From Personas to Prototypes
Recap

- UCD is premised on:
  - An early focus on users
  - Early and continual user testing
  - Iterative design process

- First steps in the design process:
  - Observing users
  - Modeling users: building personas
  - Specifications evolve naturally
Agenda

- reflecting on persona-building
  - how best to organize observations to build personas?
- use-case scenarios
- low-fidelity prototyping
  - sketching
  - paper prototypes
  - storyboarding
- Wizard of Oz
How best to build personas?
Task-Based Audience Segments

- from the reading by Indy Young, *Mental Models*
  - group people who do similar things
  - ignore standard classifications, e.g., “teenagers vs. seniors”
  - what’s important is how the people behave
Grouping the tasks into groups

- List the distinguishing behaviours:
  - use a verb-noun format and brainstorm ~200 items
  - reduce this set into ~50 groups based on similarity
- Organize the behaviours into similarity groups:
  - e.g., “People who are in the cafeteria to study tend to…”

<table>
<thead>
<tr>
<th></th>
<th>To eat</th>
<th>To study</th>
<th>To socialize</th>
</tr>
</thead>
<tbody>
<tr>
<td>use a laptop or smartphone</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>laptop open on myCourses</td>
<td></td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>go straight to food serving area</td>
<td>x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>sit solo</td>
<td></td>
<td>x</td>
<td>x</td>
</tr>
</tbody>
</table>
Forming groups of task-based segments

1. reorder so that similar rows are adjacent
2. delete rows with all (or mostly all) x’s (universal task)
3. form approximate clusters or “chunks” of similar patterns
4. name the chunks – these are your “personas”
Use-case scenario

- Who is the persona involved?
- What the user wants to do? (task model)
- What happens?

- Focus on activities and the context
Which is a better use-case scenario?

Use Case 1.1: Withdraw money from an ATM

Withdraw money from an ATM

Primary actors: Customer
ATM Technician
Bank

Preconditions: Network connection is active
ATM has available cash

Basic flow of events:
1. Bank customer inserts debit card and enters PIN.
2. Customer is validated.
3. ATM displays actions available on ATM unit. Customer selects Withdraw Cash.
4. ATM prompts account.
5. Customer selects account.
6. ATM prompts amount.
7. Customer enters desired amount.
8. Information sent to Bank, inquiring if sufficient funds/allowable withdrawal limit.
9. Money is dispensed and receipt prints.

Alternative flows
2a. Customer is not validated.
   2a.1. ATM displays error message.
7a. Customer selects invalid amount.
   7a.1. ATM prompts user to re-enter valid amount.
8a. Customer has insufficient funds.
   8a.1. ATM displays error message.
   8a.2. ATM shows available withdrawal limit, redirects to step 6.
9a. ATM has insufficient cash.
   9a.1. ATM Technician is alerted.
   9a.2. ATM displays error message and phone number to call.
9b. Cash gets stuck in dispensing.
   9b.1. ATM displays error message.

Use Case #1: Let the user view a stored order

User Classes: all

Purpose/Goal: 5/user/day

User Actions
- user enters order number he wants to view
- user enters order number, but it doesn’t exist

System Responses
- order is displayed, with details shown
- error message: no such order number found
- user does something
- next response is also shown on a sticky note
- can group related responses together
The winner

- use-case scenario should focus on the context
- should be specific, but not interface-specific
- describe all aspects of the task but don’t explain “how the user does it”
**Use-case scenarios**

### Persona

#### Attributes
- Observant, focused, meticulous, goal-oriented, busy with lectures, lab and material to study and prepare for next session (no time to waste).

#### Decision Points
It is important for him to have access to the key reading material. Questions like: "What is the next material to prepare for the following lab session?", "Where can I review (video, text format) the lab session from last week?"

He is away from the McGill Simulation Centre, but he learned about a guest lecture he would like to attend. He wishes he could see and interact in this session.

#### Associated User Profiles
- First year students (all dissection or Anatomy lab)
- Higher year students learning basic surgical procedures
- Residents, and/or Senior Surgeons learning new surgical techniques

## Use-case scenarios

<table>
<thead>
<tr>
<th>Scenario</th>
<th>Mindset</th>
<th>Desired Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>He needs to read and prepare for the next lab session, he is questioning to himself: “What is the next class objective? What is the key material to read for this?”</td>
<td>Inquisitive, Busy</td>
<td>Quick access to the next lab session. All resources together at one place.</td>
</tr>
<tr>
<td>While he is at the lab session, he is aware about the importance to remain attentive at the procedure.</td>
<td>Observant, focus</td>
<td>During the first lab session on this topic, he wishes to be guided through the procedure.</td>
</tr>
<tr>
<td>After the lab session, he would like to have the video recording of the lab session. He would like to at his own pace, reviewing any missed spots, view points and take notes.</td>
<td>Methodical, analytical,Persevering</td>
<td>Material to follow up on lab session, and now is time to revisit the material. He would need a tool that allows him to play, pause, annotate, review any view point pertinent to enhance his knowledge.</td>
</tr>
<tr>
<td>He is now a resident in a remote location to the McGill Simulation Centre; he learned about a guest surgeon session and wishes to view the session on his computer. Ideally in live mode so he can ask questions or see the surgeon actions and decision points.</td>
<td>Inquisitive, curious, Interested in following remote lab sessions in an interactive manner</td>
<td>He wishes to be informed of any remote sessions for residents at the Simulation Centre, easy access to the LIVE video streams of the session and related resources.</td>
</tr>
</tbody>
</table>

**Most Desired Features**

Tool that allows me to learn, study and review various activities done in the laboratory (i.e. dissection sessions, surgical techniques). Quick access to relevant / contextual material (literature) is an important asset.

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*Medical student profile & use-case scenario: credit: Adriana Olmos*
**Attributes**
Organized, meticulous, goal-oriented, no time to spare, nevertheless always sets time to plan and prepare any surgical procedure at hand.

**Decision Points**
Interested in tools that allow their students to watch + study / read + re-watch a surgical session.

Attracted to systems that allow him to easily point his students to the key aspects of a lab procedure, e.g., where to focus and pay attention.

Concerned by the subsequent usage of any medical material (prevent public morbid curiosity).

**Associated User Profiles**
First year anatomy / dissection lab (tutor)

Anesthesia techniques (tutor)

Surgical techniques (tutor)

Guest surgeon invited to give an endoscopic session

**Scenario**
He is invited to give a surgical session at McGill University. For this he needs to know his audience (students’ year), to establish the session objectives, application and preparation of pre-study (reading) material.

**Desired Features**
Ability to easily pre-deliver content and study material so that the students review it before the lab session.

Interested in testing devices like “SurgiCam” while teaching certain surgical procedures. This is in order to present the different viewpoints that he looks at while performing an operation.

**Mindset**
Preparation mode
Methodical and analytical thinking

While delivering the surgical session to the students, he needs to point at the parts in a surgery procedure that are important to pay attention to.

Enjoys reading about and testing new surgical and teaching tools (ideally non-obstructive and that are easy to learn to operate).

He would like to point at video content and other resources where his students can re-watch and further study after the lab session.

Goal-oriented

Quick and easy access to other resources and teaching material, including the session just completed.

**Most Desired Features**
“Video system that will allow me to guide the students while teaching a dissection or surgical technique... Objective and contextual information related to the subject of the study is an important asset pre- and post session.”

_Surgery tutor profile & use-case scenario: credit: Adriana Olmos_
Why prototype at low fidelity?

- explore many alternative solutions with low costs and little risk
- encourages experimentation, honest critique, rapid iteration
- keeps teams from getting too attached to one solution

Credit: nForm User Experience Consulting Inc.
## Prototyping Options

<table>
<thead>
<tr>
<th></th>
<th>Low-fidelity</th>
<th>High-fidelity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Examples</td>
<td>screen sketches, cardboard mock-ups, paper prototypes, storyboarding, user manuals, tutorials</td>
<td>computer simulations, animations, interface builders</td>
</tr>
</tbody>
</table>

### PROS
- quick and easy to build
- let user see more detailed interaction
- quick and easy to modify
- can test more subtle issues
- helps users concentrate on "big picture"

### CONS
- often react to details - miss "big picture"
- incomplete; misses subtle interface details
- might think it is final product
- hard to visualize progression
- reluctance to challenge
Sketching and Prototyping

[Credit: Saul Greenberg]

**Early design**
- Brainstorm different representations
  - Choose a representation
  - Rough out interface style
- Task centered walkthrough and redesign
  - Fine tune interface, screen design
  - Heuristic evaluation and redesign
  - Usability testing and redesign
- Sketches & low fidelity paper prototypes

**Late design**
- Medium fidelity prototypes
- Limited field testing
- Alpha/Beta tests
- High fidelity prototypes
- Working systems
- Working systems
<table>
<thead>
<tr>
<th>What to Do</th>
<th>What you selected</th>
</tr>
</thead>
<tbody>
<tr>
<td>Touch a different color or scan another item</td>
<td>JPA stroller</td>
</tr>
<tr>
<td></td>
<td>Green</td>
</tr>
</tbody>
</table>

<table>
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<tr>
<th>Item</th>
<th>Style</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>JPA stroller</td>
<td>Green</td>
<td>98.00</td>
</tr>
</tbody>
</table>

**Total:** 124.97

All done? [Order] [Print] [Discard]
What to do
Touch a different color, or scan another item.

What you selected
JPG Stroller
For children between 1-3 years old ...$98.

- Green
- Blue
- Red (out of stock)

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<td>98.00</td>
</tr>
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</table>

tax: 6.98

Total: $104.98

All done?
Place your order  Print this list  Throw this list away
The attributes of sketches
[Bill Buxton, Sketching User Experiences]

- **Quick**
  - to make

- **Timely**
  - provided when needed

- **Disposable**
  - investment in the concept, not the execution

- **Plentiful**
  - they make sense in a collection or series of ideas

- **Clear vocabulary**
  - rendering & style indicates it’s a sketch, not an implementation

- **Constrained resolution**
  - doesn’t inhibit concept exploration

- **Consistency with state**
  - refinement of rendering matches the actual state of development of the concept

- **Suggest & explore rather than confirm**
  - value lies in suggesting and provoking what could be i.e., they are the catalyst to conversation and interaction
Storyboarding

- a series of key frames as sketches
  - originally from film; used to get the idea of a scene
  - snapshots of the interface at particular points in the interaction
- users can evaluate quickly the direction the interface is heading

Excerpts from Disney’s Robin Hood storyboard, [www.animaart.com/Cellar/disneyart/90robin%20storyboard.jpg.html](http://www.animaart.com/Cellar/disneyart/90robin%20storyboard.jpg.html)
Storyboarding

- emphasis on presenting overall interaction style
- don't aim for a “pretty” mock-up
Tutorials as Storyboards

- a step by step storyboard walkthrough with detailed explanations
- written in advance of the system implementation
- also serves as an interface specification for programmers

A directory title shows you the name of the folder you’re presently working in—in this case, the TeachText Folder. The box beneath it shows you all the other items in the TeachText Folder that you can open with this application—in this case, only the Memos Folder.

Apple’s Tutorial Guide to the Macintosh Finder
Medium Fidelity Prototypes

- Prototyping with a computer
  - Simulate some of the interface features
  - Can test more subtle design issues

- Dangers:
  - Reactions are often “in the small”
  - Users reluctant to challenge designer
  - Users/managers might think it’s the “real thing”
Scripted Simulations

- Create storyboard with media tools
- Users given tight script to follow
  - Feels like a real system …
  - Until you deviate from the script!
Initial screen

Scan the stroller ->

Change the color ->

Place the order ->
Alternate path...

Scan the shirt ->

Delete that item->

Touch previous item ->
**Wireframe**

**What:**
One step past sketching shows the layout of an interface screen. Describes each element and behavior. Focus is on layout, labels, and interactions. Avoids finished design elements such as color and photos, instead using placeholders for images, and sometimes copy.

**Why:**
Communicate the specifications for individual pages or templates. Also used as prototype for usability testing. Prevents premature conversations about surface issues like color, instead focuses discussion on correct and complete content and functionality.

Credit: nForm User Experience Consulting Inc.
Hands-on Storyboarding
[Sue-Tze Tan, Dept Industrial Design, University of Washington]

- interactive foam core and paper sketch/storyboard
Pictive
Plastic Interface for Collaborative Technology Initiatives through Video Exploration

- designing with office supplies
  - multiple layers of sticky notes and plastic overlays
  - different sized stickies represent icons, menus, windows etc.
- interaction demonstrated by manipulating notes
  - new interfaces built on the fly
- session videotaped for later analysis
  - usually end up with mess of paper and plastic!

Photos from Nielsen Norman Group
Wizard of Oz
[Gould, Conti & Hovanvecz, CACM, 1983]

- A method of testing a system that does not exist
  - the listening typewriter, IBM 1984

What the user sees
Wizard of Oz

- Human ‘wizard’ simulates system response
  - interprets user input according to an algorithm
  - controls computer to simulate appropriate output
  - uses real or mock interface
  - wizard sometimes visible, sometimes hidden
    - “pay no attention to the man behind the curtain!”

- good for:
  - adding simulated and complex vertical functionality
  - testing futuristic ideas
The Basic Materials

- Large, heavy, white paper (11 x 17”)
- 5 x 8” index cards
- Post-its
- Tape, stick glue, correction tape
- Pens & markers (many colors & sizes)
- Overhead transparencies
- Scissors, X-acto knives, etc.
Constructing the Model
[Credits: Mandryk, Greenberg, and Landay]

- Set a deadline
  - don’t think too long - build it!
- draw a window frame on large paper
- put different screen regions on cards
  - anything that moves, changes, appears/disappears
- ready response for any user action
  - e.g., have those pop-up menus already made
- use photocopier to make many versions
Constructing the Model
Low-fidelity Prototyping Exercise
“Undersea Window” Project
User and Task Profile

Persona:
- Jane is an Ocean Science researcher with typical office computer skills, working in a lab environment.
- She is using an underwater camera as part of her current research project.
- Jane spends 5-60 minutes/day monitoring her the underwater environment, often with some interruptions.

Tasks:
- Monitoring objects from a few mm (plankton) to a few cm (worms), to 50 cm (flat fish) in length, usually within a particular area of interest.
- Pointing camera at an area of interest, zooming in/out, adjusting focus.
Hardware

- **Camera:**
  - Panasonic AK-HC1500G HD camera with 3 x 2/3” CCD
  - sensitivity of 80 lumens per m² at F2
  - titanium housing + correction optics

- **Lens:**
  - Canon HJ22ex7.6B 22x zoom
  - 2x extender
  - supports 1080i and 720p HD

- **Lighting:**
  - DeepSea Super SeaArc HID light 12,000 lumens
  - Two dimmable ROS LED SmartLights 400 lumens per light
  - *(but you will ignore these)*

- **Pan-tilt unit:**
  - ROS heavy duty, oil-filled unit
  - Position feedback for both axes
Exercise

- in groups, design a user interface for the camera control UI sketching out the overall UI design (15 minutes)
- Construct a low-fidelity prototype of your design that can be evaluated by another group (30 minutes)