Sketching User Experiences

The Workshop

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Interaction Design Guest Lecture at LMU
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Get ready: hands-on sketching throughout the talk
filling the blank page...
CONTÉ (David Vogel)

clip-on gadget

clip-on gadget

SKETCH - SKETCH REVOLUTION

side by side

pattern maker for commissioner

Drawing:
- wing pens
- max creative freedom

Shape recognition:
- assigning functions to tip/edge

LEDs:
- in the corner

CLIP-ON GADGETS

inkwell block
- acrylic block
- opening water
- contact point on touch screen

inkwell block
- opening water

inkwell block
- opening water

inkwell block
- opening water
**CHI NOTES**

3 conditions

- constant high friction
- low friction
- variable friction

3 studies overall

Future work

- Taxonomy of sensations
- Mapping to widgets

**MAGIC DECK**

Bringing touch interaction to desktop applications

Multi-functional touchscreen

Manipulate windows, work of 2 or a large touchscreen

**ACTIVE READING**

Craig, Lakhani, GetOff!

What you can do!
vs.
What you should do!
**CHI Notes**

**Sensor Synaesthesia**

Byunyoung & Ben

![Image of a hand interacting with a phone]

**Frequency**

**Accelertometry data + Combined**

**Touch**

**Eden**:

Multitouch tool for constructing virtual (with Elham) organic environments

![Image of two figures interacting]

**Imperative of multitouch**:

- Organic environment vs. non-organic ones

**Core Positioning**

- Fine positioning
- Control

**Design Principles**

1. One gesture at a time
   - Difficult for artist to use multiple, simultaneous gestures
2. Split gestures across hands
3. Simple gestures to frequent operations
4. Motion reflects operation
5. Control at most two parameters
6. Incorporate indirect manipulation
7. Avoid long trajectories

**Describe Objects from Gestures**

Chai Hozy Bandy

1. Often describe into PRIMITIVES
2. Showing top 3 objects
3. Use sizing to remove transition gestures

Idea: differences between... 
- What about providing feedback?
Why is sketching useful?
Why is sketching useful?

- Early ideation
- Think through ideas
- Force you to visualize how things come together
- Communicate ideas to others to inspire new designs
- Active brainstorming
Thomas Alva Edison | Inventor
Edison and his staff created over

2,500

notebooks with
200-300 pages each
The Sketchbook

• capture many initial ideas
• develop variations, alternatives, details
• keep a record of your ideas
• reflect on changing thought processes over time
• communicate ideas to others by showing
• choose ones worth developing
• capture good ideas you see elsewhere
• collect photos, tape them into your book
getting the design right vs. getting the right design

(Bill Buxton)
Buxton - getting the design right
Buxton - getting the design right
Buxton - getting the design right
Buxton - local versus global maxima
Buxton - local versus global maxima
Problem: Local Hill Climbing
Instead: Getting the **right** design
Getting the right design vs. getting the design right

• getting the right design involves searching as much of a design space as possible

• once you’ve found a promising design you want to improve it as much as possible (get it right) by exploring variations (local hill climbing)
Elaboration
opportunity seeking

Reduction
decision-making

Design Process
Initial number of concepts

Initial number reduced

New ones added

Further reduction

Further addition

Further reduction

Further addition

Further reduction

Concept selected

Concept generation

Convergence
generation

Convergence
generation

Convergence
generation

Convergence
generation

Iterative:

General overall concepts

Iteration 1 exploratory

Iteration 2 clarification

Iteration 3 resolution

Granularity:

General overall concepts

Coarse significant alternatives

Medium intermediate development

Fine detailed refinement
“The best way to have a good idea is to have lots of ideas.”

Linus Pauling
Carl Liu | Interaction Designer
Clear vocabulary
Clear vocabulary

Plentiful

Buxton [1]
Clear vocabulary
Plentiful
Suggest and explore rather than confirm
Quick and inexpensive
Timely, when needed
Disposable
Minimal detail and distinct gesture
Ambiguous
Appropriate degree of refinement

Buxton [1]
PERSON-TO-LARGE DIGITAL SURFACE
Continuous interaction across discrete physical zones.

DEVICE-TO-LARGE DIGITAL SURFACE
Proximity zones around large digital displays trigger interaction on remote physical devices.

PERSON-TO-DOMESTIC ROBOT
Proximity - same environment, same space, different time (agendas)

DEVICE-TO-DEVICES (MULTIPLE LARGE QUANTITIES)
Orientation and physical distance are factors for device selection.

[Diagram with various icons and labels]
Technique: 10 plus 10
Technique: 10 plus 10

1) State the design challenge

2) **Generate 10 different designs** – as creative and diverse as possible

3) Reduce the number of design concepts

4) Choose the most promising designs as a starting point

5) **Sketch 10 details and/or variations of design concepts**

6) Present ideas to a group

7) As your ideas change, sketch them out
Technique: 10 plus 10

Both people type a word chosen by them

Rotate in a pattern where other person has to mimic it (accelerometer)
Synchronous gesture
Trace a line across both side by side devices as a single stroke

Connect

Microphones pick up spoken command at similar volume
LED Strobe pattern captured by camera

Bump! Accelerometer matches bump vibrations
Faint musical sound played on one device picked up by the other device.

Ambient light sensor touch surfaces together in a pattern; both detect the same light/dark pattern.
3 simultaneous taps on both phones
Technique: 10 plus 10

Then: Choose & Refine Sketches
“Sketches do not have to be pretty, beautiful, or even immediately understandable by others. However, you should be able to explain your sketches and ideas when anyone asks about them.”

Saul Greenberg et al., 2011
Alexander G. Bell | Engineer, Inventor
Getting Started:
Sketching Vocabulary
Hands-on Sketching (page 1)
20 SECONDS WARM-UP:

Sketch 3 stick figures:

1. Pointing
2. Running
3. Picking up an object
Sketching Actions and Emotions
Sketching Devices and Objects
Hands-on Sketching (page 2)
Getting Started: Some Best Practices

- Imitate sketching styles you like
- Add date, time (+context)
- Sketching with fast, long strokes
- Keep mistakes
- Analog before digital
- 3D is not necessary (most of the time)
Sketching Hands and Gestures
CONTINUOUS INTERACTION SPACE

(CONTINUOUS)
SAME ACTION EXTENDED

(MIRRORED)
SAME GESTURE

- OR -

DISTANCE AS INPUT PARAMETER
1-DOF

++ 3-DOF

FEEDBACK (SHADOWS)

Begin here:
scaling

Begin here:
translation
STURES ABOVE SURFACES

1. 3D SIMULATION/INTERACTION

2. INPUT PARAMETER

3. AWARENESS/FEEDBACK

4. 2.5D INPUT

5. COMPLEX GESTURES

6. TOOL SPACE
Space Above Surfaces / Themes

1. Unifying Touchgestures with Gestures Above
   (Most closely related to previous work)

   - Touch gesture
   - Asynchronous
   - Simultaneous

   Questions:
   - Type of gesture:
     - Point
     - Nudge
     - Draw
     - Finger

   - Needs review in paper
   - Look up Gestures's paper for taxonomy

   - Touch vs. Space above
   - Personal preferences
   - Interaction region

2. 2.5D Interaction / Physical Simulation
   - Concept:
     - Simulating natural movement of virtual objects on physical surfaces
     - Providing natural "pre-space" interaction with digital content

   - Interactions with Constant - Touch
   - Gestures
   - Table as surface or container
   - Physical behavior:
     - Mass
     - Gravity
     - Friction

   - Types of content?
   - Gesture to interact?
   - Snap, drag, flip
   - Behavior of objects?

3. Gestures with Tablet
   (Tablet as surface)

   - Need type of gestures?
   - Difference between surface input?

4. Two-Handed Interaction
   - Concepts:
     - Frame / Plane / Node
     - Action / Value / Continuing

5. Layers
   - Interaction with digital content layer
   - Selection of layers
   - Navigation
     - Drop
     - Insert
     - Viewing layers of data

6. Collaboration
   - Handover

7. Orientation
   - Terms of interaction?
   - Behavior of data/content

8. Physical Artefacts
   - Transferable
   - Boxes / Containers
   - Other objects?

   - How to integrate?
   - How to provide adequate feedback?
   - Other tangible objects?
   - Control?
But: “I still can’t draw...”
Sketching Technique: Photo Tracing
Sketching Technique: Photo Tracing
Sketching Technique: Templates
Sketching Technique: Templates
Sketching Technique: Templates
Hands-on Sketching: Photo Tracing (page 3)
People
Portable personal devices

Digital surfaces

Information Appliances
1. **Device to Person**
   - Relative orientation
   - Distance to person
   - "Container" "Reader" (or "Presenter")

2. **Device to Device**
   - "Container" "Controller" "Lens"
   - Distance to device
   - "Palette" "Selector" "Extension" "Picker" "Stamp"

3. **Device to Non-Digital Objects / Fixed and Semifixed Feature Space**
   - Passive "Viewer" "Picture Frame" "Overview"

4. **Device to "Information Appliances" (Subtype of device-to-device?)**
   - "Viewer" "Controller"
   - Approach

5. **Device to Fixed Feature/Environment**
   - Location & orientation relative to viewer
   - Identity of viewer?

6. **Device Properties**
   - Visible
   - Activity
   - Counter
   - People around
   - Global orientation (x and y axes)
Sketching Technique: Hybrid Sketches
Sketching Technique: Hybrid Sketches
Sketching Technique: Hybrid Sketches
Sketching Technique: Reducing to Essentials
Jørn Utzon | Architect
Source: Jørn Utzon
Source: Jørn Utzon
Minimal detail and distinct gesture
Sketching Technique: Reduce to essentials
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Sketching Technique: Reduce to essentials

Computer Telephone

Last Name:
First Name:
Phone:

CALL
HELP
Sketching Technique: Reduce to essentials

Computer Telephone

Last Name:
First Name:
Phone:

CALL
HELP
PROXEMICS

COMMUNICATE
INTERACT
ENGAGE

SPATIAL RELATIONSHIPS

VS.

SURFACES
DEVICES

UBIQUITOUS COMPUTING ECologies

PROXEMIC INTERACTION

DISTANCE
ORIENTATION
MOVEMENT
IDENTITY

NICOLAI MARQUARDT
COMMUNICATE
INTERACT
ENGAGE

PROXEMICS

OBSERVE

SPATIAL RELATIONSHIPS

COMMUNICATION

VS.

SURFACES
DEVICES

UBIQUITOUS
COMPUTING
ECOLOGIES

HELLO

DISTANCE

ORIENTATION

MOVEMENT

IDENTITY
ABC

PROXEMIC
INTERACTION

EVALUATE

DESIGN & DEVELOP

NICOLAI MARQUARDT
Sketching Technique: Wireframes
Sketching Technique: Wireframes
COMMLOGIX v1

LOAD

Mobile

Horizontal

NAV w/ dropdown

SUBMIT

WHITE

CLEAN

WIDE OR FIXED

IN A SHAPE

1 - HOME
2 - ABOUT
3 - HOW IT WORKS
4 - KEY COMP
5 - SOLUTIONS
6 - REQUEST INFO
7 - CUSTOMER
8 - FAQ
9 - CONTACT

EXPLAINS TO FULL WIDTH OF WINDOW

Footer w/ add'l info

FIRE + ENCLOSURES

DEBONED
Source: Peter Mah, http://ig.obsglobal.com/2012/10/sketching-to-make-great-user-experiences/
Hands-on Sketching: Wireframes (page 5)
Task: Sketch the essential elements of the following interface
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... and now sketch variation of this interface.
Wireframe sketches: Elements

- Header
- Tab
- Filler text
- User Picture
- Photo
- Video
- Callouts
  - Can show alerts, help, guidance or sketch annotations
- Pop-up Module
- Arrows
  - Larger ones can communicate weight, or act as labels
- Side-scrolling Module
- Drop Shadows
  - Communicate depth and bring attention to callouts or popup boxes
- Calendar
- Page curl
- Mouse Cursor
  - Quietly indicates a rollover state

Source: Leah Buley
Shortcuts: Paper Prototypes with Office Supplies
Wireframing software (e.g., Balsamiq)
Characteristics of Sketches vs. Prototypes
Characteristics of Sketches vs. Prototypes

<table>
<thead>
<tr>
<th>Sketch</th>
<th>Prototype</th>
</tr>
</thead>
<tbody>
<tr>
<td>Suggest</td>
<td>Describe</td>
</tr>
<tr>
<td>Explore</td>
<td>Refine</td>
</tr>
<tr>
<td>Question</td>
<td>Answer</td>
</tr>
<tr>
<td>Propose</td>
<td>Test</td>
</tr>
<tr>
<td>Provoke</td>
<td>Resolve</td>
</tr>
<tr>
<td>Tentative</td>
<td>Specific</td>
</tr>
</tbody>
</table>
Visual Narrative and Storyboards
Single sketch

The interface at a **single moment** in time
Single sketch

• captures user interface, but not user behaviour
• excludes dynamics of interaction over time
  – user actions
  – system responses
  – context

• doesn’t tell a story
Storyboards: A Long Tradition in Animation

Key Elements: Annotations
Key Elements: Annotations
Key Elements: Annotated Actions
Key Elements: Transitions
Creating Storyboards
Step-by-Step
The goal

1. Person passing by an advertisement board.
2. Notices an announcement and is interested in more information.
3. Taking a photo of a barcode on the poster.
4. The mobile phone downloads detailed information about the new product.
5. The person puts away the phone and turns around.
Begin with 5 empty frames
Begin with 5 empty frames

Why 5 frames?
Begin with 5 empty frames

why 5 frames?

• range between 3 and 7
• if more: try to split it up
Develop a story
Write script: 1 sentence per frame

1. Person passing by an advertisement board.
Write script: 1 sentence per frame

1. Person passing by an advertisement board.
2. Notices one announcement and is interested in more information.
3. Taking a photo of a bar code on the poster.
Sketch the individual frames

1. Person passing by an advertisement board
Sketch the individual frames

**Remember:** use sketching vocabulary and other sketching techniques we learned earlier
Select appropriate camera shots
(learning from film making)
Select appropriate camera shots
(learning from film making)

**Extreme long shot (wide shot)**
A view showing details of the setting, location, etc.

**Long shot**
Showing the full height of a person.

**Medium shot**
Shows a person's head and shoulders.

**Over-the-shoulder shot**
Looking over the shoulder of a person.

**Point of view shot (POV)**
Seeing everything that a person sees themselves.

**Close-up**
Such as showing details of a user interface a device the person is holding.
Extreme long shot
(wide shot)
A view showing details of
the setting, location, etc.
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Select appropriate camera shots

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**Close-up**
Such as showing details of a user interface a device the person is holding.
Select appropriate camera shots (learn from film making)
Key Decisions

• Should I show the user in the scene?

• **What key frames** should I use to create the sequence?
  – capture the essence of the story
  – people can ‘fill in’ the rest

• **What key transitions** should I show?
  – actions to get from one frame to the next?
Key Decisions

• How explicit do you need to be?

  Depends on what you are trying to explain
  • are the missing parts important?

  Depends on the audience
  • can your audience fill in the missing bits?
Emphasize actions and motions
Add annotations to emphasize people’s actions or thoughts, or changes happening in a device’s user interface.
The final storyboard

1. Person passing by an advertisement board.
2. Notices an announcement and is intrigued by more information.
3. Taking a photo of a barcode on the poster.
4. The mobile phone downloads detailed information about the new product.
5. The person puts away the phone and turns around.
Another storyboard example

I'm going to use my phone to keep track of my fitness goals.

Week 1

Week 2

Now I have a full garden!

Each time I exercise, I will get another item added to my garden.
Case study (Kevin Cheng):
The Square
Case study (Kevin Cheng):
The Square
Hands-on Sketching: Storyboards (page 7)
Other methods for creating storyboards
Photo-based storyboards:
Take 5 photos of key moments
Print out (50% transparency)
Add annotations
Add storyline and comments

1. Person is passing by an advertisement board
2. Notices one particular announcement and is interested in more information.
3. Takes a photo of the barcode on the post.
Result

1. Person is passing by an advertisement board.
2. Notices one particular announcement and is interested in more information.
3. Takes a photo of the barcode on the poster.
4. Detailed information appears on the phone’s screen.
5. Person turns around and leaves.
Case Study:
Microsoft Research
Cross-Device Interactions
Tablets/ devices + table + supporting micro-mobility

1. "Drop-out"
   - "Day-over" (enlarged)

2. "Shadow"

3. "Two-handed"

4. "Mirror"
"Transfer edges"

Colored borders, indicate links

EXTEND WORKSPACE

Personal & Shared Connections

1. Personal shared pockets
2. Personal shared space
3. Interact, connect

Types
direct touch

connectivity
Exploratory study: 10 participants
Foam-core mockups of devices
Tasks
Tasks

collaborative
Tasks

- collaborative
- competitive
Tasks

- competitive
- collaborative
- individual
Could be part of Figure 2 (smaller).

Dedalus Formations

[Diagram showing molecular structures with arrows indicating directions and angles.]
Detect people's f formations
Changes in micro mobility allow federation of devices
More copy digital content

Informing design

Considering Proximities of people + Proximities of devices

Lightweight federation of devices

1) Vidoes

What if

4 Techniques

But how to detect + federation of people & devices?
Tracking people’s position

- Kinect
- Orthographic projection
- Combining multiple depth images
Tracking people’s position

Kinect

Orthographic projection

Combining multiple depth images
Tracking people's position

- Kinect
- Head
- Shoulder
- Torso + devices
Learning more...
Sketching as everyday habit

The Sketchnote Handbook

The Illustrated Guide to Visual Note Taking

by Mike Rohde

the illustrator of Rework
Problem solving with simple sketches

Dan Roam
The Back of the Napkin
Solving Problems and Selling Ideas with Pictures
Expanded Edition
Sketching ideas
Visual storytelling
Sketching user experiences
Sketching workbook website:
http://saul.cpsc.ucalgary.ca/sketchbook/

References:
Jack Dorsey | Software Architect
Sketching User Experiences
The Workshop

Nicolai Marquardt
Interaction Design Guest Lecture at LMU
University College London
www.nicolaimarquardt.com