

Introduction to User-Centered Design

Lecture 6 – Ideation part 2

Eleftherios Papachristos

Associate Professor at the Department of Design (NTNU)

Today's lecture

Goals Lecture 5

What will you learn?

Move from problem statements toward ideas/specific solutions/conceptual design (generate multiple)

- More hands-on experience with ideation techniques
- Inspiration
- Documentation / Conceptual design

Outline of this lecture

Goals Lecture 1

Part 1: Summing up activities so far

- Basic ideation techniques
- Brainstorming

Part 2: More techniques

- Generation
- Shorting Ranging
- Voting

Part 3: Inspiration / Documentation

- Where can we find inspiration?
- Metaphors / Technology
- Conceptual designs – sketches
- Storyboards

Part 1

1 Summing up activities so far

Basic ideation techniques
Brainstorming

Brainstorming

Creation methods

Multi-person ideation process

Goal:

Utilising group diversity to ideate and :

- Generate a **multitude** of ideas
- Aiming for **creative** ideas, **innovative** ideas

A process that will lead to more ideas than you would emerge by one person working alone

The goal is not to solve the problem but provide possibilities solving comes during the convergence phase of selection

Brainstorming process example

Creation methods



Brainstorming

Creation methods

Tips:

1. More is not always better

- Number of people (optimal number of people 5-7)
- Time (set timers)

2. Divergent people are better than homogenous groups

- Different perspectives are needed (researchers, engineers, programmers)
- Innovative ideas emerge from the space between your individual expertise

3. Make the problem visible

- Don't forget to put the question/problem statement on top of the board/table

4. Democratisation of the process

- If you invite people that are higher up in hierarchy, emphasise democratisation of the process

Workshop methods basic components

Creation methods

Basic activities

1. Post-up
2. Idea grouping
3. Mapping
4. Forced ranking

Workshop methods basic components

Creation methods

1. Post-up

Purpose:

generation of wide-ranging ideas
representing diverse perspectives in a
time-efficient and democratic manner.

Helpful for:

- Encouraging the **participation of everyone**
- Deal with **dominating participants**
- Avoid unproductive conversation
- Bring some structure and order



Variation in methods to achieve this

Workshop methods basic components

Creation methods

2. Idea grouping

Purpose:

Grouping of ideas based on similarity or themes.

Similar principle to:

- Affinity diagram
- Card sorting

Helpful :

- Identify patterns
- Simplify
- Creates a common language among participants



Workshop methods basic components

Creation methods

3. Mapping

Purpose:

Assess if ideas or themes are varying systematically on some dimensions.

Similar principle to:

- Closed Card sorting
- Empathy maps

Helpful for:

- identifying patterns and relationships of ideas by organising ideas spatially



Workshop methods basic components

Creation methods

4. Forced ranking

Purpose:

Identify and prioritise the best ideas democratically.

Helpful for:

- Achieving agreement among participants



Brainstorming variations

Creation methods

Brainstorming – You build good ideas from each other's wild ideas.

Braindumping – This is like brainstorming, but done individually.

Brainwriting – This is like brainstorming, but everyone writes down and passes ideas for others to add to before discussing these.

Brainwalking – This is like brainwriting, but members walk about the room, adding to others' ideas.



Braindumping

Creation methods

Individual sessions

1. Ask all participants to write down their ideas as they come individually, and silently.
2. Give them between 3 and 10 minutes to write their ideas
3. Afterwards, each participant will say a few words about the ideas and stick them on the table or wall. (no discussions/critique)
4. The group identifies duplicates together.
5. When all team members have presented their ideas, you can group, map, and vote for the best ones



Braindumping

Creation methods

When is it good to use

It helps freethinking after dumping what you had in mind.

(Holding onto your thoughts, or unexplored ideas create mental blockages and prevent freethinking.)



Good for:

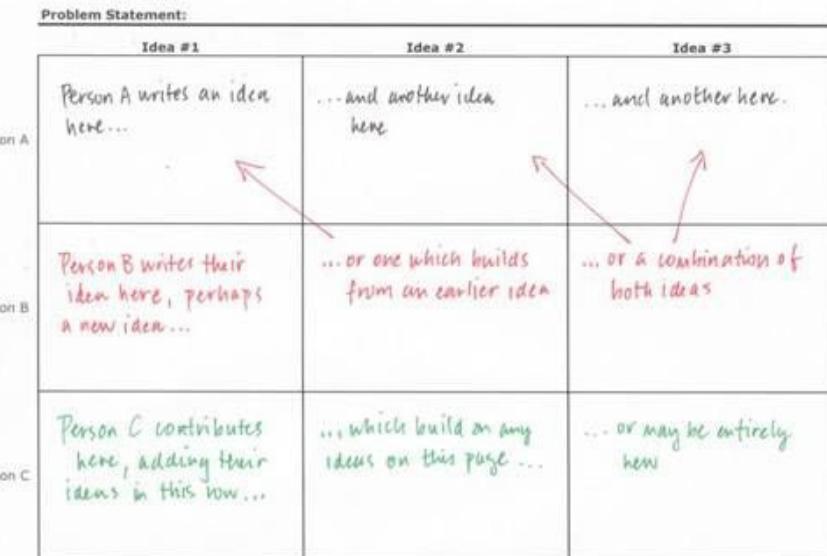
- Quiet introvert participants to get a voice.
- When under time pressure
- If the group is too large to brainstorm effectively

Brainwriting

Creation methods

A mix of individual and group sessions

1. Give out a sheet with 3 columns to each participant.
2. Encourage participants to write down 3 ideas in 3-5 min silently
3. Afterwards, participants give the sheet to the one next to them
4. Another round of 3-5 min. Ideas can be new, or they can builds on ideas from others
5. Repeat 3-10 times
6. Participants present their idea cards briefly and then you can group, map, and vote for the best ones



Brainwriting

Creation methods

A mix of individual and group sessions

Good for:

1. Mixing individual and group work
2. Can generate many ideas in a short amount of time

In Brainwriting 6-3-5 (six participants, three ideas, 5 minutes) -> can ideally lead to 108 ideas in half an hour
3. Quiet introvert participants to get a voice.
4. When under time pressure
5. Good for small groups

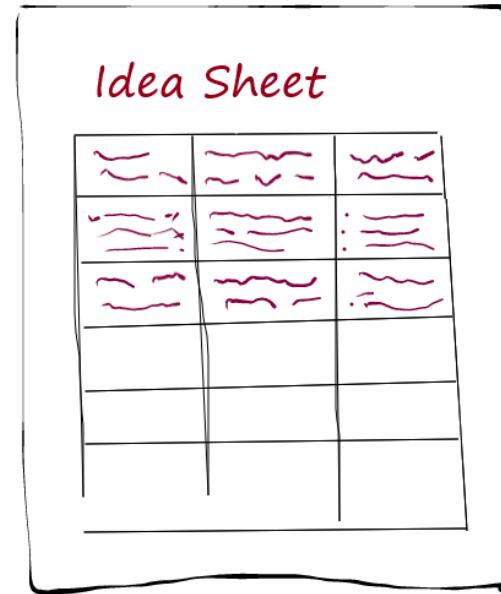


6-3-5 method

Creation methods

Is brainwriting

1. Specific number of participants = 6
2. Specific number of ideas per round = 3
3. Specific amount of time per round = 5 min



The point is not the maturity of the ideas, but the quantity and the integration of the whole group to discover new creative ways to solve the problem.

Brainwalking

Creation methods

A mix of individual and group sessions

Exactly like brainwriting but participants have to get up from their seats and move to another spot around the brainstorming table or even to another table altogether.

Why?

- Gets people moving,
- Keeps energy levels up and mixes things up enough so that the group as a whole does not get stuck



2

Part 2

More Methods

- Generation
- Shorting Ranging
- Voting

Ideation methods (Last time)

Method overview

creating

- Brainstorm
- Brainwriting
- HMW questions
- Six thinking hats
- Attribute listing
- 5 Ws+H
- Five Whys
- 6-3-5 Method
- 10 plus 10
- Crazy 8
- Creative Matrix
- Idea card
- Use of analogies

reducing

Sorting ideas

- Octopus clustering
- Benny Hill sorting

Ranging ideas

- Idea portfolio'
- Desicion matrix

Voting ideas

- Raise hands
- Dot voting
- Barometer
- Four categories method

Ideation methods (Today)

Method overview

creating

- Brainstorm
- Brainwriting
- HMW questions
- Six thinking hats
- Attribute listing
- 5 Ws+H
- Five Whys
- 3-6-5 Method
- 10 plus 10
- Crazy 8
- Creative Matrix
- Idea card
- Use of analogies

reducing

Sorting ideas

- Octopus clustering
- Benny Hill sorting

Ranging ideas

- Idea portfolio'
- Desicion matrix

Voting ideas

- Raise hands
- Dot voting
- Barometer
- Four categories method

Methods to help split up the problem

Creation methods

Most brainstorming techniques help bring divergent perspectives into play and aid the democratisation of the process

But what if ideation cannot be triggered because the problem is too challenging, complex or abstract to get a grip on it?

We need techniques to help

- limit or split the theme into more manageable chunks,
- See different aspects of the theme,
- Produce more diverse ideas.

Methods to help split up the problem

Creation methods

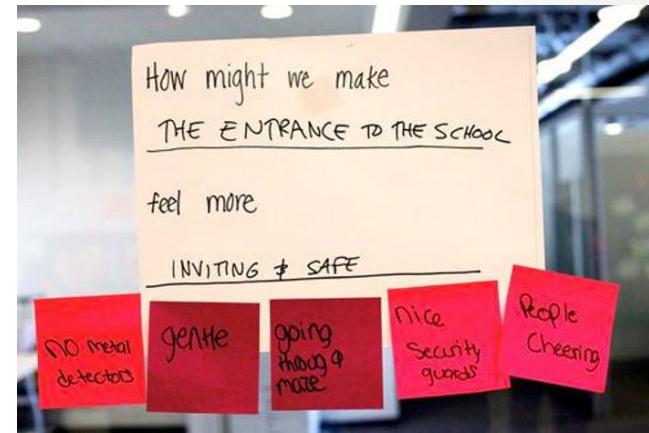
We have already seen the:

How Might We (HMW) questions technique

Converting insights and user stories into a wide range of actionable ideas.

Other methods:

- Six thinking hats
- Attribute listing
- The 5 Ws + H
- Five Whys



Six Thinking Hats

Methods to help split up the problem

Roleplaying:

Participants are encouraged to sequentially adopt different viewpoints by changing hats and ideate based on these

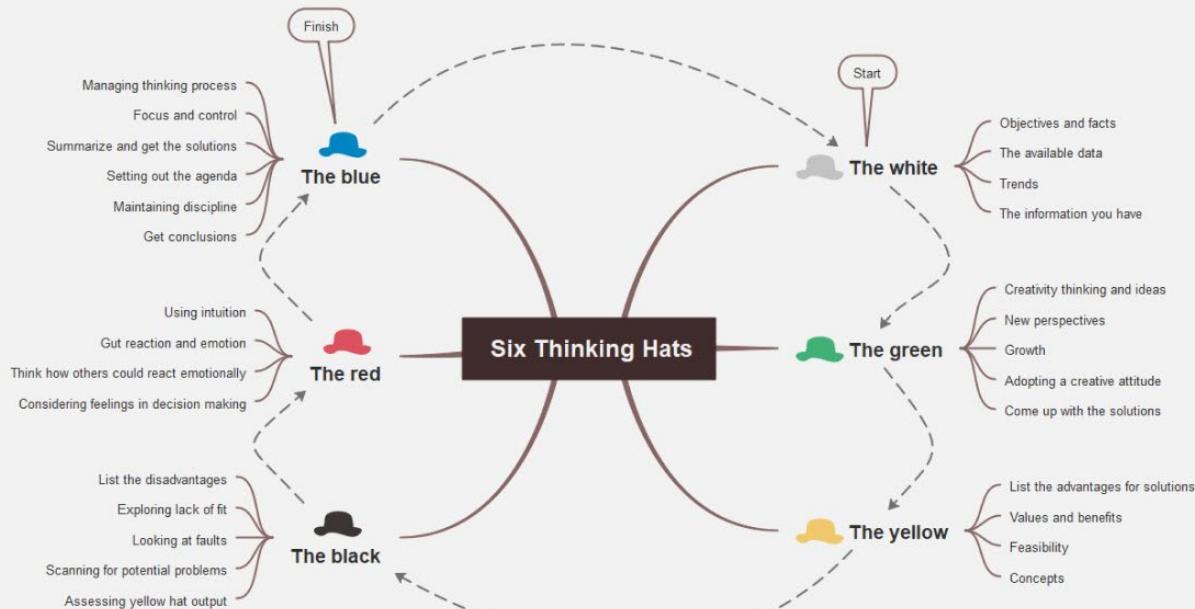


e.g.

blue for managing the big picture,
white for information and facts etc.

Six Thinking Hats

Methods to help split up the problem



Other techniques

Methods to help split up the problem

Attribute listing:

Participants emphasise ideas based on the perspective of different attributes (such as physical, social, procedural, or psychological) of a problem or idea

Five Whys

Method made famous by Toyota, we look at a problem or fact and ask ourselves “why” five times or more. Each answer can be the starting point for ideation

5 Ws + H

Invites participants to ask themselves six questions and look at variations of the answers to each of those.

who, where, what, why, when, and how

Other methods

10 plus 10 – deep sketching

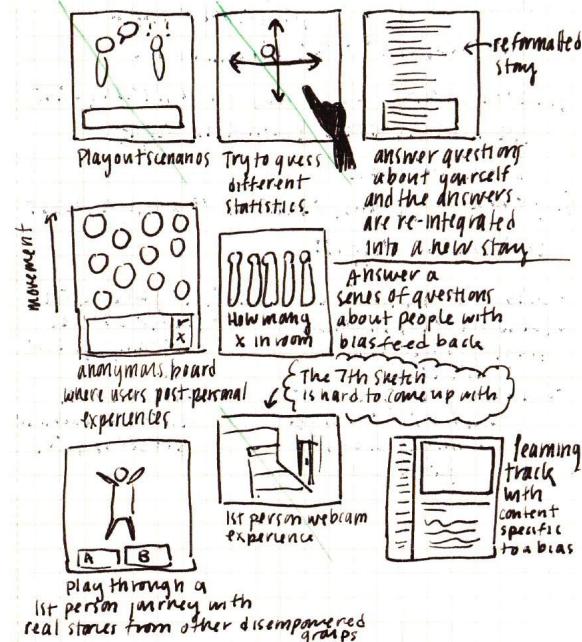
Ideation methods

Great way to get started:

1. Each group member works individually sketching for some prespecified amount of time
2. Each group ends up with 10 rough sketches
3. Ideas are shared, and one is chosen for the starting point of the second round
4. Another round in which variations of the chosen idea are sketched
5. Each group ends up with 10 +10 sketches

10 + 10 METHOD

1. State your design challenge
"I would like people to be more informed about their negative biases"
2. Generate 10 or more design concepts of a system that addresses this challenge



Creative matrix

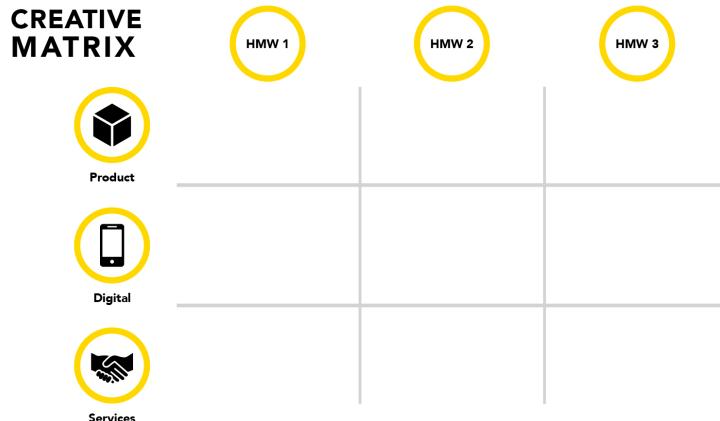
Ideation methods

The Creative Matrix is a grid where each cell represents the intersection of two disparate categories.

- **Columns** can be problem statements or subproblems from HMW questions
- **Rows** can be enabling solutions (e.g., technologies, environments, or policies).

Try to populate the matrix with as many ideas as possible.

Generate your ideas using a creative matrix shown so as to get a variety of ideas



Creative matrix

Ideation methods

How might we... make package holidays more attractive to our customers?

	Families	Couples	Young Singles	Retirees
Inclusions	Kids eat free Toys and games onsite	All you can eat & drink	Activity equipment included Freebies on arrival	Concierge services
Partnerships	Babysitting services	Mobile services, e.g. massages	Extreme sports activities Area guides: bars, clubs, activities	Travel programme inspired itineraries Bus tours
Discounts	Family of 5-6 packages (not just 4)	Discounted room upgrades		Large groups discounts Extended stay discounts
Experiences	Providing children's equipment	Honeymoon packages Weekend getaways	'As seen in' movie inspired activities	Themed packages, e.g. sightseer

Use of analogies

Ideation methods

Instead of trying to create ideas from nothing, translate **and adapt existing solutions or look for links to random stimuli.**

- If you have similar problems A and B, then you look at solutions to B and adapt back to A. Here you can adapt ideas that already exist so it is a useful kickstart if the group is stuck.
- It can also make a difficult problem more manageable.
- you can borrow ideas from elsewhere, and you can build on others' ideas and remix them into new formats and combinations

More on this later...

Usefull Tool : Idea card

Ideation methods

Idea cards are a great tool to use when facilitating workshops. The cards facilitate drawing, text and naming of ideas. In addition, it is possible to assess the value the idea has for the users and the customer afterwards

Oppgave	Tittel:
Oppgavetekst /scenario	
Tegn ut idéen din	
Kort beskrivelse av idéen:	Gi poeng ved gjennomgang av idén:
<hr/> <hr/> <hr/> <hr/>	Hvor stor verdi har denne ideen for brukeren?  /10
	Hvor stor verdi har denne ideen for bedriften?  /10

Crazy 8 example

Ideation methods



Sorting techniques

Sorting ideas - Octopus clustering

Sorting ideas

We have seen Octopus clustering previously



Sorting ideas - Benny Hill sorting

Sorting ideas

In this method large number of ideas are quickly ranked according to how interesting they are.

- Everyone makes sheets out of their idea
- Everyone stands in a tight room holding an idea sheet
- Participants move through the group, changing sheets randomly and repeatedly until the music stops



Requires space, sheets and music, as well as a good facilitator

Sorting ideas - Benny Hill sorting

Sorting ideas

- Then, in pairs, (whoever stands next to each other) **they compare the two papers they're holding**
- The pairs have one minute to compare the pitches on their two papers and assign 7 “interestingness points” between the two ideas. They can assign 7:0, 4:3, or anything in between.
- Start the music again, and repeat the cycle
- Run 5 cycles



Sorting ideas - Benny Hill sorting

Sorting ideas

The benny hill show theme music



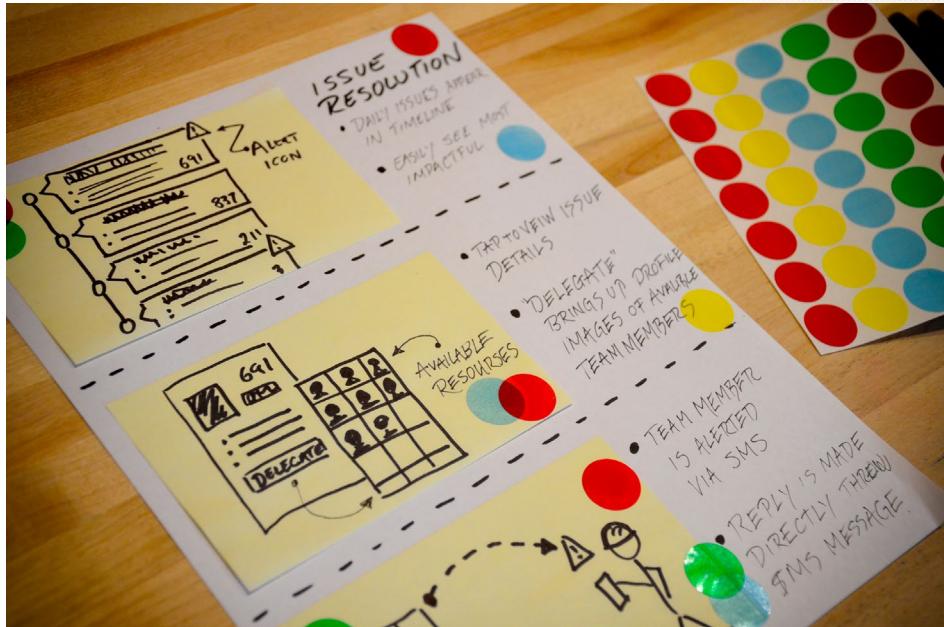
<https://www.youtube.com/watch?v=zQf2TiwBFHo>

Quick voting techniques

Quick voting techniques

Voting ranking methods

- Dot-voting (previous time)
- Nose-picking
- Raise of hands
- Barometer
- Four categories method



Quick voting techniques

Voting ranking methods

Nose-picking

Ideal for small groups

- To vote, each team member puts one finger on their nose;
- They count to three, and each quickly put that finger on their preferred item.
- Anyone who hesitates, even for a split second, has lost her vote.
- If there is a tie, discount all the other items, briefly discuss the favorites, and vote again on the tied items

Raise of hands

Ideal for medium to large-sized groups

- Self explanatory

Quick voting techniques

Voting ranking methods

Barometer

Method 1

Hang or draw a simple “barometer” – say, a Likert scale from -2 to +2 – on every item. The participants go around the room and place a pen mark or dot to show their “vote” for each item.

Method 2

Give everyone a bright sticky note and ask them to hold it high over their heads (“I like it”), low by their knees (“I hate it”), or somewhere in between to vote for each item



Four categories method

Voting ranking methods

Divide ideas according to their relative abstractness, ranging from the most rational choice to the 'long shot'

Participants decide upon one or two ideas for each of these categories. This method ensures that the team covers all grounds, from the most practical to the ideas with the most potential to deliver innovative solutions.



Part 3

3

Inspiration / Documentation

- Where can we find inspiration?
- Metaphors / Technology
- Conceptual designs – sketches
- Storyboards

Inspiration

Until now we focused on the Human
its time to think about technology too

Metaphors

Definition

“Interface metaphors...provide familiar entities that enable people to readily understand the underlying conceptual model and know what to do at an interface”

Preece, et al., 2015, p. 44



Metaphors

Definition

Think about all the metaphors that have been drawn from supermarkets to online shopping.

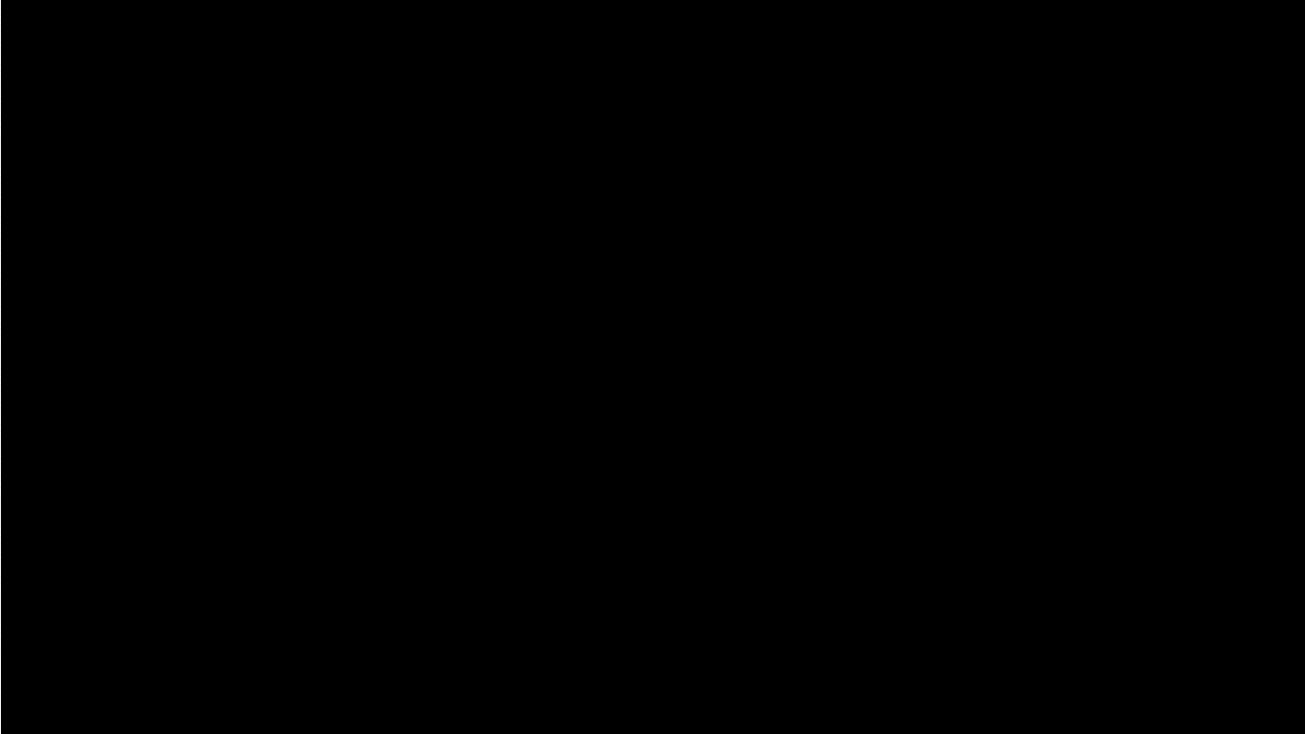


Any differences?

Reverse Metaphors

Definition

What would happen if real shops would lend metaphors from online shopping.



Metaphor in Widgets

Definition

good metaphor should:

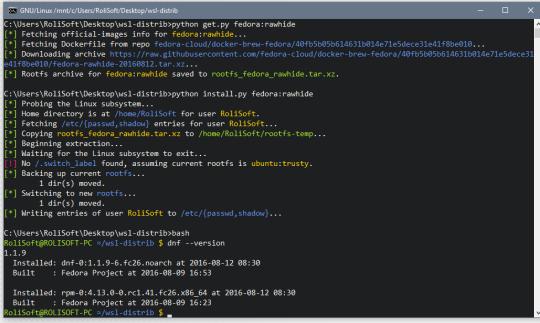
- provide familiar structure
- be relevant to the problem
- easy to represent
- understandable by users
- be extensible



Interaction Types

Definition

Instructing



```
GNULinux /mnt/c/Users/RollSoft/Desktop/wsl-distro
C:\Users\RollSoft\Desktop\wsl-distro\python get.py fedora:rawhide
[*] Fetching official-images.info for fedora:rawhide...
[*] Using Docker image fedora:rawhide-cloud
[*] Downloading archive https://raw.githubusercontent.com/Fedora-Cloud/docker-brew-fedora/40fb5d05616431b01de71e5dec31d1f08e10/fedora-rawhide-20160812.tar.xz...
[*] Roots archive for fedora:rawhide saved to roots_fedora_rawhide.tar.xz.

C:\Users\RollSoft\Desktop\wsl-distro\python install.py fedora:rawhide
[*] Probing the Linux subsystem...
[*] Mounting /etc/ (rw,relatime) for user RollSoft...
[*] Copying /etc/{passwd,shadow} entries for user RollSoft...
[*] Copying roots_fedora_rawhide.tar.xz to /home/RollSoft/roots-temp...
[*] Beginning install...
[*] Waiting for the Linux subsystem to exit...
[!] No /.switch_label found, assuming current rootfs is ubuntu:trusty.
[*] Backing up current rootfs...
[*] Creating new rootfs...
[*] Switching to new rootfs...
[*] Writing entries of user RollSoft to /etc/{passwd,shadow}...
[*] Writing entries of user RollSoft to /etc/{passwd,shadow}...

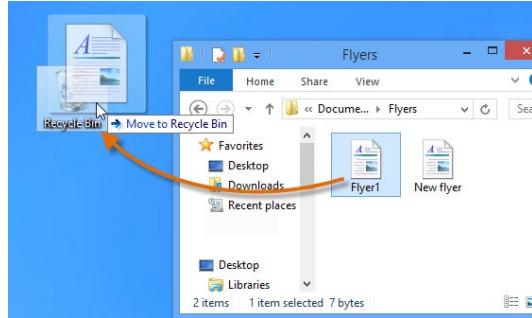
C:\Users\RollSoft\Desktop\wsl-distro\dash
RollSoft@ROLLSOFT-PC ~\wsl-distro $ dnf --version
dnf-2.4.3-1.fc26
Installed: def-0:1.1.9-6.fc26.moarh at 2016-08-12 08:30
Build : Fedora Project at 2016-08-09 16:53

Installed: rpm-0:4.13.0-0.8.rc1.i486.fc26.x86_64 at 2016-08-12 08:30
Build : Fedora Project at 2016-08-09 16:53
RollSoft@ROLLSOFT-PC ~\wsl-distro $
```

Conversing



Manipulating



exploring



Instructing

Interaction Types

Instruction: giving instructions to a system

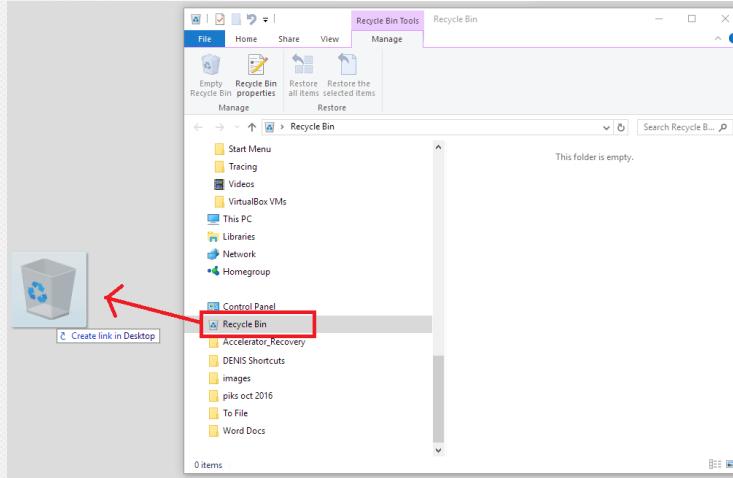
(e.g., typing, selecting from menus, touching, speaking, gesturing, pressing buttons)



Manipulating

Interaction Types

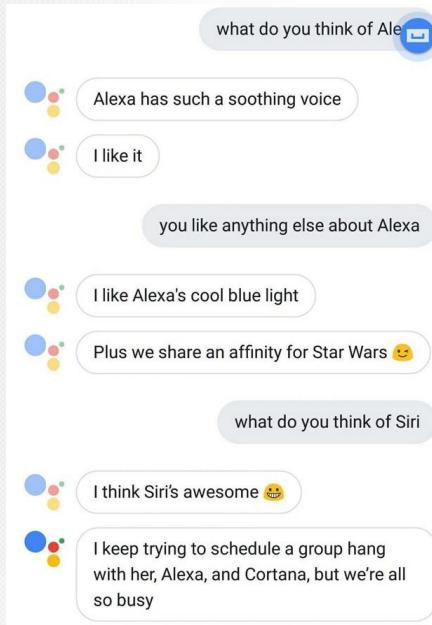
Manipulation: interacting with system by manipulating virtual or physical objects



Conversing

Interaction Types

Conversing: users have a dialog with a system



Where is the interface?



Interface types

Interaction design

- Graphical
- Command
- Speech
- Multimodal
- Invisible
- Ambient
- Affective
- Mobile
- Intelligent
- Adaptive
- Smart
- Tangible
- Touchless
- Natural

Technology considerations

Function

To be Intelligent, to be Adaptive, to be Ambient, to be Smart

Interaction style

Command, Graphical, Multimedia

Input/output device

Pen based, Speech based, Gesture based

Platform

PC, mobile, wearable, tablet

Interface types (Historical order)

Interaction design (Preece, Rogers, Sharp)

1. Command based
2. WIMP & GUI
3. Information visualisation & dashboards
4. Web
5. Consumer electronics & appliances
6. Mobile
7. Speech, pen, touch
8. Air-based gesture
9. Haptic
10. Multimodal
11. Shareable
12. Tangible
13. Virtual, augmented & mixed reality
14. Wearable
15. Robots & drones
16. Brain-computer interaction

Command-based UI

Interface types

typing in commands in command prompt
experts vs novice

Command prompt

```
Command Prompt - mysql.exe -u root
(c) 2015 Microsoft Corporation. All rights reserved.

C:\Users\papac>cd c:\xampp\mysql\bin
c:\xampp\mysql\bin>mysql.exe -u root
Welcome to the MariaDB monitor. Commands end with ; or \g.
Your MariaDB connection id is 36
Server version: 10.1.16-MariaDB mariadb.org binary distribution

Copyright (c) 2000, 2016, Oracle, MariaDB Corporation Ab and others.

Type 'help;' or '\h' for help. Type '\c' to clear the current input statement.

MariaDB [(none)]> SHOW DATABASES;
+-----+
| Database      |
+-----+
| gpro          |
| gpro_b        |
| information_schema |
| mysql          |
| performance_schema |
| phpmyadmin    |
| test           |
+-----+
7 rows in set (0.01 sec)

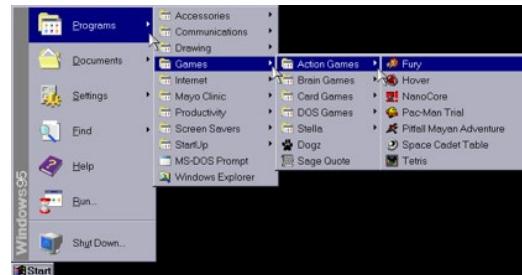
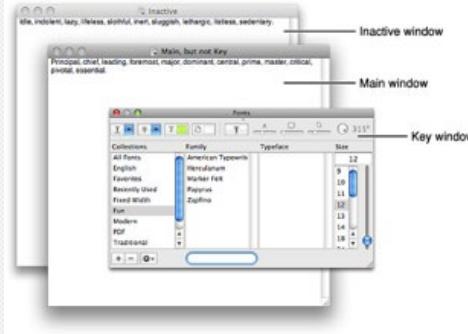
MariaDB [(none)]> USE gpro;
Database changed
MariaDB [gpro]>
```



WIMP & GUI

Interface types

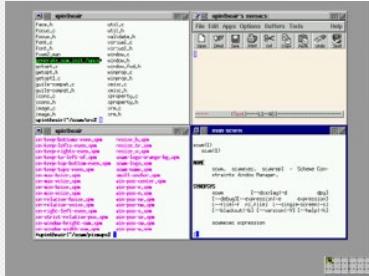
windows, icons, menus, pointers (WIMP)
graphical user interface (GUI)



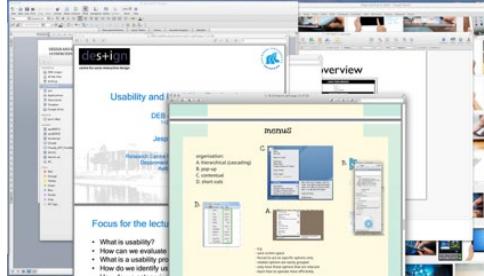
WIMP - Windows design

Interface types

Windows (can be scrolled, stretched overlapped, opened, closed and moved around)



Tiled



Overlapping



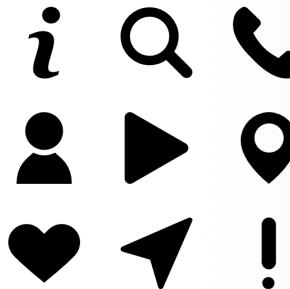
Cascading

design issues: switching between windows spacing grouping

WIMP - Icons

Interface types

easier to learn and remember, more compact than text labels
mapping can be similar, analogical or arbitrary

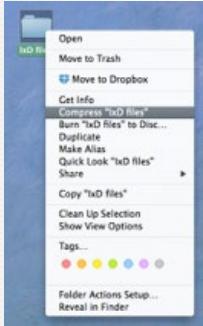


design issues: **distinguishable, identifiable, memorable**

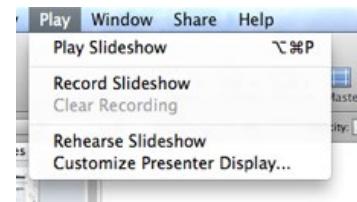
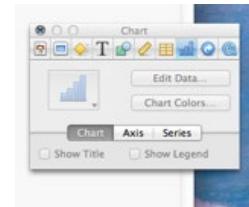
WIMP - Menus

Interface types

structured way of choosing from available options



flat lists
drop-down
pop-up
contextual
expanding



what are the benefits/limitations of each?

Web

Interface types

web usability guidelines: **simplicity, feedback, speed, legibility, ease of use**

designer's approach: **crafting great literature and art**

user's approach: **billboard at a glance**

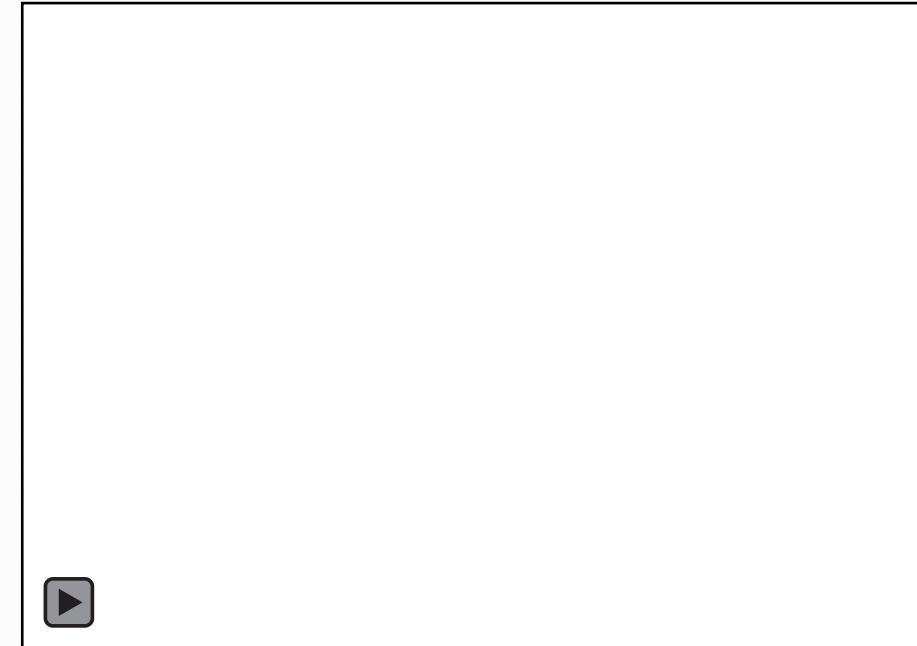
The screenshot shows the Nielsen Norman Group website. At the top, there is a navigation bar with links for HOME, TRAINING, CONSULTING, REPORTS, ARTICLES (which is underlined), and ABOUT NN/G. Below the navigation, there is a sidebar with 'Topics' including E-commerce, Intranets, Mobile & Tablet, User Testing, and Web Usability, along with a link to 'See all topics...'. Another sidebar lists 'Author' information for Jakob Nielsen, Don Norman, and Bruce "Tog" Tognazzini, with a link to 'See all authors'. The main content area features an article titled '10 Good Deeds in Web Design' by Jakob Nielsen on October 3, 1999. The article summary states: 'Summary: Ten design elements that would increase the usability of virtually all websites if only they were employed more widely.' It also notes that analyzing Web design is easy due to many mistakes that reduce usability, listing three examples: the original top-ten mistakes of Web design, the top-ten new mistakes of Web design, and the top-ten mistakes of Web project management. The text concludes by mentioning that it's hard to say what good things to do since no site is truly stellar.

design issues: **Where am I? What's here? Where can I go**

Consumer Electronics & Appliances

Interface types

machines for everyday use - getting things done



design issues: transient interfaces, short interactions, simplicity, visibility

Consumer Electronics & Appliances

Interface types

machines for everyday use – a new perspective



design issues: transient interfaces, short interactions, simplicity, visibility

Consumer Electronics & Appliances

Interface types

machines for everyday use - a new perspective



design issues: transient interfaces, short interactions, simplicity, visibility

Consumer Electronics & Appliances

Interface types

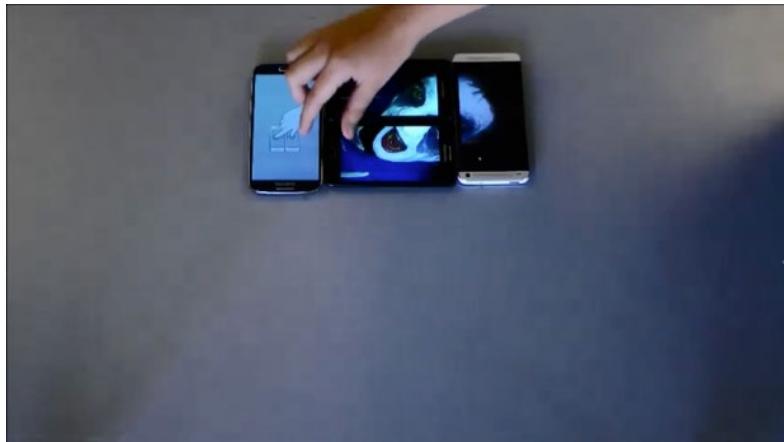
machines for everyday use - getting things done



design issues: transient interfaces, short interactions, simplicity, visibility

Speech, Pen, Touch

Interface types



Air-based gestures

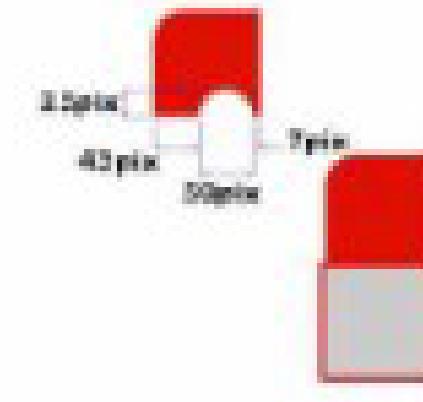
Interface types



Multimodal

Interface types

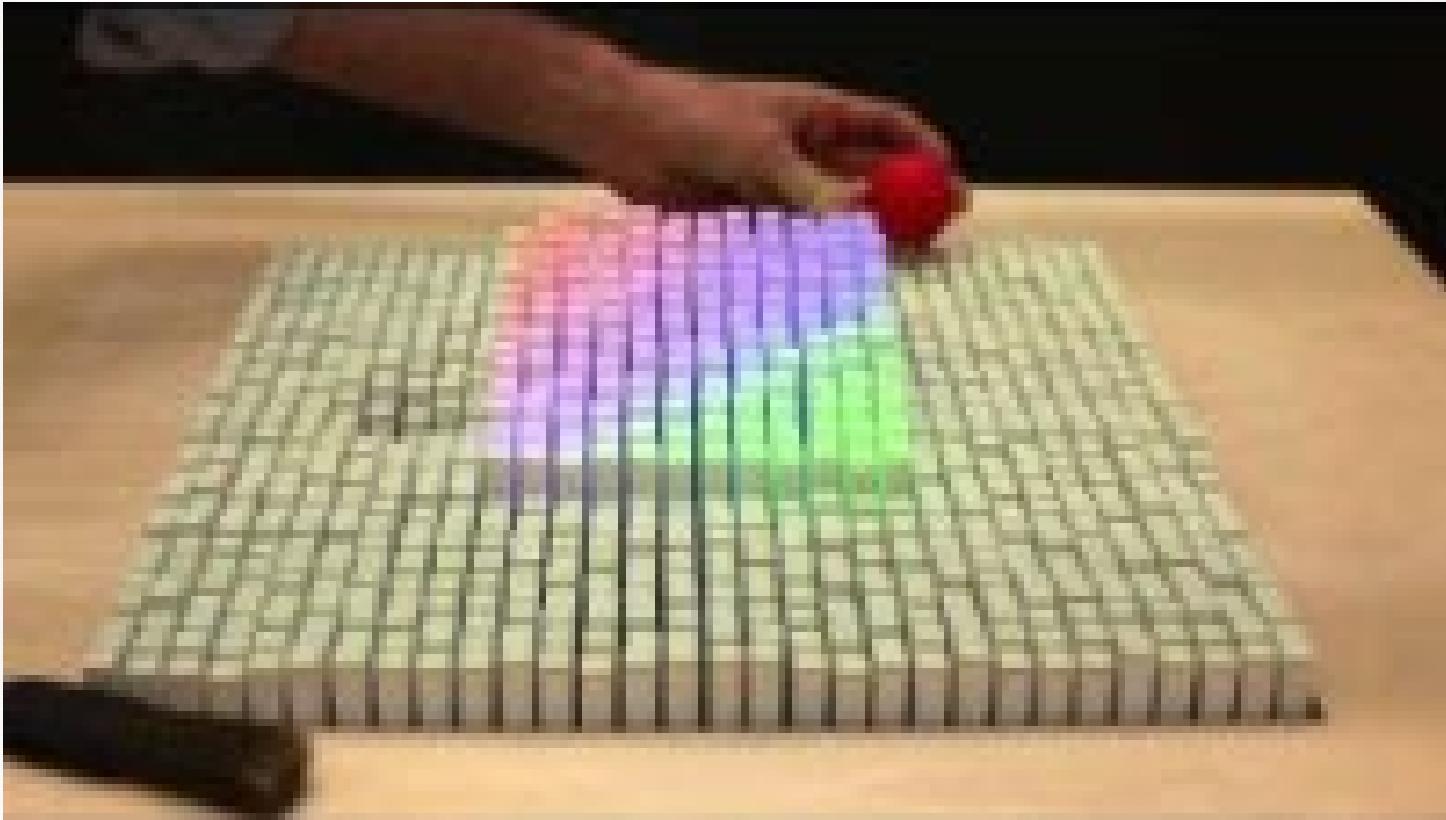
UI is controlled through different modalities (touch, sound, sight, speech)



Tangible

Interface types

UI where physical objects are coupled with digital representations



Tangible

Interface types

UI where physical objects are coupled with digital representations



Virtual, Augmented & Mixed Reality

Interface types

opportunities for new kinds of immersive experiences



Wearable

Interface types



Robots and drones

Interface types



Robots and drones

Interface types



Brain Computer Interfaces

Interface types



Random association (inspiration technique)

Interface types

Attach **adjectives** to your idea usually used to describe **people, qualities, philosophies, technologies**

Example Toaster

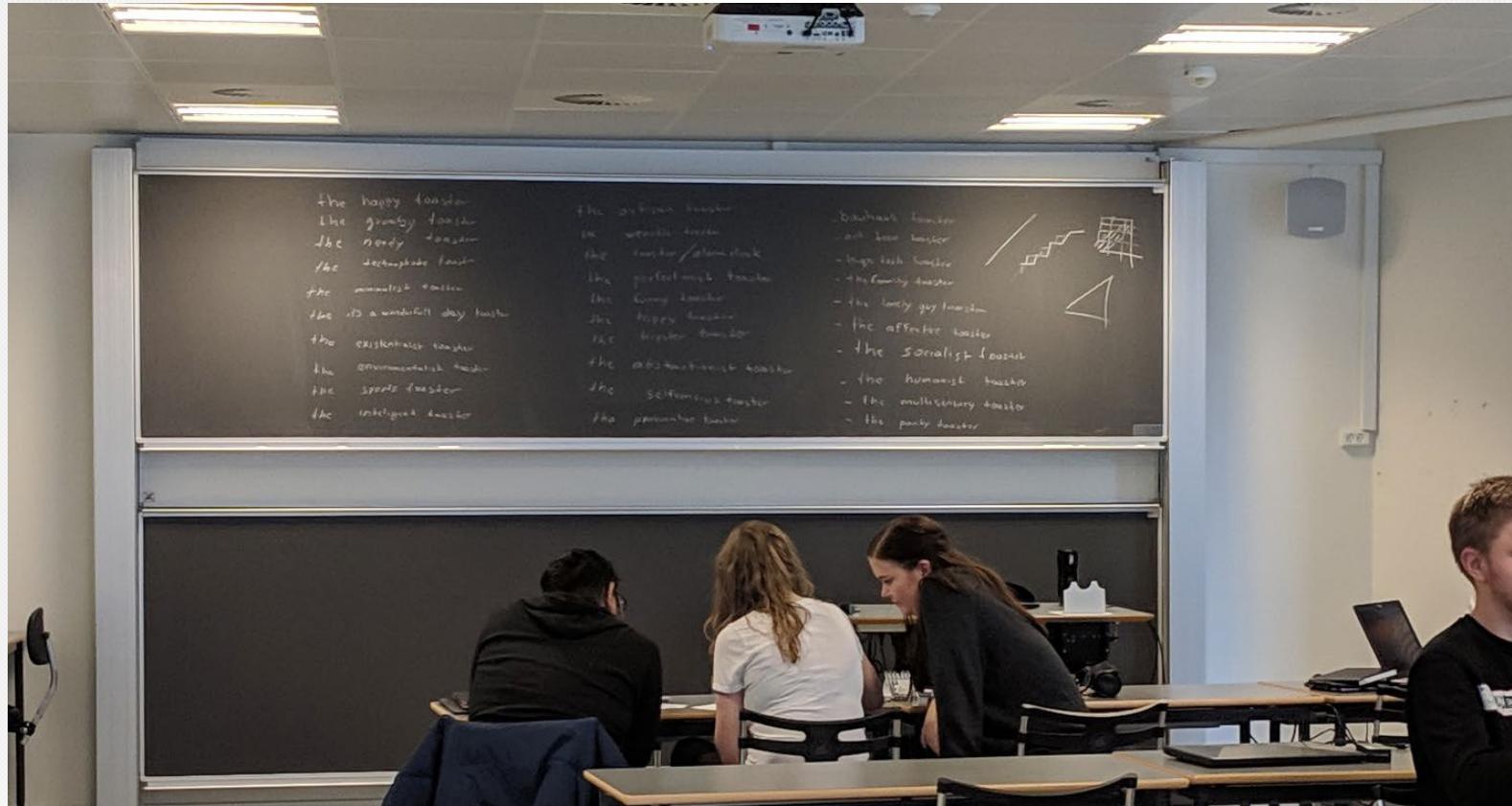


What could a toaster be? Collaboratively Write adjectives on a wall
(even some that may be silly or do not make sense)

Random association (inspiration technique)

Interface types

Example Toaster



Random association (inspiration technique)

Interface types

Example Toaster

the shared toaster
the happy toaster
the nerdy toaster
the technophobe toaster
the minimalist toaster
the "its a wonderful day" toaster
the existentialist toaster
the environmentalist toaster
the sports toaster
the smart toaster
the intelligent toaster
the emotional toaster
the wearable toaster
the party toaster

the hippy toaster
the grumpy toaster
the expressionist toaster
the abstractionist toaster
the provocative toaster
the calm toaster
the feminist toaster
the affective toaster
the lonely toaster
the socialist toaster
the family toaster
the humanist toaster
the multisensory toaster
the party toaster

Random association (inspiration technique)

Interface types

Go through the list and think about what those could be

Example the shared toaster



Discard not feasible ideas. Think about technologies, design, functionality, and interaction styles that could make it happen

Documentation

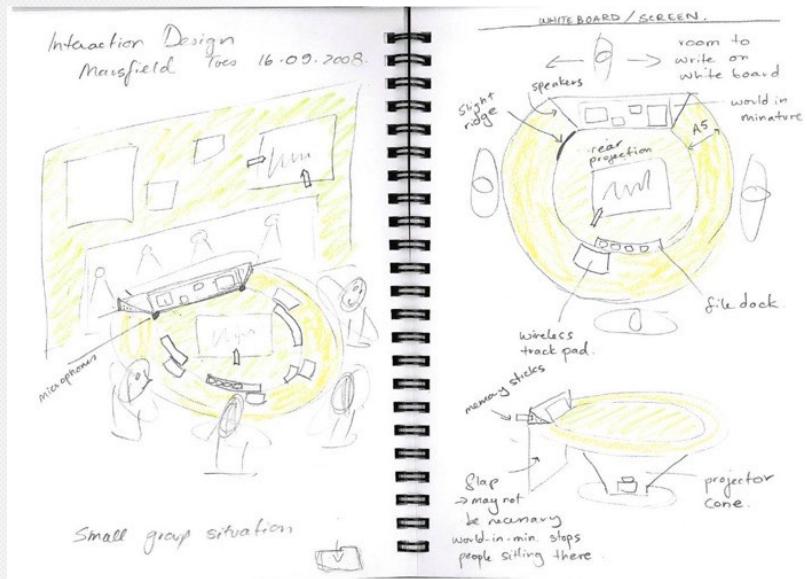
Part 2

Sketches, Mockups, and Storyboards

Sketching & Mockups

Prototyping

sketching - mockups

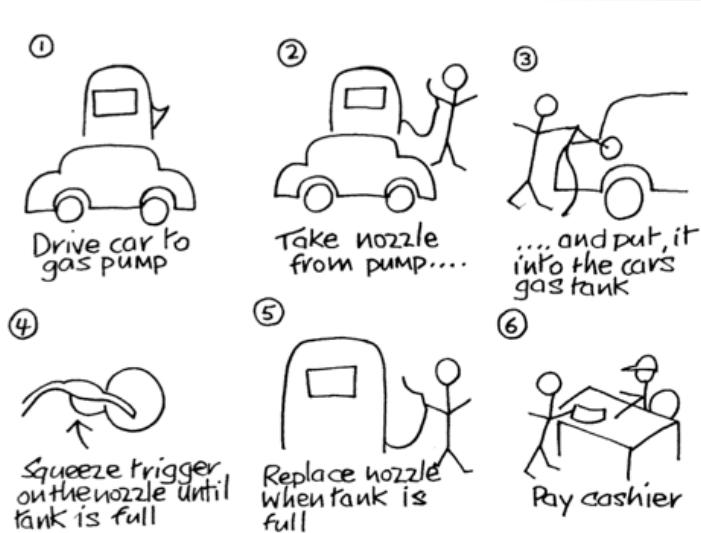
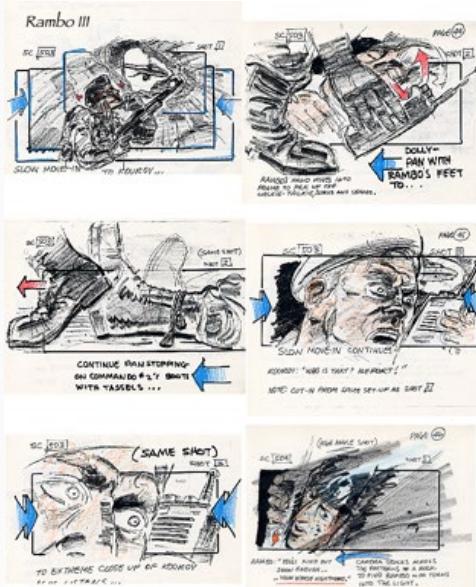


Storyboarding

What is storyboarding

Technique taken from film-making:

- key moments from the interactive experience
- get a feel for the flow of the experience



Storyboards should convey

What is storyboarding

Setting:

- people involved
- Environment
- task being accomplished

Sequence:

- What steps are involved
- what leads someone to use the system?
- what task is being illustrated

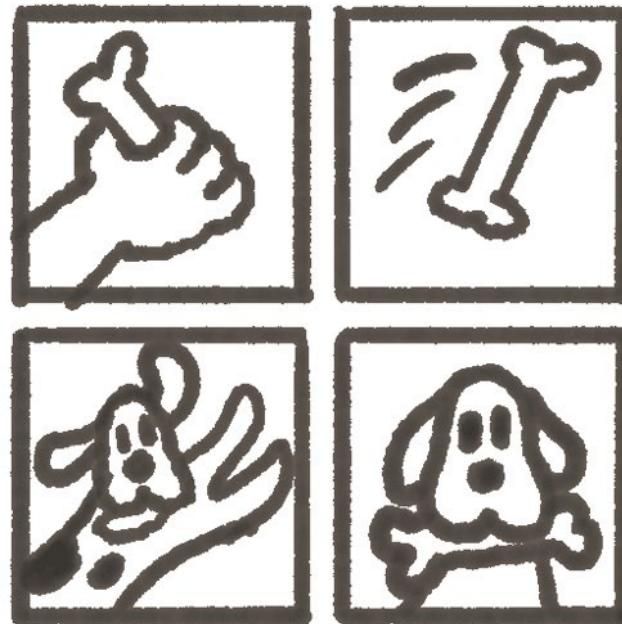
Satisfaction:

- what motivates people to use the system
- what does it enable people to accomplish
- What need does the system fulfil

Storyboards advantages

What is storyboarding

- Conceptual focus
- Avoids commitment to a particular UI
- Helps everybody understand (common ground)



Picture Scenarios

Picture scenario example



Cardboard Mockups

What are cardboard mockups



who are these aimed at?

what stage of design?

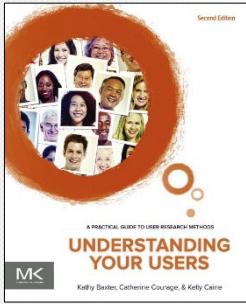
features being explored?



Reading material for this Lecture

exercise

Reading



I will provide additional external resources in the lecture slides

For the Lab session

project

Meet up in the Lab rooms and prepare to analyse User Research (primary research)

- Use as many of the new techniques as you have time for to work on refining ideas for your problems statement
- Generate Sort, Rang, and Vote for your ideas using any method you have not experimented with
- Start on a description or conceptual sketch of your final idea. Create a storyboard explaining your idea



Don't forget to take pictures of your ideation process

Obligatory assignment 2

Oblig 1



Work in groups and deliver (one submission per group)

- Write a report (max four pages) that summarises your activities over the previous two weeks (ideation)
- Use pictures and diagrams where needed to document your process
- Be reflective about your process of ideation and how you ended up with your final idea
- What type of methods did you use? Which were helpful and how?

Deadline:
October 5

Submit:
Blackboard

One
submission
per group

Obligatory assignment 2

Oblig 1



What to include

1. Short group introduction again (just names, education etc)
2. The problem statement you decided to work with after the understanding phase
3. How did you ideate? List the methods you used.
4. If you didn't use some methods, explain why?
5. Reflect on the methods you used. How were they helpful
6. Describe your final idea you chose (include a sketch or storyboard). What were the alternatives and why did you choose this over the others? Why is it a good idea?

Deadline:
October 5

Submit:
Blackboard

One
submission
per group

**There is a
template on
blackboard**