


# The Interaction Design Process

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CS 130 Fall 2016



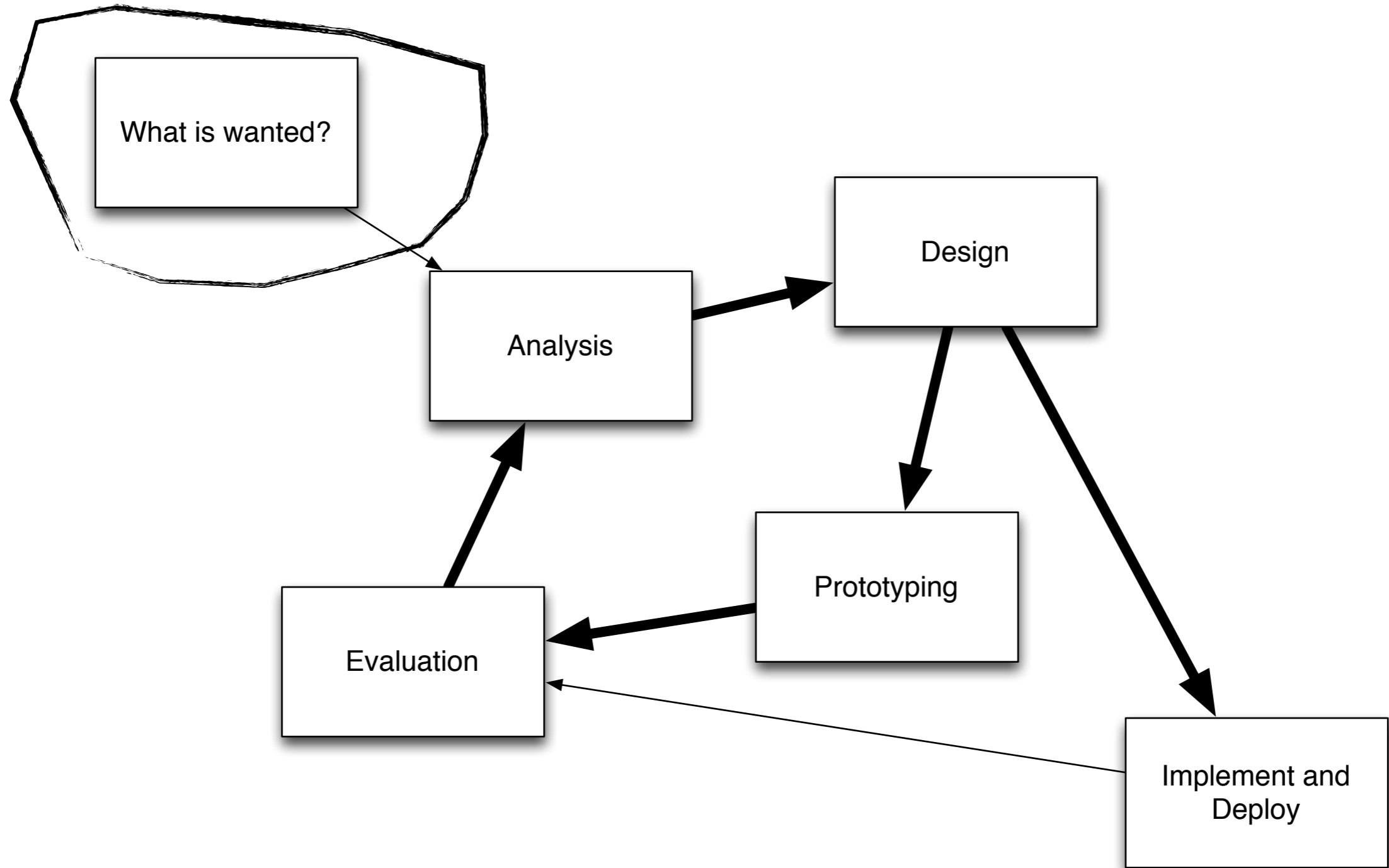
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# What is Interaction Design?

- 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



# Design Process



# What is interaction design?

# Bad Designs



# Bad Designs

- Show video



# Bad Designs



# 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

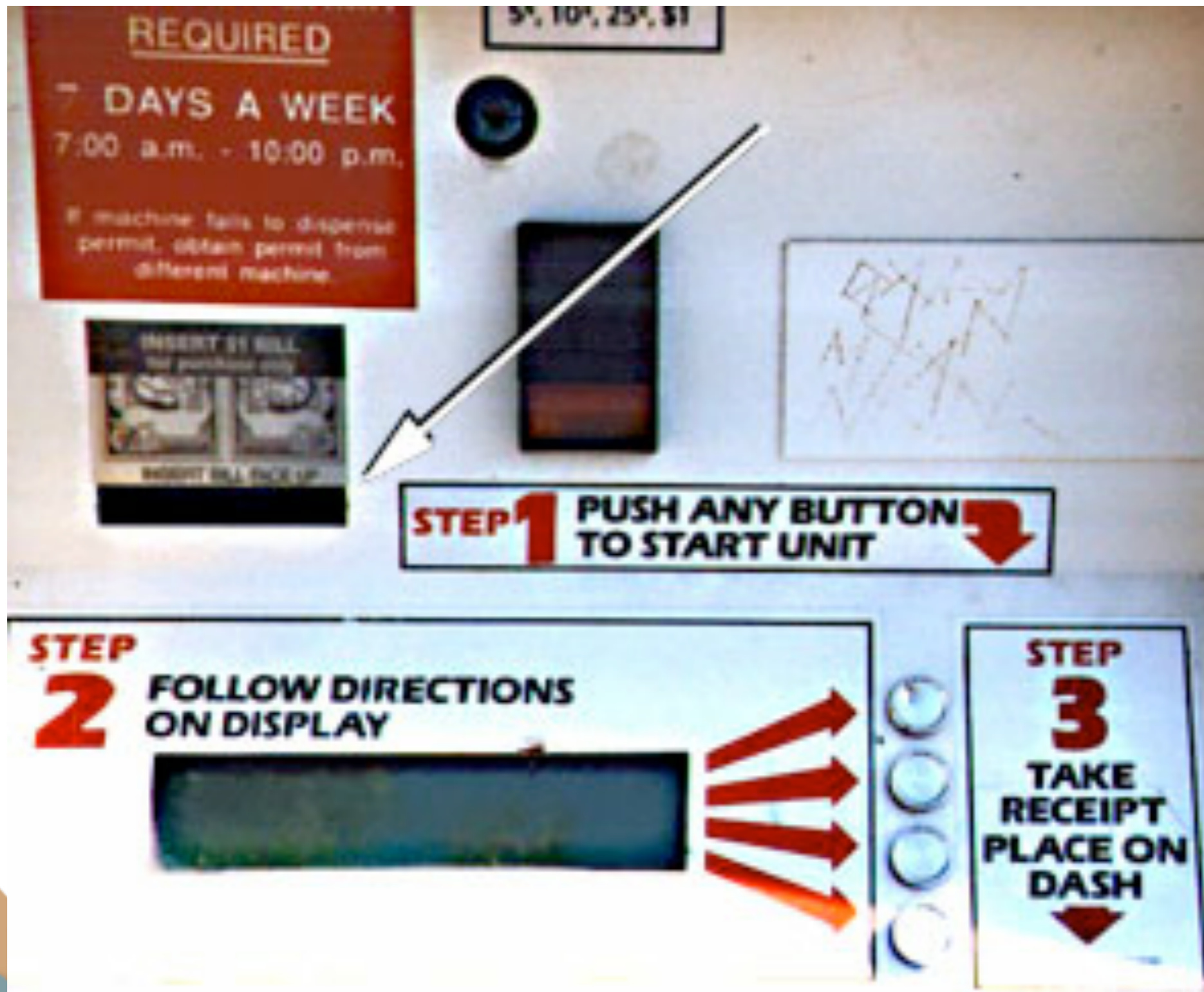


- People do not make same mistake for the labels and buttons on the top row. Why not?



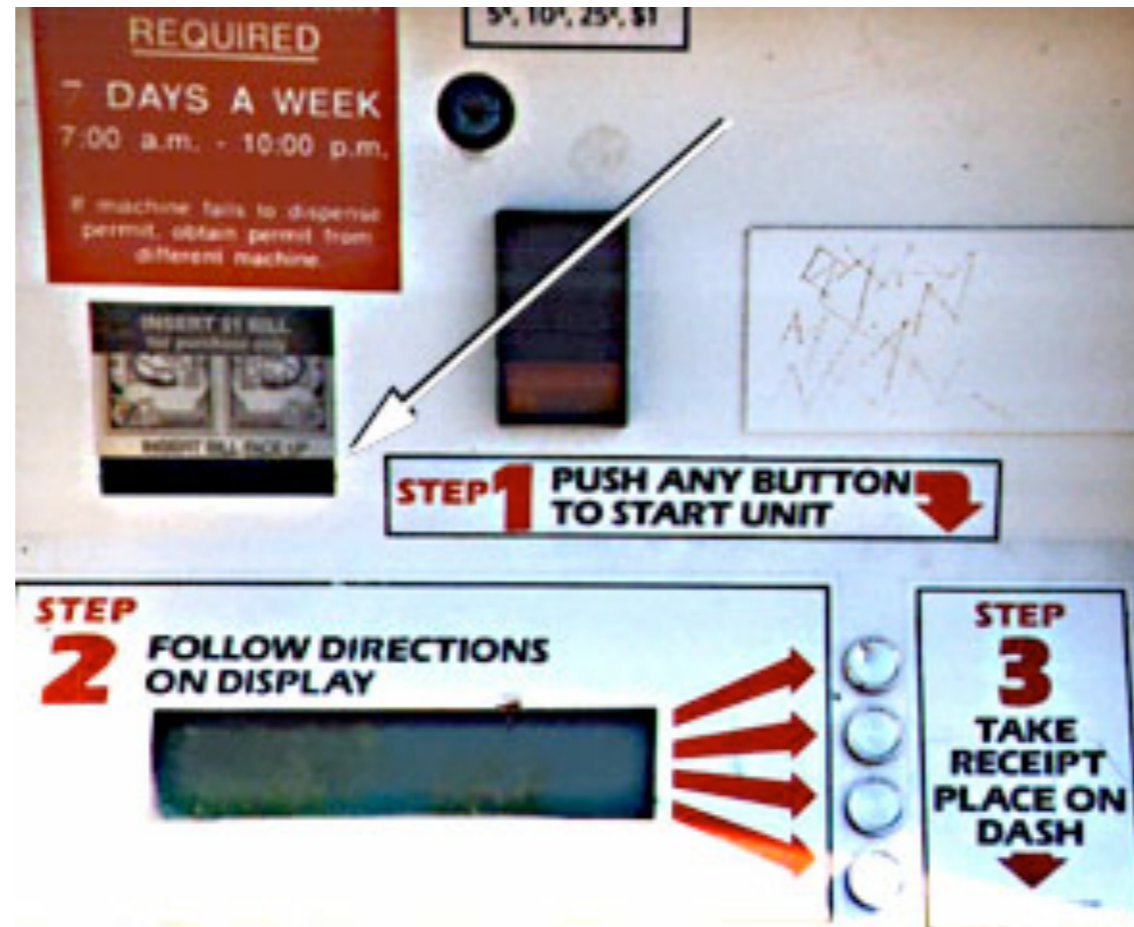
# Bad Designs

- Why is this vending machine so bad?



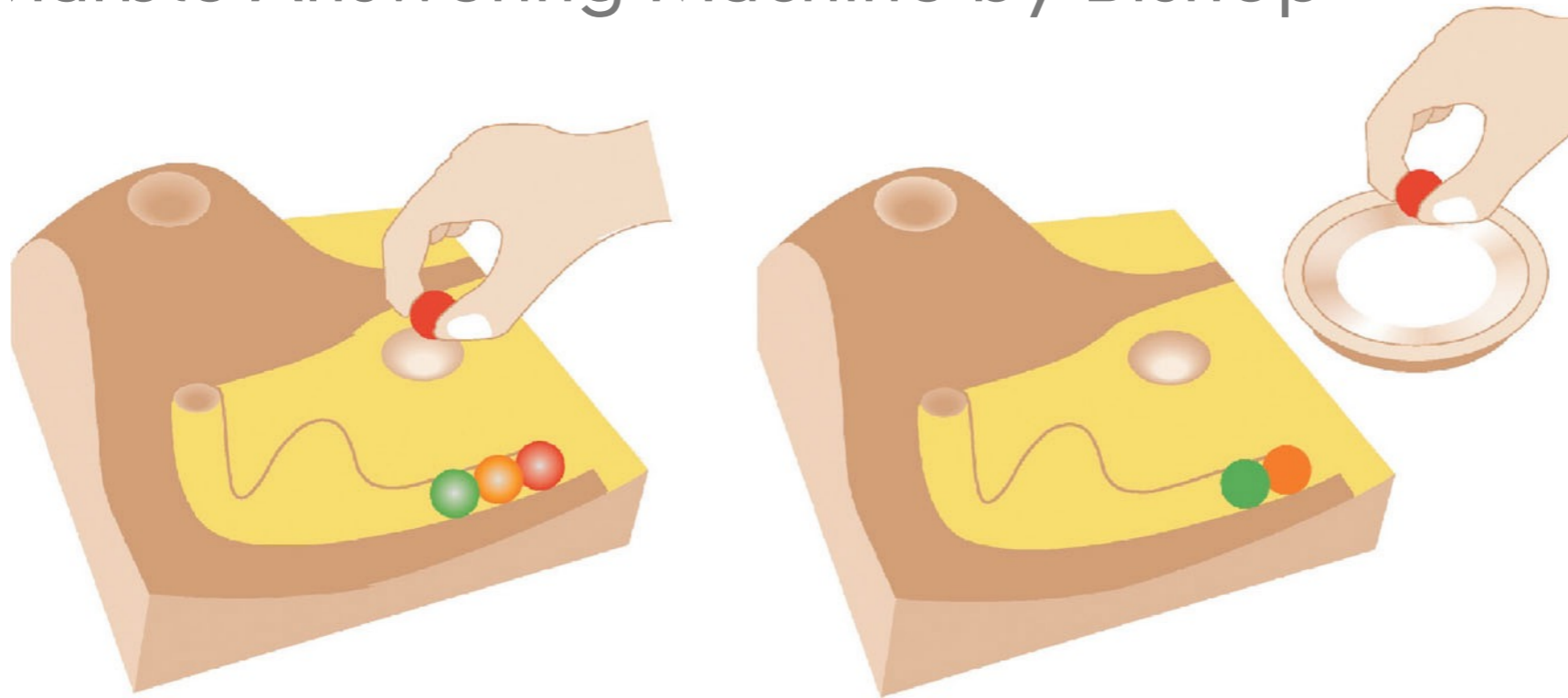
# Bad Designs

- 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

- Marble Answering Machine by Bishop



- Based on how everyday objects behave
- Easy, intuitive and a pleasure to use
- Only requires one-step actions to perform core tasks

# Good and Bad Designs

- Which remote is better designed?



# Good and Bad Designs

- Peanut shaped to fit in hand
- Logical layout and color-coded, distinctive buttons
- Easy to locate buttons



# 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



# Interaction design is about designing interventions

- Designing something in a vacuum vs.
- Designing a new “intervention”
  - Ix needs a goal
  - Ix acknowledge that lots of stuff is already going on
  - Ix designers need to understand it deeply
    - so that the new intervention will be successful



# Novel Interface





# Novel Interface



<http://freshome.com/2011/05/30/wake-up-or-start-your-day-sobbing-the-money-shredding-alarm-clock/>

# Understanding users' needs

- Need to take into account what people are good and bad at
- Consider what might help people in the way they currently do things
- Think through what might provide quality user experiences
- Listen to what people want and get them involved
- 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)



# Goals of interaction design

- Develop usable products
  - Usability means easy to learn, effective to use and provide an enjoyable experience
- Involve users in the design process

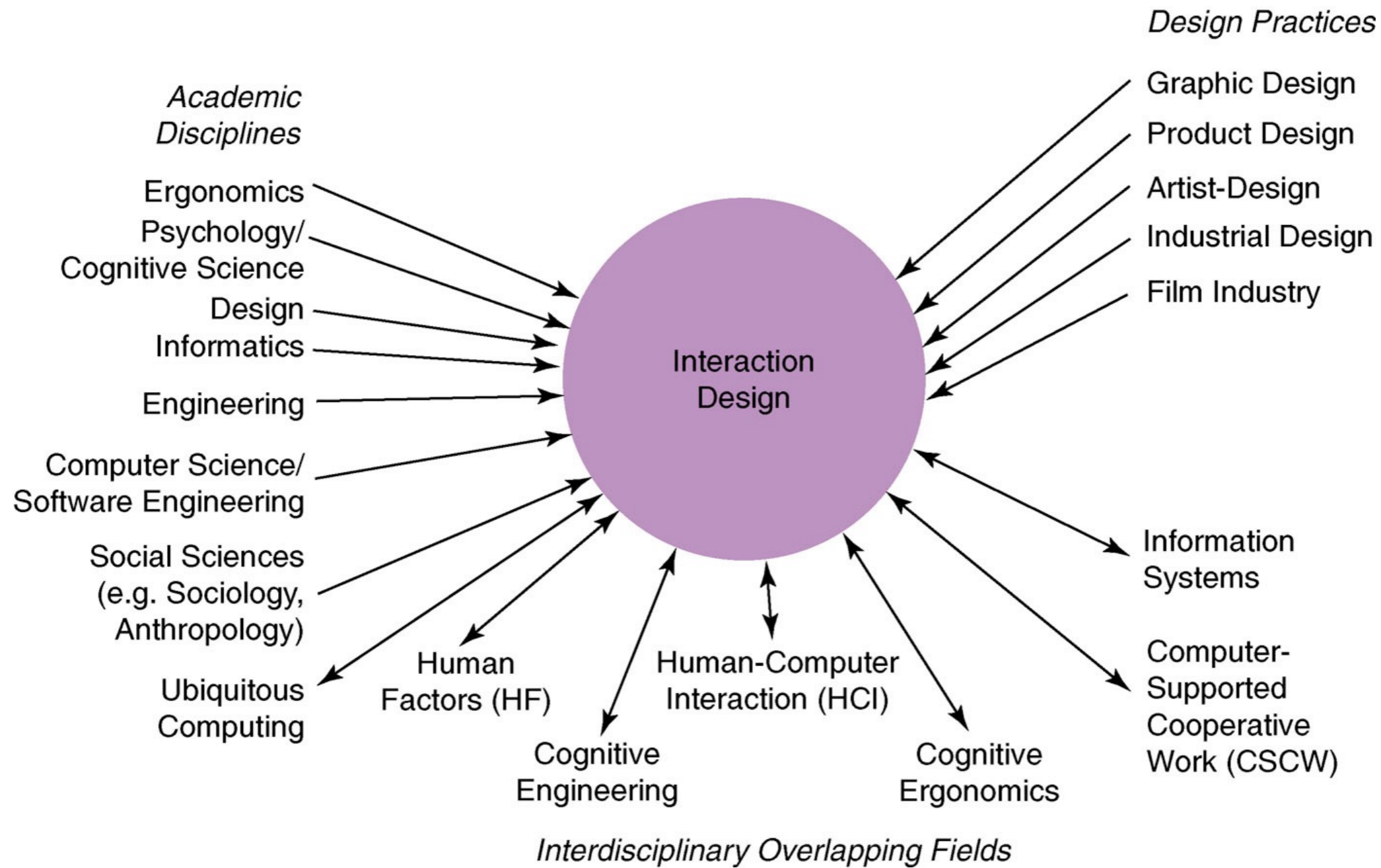


# What kind of design?

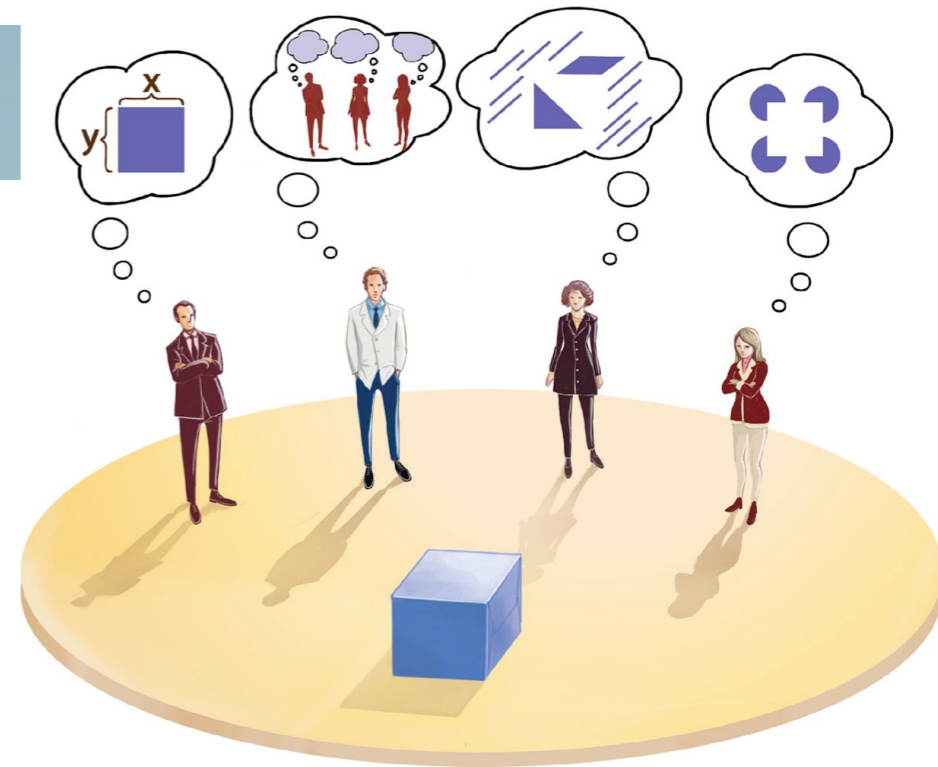
- Number of other terms used emphasizing what is being designed:
  - user interface design, software design, user-centered design, product design, web design, experience design (UX)
- Interaction design is the umbrella term covering all of these aspects
  - fundamental to all disciplines, fields, and approaches concerned with researching and designing computer-based systems for people



# HCI and Interaction Design



# 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 create



# Interaction design in business

- Increasing number of ID consultancies, examples of well known ones include:
  - **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” <http://vimeo.com/33544142>

**NN/g**



**SWIM**

**IDEO**



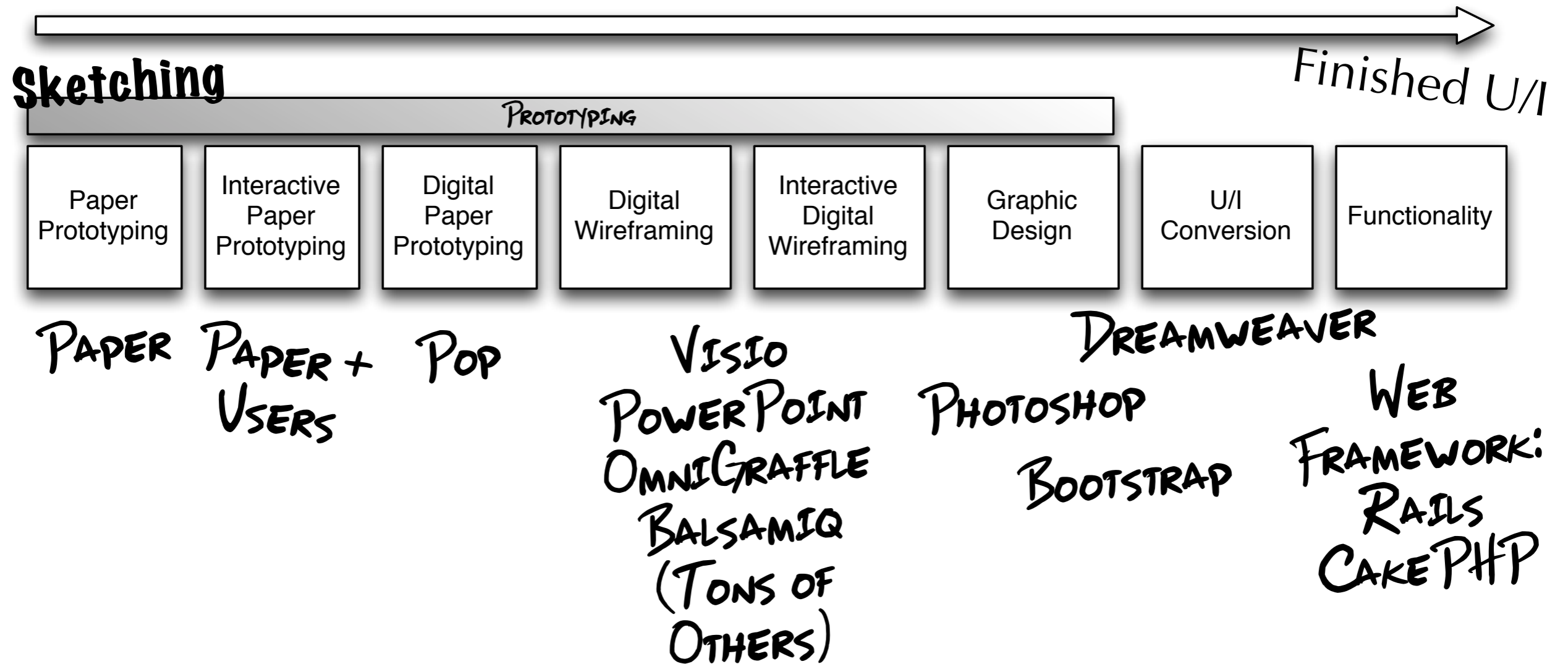


# What do professionals do in the ID business?

- **interaction designers** - people involved in the design of all the interactive aspects of a product
- **usability engineers** - people who focus on evaluating products, using usability methods and principles
- **web designers** - people who develop and create the visual design of websites, such as layouts
- **information architects** - people who come up with ideas of how to plan and structure interactive products
- **user experience designers (UX)** - people who do all the above but who may also carry out field studies to inform the design of products

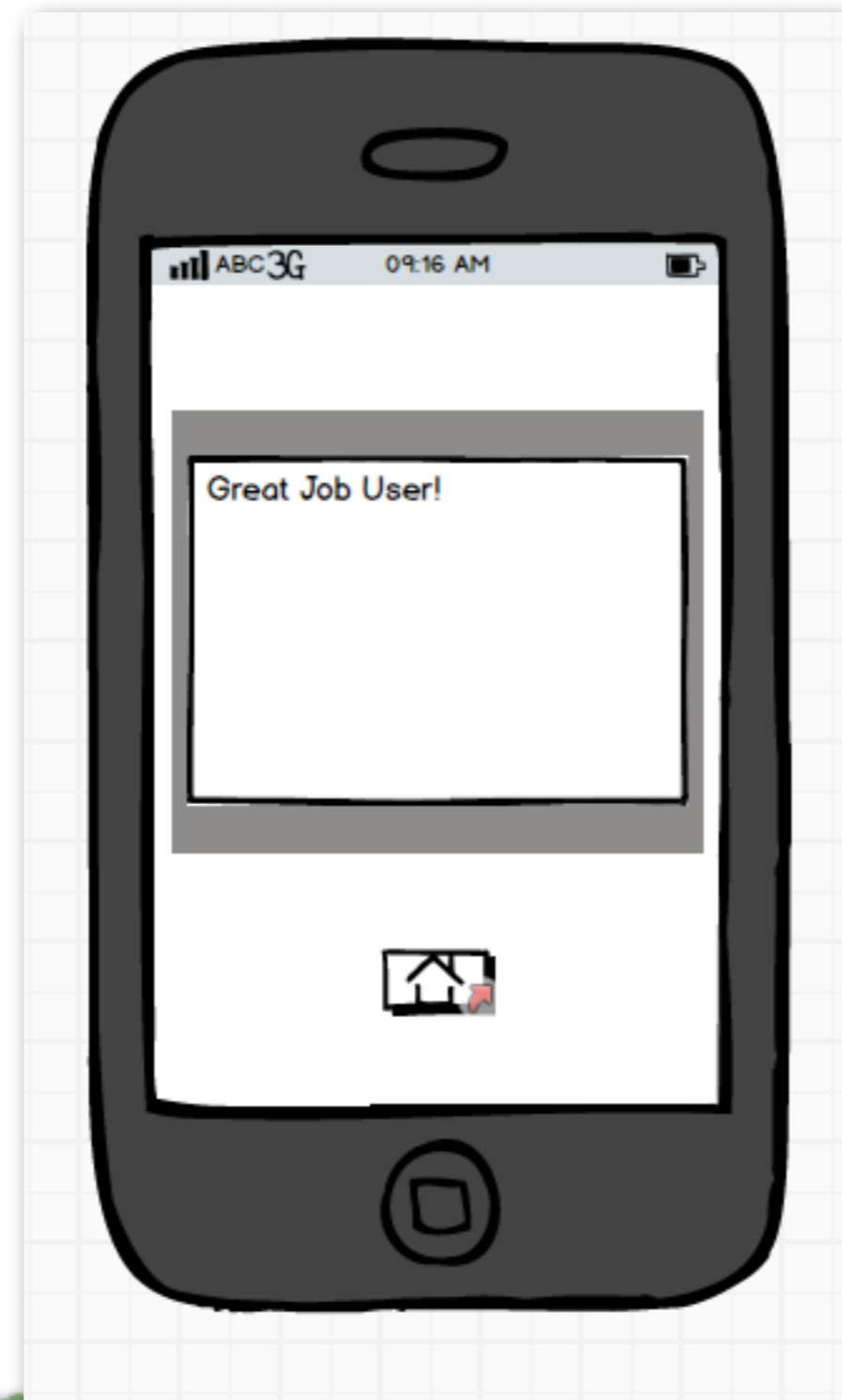


# Prototyping



# Balsamiq

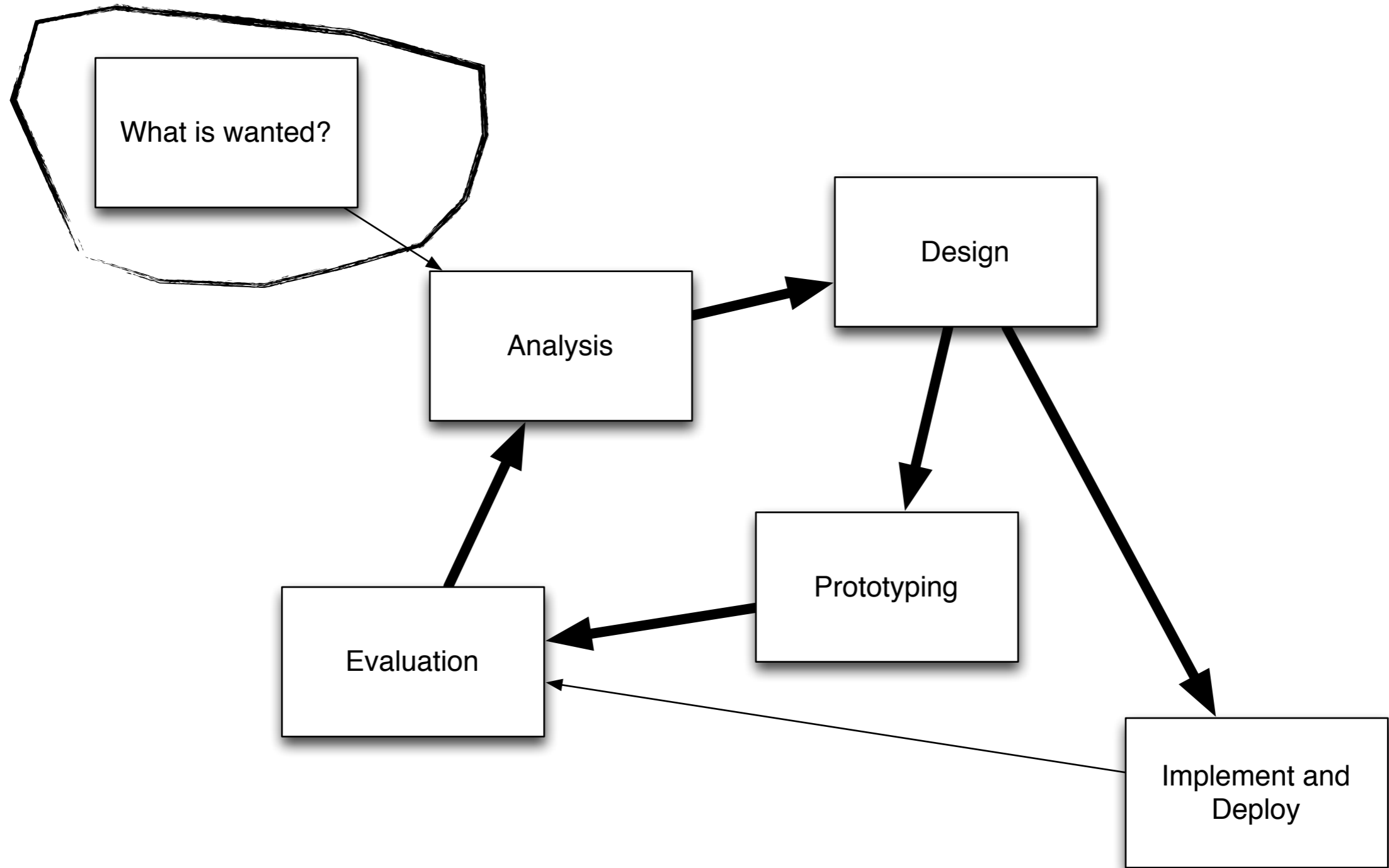




# Interaction design tools



# Design Process



# Interaction Design - Getting what is wanted

- Brainstorming
- Contextual Inquiry



# Goals of Brainstorming

- Generating alternatives is a key principle in most design disciplines
- This should be encouraged in interaction design
- “The best way to get a good idea, is to get lots of ideas” - Linus Pauling





# Brainstorming

- Brainstorming is used to
  - generate ideas
  - refine ideas
  - develop ideas
- “Brainstorming is used when you're searching for ideas and discovering possibilities that may be found in problems.”
- General goal:
  - Include stake holders in creating:
    - a new future
    - a new innovation
    - a way to solve a problem

# Interaction Design - Getting what is wanted

- Brainstorming
- Contextual Inquiry



# Contextual Inquiry - what is the question and problem?

- Similar to ethnography
  - Studies the user in place
  - Tries to capture the reality of his work culture and practice
- Different from ethnography
  - It is not open-ended
  - The investigator has a specific focus
  - Its goal is to
    - find the right design
    - design the right system



# Contextual Inquiry

- Contextual Inquiry
  - Is like being an apprentice to the user
  - Go to their location
    - See their work place
    - See the objects they use
    - See the artifacts they create
    - Experience their communication patterns
      - verbal
      - non-verbal
    - Gather data



# Contextual Inquiry

- The user is the expert and a partner to the investigator
- However, the investigator is not passive
  - Her goal is to understand what is going on.
    - Asking questions...
    - Questioning motivations...
    - Make sense of the actions is expected
  - She must be ready to challenge her assumptions of understandings of the place, user and task



# Contextual Inquiry

- Step 1
  - Data collection
    - Interviews
    - Photographs
    - Videos
    - Drawings
    - Sample collection



# Contextual Inquiry

- Step 2
  - Data analysis
    - Sequential analysis of actions
    - Physical models of actions
    - Models of communication flow
    - Cultural insights
    - Artifact categorization



# Contextual Inquiry

- Step 3
  - Outcome
    - Representation of the required task sequences, artifacts and communication channels that must be supported.
    - Understanding of physical and cultural constraints



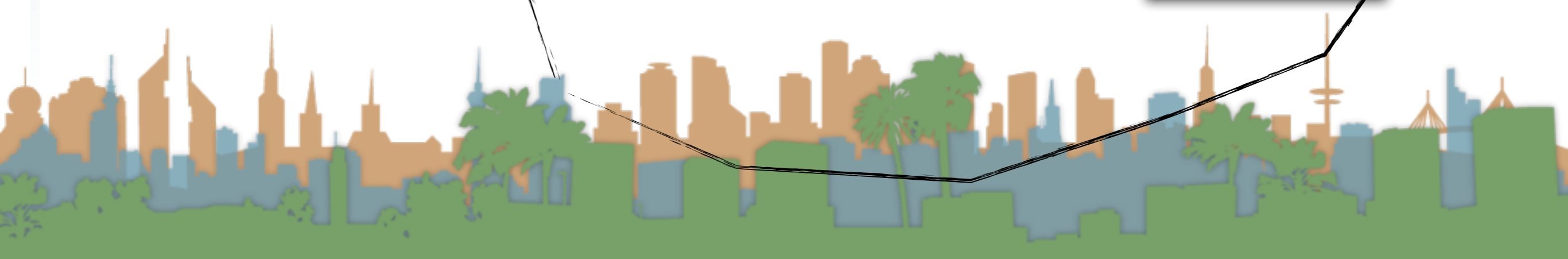
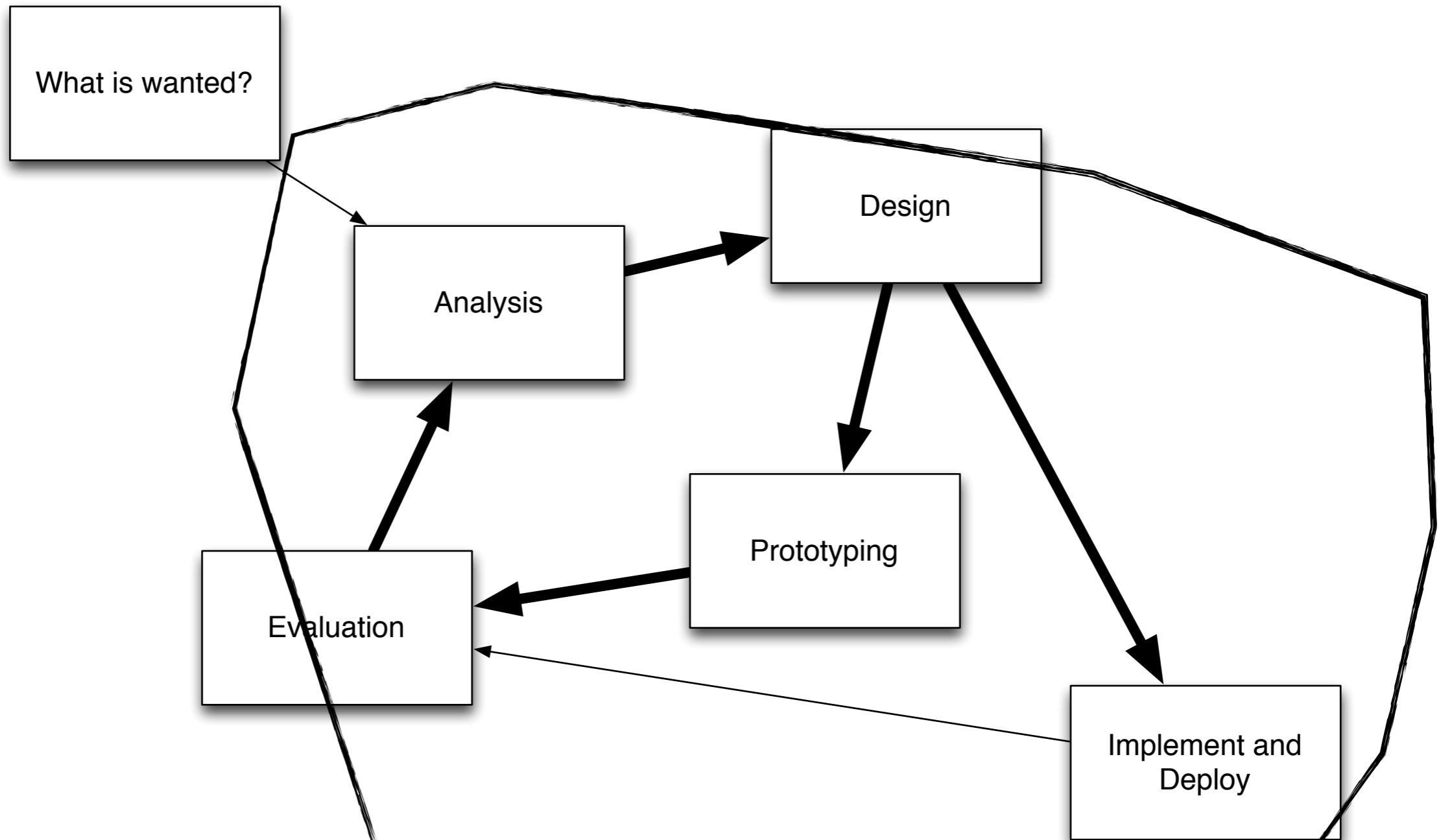


# Contextual Inquiry

- Resources
  - IDEO Method Cards
    - Learn
      - Activity Analysis
      - Competitive Product Survey
    - Look
      - Still-Photo Survey
    - Ask
      - Narration/Think Aloud
    - Try
      - Behavior Sampling
  - <http://www.ideo.com/work/>

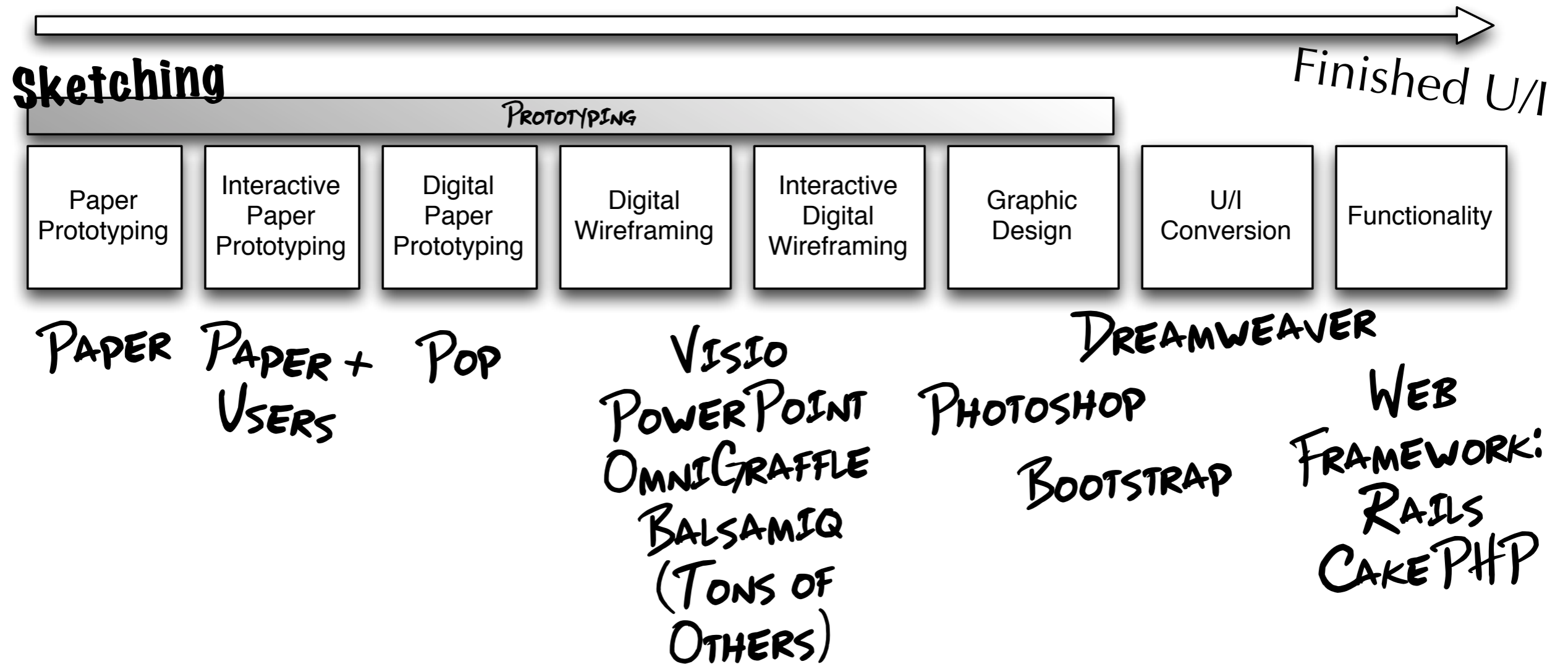


# Design Process



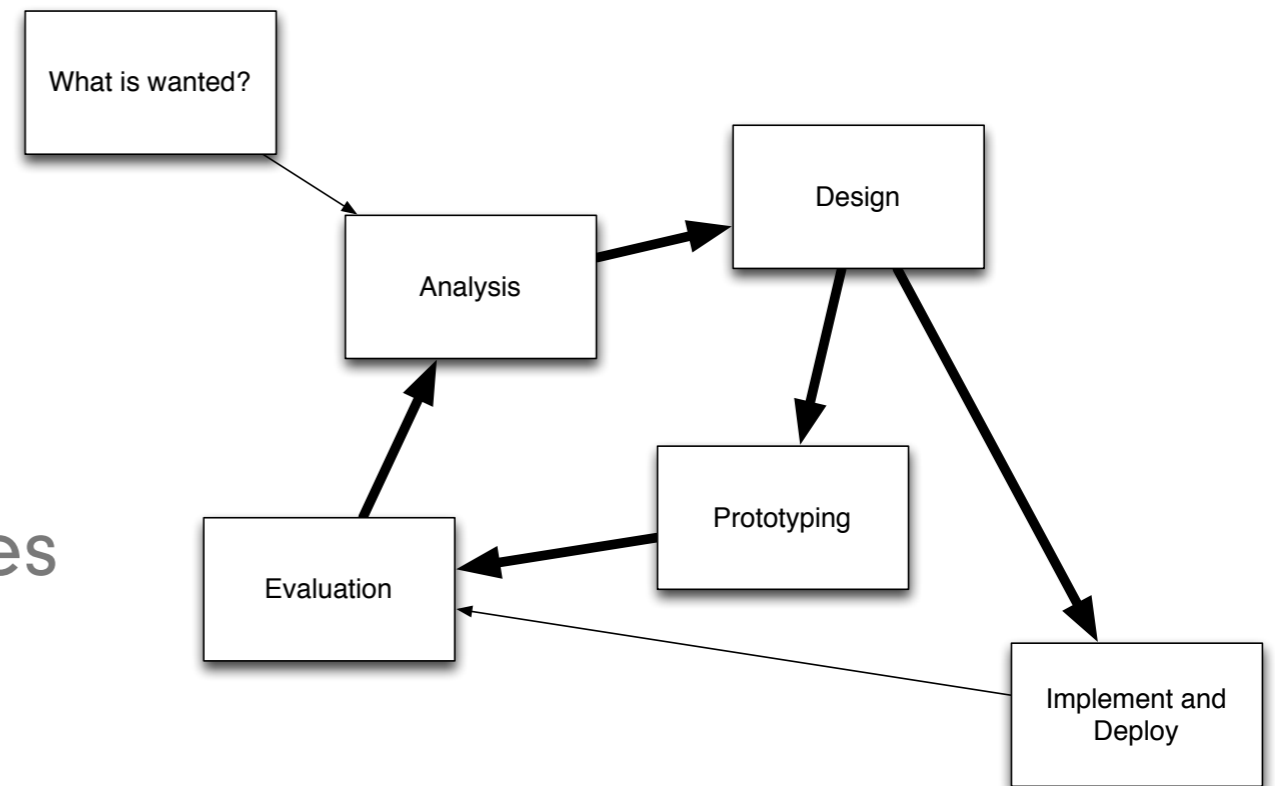


# Prototyping



# Online questionnaires

- Can be used to:
  - Gather requirements
    - “What is wanted”
  - Evaluate prototypes
    - “Evaluate”
  - Understand user experiences
    - “Analysis”



# Advantages of online questionnaires

- Responses are usually received quickly
- No copying and postage costs
- Data can be collected in database for analysis
- Time required for data analysis is reduced
- Errors can be corrected easily

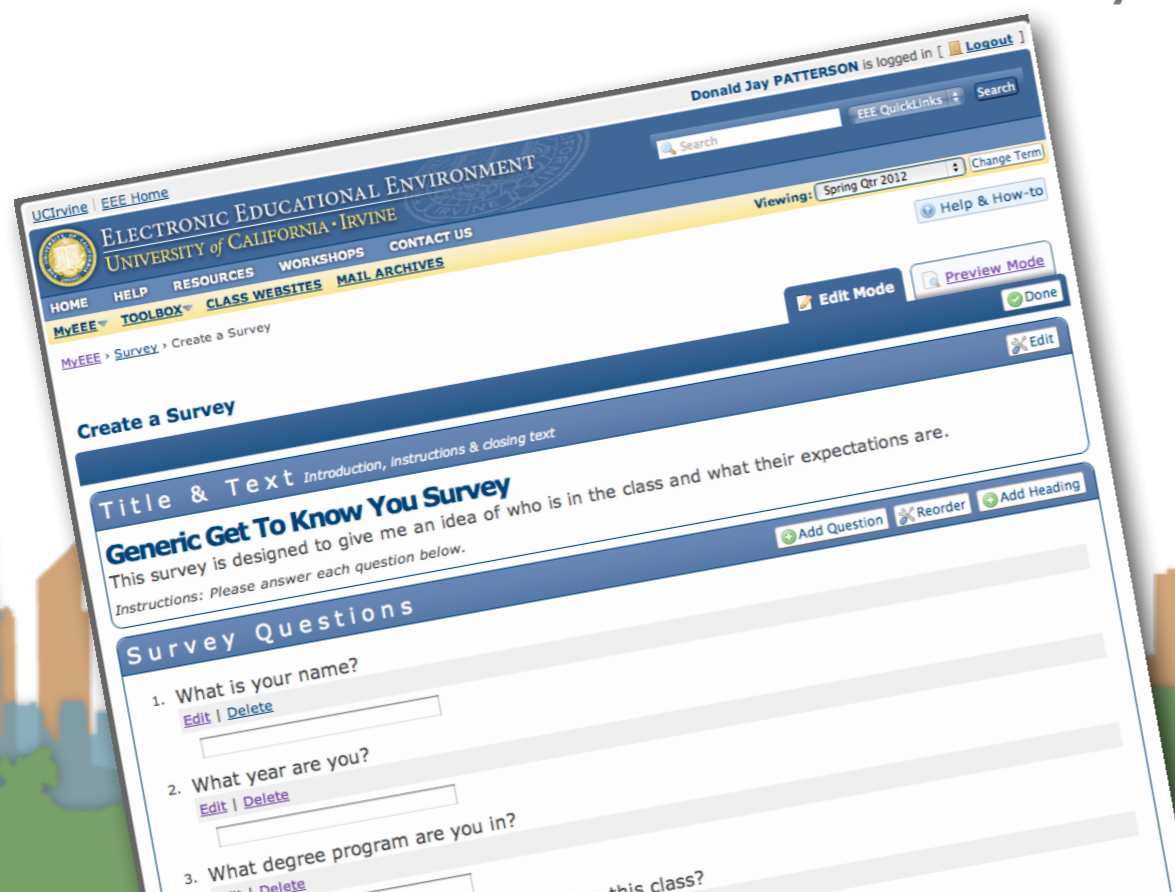


Home Take a Tour Resources Plans & Pricing

## Example Questions & Results:

How likely are you to cancel your Netflix subscription in the next 3-6 months?			
		Response Percent	Response Count
Extremely likely		5.7%	15
Very likely		5.7%	15
Moderately likely		13.7%	36
Slightly likely		26.3%	69
Not at all likely		48.5%	127

Why do you think you might cancel your Netflix subscription in the next 3-6 months?			
		Response Percent	Response Count
Price is too high		23.7%	32
May move to a competitor		5.2%	7
Don't use enough		20.0%	27
Content I want is not available		27.4%	37
Poor video or audio quality		5.2%	7
Poor customer service		0.0%	0
Poor technical support		0.7%	1
Other (please specify)		17.8%	24



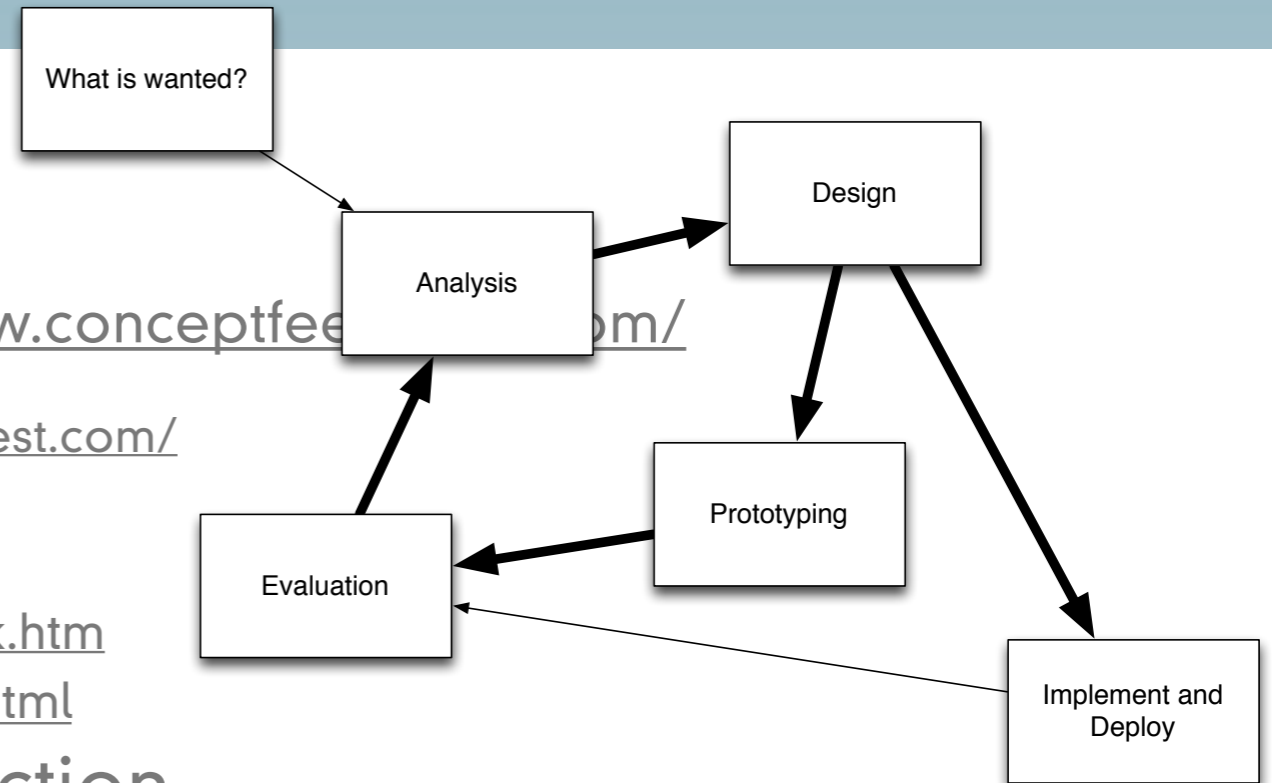
# Survey Tools

- Survey Monkey
  - <http://www.surveymonkey.com/>
  - Supports Targeted Audiences
- Google Forms
  - <http://youtu.be/xEY10Ub-k-U>
- Mechanical Turk
  - <https://www.mturk.com/mturk/welcome>
- Audiences
  - mailing lists
  - Survey Monkey
  - Lotteries



# Analysis

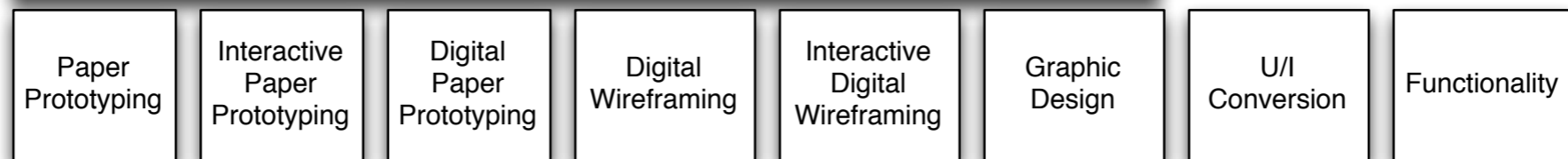
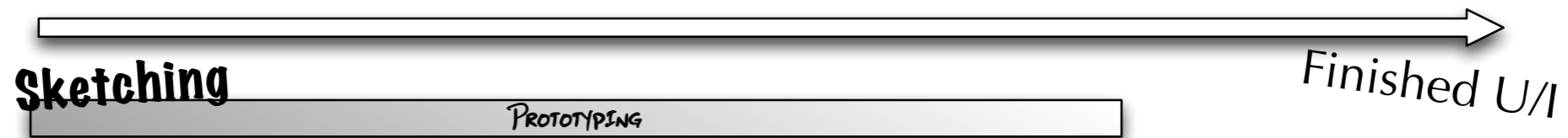
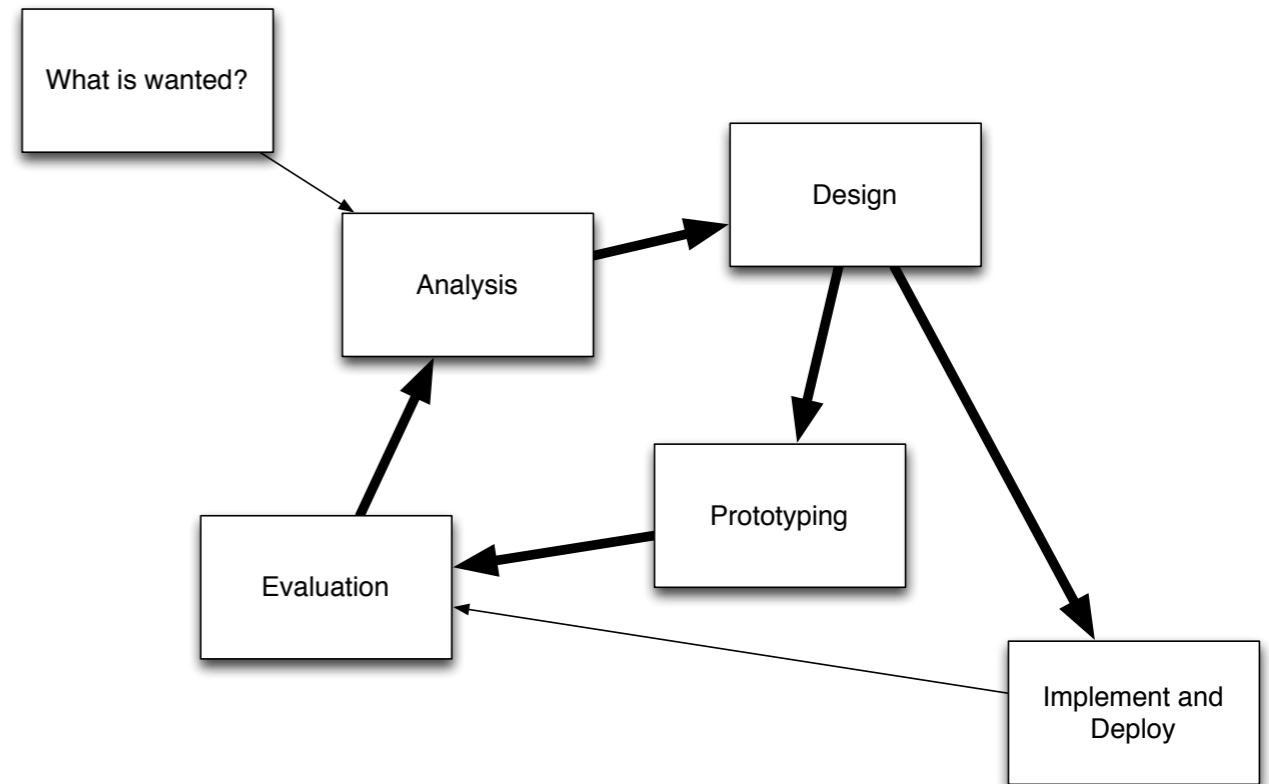
- “Expert Review”
- Concept Feedback: <http://www.conceptfeedback.com/>
- FiveSecondTest: <http://fivesecondtest.com/>
- Chalkmark/ClickHeat
  - <http://www.optimalworkshop.com/chalkmark.htm>
  - <http://www.labsmedia.com/clickheat/index.html>
  - Test user understanding of action
  - screen shot + heatmap
- Action Tracking
  - ClickTale: <http://www.clicktale.com/default.aspx>





# Prototyping

- Each time you do a prototype it becomes more refined
  - from Sketching
  - to deployment
  - and beyond

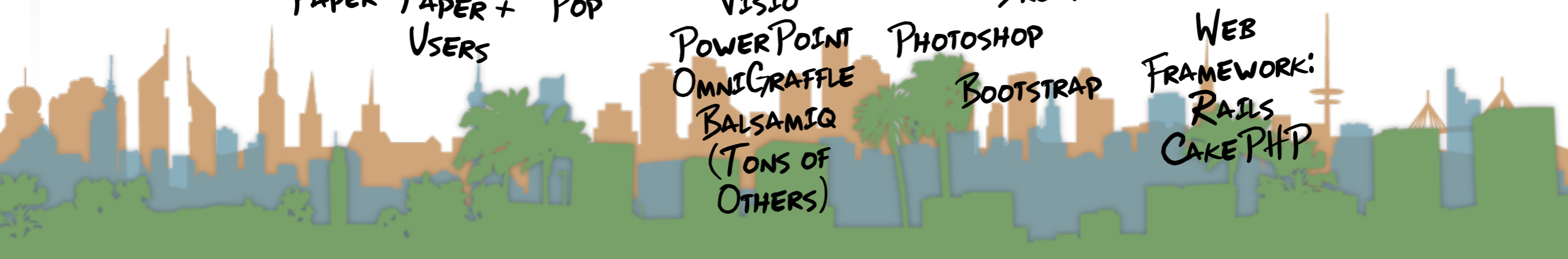


PAPER  
PAPER + POP  
USERS

VISIO  
POWERPOINT  
OMNIGRAFFLE  
BALSAMIQ  
(TONS OF OTHERS)

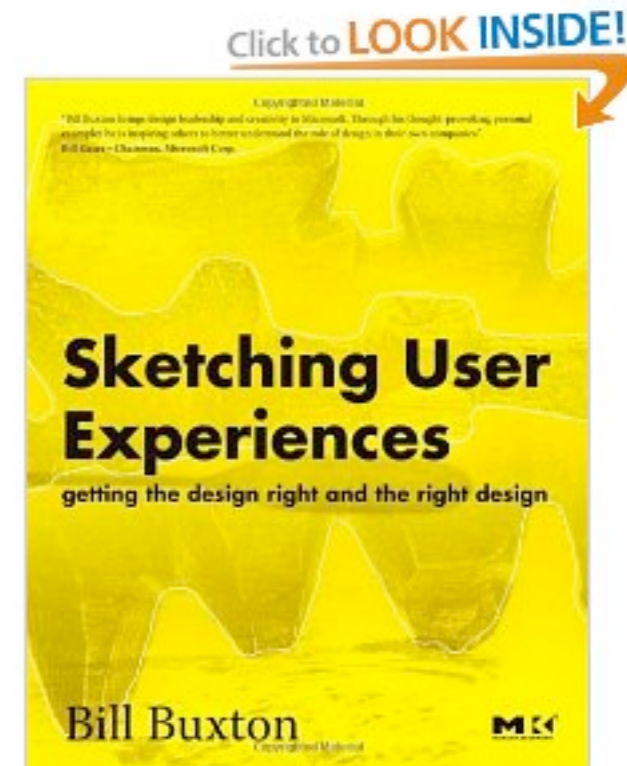
DREAMWEAVER  
PHOTOSHOP  
BOOTSTRAP

WEB FRAMEWORK:  
RAILS  
CAKE PHP



# Prototyping

- Paper Prototyping
  - Post it video
  - Tektronics video
    - <http://www.elsevierdirect.com/companion.jsp?ISBN=9780123740373>
  - iPhone:
    - <http://www.youtube.com/watch?v=6TbyXq3XHSc>
  - Pop!
    - <http://popapp.in/>
- Digital Sketching Prototyping
  - Balsamiq:
    - [http://www.youtube.com/watch?v=70hfU7\\_95Gw](http://www.youtube.com/watch?v=70hfU7_95Gw)
  - PowerPoint:



# Interactive Paper Interfaces

- Why sketching?

- Quick

- Timely
  - Inexpensive
  - Disposable
  - Plentiful
  - Clear Vocabulary
  - Distinct Gesture
  - Minimal Detail
  - Appropriate degree of refinement
  - Suggest and explore, not confirm
  - Ambiguity

Quick to make (at least after some practice)

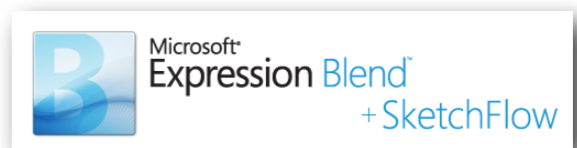


# Prototyping - Enterprise Tools - post sketching

- Expression Blend - MS family of products
  - <http://expression.microsoft.com/en-us/cc136530>
  - <http://youtu.be/47Luwq85NCs>
- SketchFlow - Silverlight - deprecated
- Adobe Catalyst - Flash - deprecated
  - For creating Flash/Flex interaction design
    - <http://www.adobe.com/products/flashcatalyst.html>
- Adobe Dreamweaver - HTML
  - <http://www.adobe.com/products/dreamweaver.html>

• [http://www.adobe.com/products/dreamweaver.html#nerolimedia\\_split\\_dw-updates-cc\\_708x398-1300.mp4](http://www.adobe.com/products/dreamweaver.html#nerolimedia_split_dw-updates-cc_708x398-1300.mp4)

• <http://www.adobe.com/products/dreamweaver/features.sl.id-contentfilter.sl.featuredisplaytypes.sl.new.html#content-dotcom-en-fe>



What is wanted

Analysis

Design

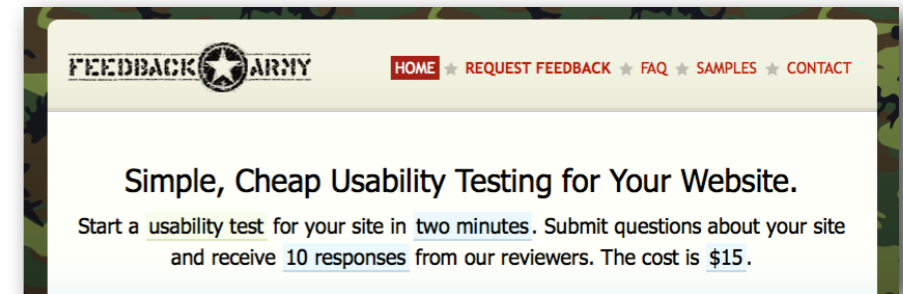
Prototype

Implement  
deploy



# UI/UX evaluation post-deploy

- Feedback Army
  - <http://www.feedbackarmy.com/>
- Silverback
  - <http://silverbackapp.com/>
- Userfly (dead)
  - <http://userfly.com/>
- Morae
  - <http://www.techsmith.com/morae/uses.asp>
- Hana Lab



**FEEDBACK ARMY** [HOME](#) [REQUEST FEEDBACK](#) [FAQ](#) [SAMPLES](#) [CONTACT](#)

Simple, Cheap Usability Testing for Your Website.

Start a usability test for your site in two minutes. Submit questions about your site and receive 10 responses from our reviewers. The cost is \$15.



Clearleft presents

## Silverback 2.0

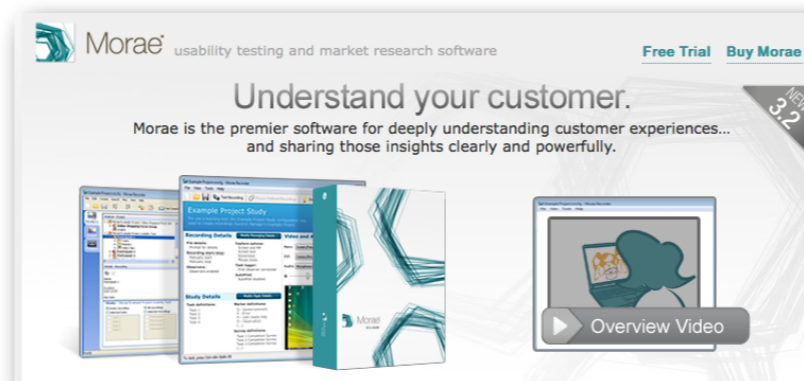
Guerrilla usability testing software for designers and developers

- ▶ Capture screen activity
- ▶ Add chapter markers on-the-fly
- ▶ Video the tester's face
- ▶ Control recording with the remote
- ▶ Record the tester's voice
- ▶ Export to Quicktime

Features in 2.0 include

<b>Preview</b> Watch sessions within Silverback	<b>Batch Export</b> Save selected sessions, tasks, highlights or projects in one go
<b>Tasks &amp; Highlights</b> Set tasks and mark noteworthy moments within a session	<b>Performance</b> Faster export, better usability

NEW FEATURES



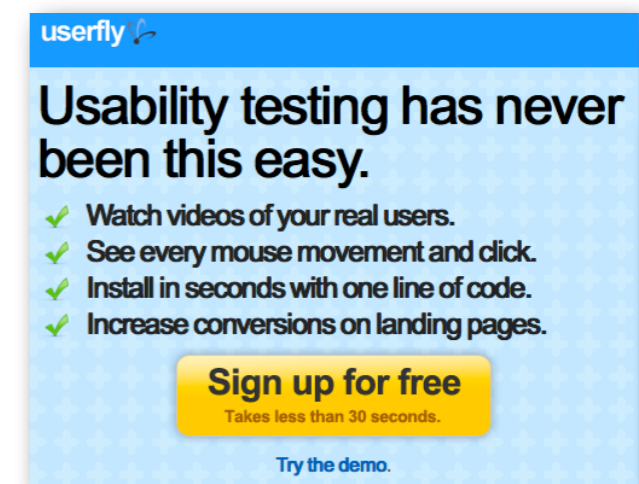
Morae usability testing and market research software [Free Trial](#) [Buy Morae](#)

### Understand your customer.

Morae is the premier software for deeply understanding customer experiences... and sharing those insights clearly and powerfully.

NEW 3.2

Overview Video



userfly

## Usability testing has never been this easy.

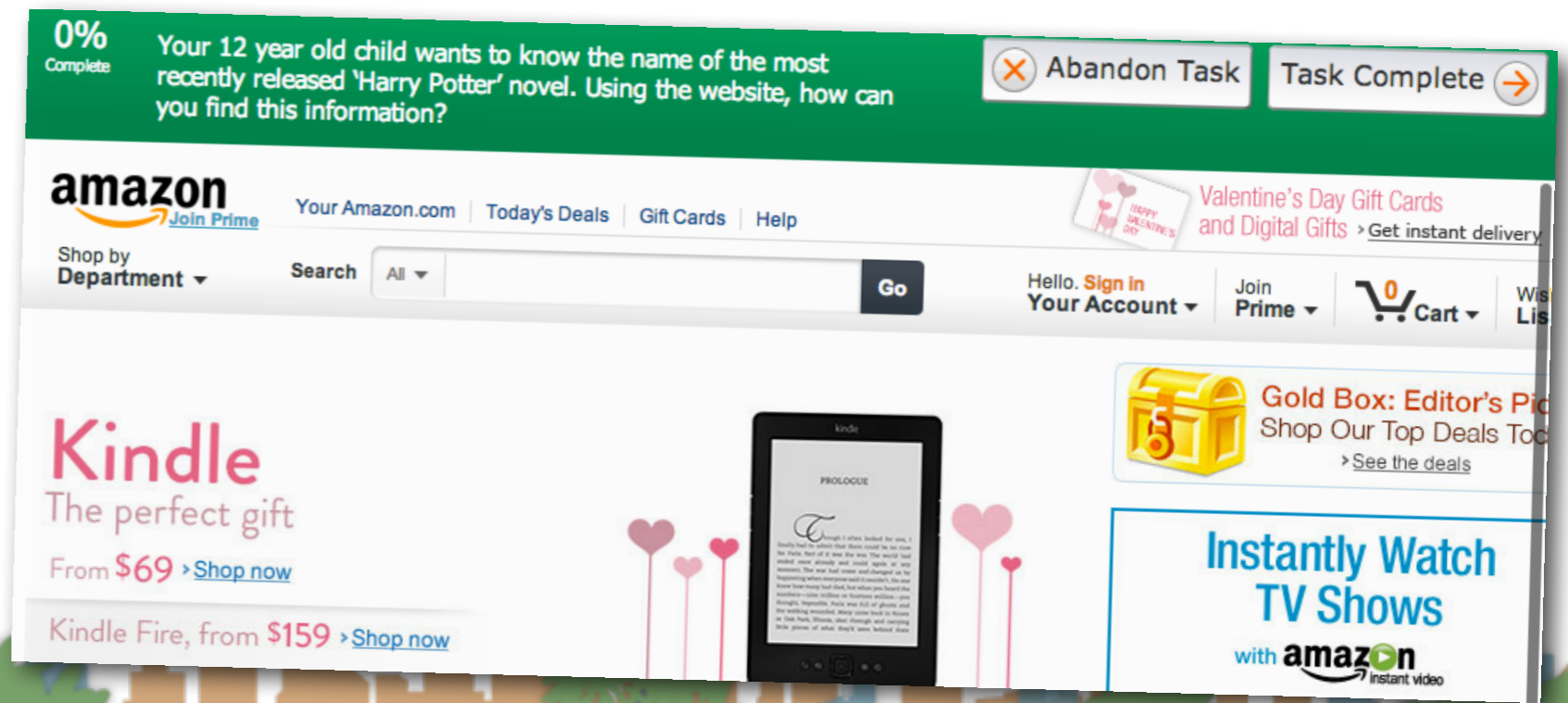
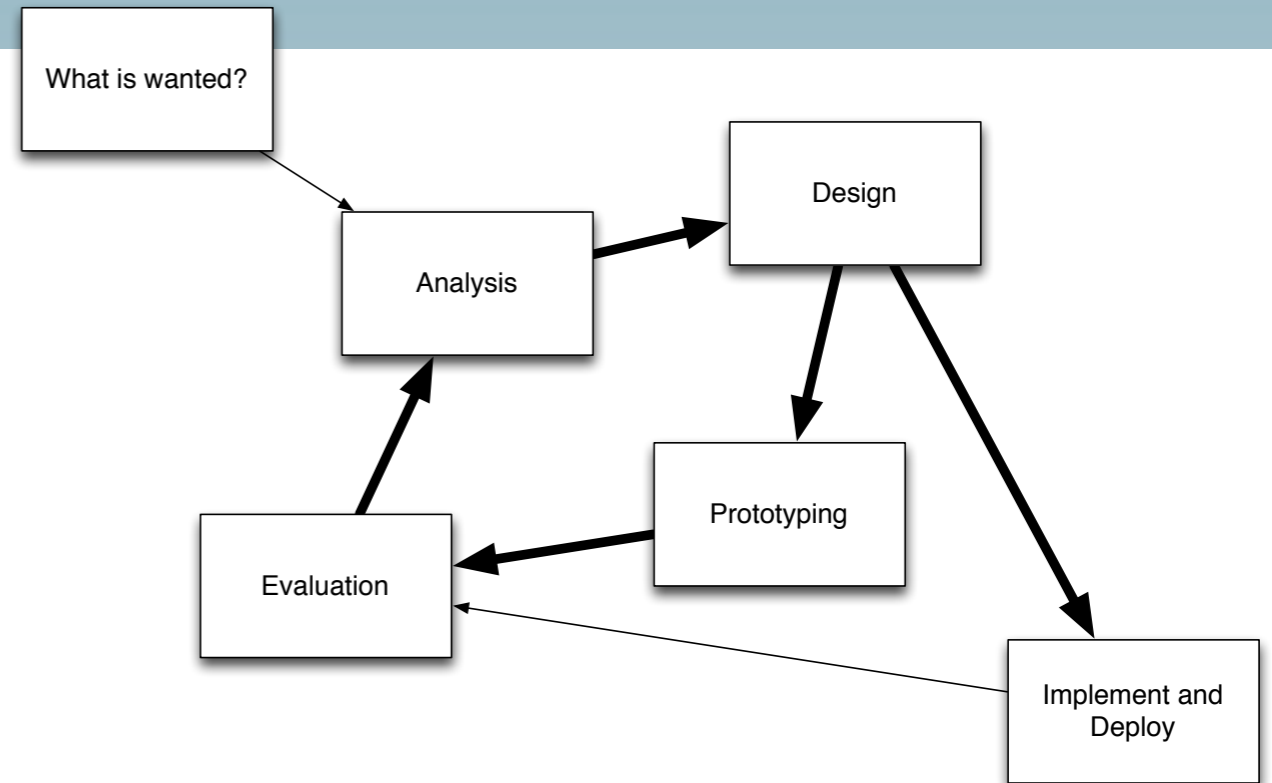
- ✔ Watch videos of your real users.
- ✔ See every mouse movement and click.
- ✔ Install in seconds with one line of code.
- ✔ Increase conversions on landing pages.

**Sign up for free**  
Takes less than 30 seconds.

[Try the demo.](#)

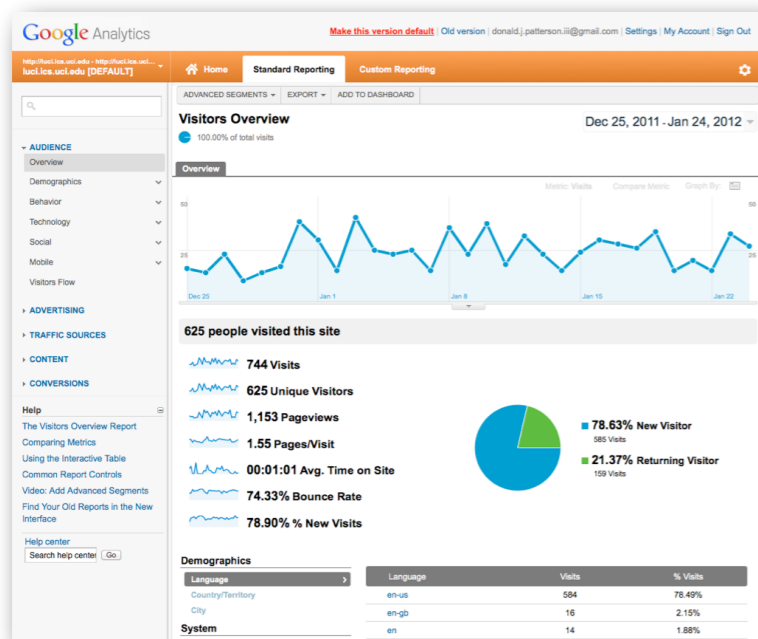
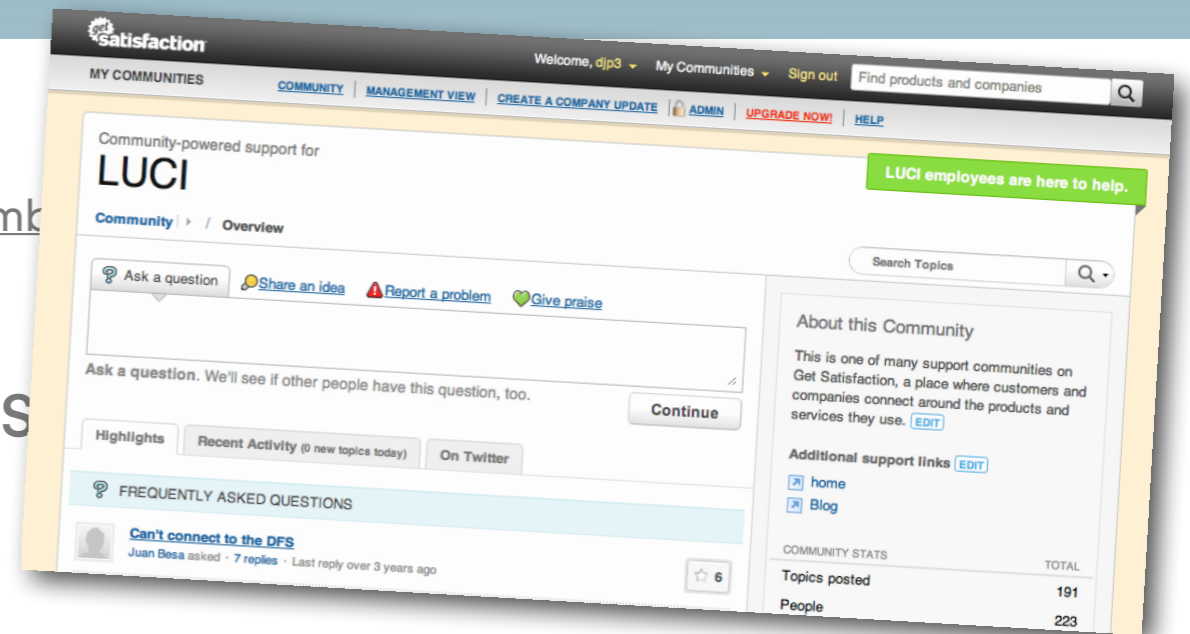
# Acceptance tests

- Loop 11: <http://www.loop11.com/>



# UI/UX evaluation post-deploy

- Get Satisfaction
  - [http://www.youtube.com/watch?feature=player\\_embedded](http://www.youtube.com/watch?feature=player_embedded)
- Google Analytics
- Google Context Experiments



### Experiment to improve goal conversion

Test which page design is more effective for your website visitors

Enter the URL for the page you want to improve:


#### Which pages should I include in my experiment?

Your experiment can focus on any single page that helps visitors accomplish a specific goal:

- A landing page
- A page along the goal funnel
- Your goal page

#### How do I get started?

- Decide which page to test
- Design variations of that page (separate URL for each variation)
- Decide which goal conversion to improve





# Need followup

- Other ideas
  - Camtasia
    - screen recorder
  - processing
    - visualization design
  - Kompozer.net
    - web design for dummies
  - Pencil Project
    - online Balsamiq
  - Lucid chart
    - online omnigraffle
  - Axure.com instead of Balsamiq
  - Usabilla



Let's do some paper prototyping

# Paper prototyping explained

<https://www.youtube.com/watch?v=FS00Ulo12Xk>

# The User Experience

- How a product behaves and is used by people in the real world
  - the way people feel about it and their pleasure and satisfaction when using it, looking at it, holding it, and opening or closing it
  - “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 design *for* a user experience

# The iPod Nano Touch



# Why was the iPod user experience such a success?

- Quality user experience from the start
- Simple, elegant, distinct brand, pleasurable, must have fashion item, catchy names, cool, etc.,

# What is involved in the process of interaction design

- Establishing requirements
- Developing alternatives
- Prototyping
- Evaluating

# Core characteristics of interaction design

- users should be involved through the development of the project
- specific usability and user experience goals need to be identified, clearly documented and agreed at the beginning of the project
- iteration is needed through the core activities



# Why go to this length?

- **Help designers:**

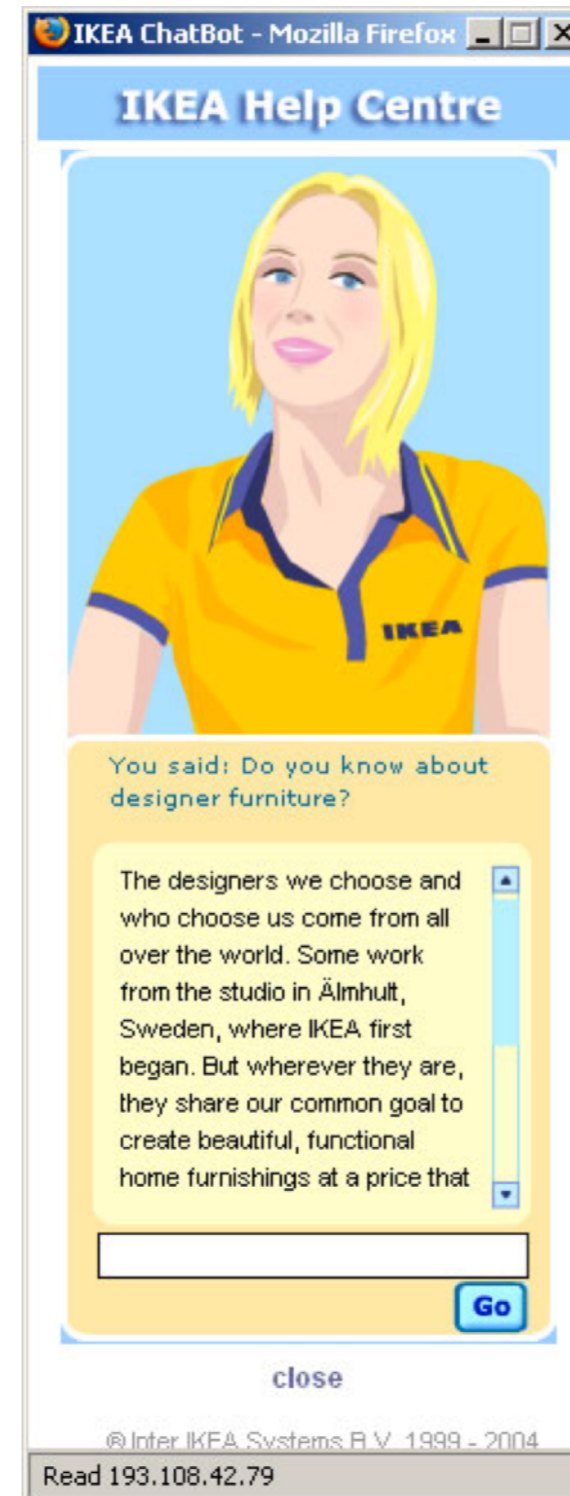
- understand how to design interactive products that fit with what people want, need and may desire
- appreciate that one size does not fit all
  - e.g., teenagers are very different to grown-ups
- identify any incorrect assumptions they may have about particular user groups
  - e.g., not all old people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

# 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 goals

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

# Activity on usability

- How long should it take and how long does it actually take to:
  - Using a DVD to play a movie?
  - Use a DVD to pre-record two programs?
  - Using a web browser tool to create a website?



# 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

# 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?

# 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



# Visibility

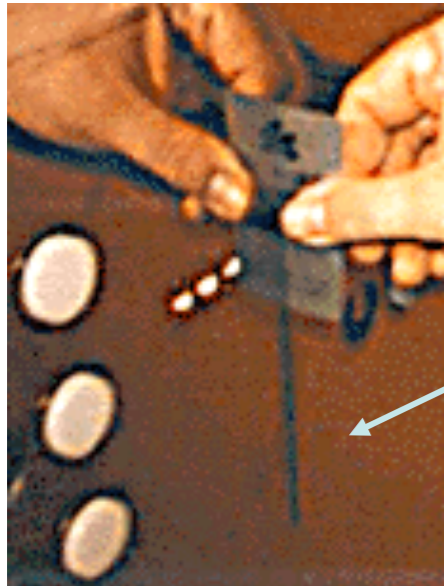


- This is a control panel for an elevator
- How does it work?
- Push a button for the floor you want?
- Nothing happens. Push any other button? Still nothing. What do you need to do?

It is not visible as to what to do!

From:  
[www.baddesigns.com](http://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

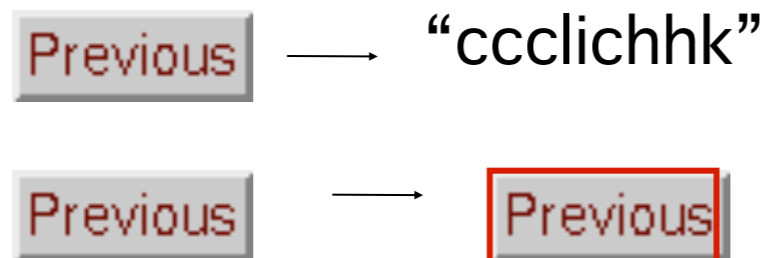
# What do I do if I am wearing black?

- 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:



# 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](http://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](http://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:

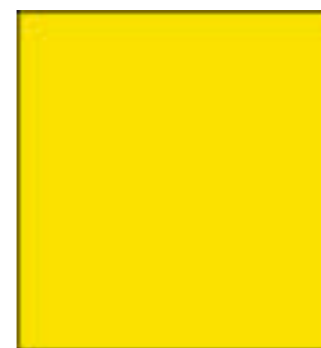
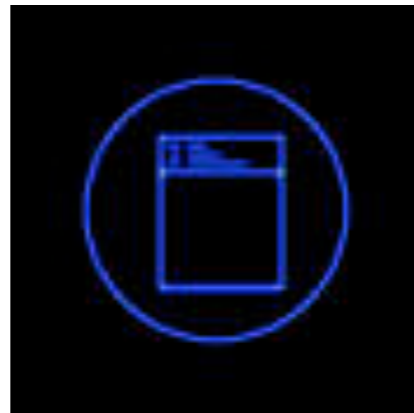
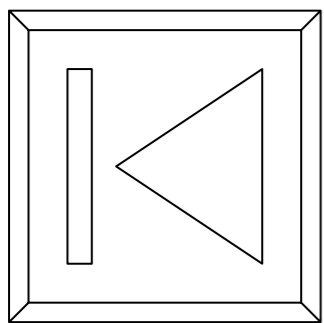
How do the following physical objects afford? Are they obvious?



# 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?



# Summary

- 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

