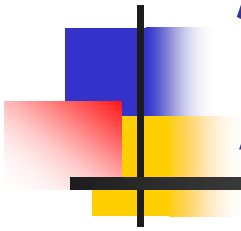
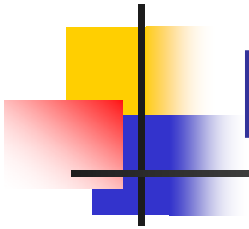


SOEN 6751: Human Computer Interface Design

The Process of Interaction Design

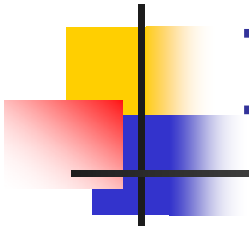
Based on Chapter 2 of the textbook

What is involved in the process of interaction design



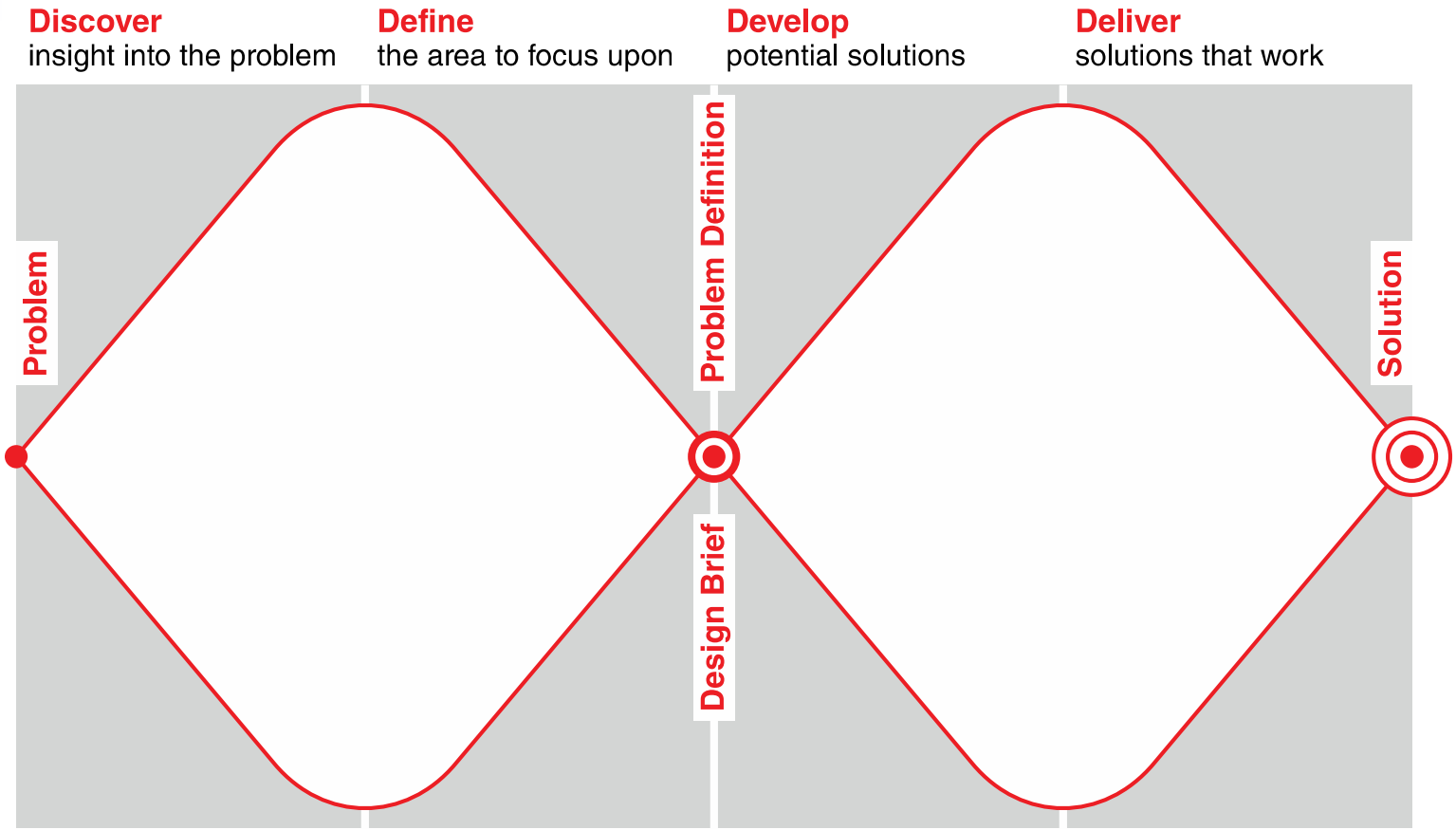
- Identifying needs and establishing requirements for the user experience
- Developing alternative designs to meet these requirements
- Building interactive prototypes that can be communicated and assessed
- Evaluating what is being built throughout the process and the user experience it offers

What is involved in Interaction Design?



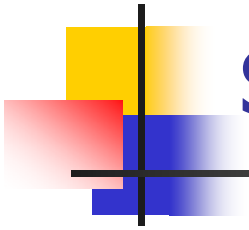
- It is a process:
  - Focused on discovering requirements, designing to fulfil requirements, producing prototypes and evaluating them
  - Focused on users and their goals
  - Involves trade-offs to balance conflicting requirements
- Generating alternatives and choosing between them is key
- Four approaches: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

The double diamond of design

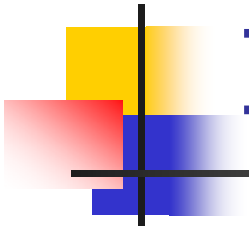


Source: Adapted from The Design Process: What is the Double Diamond?

Understanding the problem space

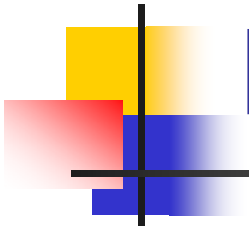


- Explore
  - What is the current user experience?
  - Why is a change needed?
  - How will this change improve the situation?
- Articulating the problem space
  - Team effort
  - Explore different perspectives
  - Avoid incorrect assumptions and unsupported claims



Importance of involving users

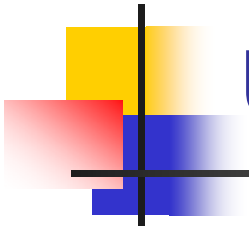
- Expectation management
  - Realistic expectations
  - No surprises, no disappointments
  - Timely training
  - Communication, but no hype
- Ownership
  - Make the users active stakeholders
  - More likely to forgive or accept problems
  - Can make a big difference to acceptance and success of product



Degrees of user involvement

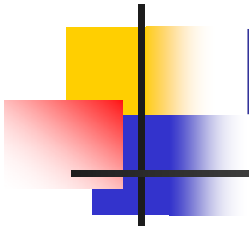
- Member of the design team
  - Full time: constant input, but lose touch with users
  - Part time: patchy input, and very stressful
  - Short term: inconsistent across project life
  - Long term: consistent, but lose touch with users
- Newsletters and other dissemination devices
  - Reach wider selection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

What is a user-centered approach?



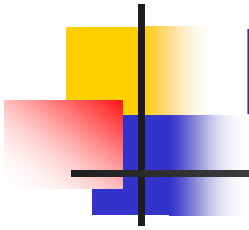
User-centered approach is based on:

- Early focus on users and tasks: directly studying cognitive, behavioral, anthropomorphic & attitudinal characteristics
- Empirical measurement: users' reactions and performance to scenarios, manuals, simulations & prototypes are observed, recorded and analysed
- Iterative design: when problems are found in user testing, fix them and carry out more tests



Four basic activities

- There are four basic activities in Interaction Design:
  1. Identifying needs and establishing requirements
  2. Developing alternative designs
  3. Building interactive versions of the designs (Prototyping)
  4. Evaluating designs

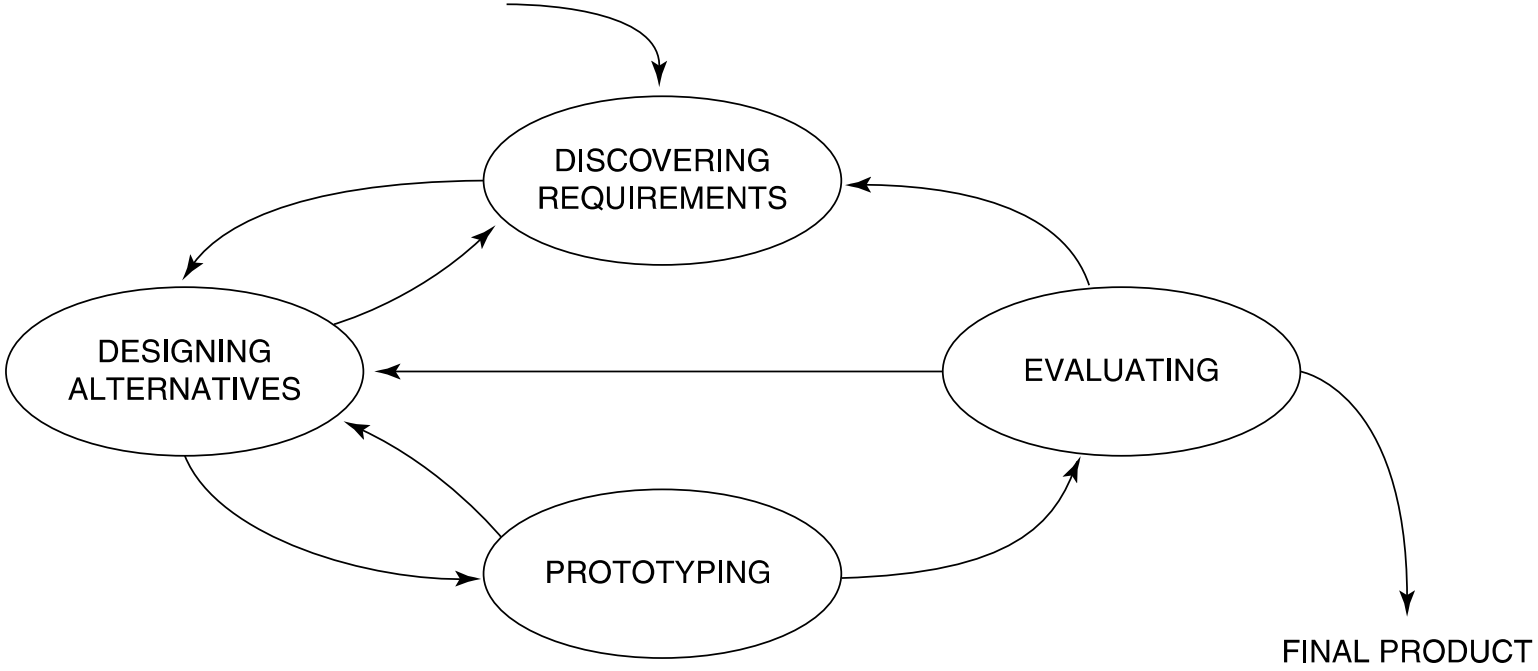


Lifecycle models

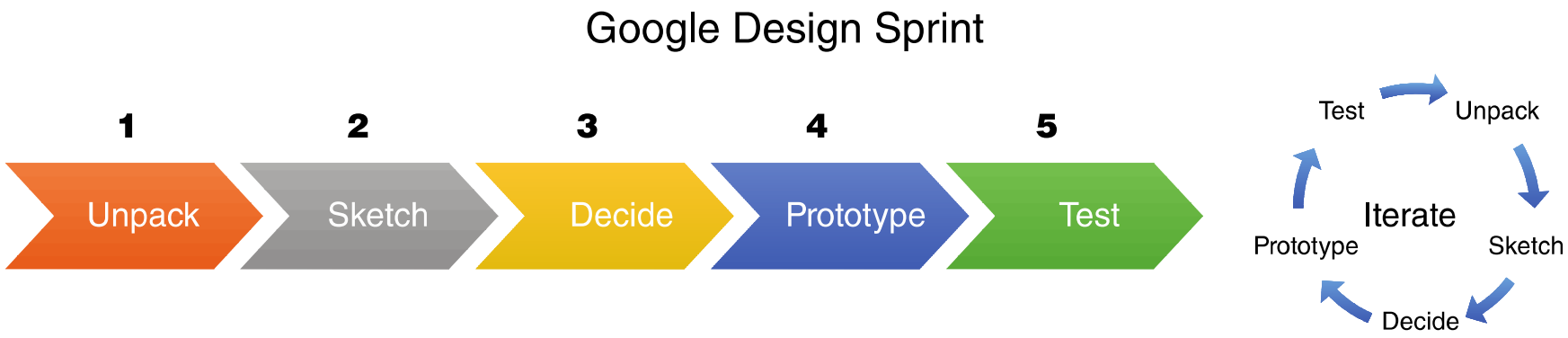
- Show how activities are related to each other
- Lifecycle models are:
  - management tools
  - simplified versions of reality
- Many lifecycle models exist, for example:
  - from software engineering: waterfall, spiral, JAD/RAD, Microsoft, agile
  - from HCI: Star, usability engineering

A simple interaction design lifecycle model

Exemplifies a user-centered design approach

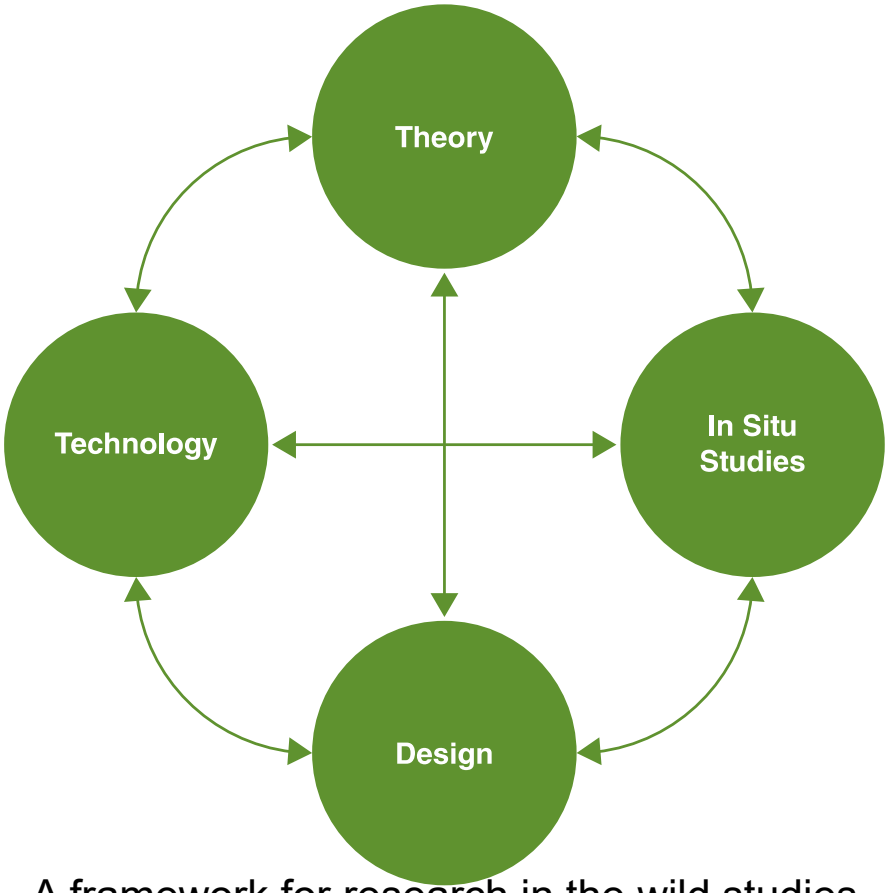


Another lifecycle model: Google Design Sprints (Knapp et al., 2016)



Source: *Google Design Sprints* (used courtesy of Agile Marketing)

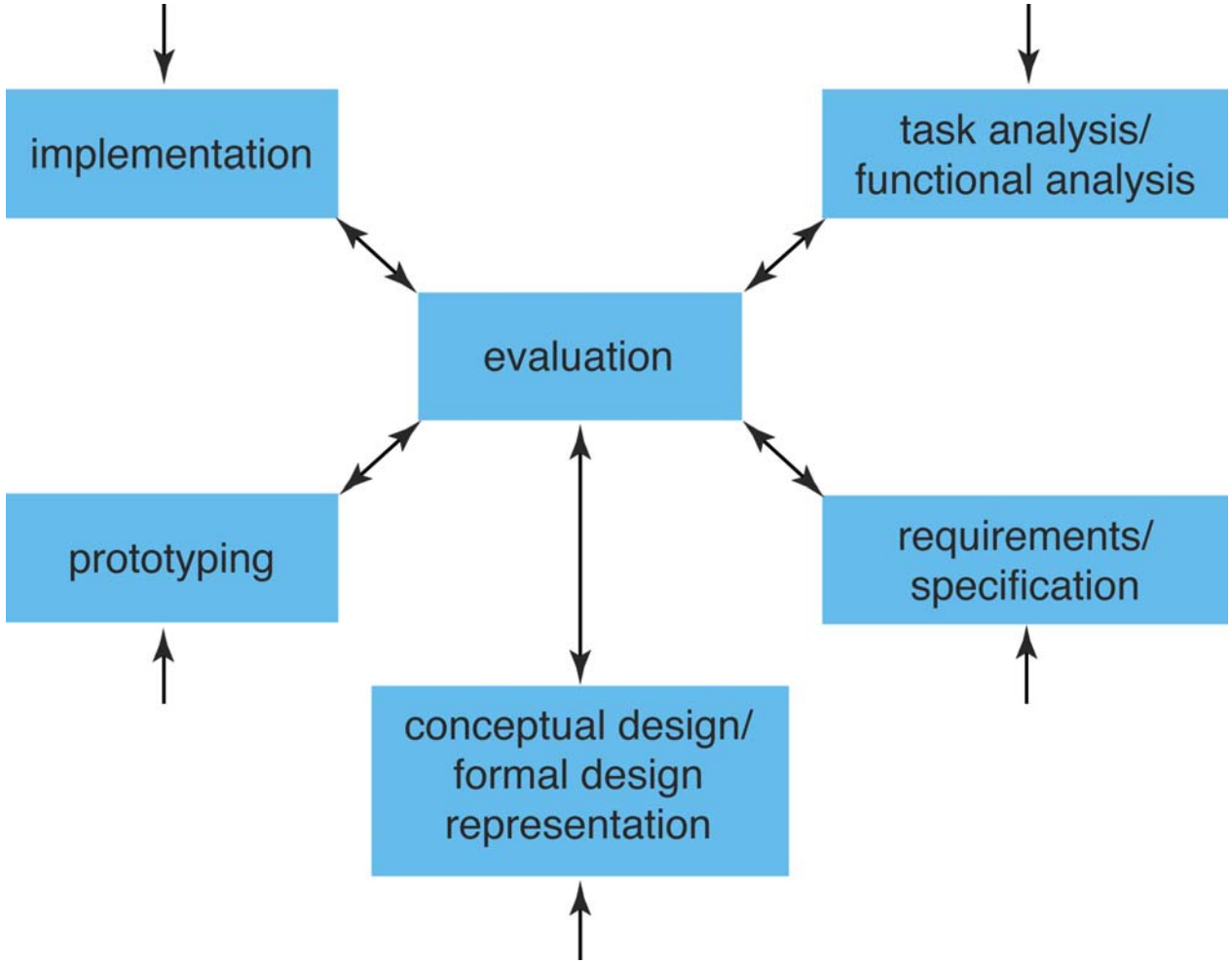
Another lifecycle model: Research in the Wild (Rogers and Marshall, 2

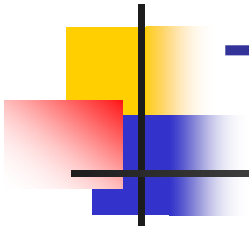


A framework for research in the wild studies

Source: Rogers and Marshall, 2017, p6. (used courtesy of Morgan and Claypool)

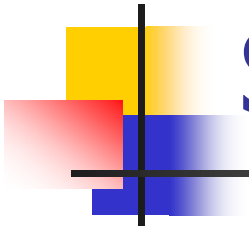
The Star Model (Hartson and Hix, 1989)





The Star lifecycle model

- Suggested by Hartson and Hix (1989)
- Important features:
  - Evaluation at the center of activities
  - No particular ordering of activities; development may start in any one
  - Derived from empirical studies of interface designers



Some practical issues

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

Who are the users/stakeholders?

- Not obvious
  - 382 distinct types of users for smartphone apps (Sha Zhao et al, 2016)
  - Many products are intended for use by large sections of the population, so user is "everybody"
  - More targeted products are associated with specific roles
- Stakeholders
  - Larger than the group of direct users
  - Identifying stakeholders helps identify groups to include in interaction design activities

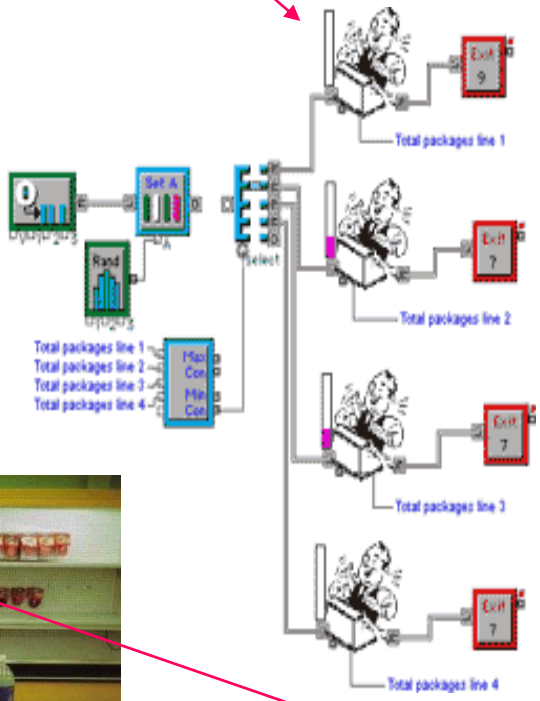
Who are the users/stakeholders?

- Potential users:
  - those who interact directly with the product
  - those who manage direct users
  - those who receive output from the product
  - those who make the purchasing decision
  - those who 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

Who are the stakeholders?

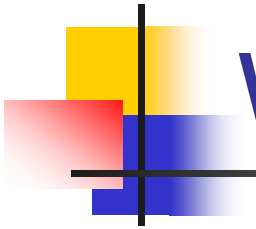
- Suppliers
- Local shop owners

Check-out operators



Managers and owners

Customers



What are the users' 'needs'?

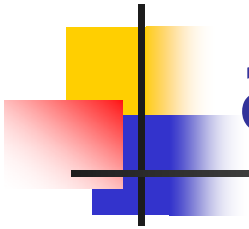
- Users rarely know what is possible
- Instead:
  - Explore the problem space
  - Investigate who are the users
  - Investigate user activities to see what can be improved
  - Try out ideas with potential users
- Focus on peoples' goals, usability, and user experience goals, rather than expect stakeholders to articulate requirements

What are the users' capabilities?

Humans vary in many dimensions:

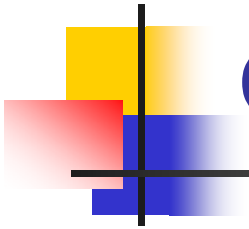
- size of hands may affect the size and positioning of input buttons
- motor abilities may affect the suitability of certain input and output devices
- height if designing a physical kiosk
- strength - a child's toy requires little strength to operate, but greater strength to change batteries
- Disabilities (e.g. sight, hearing, dexterity)

Where do alternatives come from?



- Humans stick to what they know works
- Considering alternatives helps identify better designs
- How do you generate alternatives?
  - 'Flair and creativity': research and synthesis
  - Cross-fertilization of ideas from different perspectives
  - Users can generate different designs
  - Product evolution based on changing use
  - Seek inspiration: look at similar products or look at very different products
- Balancing constraints and trade-offs

How do you choose among alternatives?



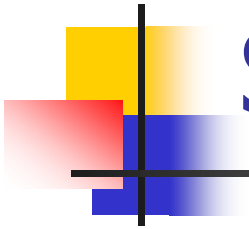
- Interaction design focuses on externally-visible and measurable behavior
- Evaluation with users or with peers, e.g. prototypes
- Technical feasibility: some not possible
- A/B Testing
  - Online method to inform choice between alternatives
  - Nontrivial to set appropriate metrics and choose user group sets

How do you choose among alternatives?

- Quality thresholds: Usability goals lead to usability criteria set early on and check regularly
  - Different stakeholder groups have different quality thresholds
  - Usability and user experience goals lead to relevant criteria
  - safety: how safe?
  - utility: which functions are superfluous?
  - effectiveness: appropriate support? task coverage, information available
  - efficiency: performance measurements

How to integrate interaction design in other models

- Integrating interaction design activities in lifecycle models from other disciplines needs careful planning
- Several software engineering lifecycle models have been considered
- Integrating with agile software development is promising
  - incorporates tight iterations
  - 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. Identify needs and establish requirements
  2. Design potential solutions ((re)-design)
  3. Choose between alternatives (evaluate)
  4. Build the artefact
- User-centered design rests on three principles
  1. Early focus on users and tasks
  2. Empirical measurement using quantifiable & measurable usability criteria
  3. Iterative design
- Lifecycle models show how these are related