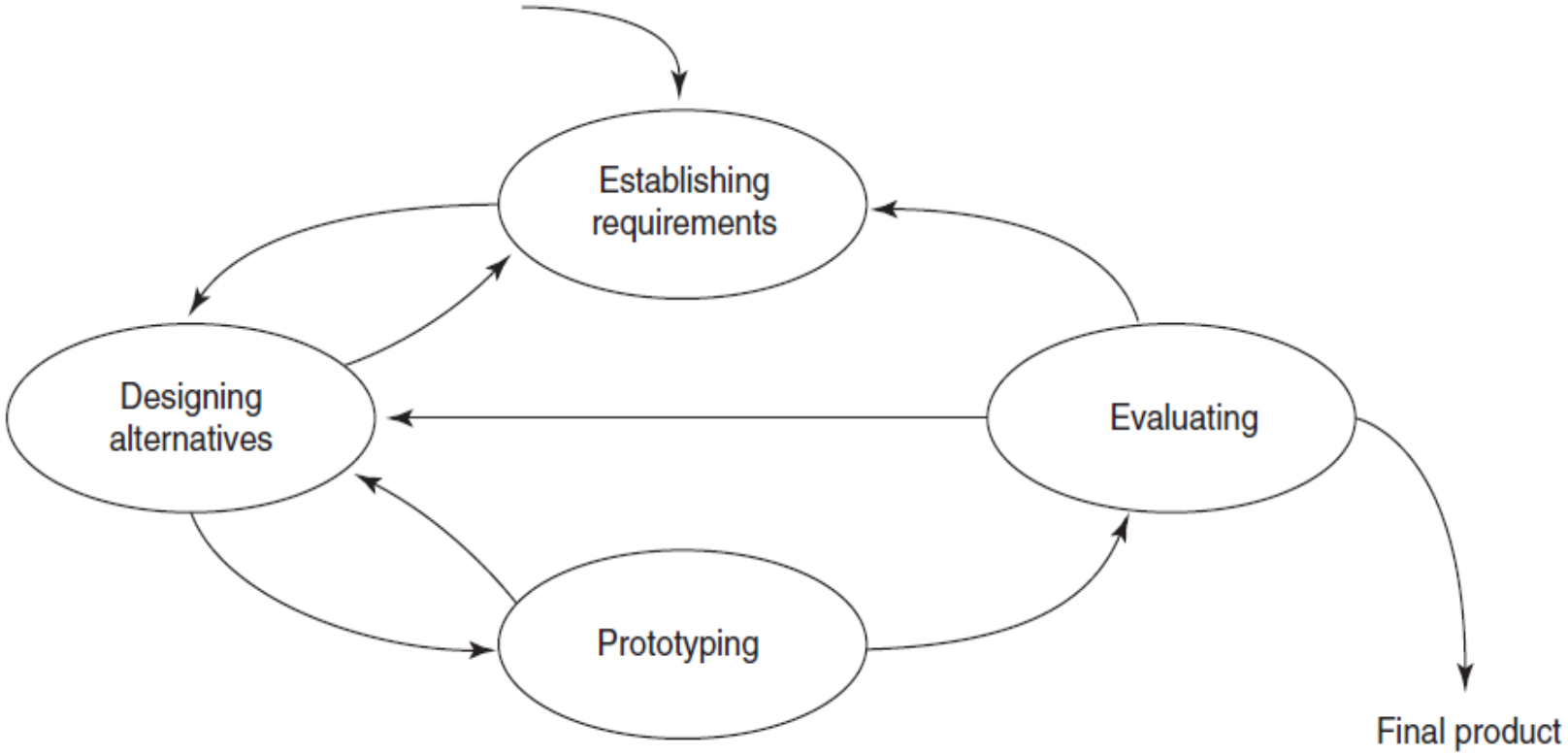
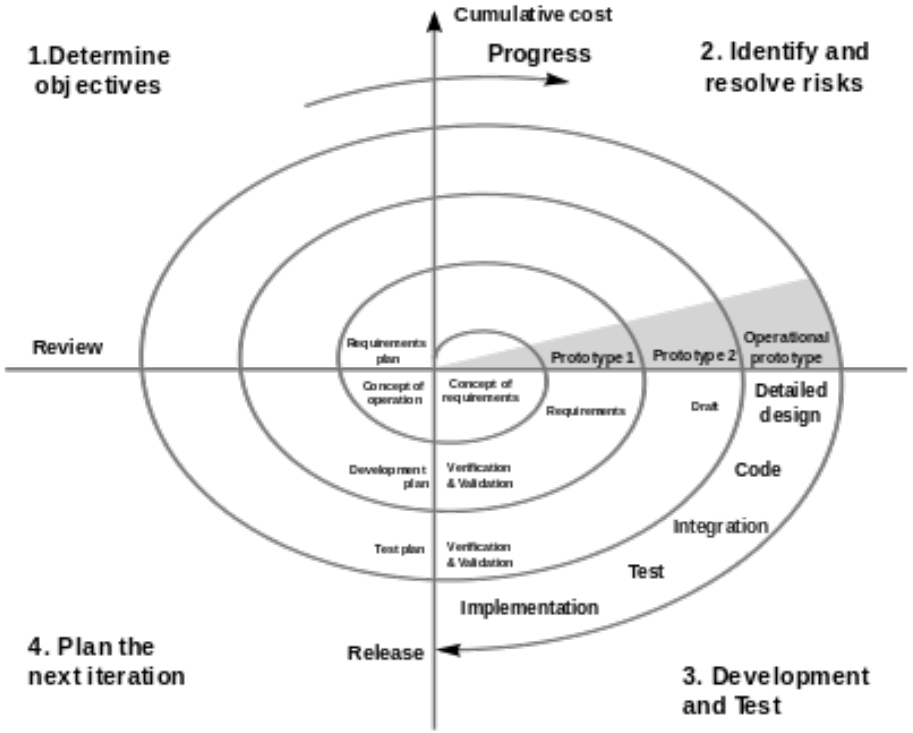
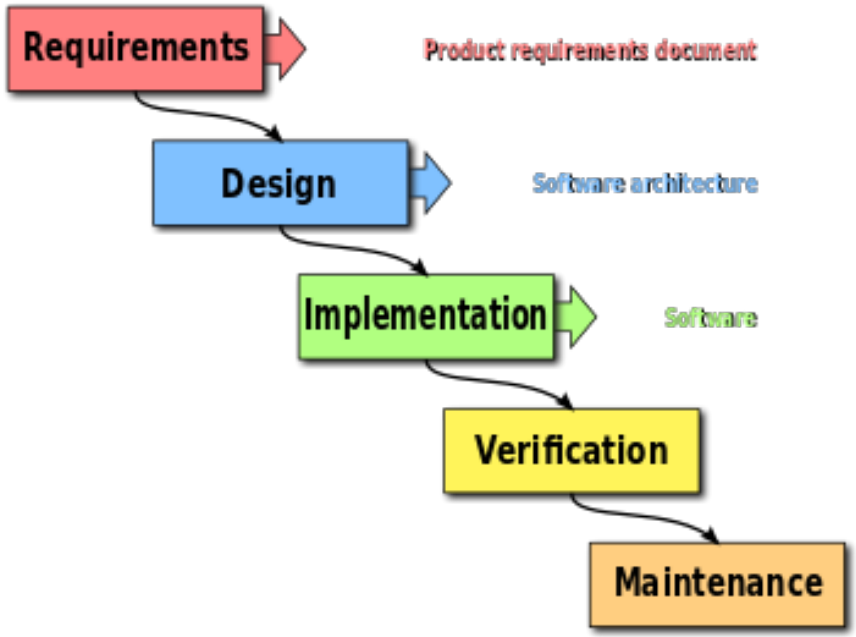


Figure 9.3 A simple interaction design lifecyle model

Other models



Spiral



Waterfall

https://en.wikipedia.org/wiki/Software_development_process

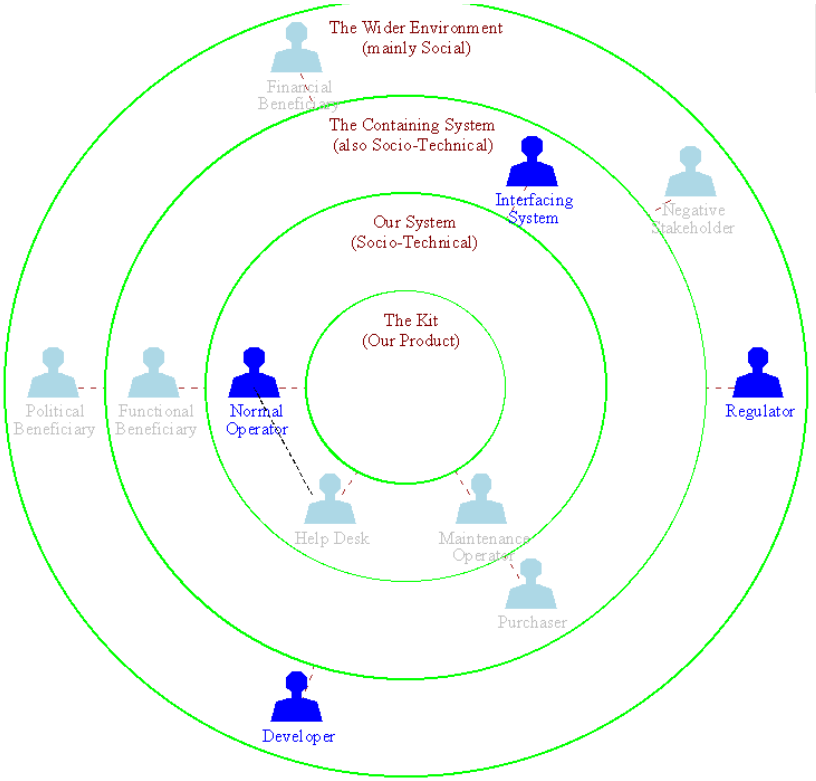
Some practical issues

- Who are the users?
- What do we mean by 'needs'?
- How to generate alternatives
- How to choose among alternatives
- How to integrate interaction design activities with other models?

Who are the users/stakeholders?

- Not always obvious:
  - interact directly with the product
  - manage direct users
  - receive output from the product
  - make the purchasing decision
  - use competitor's products

- Three categories of user (Eason, 1987):
  - primary: frequent hands-on
  - secondary: occasional or via someone else
  - tertiary: affected by its introduction, or will influence its purchase



Onion Diagram

Who are the users/stakeholders?

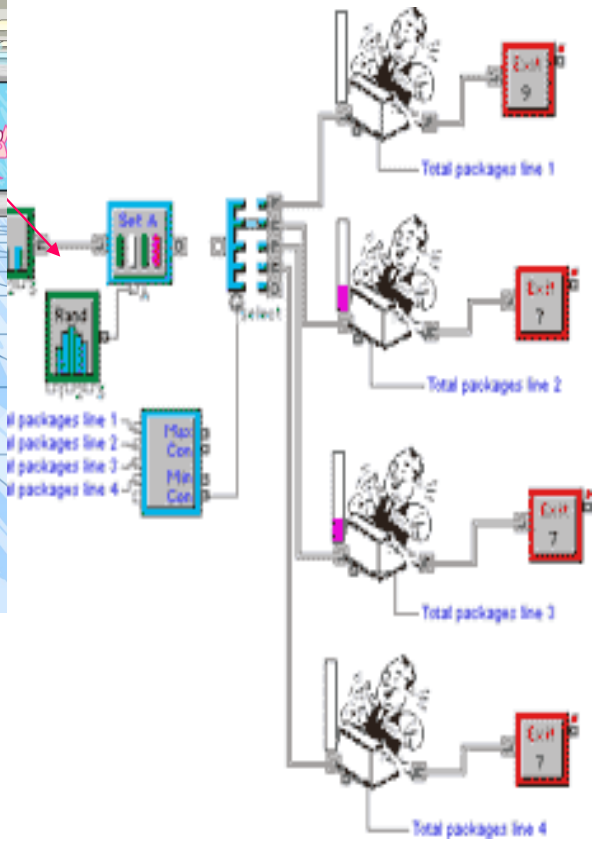
- Suppliers
- Transport & Delivery
- Local shop owners

Managers and owners

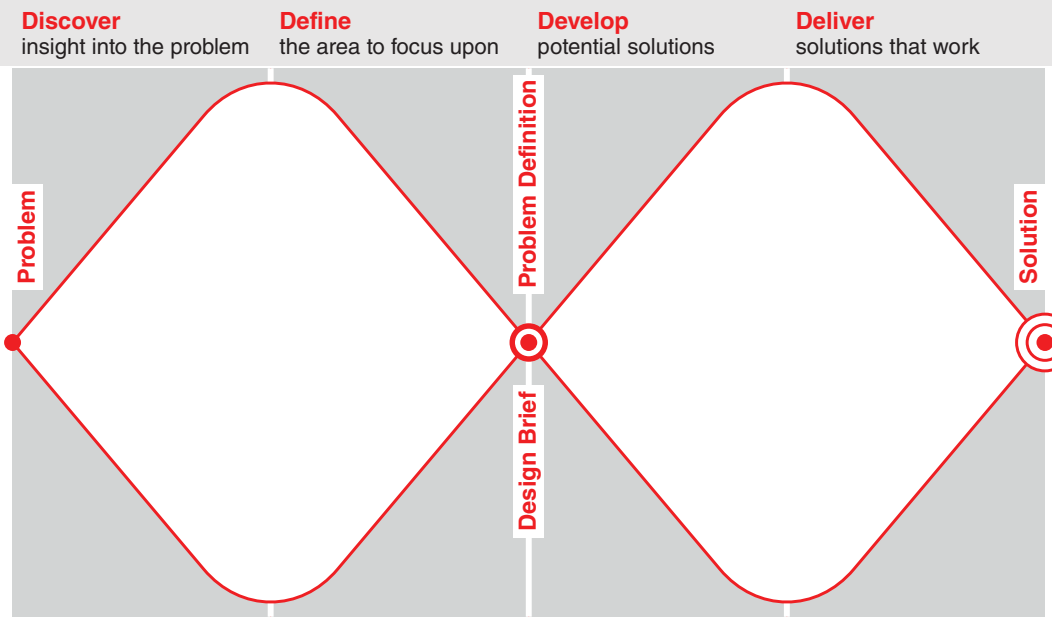
Sales People, House Keeping, Security

Customers

Check-out operators



And many more.....



What are the users' needs?

- People rarely know what is possible
  - Sometimes they can't tell you what they 'need' to help them achieve their goals
- Instead:
  - Explore the problem space
  - Investigate who are the users
    - what information do they require?
    - who collaborates to achieve the activity?
    - why is the activity achieved the way it is?
- Investigate user activities to see what can be improved
- Try out ideas with potential users
  - can be based on existing behaviour
  - can be described as future scenarios
- Focus on peoples' goals, usability, and user experience goals, rather than expect stakeholders to articulate requirements

How to generate alternatives

- People stick to what they know works
- Considering alternatives is important to 'break out of the box'
- How do you generate alternatives?
  - Imagination and creativity : research and synthesis
  - Inspiration : similar products or very different products
- Balancing constraints and trade-offs

How to choose among alternatives

- Evaluation with users or with peers, e.g. prototypes
- Technical feasibility: some not possible
- Quality thresholds: check against your usability criteria
  - **safety**: how safe?
  - **utility**: which functions are superfluous?
  - **effectiveness**: activity support
  - **efficiency**: performance assessments
  - **learnability**: time to learn a function acceptable to users?
  - **memorability**: can infrequent users remember how to use it?

How to choose among alternatives

User Testing (v2.0)

- Grid view vs. Creative (Bubble) view
  - Bubble view:
    - Pros:
      - "Looks more interesting than the standard grid format"
      - "Likes the personal touch"
    - Cons:
      - "Hard to direct my attention"
      - "Looks messy"
  - Grid view:
    - Pros:
      - "More familiar with it"
      - "Allows me to categorize"
    - Cons:
      - "Boring"
      - "Not personal"
- Results:
  - There's pros and cons for both views, we can accommodate both by allowing the users to switch between different views

How to integrate design activities within other models

- Integrating design activities in lifecycle models from other disciplines needs careful planning
- Several software engineering lifecycle models can accommodate
- Integrating with agile software development is promising
  - stresses the importance of **iteration**
  - champions early and regular **feedback**
  - handles **emergent** requirements
  - aims to strike a **balance** between flexibility and structure

Summary

- Four basic activities in the design process
  1. Establishing requirements
  2. Designing alternatives
  3. Prototyping
  4. Evaluating

- User-centered design rests on three principles
  1. Early focus on users and activities
  2. Empirical analysis of usability criteria
  3. Iterative design

Assignment 3+Tutorial Session

Activity 2.1 – p. 39 - 40

- *This activity asks you to apply the double diamond of design to produce an innovative interactive product **for your own use**. By focusing on a product for yourself, the activity deliberately de-emphasizes issues concerned with involving other users, and instead it emphasizes the overall process.*

- *Imagine that you want to design **a product that helps you organize a trip.** This might be for a business or vacation trip, to visit relatives halfway around the world, or for a bike ride on the weekend—whatever kind of trip you like. In addition to planning the route or booking tickets, the product may help to check visa requirements, arrange guided tours, investigate the facilities at a location, and so on.*

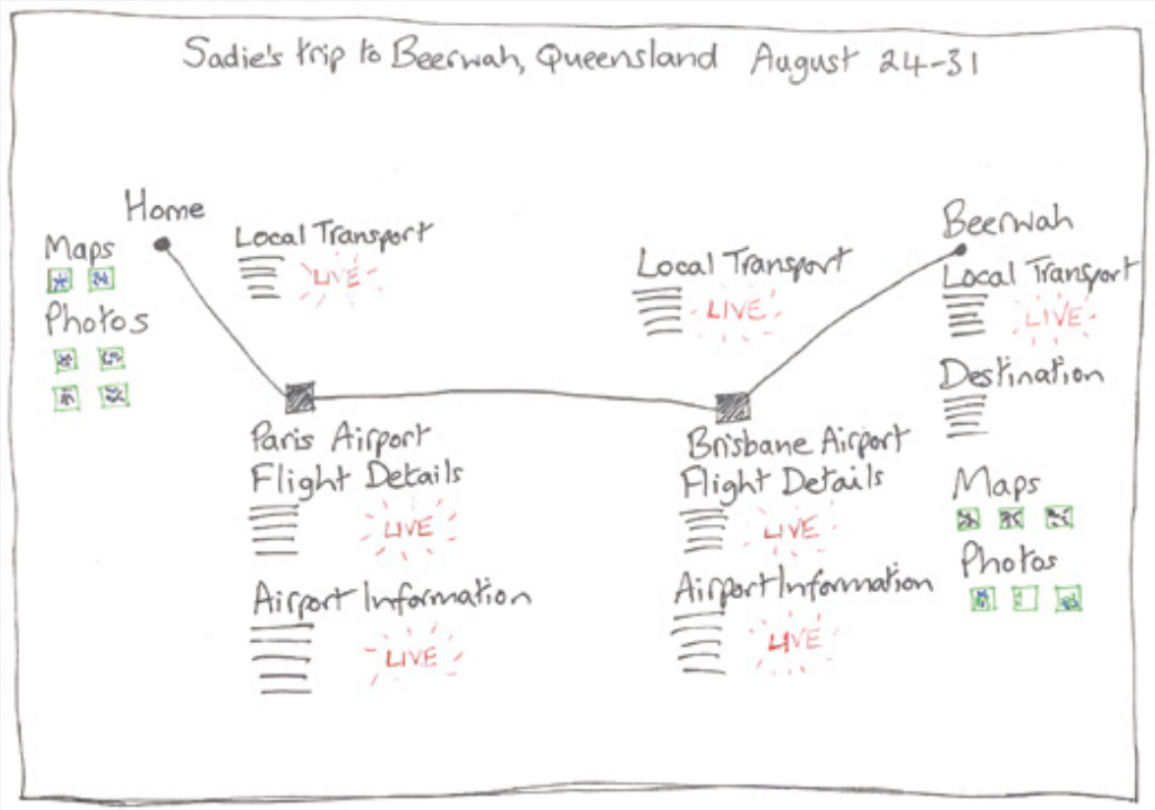
- *1. Using **the first three phases of the double diamond of design**, produce an initial design using a sketch or two**, showing its main functionality** and its **general look and feel.** This activity omits the fourth phase, as you are not expected to deliver a working solution.*

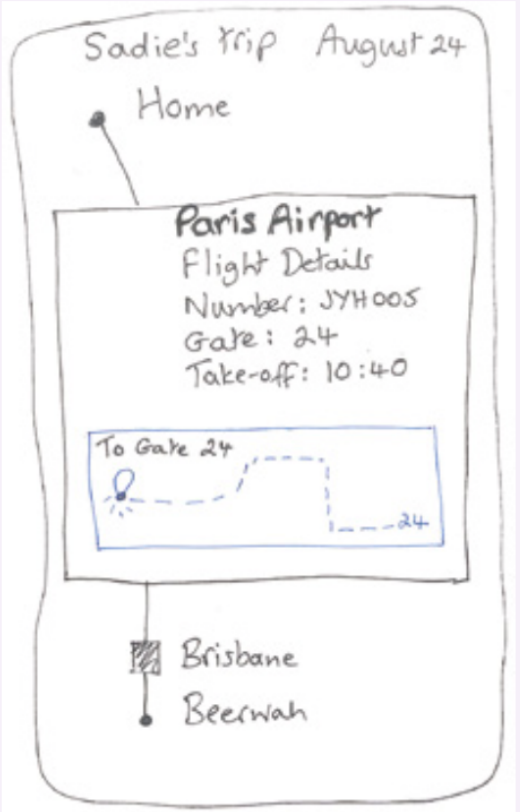
- *2. Now **reflect** on how your activities fell into these phases. What did you do first? What was your instinct to do first? Did you have any particular artifacts or experiences upon which to base your design?*

Assignment 3+Tutorial Session

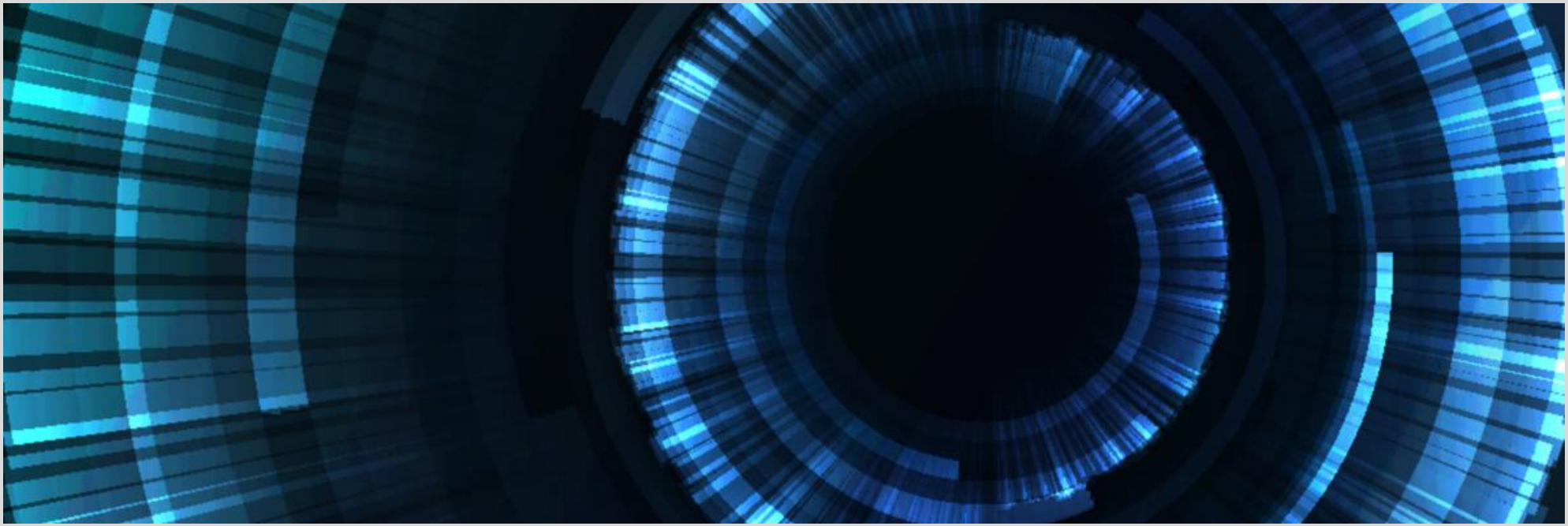
Activity 2.1 – p. 39 - 40

Sketch two alternatives to your idea





Human Computer Interaction



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HUMAN CENTERED DESIGN