Sketching User Experiences: The Hands-on Course

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Sketching User Experiences: The Hands-on Course
Sketching
USER EXPERIENCES

The Workbook

Saul Greenberg
Sheelagh Carpendale
Nicolai Marquardt
Bill Buxton
What to expect?

Techniques and hands-on activities around sketching for human-computer interaction research.
What to expect?

Techniques and hands-on activities around sketching for human-computer interaction research.

- Part 1: About Sketching
- Part 2: Getting Started with Sketching
- Part 3: Advanced Sketching Techniques
- Part 4: Visual Narrative and Storyboards
Introduction and warm-up activity
Introduce yourself to the person sitting next to you.

For 2 minutes, one of you is **introducing yourself**, the other person is **creating a quick sketch about you** while listening.

**After 2 minutes you switch roles.**
Meet Tom Lee

Travelled for 5 years

Visited all continents

Wants to work with older / elderly people and UX

Waved in web development

Tom studied philosophy, religion, and ethics

Came back to the UK

One of jobs to fund the traveling

£7 £8

UK flag
Introduce yourself to the person sitting next to you.

For 2 minutes, one of you is introducing yourself, the other person is creating a quick sketch about you while listening.

After 2 minutes you switch roles.
PART I

ABOUT SKETCHING
Motivation: A short story about sketching
Thomas Alva Edison  |  Inventor
forms of spiral
Edison and his staff created over 2500 notebooks with 200-300 pages each

Source: The Thomas Edison Papers, Rutgers University
http://edison.rutgers.edu/
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
getting the design right vs. getting the right design
getting the design right vs. getting the right design

(Bill Buxton)
Buxton - getting the design right
Buxton - getting the design right

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Buxton - getting the design right
Buxton - local versus global maxima

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Problem: Local Hill Climbing

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Instead: Getting the **right design**

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Design is Choice

there are two places where there is room for creativity:

1. the creativity that you bring to enumerating meaningfully distinct options from which to choose

2. the creativity that you bring to defining the criteria, or heuristics, according to which you make your choices.

Bill Buxton
Elaboration
opportunity seeking

Design Process

Reduction
decision-making

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Characteristics of Sketches
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
Toru Iwatani | Designer
Source: Toru Iwatani
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
“The best way to have a good idea is to have lots of ideas.”

Linus Pauling
Carl Liu | Interaction Designer
Quick, inexpensive and disposable
But: “I can’t draw...”
“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.
Alexander G. Bell | Engineer, Inventor
“The fidelity of the sketch should reflect the depth of our thinking”

Bill Buxton
PART II

GETTING STARTED WITH SKETCHING
Sketching Tips and Tricks
Sketching Tip 1: Don’t use pencils but pens and markers instead
Sketching Tip 2: Keep your mistakes, just keep going
Sketching Tip 3:
Imitate sketching styles you like
Sketching Tip 4: Sketch with fast and long strokes (needs some practice)
Sketching Tip 5:
Sketch *analog* (pen and paper) before *digital* (tablet)
Sketching Tip 6: Sketch in 2D – three dimensions are not necessary (most of the time)
Drawing People
REALISTIC → ABSTRACT

PORTRAIT → IDEA

Source: Drawing from Scott McCloud; Slide from Eva Lotta Lamm
Drawing stick figures

Source: Ralf A. Faste Foundation
Drawing stick figures

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Expressions
Expressions

- don't know
- panic
- look, there!
Hands-on Sketching:
Drawing people
Quickly sketch 10 different stick figures:

Share ideas about what to draw with your neighbor.

For example, draw a person pointing, running, picking up an object, …
Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Star People

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Star People
Star People

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Star People
Sketch 10 star people:

Different positions, actions, movements, size, …
Changing view/perspective
Pamir / Container

Active / approval

Active / invasion
Sketching
Faces and Emotions
Eyebrows

Mouth

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Eyebrows

Mouth

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching motion (1)

- Arrows
- Motion path
- Motion lines
Sketching motion (2)

- Wiggle lines
- Ghosting
Hands-on Sketching: Drawing people, actions, emotions
Sketch 2 situations involving people (use stick figures or star people, emotions, objects, actions).

Pair activity: you tell your neighbor what situation to draw, then switch, then switch again, …
Sketching Devices and Objects
Hands-on Sketching: Objects and Devices
PART III
ADVANCED SKETCHING TECHNIQUES
Sketching Hands and Gestures
CONTINUOUS INTERACTION SPACE

(MIRRORED)
SAME GESTURE

-DIR-

DISTANCE AS INPUT PARAMETER
1-DOF

FEEDBACK
4 DIMENSIONS

BEGIN:
-translation

Begin here:
scaling
**Stokes Above Surfaces**

1. **3D Simulation/Interaction**
   - Interaction and gestures

2. **Input Parameter**
   - Video
   - Timeline navigation

3. **Awareness/Feedback**
   - Feedback of approaching hand

4. **2.5D Input**
   - Watching content

5. **Complex Gestures**
   - E.g.: handover? hand roll/yaw/pitch?

6. **Tool Space**
   - Layers?
Space Above Surfaces / Themes

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

   - Gestures start with touch & extend
   - Gestures begin from space
   - Only from space

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

   - Hitting / Slapping / Clapping / digital content
   - Types of content?
   - GESTURE to interact?
      - Snaps, drag, flick
   - Behavior of device?

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

   - Extension with graphics?

   - TOUCH?

   - Interaction with digital content layer

   - Selection of layers
   - Arrangement
   - View
   - Manipulate
   - Insert
   - Rescaling layers of data

   - Mirror?

   - Content

   - Value / Extending

   - Session

   - Node

   - How to integrate?

   - How to provide adequate feedback?

   - Other tangible objects?

   - Other objects?

   - How to integrate?

   - How to provide adequate feedback?

   - Other tangible objects?

   - Control?

   - Orientation

   - Interaction with digital content layer

   - Selection of layers

   - Arrangement

   - View

   - Manipulate

   - Insert

   - Rescaling layers of data

   - Mirror?

   - Concept

   - Value / Extending

   - Session

   - Node

   - How to integrate?

   - How to provide adequate feedback?

   - Other tangible objects?

   - Other objects?

   - How to integrate?

   - How to provide adequate feedback?

   - Other tangible objects?

   - Control?
But: “I really, really can’t draw hands…”
Sketching Technique: Photo Tracing
Sketching Technique: Photo Tracing
Sketching Technique: Photo Tracing

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching Technique: Templates
Sketching Technique: Templates

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching Technique: Templates

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Tricks for photo tracing
Tricks for photo tracing:
Begin with major outline, then add minimal details
Tricks for photo tracing:

Begin with major outline, then add minimal details
Tricks for photo tracing:
Begin with major outline, then add minimal details
Tricks for photo tracing:

*Leave space for later sketching*
Tricks for photo tracing:

**Emphasize major elements through thicker lines**
Tricks for photo tracing:

Minimal details when drawing people’s faces
Tricks for photo tracing:
Minimal details when drawing people’s faces
Tricks for photo tracing:

Minimal details when drawing people’s faces

vs.

Minimal details when drawing people’s faces
Tricks for photo tracing: Drawing people’s faces
Hands-on Sketching: Photo Tracing
Sketching Technique:
More examples of templates and photo tracing
1. DEVICE TO PERSON

- Relative orientation
+ Distance to person

"CONTAINER"  "SEMI-ACTIVE"  "READER"  "LENS" (or "PRESENTER")

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2. DEVICE TO DEVICE

"CONTAINER"  "CONTROLLER"  "LENS"

DISTANCE TO DEVICE

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3. DEVICE TO NON-DIGITAL OBJECTS / FIXED AND DELAYED FEATURE SPACE

PASSIVE  "VIEWER"  "PICTURE FRAME"  "OVERVIEW"

---

4. DEVICE TO "INFORMATION APPLIANCES" (Shall we device-to-device?)

"VIEWER"  "CONTROLLER"  "TRANSPARANT"

---

5. DEVICE TO FIXED FEATURE / ENVIRONMENT

"PALETTE"  "SELECTOR"  "EXTENSION"  "PICKER"  "STAMP"

---

6. DEVICE PROPERTIES

- Location & orientation relative to viewer
- Identity of viewer?

- Visible
- Activity
- Counter
- People around
- Grid orientation (grid vs. campus)
1. Device-to-Person
   - Relative Orientation
   - Distance to Person
   - "Container" (Active)
   - "Reader" (or "Presenter")

2. Device-to-Device
   - Distance to Device
   - "Container" (Active)
   - "Controller" (Passive)
   - "Leaves" (or "Presenter")

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

4. Device-to-"Information Appliances" (Subt of device-to-device?)
   - "Viewer"
   - "Controller"

5. Device-to-Fixed Feature/Environment
   - "Palette"
   - "Selector"
   - "Extension"
   - "Picker"
   - "Stamp"

6. Device Properties
   - Location & Orientation Relative to Viewer
   - Identity of Viewer
   - Visible
   - Activity
   - Context
   - People Around
   - Global Orientation (Angle, Movement)
Sketching Technique: Hybrid Sketches
Sketching Technique: Hybrid Sketches

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching Technique: Hybrid Sketches

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching 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

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Technique: 10 plus 10 - Example

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Technique: 10 plus 10 - Example

Both people type a word chosen by them.

Rotate in a pattern where other person has to mimic it (accelerometer) within 5 seconds.
Synchronous gesture
Trace a line across both side by side devices as a single stroke

Connect

Microphones pick up spoken command at similar volume

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
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 same light/dark pattern
3 simultaneous taps on both phones
Mutual video/photos captures identifying images such as tags via camera.
Technique: 10 plus 10

Then: Choose & Refine Sketches:

Choose the most promising designs as a starting point

Sketch 10 details and/or variations of design concepts

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Another example of 10+10
PERSON-TO-LARGE DIGITAL SURFACE
Continuous measurement of discrete physical zones

DEVICE-TO-LARGE DIGITAL SURFACE
Proactive zones around legacy digital devices. Target person detection on possible network devices.

PERSON-TO-DOMESTIC ROBOT
Proximity—same environment, same space, different time (sensor-sharing)

DEVICE-TO-DEVICES (MULTIPLE LARGE QUANTITIES)
Orientation and physical distance as filter for device selection
Sketching Technique: Reducing to Essentials
Jørn Utzon  | Architect
Source: Jørn Utzon
Minimal detail and distinct gesture
Sketching Technique: Reduce to essentials
Sketching Technique: Reduce to essentials

vs.
Sketching Technique: Reduce to essentials

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketching Technique: Reduce to essentials

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
COMMUNICATE  INTERACT  ENGAGE

VS.

SURFACES  DEVICES

OBSEVR

SPATIAL RELATIONSHIPS

PROXEMICS

UBQUITOUS COMPUTING ECLOGIES

DISTANCE

ORIENTATION

MOVEMENT

IDENTITY

PROXEMIC INTERACTION

HELLO

EVALUATE

DESIGN & DEVELOP

NICOLAI MARQUARDT
“If you want to get the most out of a sketch, you need to leave big enough holes.

There has to be enough room for the imagination.”

Bill Buxton
PART IV: VISUAL NARRATIVE AND STORYBOARDS
From single sketch to storyboard

The interface only at a single moment in time

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Storyboards: A Long Tradition in Animation

Key Elements: Annotations
Key Elements: Annotations

Image from: www.michaelborkowski.com/storyboards/images/big_bigguy1.gif
Key Elements: Annotated Actions
Key Elements: Transitions
Creating Storyboards
Step-by-Step
The goal

1. Person passing by an advertisement board.
2. Notices the 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.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
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

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Develop a story
Write script: 1 sentence per frame

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 board on the poster.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Sketch the individual frames

1. Person passing by an advertisement board

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
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.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Extreme long shot
(wide shot)
A view showing details of the setting, location, etc.
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Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Over-the-shoulder shot
Looking over the shoulder of a person.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
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.
Select appropriate camera shots

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**Close-up**
such as showing details of a user interface a device the person is holding.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Select appropriate camera shots (learn from film making)

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
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?
Emphasize actions and motions

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Add annotations to emphasize people’s actions or thoughts, or changes happening in a device’s user interface.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
The final storyboard

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.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Case study (Kevin Cheng):
The Square

Source: Kevin Cheng
Case study (Kevin Cheng):
The Square

Source: Kevin Cheng
Hands-on Sketching: Storyboards
Shortcuts and other methods for creating storyboards
Photo-based storyboards:
Take 5 photos of key moments

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Print out (50% transparency)
Add annotations

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
1. Person is passing by an advertisement board

2. Notices one particular announcement and is interested in more info.

3. Takes a photo of the barcode on the poster.

Add storyline and comments

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Overlays
Overlays

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Overlays

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Result

1. Person is passing by an advertisement board.
2. Notices a particular announcement and is interested in more information.
3. Takes a photo of the barcode on the phone.
4. Detailed information appears on the phone’s screen.
5. Person turns around and leaves.

Source: Sketching User Experiences: The Workbook, Morgan Kaufmann, 2011
Branching storyboard
(state-transition diagram)
The sequence of images sketches out a potential design for interacting with a mobile calendar agenda application.
Case Study:
Microsoft Research
Cross-Device Interactions
“Transfer edges”

Colored borders, interactive links

EXTEND WORKSPACE

“PERSONAL & SHARED CONNECTIONS”

- Personal shared pockets
- Convenient touch screen
- Click connectors
direct touch

distance

connectivity

distance

“Feedback” through with
**Distance**
- Presence
- Direct Touch
- N-Zones
- Continuous

**Orientation**
- Self: 3-DOF (+wrist)
- Facing Towards/Away
- Relative Angles (front)
- Pointers/Pointing

**Motion**

| Phone-to-Phone | Target-to-Table | Mobile-to-Table | Mobile-to-Wall Display | Human-to...
|----------------|-----------------|-----------------|------------------------|-------------
| ![Image]        | ![Image]        | ![Image]        | ![Image]               | ![Image]    |

<table>
<thead>
<tr>
<th>Human</th>
<th>Table</th>
<th>Wall</th>
</tr>
</thead>
<tbody>
<tr>
<td>![Image]</td>
<td>![Image]</td>
<td>![Image]</td>
</tr>
</tbody>
</table>

**Human-to-Device-to-Device**

- ![Image]
Exploratory study: 10 participants
Foam-core mockups of devices
Tasks
Tasks

collaborative
Tasks

- collaborative

- competitive
Tasks

collaborative

competitive

individual
Competitive

Individual

Collaborative

Competitive
F-Formations

O-Space

P-Space

Tablet

Head

Shoulder

Torso
FIGURES MSR PAPER

FIGURE 2

FIGURE 6

FIGURE 7

FIGURE 8

Map to figure 7
Combine as one figure!

Framework System
Observation

Informing design

1) influences
2) biological
3) psychological

Considering proximities of people + proximities of devices

Light-weight federation of devices?

Detect people's if formations

Change in micro-mobility allow federation of devices

More and copy digital content

4 Techniques

Video

Why are

But: how to achieve 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
Digital Sketching
Digital Sketching Favorite Software

- **Paper** by 53 (iPad)
- **Adobe** sketching apps: Line/Sketch/Ideas (iPad)
- **Bluebeam** PDF Revu (Windows)
Digital Sketching Favorite Pens

- Adonit Touch
- Adonit Jot Pro
- Wacom Bamboo pen
Learning more...
Sketching as everyday habit
Problem solving with simple sketches
Rapid (not design) sketching
Visual storytelling
Sketching workbook website:
http://saul.cpsc.ucalgary.ca/sketchbook/
Jack Dorsey | Software Architect
my status

status

authentication triples

reading

name email phone number

* in bed

* going to park

set

e-mail looks for jabber presence and sets

know someone? find 'em

find 'em

watch?
Sketching User Experiences:
The Hands-on Course

Nicolai Marquardt
University College London London
Optional techniques
The sketchbook
Sketchbook examples
Idea variations
Source: Nicolai Marquardt sketchbook, with permission.

Four different versions of an idea
Sketchbook examples

Overviews
- flow over time
- relationships

Source: Nicolai Marquardt sketchbook, with permission.

Arrows indicate relationships and flow

1. **CONTEXT VIEW** (PERSONALIZED)
   - Show possible associations, aggregates, devices
   - Show how to combine

2. **Focus on 3rd Applications**
   - See possible connections
   - Pick any

3. **Close**
   - Focus
   - Near
   - Close
Sketch examples

- Storyboards
- Overviews
  - Flow over time
  - Relationships

Source: Nicolai Marquardt sketchbook, with permission.
Five envisaged scenarios of a technology in action
Sketching Technique: Wireframes
Sketching Technique: Wireframes
Task: Sketch the essential elements of the following interface
Task: Sketch the essential elements of the following interface
Task: Sketch the essential elements of the following interface

... and now sketch variation of this interface. (using part of the templates provided)
Wireframe sketches: Elements

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

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