

**MAYOCLINIC** ORGHTQVONGKLIRJWAB4  
**PROJECT** NGRAABHJKREAKBJWWEAGH  
EAJGKNB4QB4GG34Q8TUGNVARWJGBE  
AKWBFKABGIWRH832YT3UO4GHJKRBA  
JK;F3IUT4NGJLWABLJ'2PTOHIOA'BGJC  
ENAGTIO42QJ'IGEDNJLBGIO42HITO4GH  
WLABNGJNWRTI24TD **PROCESSBOOKU9**

Shaziya Tambawala × (Nicole)Ning Xu  
MS-HCI, Class of 2016

LMC 6650 NJ | 8 Weeks Class Project | Fall 2015

# Table of Contents

<b>Problem Space Description</b>	<b>1</b>
<b>Design Challenge</b>	<b>2</b>
<b>Strategy</b>	<b>3</b>
<b>Proposed Solutions</b>   Prototype 1, Prototype 2	<b>4</b>
<b>Design Process</b>	<b>6</b>
Week 1   Stakeholder interview and 1st brainstorming .....	7
Week 2   Observations and 2nd brainstorming .....	9
Week 3   Class critique 1 and 3rd brainstorming .....	11
Week 4   Idea generalization and class critique .....	13
Week 5   Iteration .....	20
Week 6   Iteration .....	23
Week 7   Usability testing .....	24
Week 8   Iteration and final presentation .....	26
<b>Reflections</b>	<b>28</b>
<b>Appendix</b>	<b>29</b>

# Problem Space

- **Patients and clinicians have different expertise** when it comes to making consequential clinical decisions. While clinicians know information about the disease, tests and treatments, the patient knows information about their body, their circumstances, their goals for life and health care.
- **The choice of depression medications in primary care is difficult** as there are many choices and the best evidence does not indicate a clear winner in terms of efficacy.
- *How can a decision aid, one which presents issues that patients care about, be designed to facilitate patient-doctor conversations during the clinical encounter?*

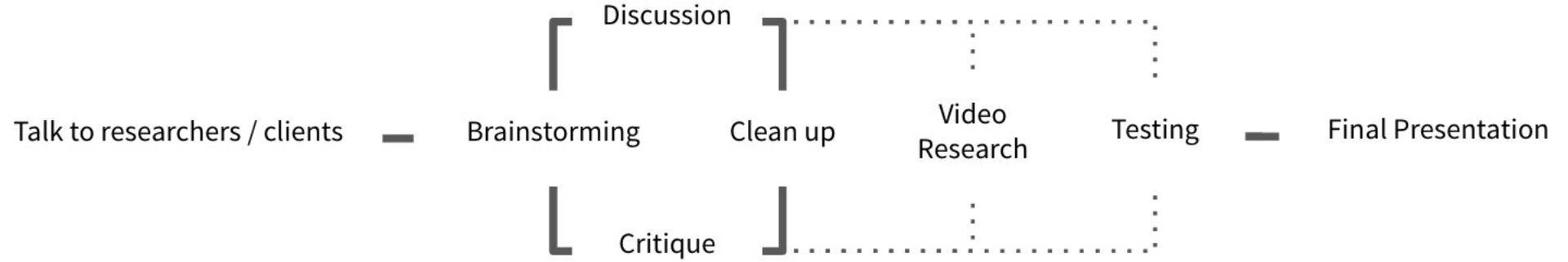


# Design Challenge

- Avoid quantification/ calculation
- Fluid interaction - flat structure
- Accommodate various scenarios
- No mental model to refer to
- Real-estate problem
- Can't have tutorial, interaction is required to be intuitive and users should be able to use it with minimum instructions; can't interrupt with the conversation
- The design should support both user groups: patients and physicians
- Avoid creating just a decision making tool for independent usage by patients



# Strategy



# Prototype 1

*Parallel Coordinates*  
[marvelapp.com/13be9i7](http://marvelapp.com/13be9i7)

- Information Visualization design method
- Presents all options : **Overview**
- Allows comparison and selection : **Drill Down**
- Key features: **Fluidity, Color coding**

**Making Wiser Choices About Medicines**  
A take-home guide to help patients compare depression medicines

*Will this medicine work for me?*

- The **antidepressants** presented in this decision aid **all work the same** for treating depression.
- **Most people** with depression can **find one** that can make them feel better.
- **6 out of 10 people** will feel **better** with the **first** antidepressant they try and the rest will have to try other antidepressants before they find the one that is right for them.

*How long before I feel better?*

- Most people need to take an antidepressant regularly for **at least 6 weeks** to begin to get the **full effect**.

*Understanding side effects*

- Most people taking antidepressants have **at least one side effect**.
- Many side effects **go away after a few weeks**, but some only go away after you stop the medicine.

**GOT IT >**

**MAYO CLINIC**  
This information reflects the best available research studies. It was prepared by Mayo Clinic researchers without funding from makers of depression medicines.

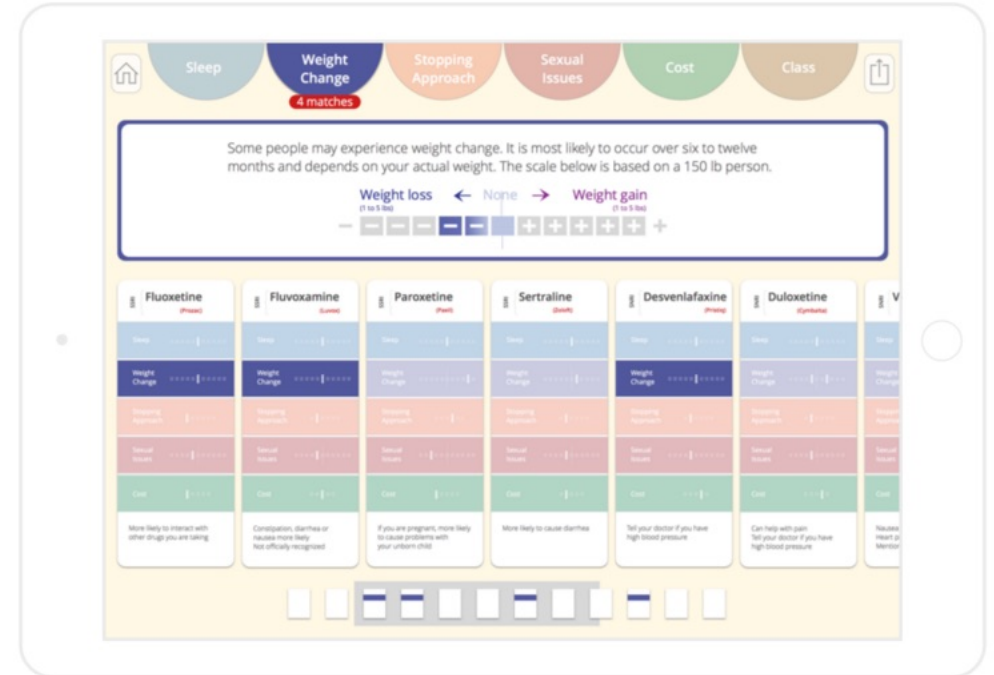
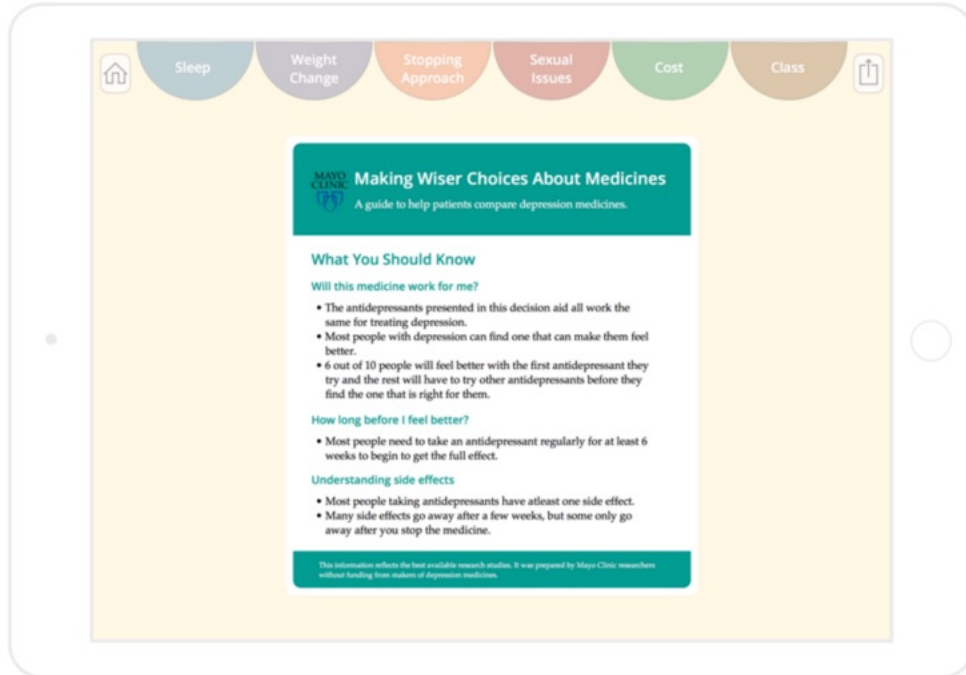




# Prototype 2

*Cards as Medicines*  
[marvelapp.com/ci75j7](http://marvelapp.com/ci75j7)

- Process based design method
- Presents factors in a sequence
- Allows for comparison and selection
- Key features: **physical form to virtual entities**



## Design Process

8 weeks

7 rounds of iterations

3 usability testings

*We followed a user-centered design approach, did quick iterations based on heuristic evaluations and usability testing feedback. During design and presentation, we adopted role playing and conversation based strategy in order to mimic the clinical settings.*



# Stakeholder Interview *Sep.22*

- Spoke with Mayo Clinic researchers to clarify the design challenge
- Pros and cons of the current physical cards
  - pros** | *low cost, secure, safety, comfort, reliability, readability*
  - cons** | *hard to update, maintenance problem, limited presentation, no easy comparison, no easy sharing*
- The history of card design (*iteration, observation, scenario, validation*)
- Competitives, expected platform, data source





# 1st Brainstorming Sep.25

- This happened prior to studying videos in order to avoid bias
- 2 design directions  
*innovate the process*  
*new information visualization techniques*
- 3 design models/ criteria  
**Weaver** | *self report, choose factor, rate concern level*  
**Goffman** | *peer's choice, survey to match persona*  
**Dewey** | *facilitate conversation, go back and forth*
- 10 design ideas  
*multi-platform explorations*

Studied 3 videos from Mayo Clinic showing the usage of physical medication cards during actual clinical encounters

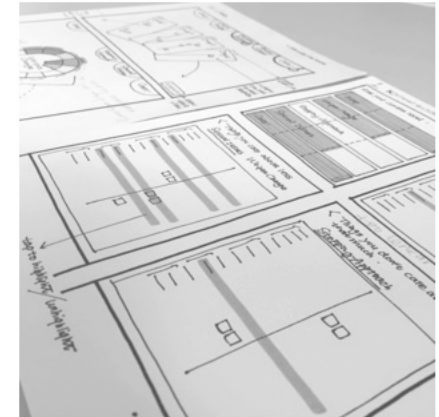
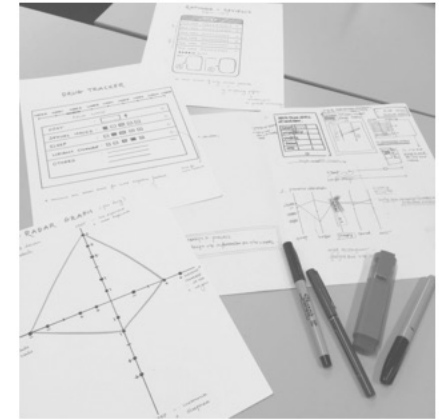
- *Various usage scenarios*
- *Different conversation strategies*
- *Generated basic function requirements*
  
- *Acknowledgement from the patients getting involved*
- *No voice or video recording*

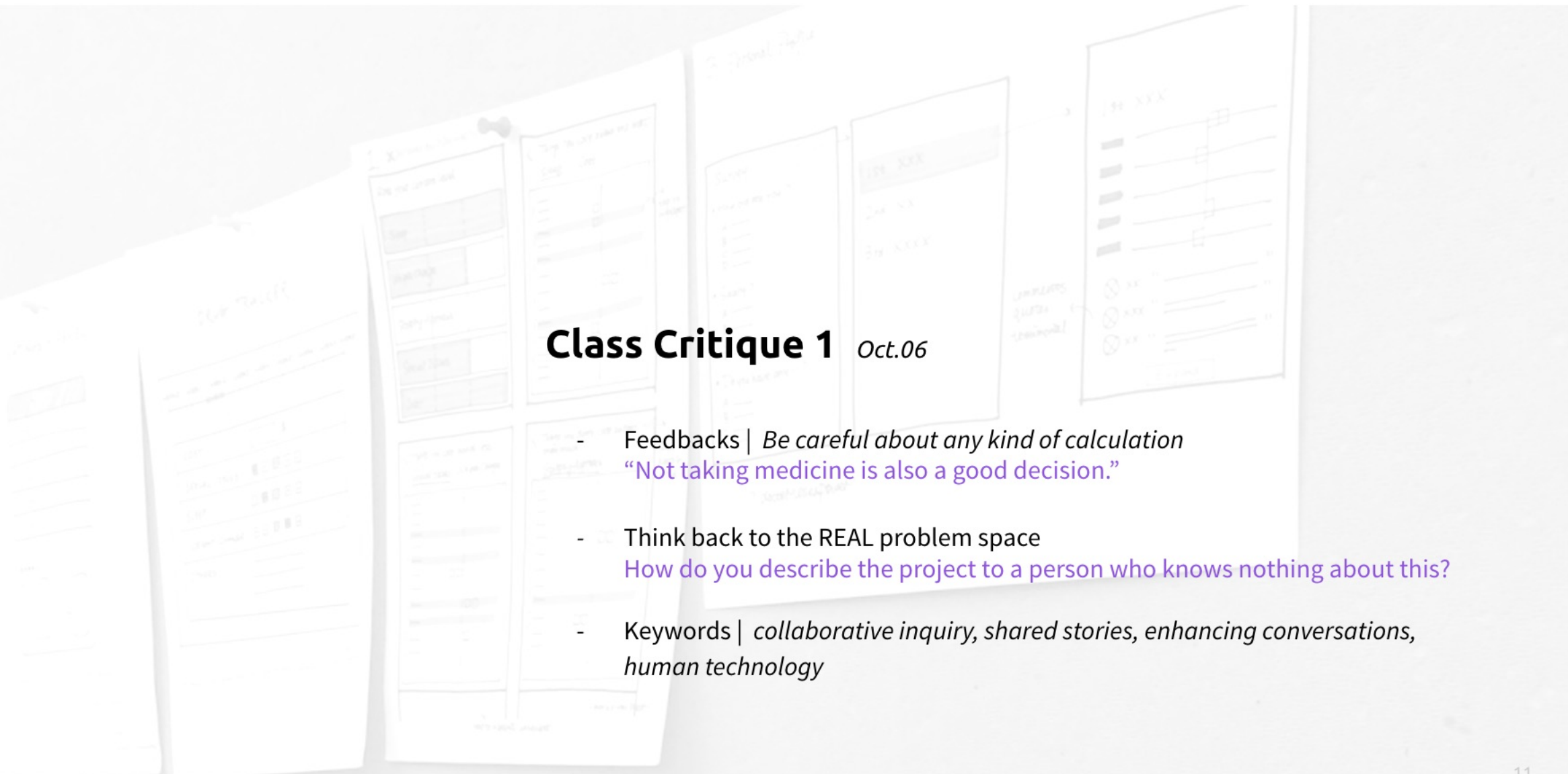


**Observations** Sep.26

## 2nd Brainstorming *Oct.02*

- Reviewed current ideas
  - Radar graph** | *hard to compare because of overlapping*
  - Drug tracker** | *feelings are hard to scale, different criteria for different people so can't compare*
  - Ratings and reviews** | *what are the inputs from patient, doctor may lose power, privacy issue*
- Refinement and discussion about the new ideas





## Class Critique 1 Oct.06

- Feedbacks | *Be careful about any kind of calculation*  
“Not taking medicine is also a good decision.”
- Think back to the REAL problem space  
How do you describe the project to a person who knows nothing about this?
- Keywords | *collaborative inquiry, shared stories, enhancing conversations, human technology*

## 3rd Brainstorming *Oct.09*

### Problem of the current designs

- Too clinical tone | *try to be narrative about the scales by using life scenario*
- Not transferring all information on the physical cards | *what you should know, grouping, price*
- No images for pills
- More emphasis on promotional names
- Rely too much on the elimination model | *when criterias are too narrowed, result can be useless*

### Start over | *What enhances clinical conversation*

- music
- constantly receiving feedbacks
- emotion “anchor” (pillow, stuffed animal etc.)
- doodling
- stress ball
- sandplay | *in psychological treatment*

**2** ideas for iteration: parallel coordinates, cards

## 4th Brainstorming

Oct.18 via Google Hangout

Realized that we might be in the wrong direction for the previous design without focusing on enhancing conversation

### IDEA I

An interactive room that can separate and combine, with a splittable screen wall, sound proof

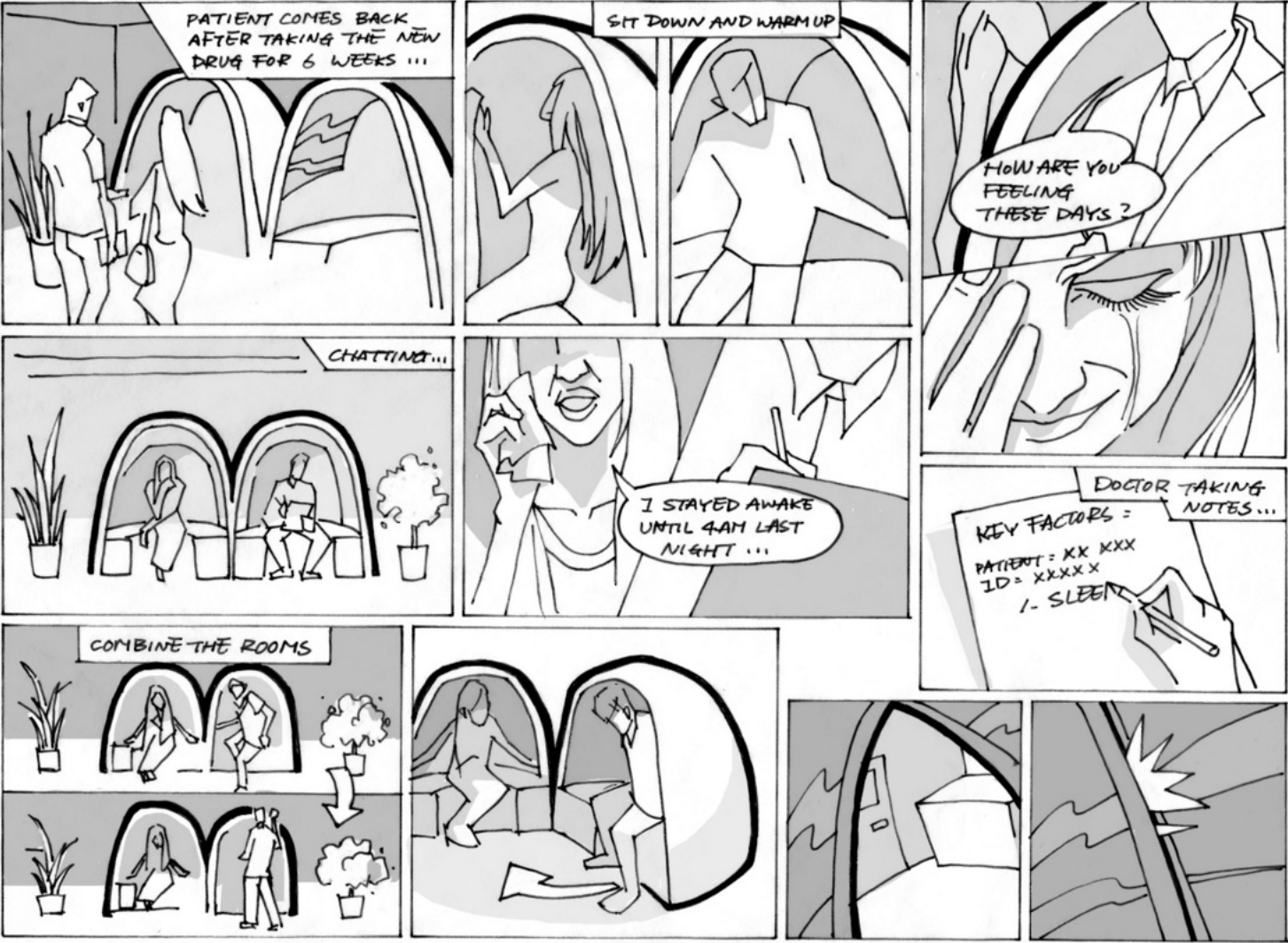
- *people feel uncomfortable to talk when face to face*
- *sense of insecurity in open space*

### IDEA II

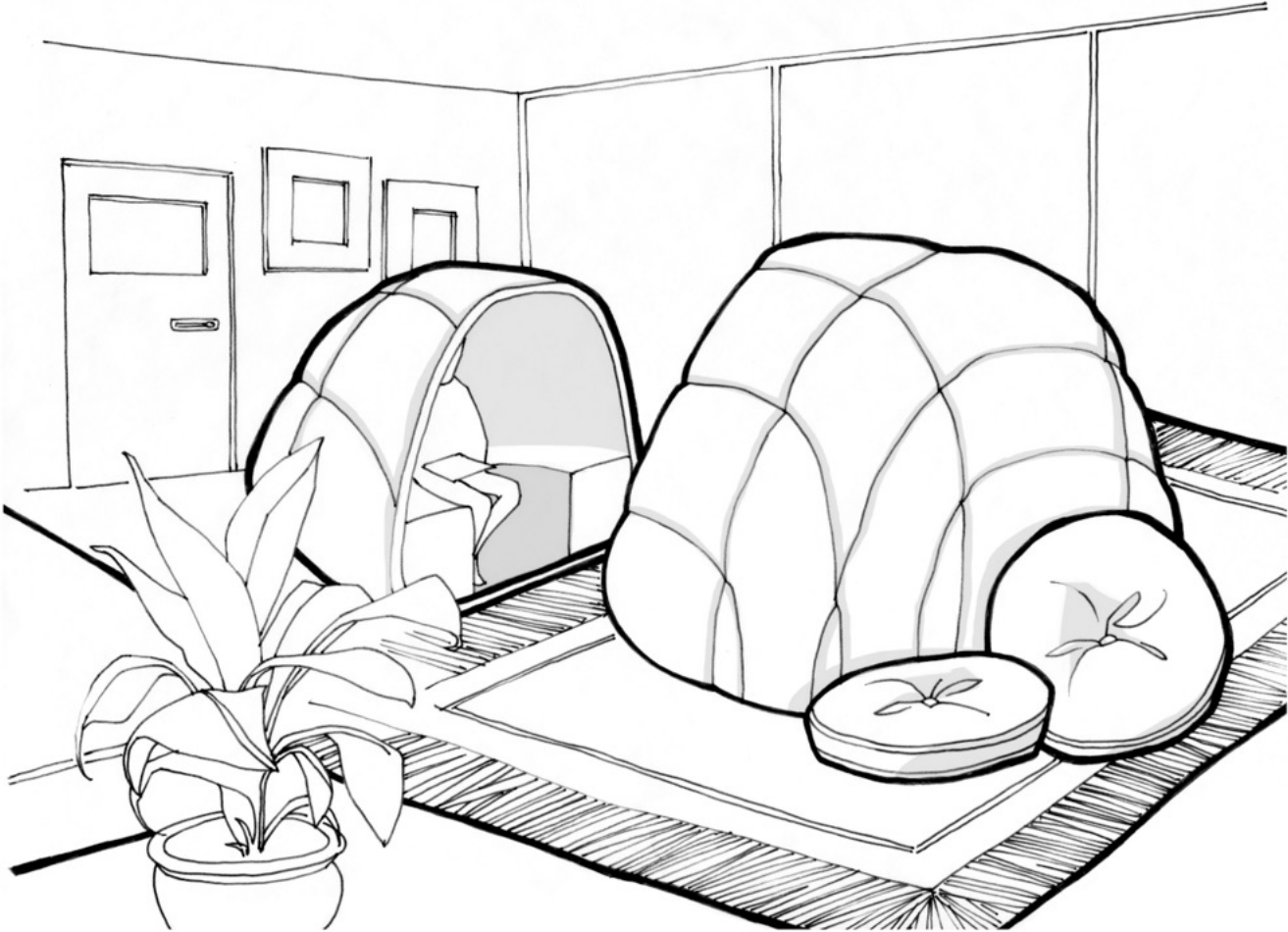
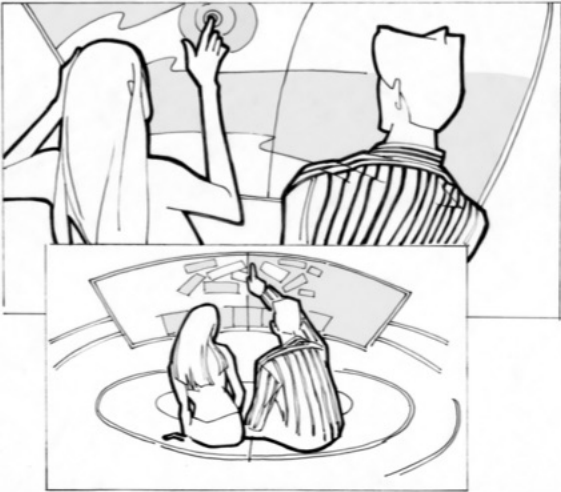
Word game that encourages self expression

- *reverse version of Taboo*
- *choose from a bundle of adjectives to explain the five main factors of the medicines*
- *word cloud + buckets*



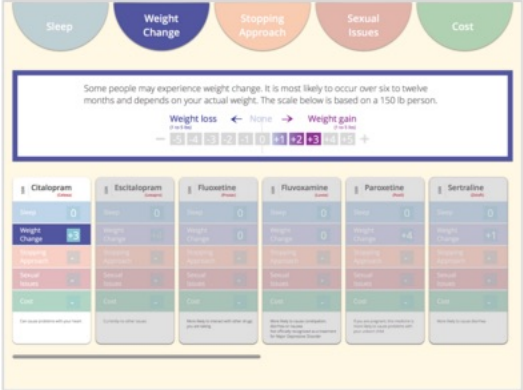
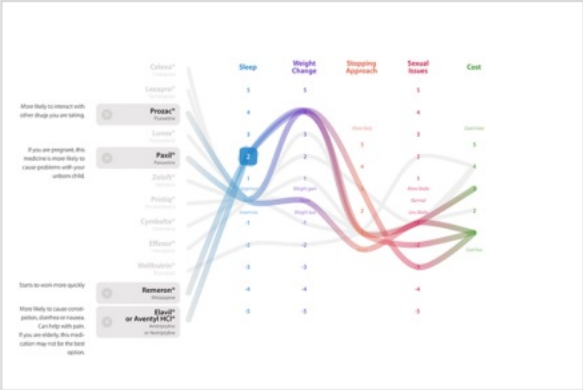


Storyboard



Scenario

# Clean-up Discussion Oct.19



← A-room & Word game

Parallel coordinates & Medicine as cards ↑



## Class Critique 2

Oct.20 Present to Mayo Clinic Researchers

This is basically like participatory design because of the conversation based design strategy

### Feedbacks

*decision making is hard because*

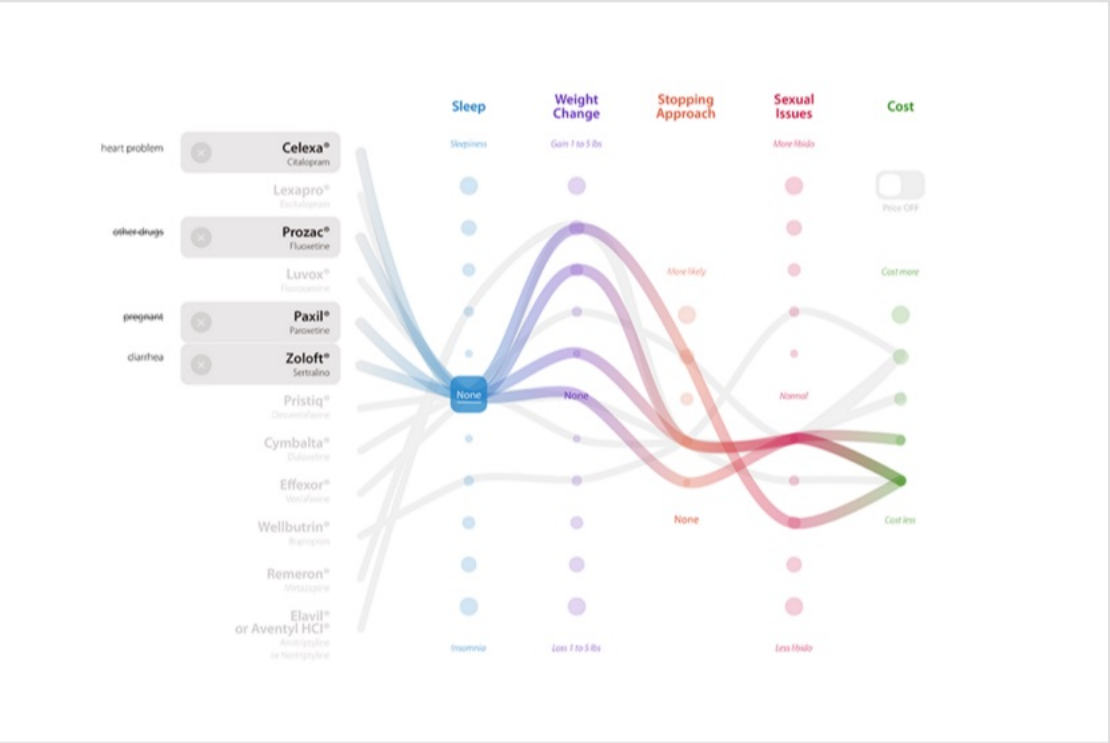
1. *clearness of information*
2. *information itself can't make decision, cooperation with people do*

### Parallel

- ✓ good color and opacity, fluidness, use of gradient
- × scales are presented the same way, but factors are actually not comparable
- × be cautious of using numbers, units can be better

### Medicines as Cards

- ✓ neatly designed
- × too linear



# Clean-up Discussion Oct.23

*Also created persona for user journey*

## Parallel key refinements

- *Think of scales that are neutral, non-comparable, radical but not numeric*
- *For “Keep in mind”, break text body into keywords*
- *Add visual clue for clickable items*
- *Enhance selection mechanism*



## Clean-up Discussion *Oct.23*

*Also created persona for user journey*

### Medicines as Cards key refinements

- Allow users to reorder
- Add 1/2 card at the edge to indicate hidden cards
- Change units to static slider to show scale
- Add thumbnail feature

## Video Research 2 *Oct.27*

*Rewatch the use of card video followed by discussion  
Focus on flexibility - Tools should be quiet and fluid*

### **Patient 1**

- *Patient chose 3 key factors*
- *Doctor mentioned the particular medicine name*
- *Doctor taking notes, pointing on the cards, using marker to highlight the medicine line, and gave the card to the patient*

### **Patient 2**

- *Doctor taking charge, introduced card by card, factor by factor*
- *“This is our winner”*
- *“Do you agree?”*

### **Patient 3**

- *Doctor already knew what to prescribe*
- *One-sided conversation*
- *Very comprehensive introduction*
- *Hard to keep track of what the doctor had mentioned or not*



# Clean-up Discussion *Oct.30*

## Parallel key refinements

- Add "lock" function
- Enhance "Keep in mind"
- Test display on iPad
- Add "print" and "email" function
- Add "What you should know" screen
- Mayo branding



# Clean-up Discussion Oct.30

## Medicines as Cards key refinements

- Enhance thumbnail interaction
- Enlarge the cards
- Add an extra tab for groupings on the top
- Add "print" and "email" function





**Class Critique 4** *Nov.03*  
+ **Clean-up Discussion** *Nov.06*

*Detailed enhancements*

# Usability Testing *Nov.12/13*

*Benchmark tasks based on each prototype*  
*Test with hypothesis*  
*Followed by session and comparison interview*

- Participants recruited by proximity, no HCI specialists
- 3 within subject testings with randomized prototype order
- 1hr for each participant
- Quiet and comfortable settings
- No voice or video recording
- Chocolates were provided as compensation

# Usability

## Testing Results *Nov.12/13*

### Likes

#### **Parallel Coordinates**

- ✓ *Visibility of grey lines, gives a sense of understanding*
- ✓ *Visual design of colors*

#### **Cards as Medicines**

- ✓ *Thumbnails reordering which indicate state*
- ✓ *Specific comparison of drugs*

### Dislikes

#### **Parallel Coordinates**

- × *Context of “What You Should Know” page not obvious; headings help, but confusing at first*

#### **Cards as Medicines**

- × *Confusing interaction for card scrolling and thumbnail slider*
- × *Didn't notice number callout for each factor*

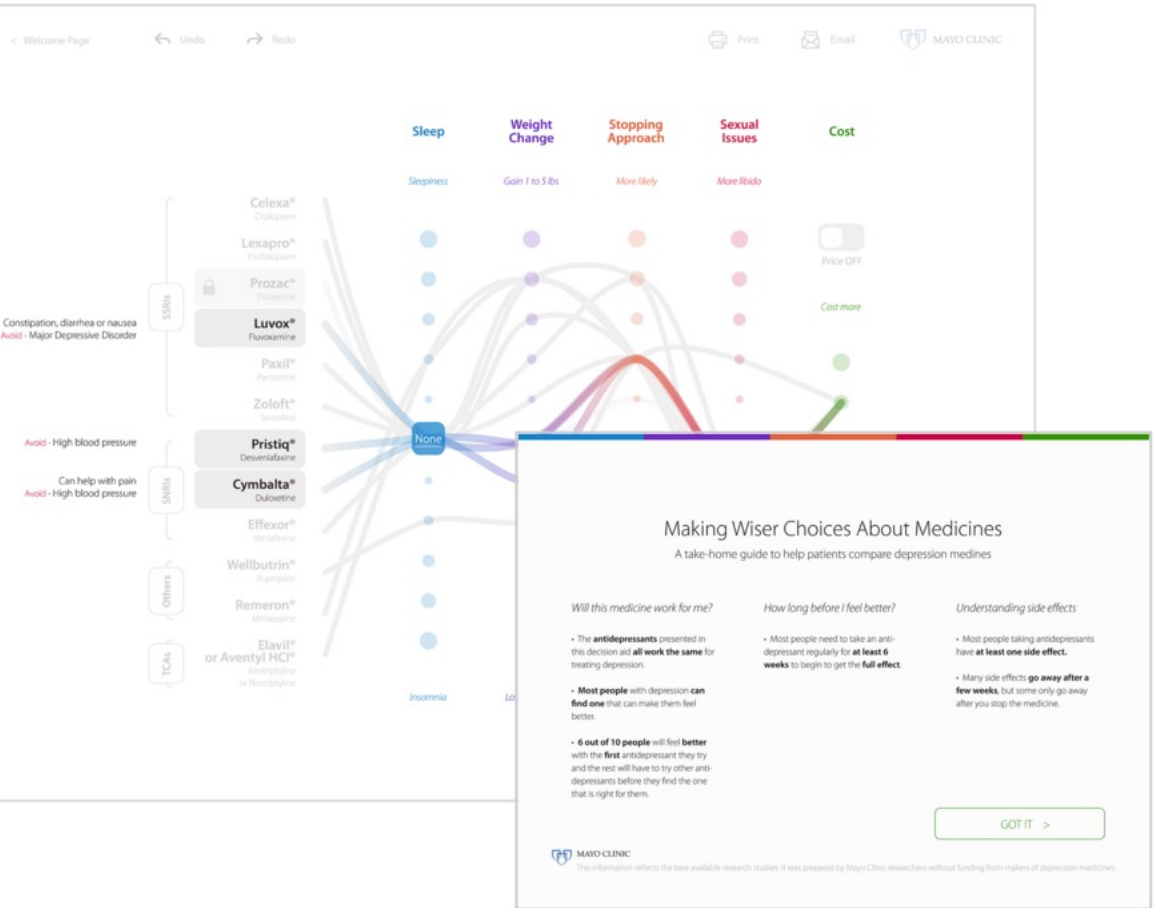
### Recommendations

#### **Parallel Coordinates**

*Visual feedback of things that are not clickable*

#### **Cards as Medicines**

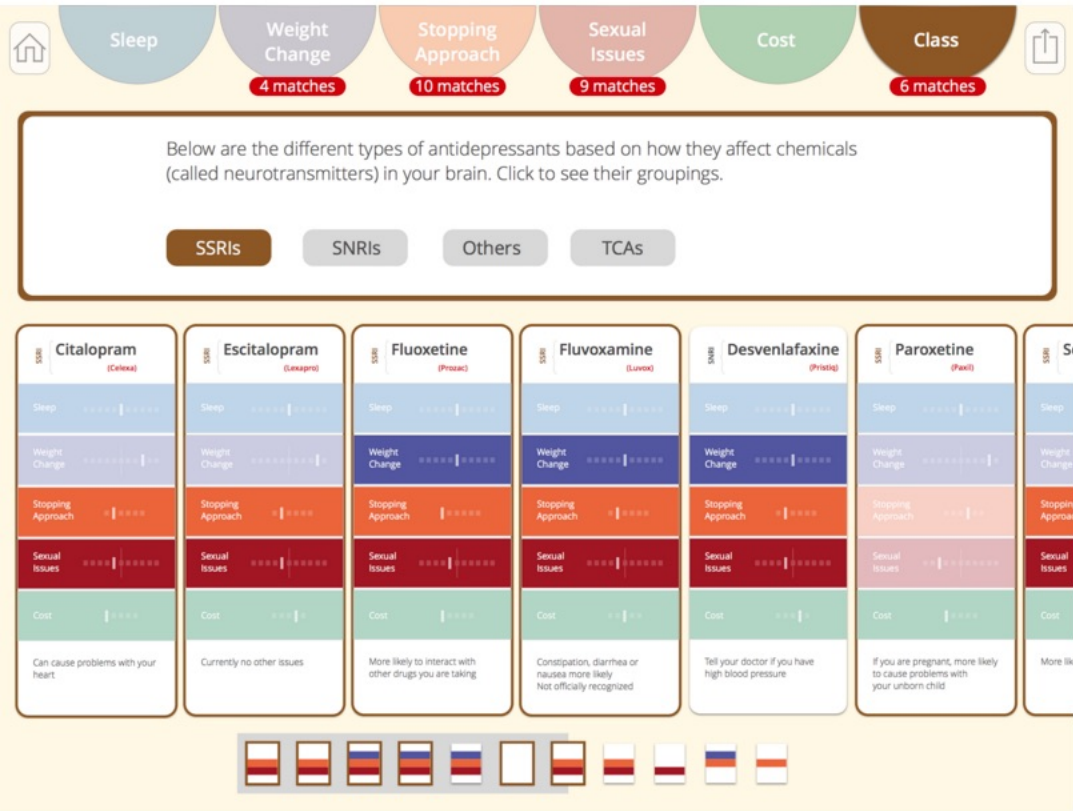
*Explicit back button to go to the home screen*



# Class Critique 5 *Nov.17* + **Final Clean-up** *Nov.20*

## Parallel Coordinates key refinements

- Bolded, highlighted keywords within paragraphs
- Enhanced layout: spacings, size of legends, alignment, clickability visual cue
- Flexible interaction: multiple tapping choices for a single objective
- Change baseline for stopping approach
- Add Back and Forward function



# Class Critique 5 *Nov.17* + Final Clean-up *Nov.20*

## Cards as Medicines key refinements

- Organic scrolling
- Thumbnail interaction for positioning
- Bordered the cards to show grouping



## Reflections

- Targeting on special population, such as children, the elderly and etc. from the beginning can be a good way to achieve better usability in the end.
- Icons can be overvalued. Sometimes text is more effective.
- Always provide options and examples.
- Freedom for customization.
- **Never be afraid to start over.** User research runs through the entire design process.
- Always be fully prepared for presentation in advance. Always have backup plans.
- Role playing and conversation flow can be a good way to present prototypes.
- It takes a lot more time to work in groups, but the results are going to be much better.
- Designers can't work separately - constant critiquing is the one and only way to great design.

## *Appendix*

1. “The Mathematics of Communication,” Weaver
2. Presentation of Self in Everyday Life, Intro and Chapter 1; Erving Goffman
3. Selections from “Democracy and Education” by John Dewey
4. Keeping the Patient in the Equation — Humanism and Health Care Reform (Pamela Hartzband and Jerome Groopman)
5. The Case Against “the Evidence”: A Different Perspective on Evidence-based Medicine
6. Visualizing Uncertainty about the Future, by David Spiegelhalter, Mike Pearson, Ian Short
7. Selections from “The Company We Keep, an Ethics of Fiction,” by Wayne Booth

MAYOCLINICORGHTQVONGKLIJRJWAB4  
PROJECTNGRAABHJKREAKBJWWEAGH  
EAJGKNB4QB4GG34Q8TUGNVARWJGBE  
AKWBFKABGIWRH832YT3UO4GHJKRBA  
JK;F3IUT4NGJLWABLJ'2PTOHIOA'BGJC  
ENAGTIO42QJ'IGEDNJLBGIO42HITO4GH  
WL**THANK YOU!**VEU9BNGJNWRTI24TDP

Shaziya Tambawala × (Nicole)Ning Xu  
MS-HCI, Class of 2016