



## ADMIN

- I1 returned tomorrow

## INTERACTION DESIGN

Involves studying & designing for

### Usability & User Experience (UX)

*Overlapping concepts*

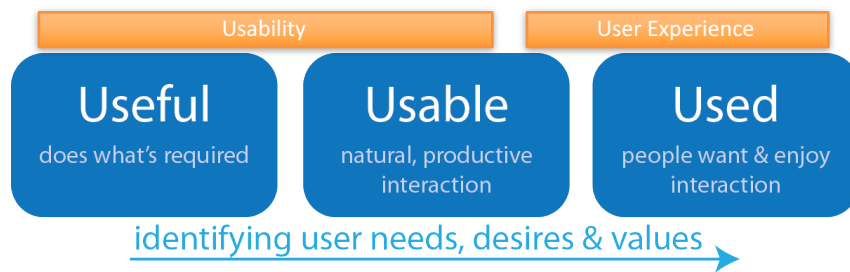
*Usability: traditional HCI*

*UX: contemporary*



## Usability and user experience goals

- Help designers understand the multifaceted nature of people's engagement with technology
- How do usability goals differ from user experience goals?
  - Pragmatic vs Experiential



## The User Experience

- How a product behaves & is used in the real world
  - how people feel about it
  - Pleasure, stimulation, engagement, satisfaction when
    - using, looking, holding, opening or closing
  - Quality
    - "quick", "leisurely", "invigorating", "trustworthy", "empowering"
- Cannot design a user experience, only design *for* a user experience

## USABILITY GOALS

- **Utility**
  - *appropriate functions for key tasks*
- **Learnability**
  - Memorability
  - Consistency
- **Flexibility**
  - *Effectiveness*
  - *Efficiency*
- **Robustness**
  - *Safety*
  - *Constraints*
  - *Memorability*
  - *Visibility*
  - *Feedback*

### (1) LEARNABILITY

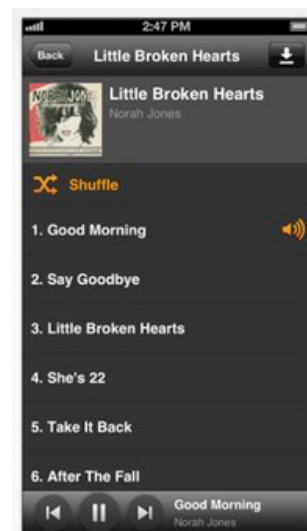
the ease with which new users can begin effective interaction and achieve maximal performance

## PRINCIPLES OF LEARNABILITY: CONSISTENCY

- similar operations & elements for similar tasks
- *predictability*
  - Enable user to determine effect of future actions based on past interaction history
- How related to cognition?
  - Supports building of stable, and deep mental models
    - Rehearsed over time and use cases
  - Rehearsal (repeated exposure) aids LTM storage
    - Supports *Memorability*
  - supports quick and effective comparisons of info in working memory to LTM (MHP)

## PRINCIPLES OF LEARNABILITY: CONSISTENCY

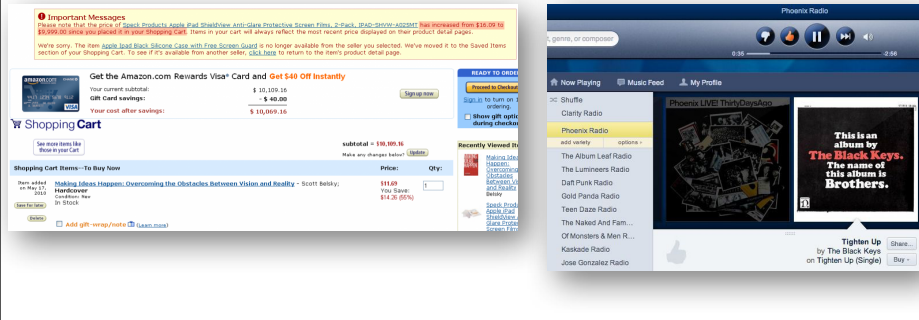
- Internal consistency
  - Operations behave the same within an application
- External consistency
  - operations, interfaces, etc., to be the same across applications and devices
- Examples
  - Internal: pressing on any song name = play
  - External: iOS + Android style guides



# PRINCIPLES OF LEARNABILITY

## Synthesizability

- assessing the effect of past actions
- Feedback
- Honesty
  - immediate vs. eventual



# PRINCIPLES OF LEARNABILITY



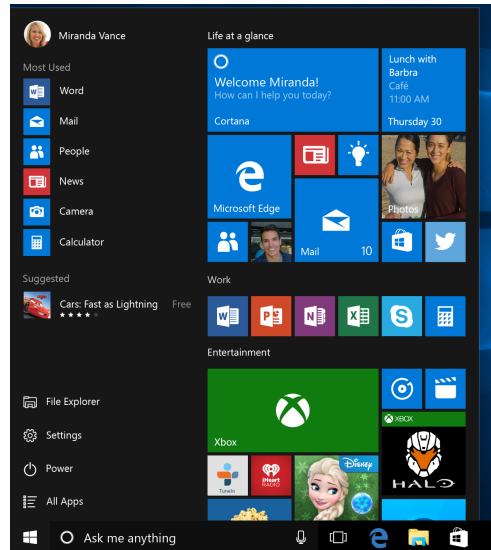
## Familiarity

- how prior knowledge applies to new system
- guessability; **affordance**
- assumes user has a good mental model

## Familiarity vs. Innovation?

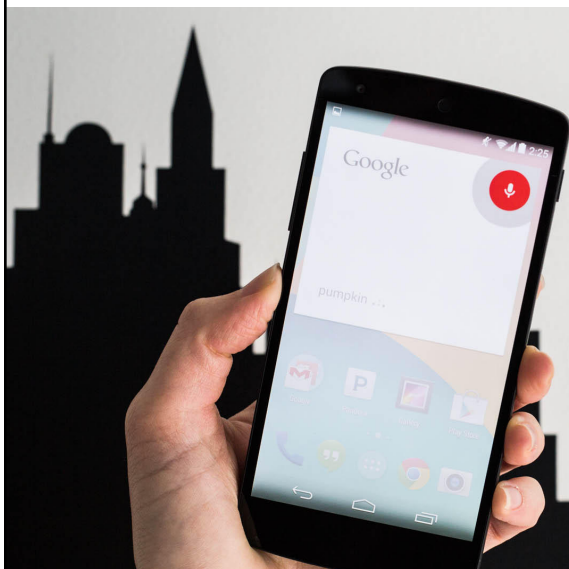
How do you decide?

## PRINCIPLES OF LEARNABILITY



Familiarity

## (2) FLEXIBILITY



- the multiplicity of ways the user and system exchange information
- Contributes to
  - Efficiency (how timely)
  - Effectiveness (how well)

## PRINCIPLES OF FLEXIBILITY

the multiplicity of ways the user and system exchange information

### Dialogue initiative

- freedom from system-imposed constraints on input dialogue
- system vs. user pre-emptiveness
  - Maximize: user pre-empt the system
  - Minimize: system pre-empt the user

### Multi-modality

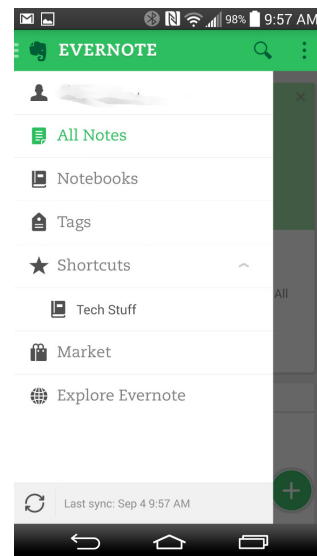
### Task migratability

- passing responsibility for task execution between user and system
- E.g., Google Now / Siri, Spell check; Auto-update w / Endnote

## PRINCIPLES OF FLEXIBILITY

### Customizability

- modifiability of the user interface
- by user (*adaptability*)
  - Create shortcut sidebar
- or system (*adaptivity*)
  - Evolving list of most recently-used notes
  - Games: progressively harder challenges



### (3) ROBUSTNESS

- the level of support provided such that the user can successfully achieve and assess goal-directed behavior

### PRINCIPLES OF ROBUSTNESS

the level of support provided such that the user can successfully achieve and assess goal-directed behaviour

#### Observability

- ability of user to **evaluate the internal state** of the system from its perceivable representation
- Mental models leveraged here
- Bridging gulf of evaluation

## PRINCIPLES OF ROBUSTNESS

the level of support provided such that the user can successfully achieve and assess goal-directed behaviour

### Constraints (Safety)

- restricting what can be done to avoid error, help focus on relevant tasks at hand

### Recoverability (Safety)

- ability of user to **take corrective action** once an error has been recognized
- commensurate effort
  - Difficult to undo, then difficult to do

## PRINCIPLES OF ROBUSTNESS

### Responsiveness

- how the user perceives the **rate of communication** with the system
- MHP can help: estimating time it takes users to process + be ready for new information

### Task conformance

- degree to which **system services support all** of the user's tasks
- task completeness
  - Supports all tasks of interest
- task adequacy
  - Supports tasks as the user wants
- Bridging gulf of execution



## PRINCIPLES OF ROBUSTNESS



- Visibility
  - This is a control panel for an elevator
  - Problems?
    - 2 open/close sets
    - Open/Close hard to distinguish
    - PB and PG? 2R?
    - Why color-coded?

It is not clearly perceivable what you can do!

[http://www.cooper.com/journal/2010/05/hold\\_that\\_elevator.html](http://www.cooper.com/journal/2010/05/hold_that_elevator.html)

## Visibility

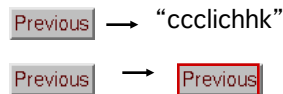
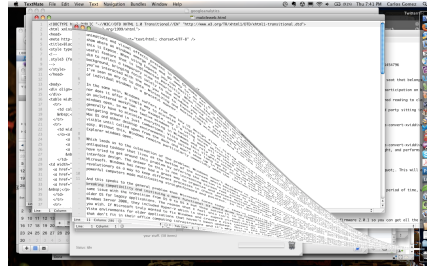


- How would you improve?
- Signage explaining PB/PG
- Better iconography
- So...
  - Make what has to be done obvious
  - Make relevant parts visible
- Cognition?
  - Attention
  - Gulfs of execution & evaluation

[http://www.cooper.com/journal/2010/05/hold\\_that\\_elevator.html](http://www.cooper.com/journal/2010/05/hold_that_elevator.html)

## Feedback

- Sending information back to the user about what has been done
  - sound, highlighting, animation
  - combinations of these
- Cognition?
  - Attention, perception
  - Gulf of evaluation
- Supports other design principles
  - Recoverability
  - Synthesizability

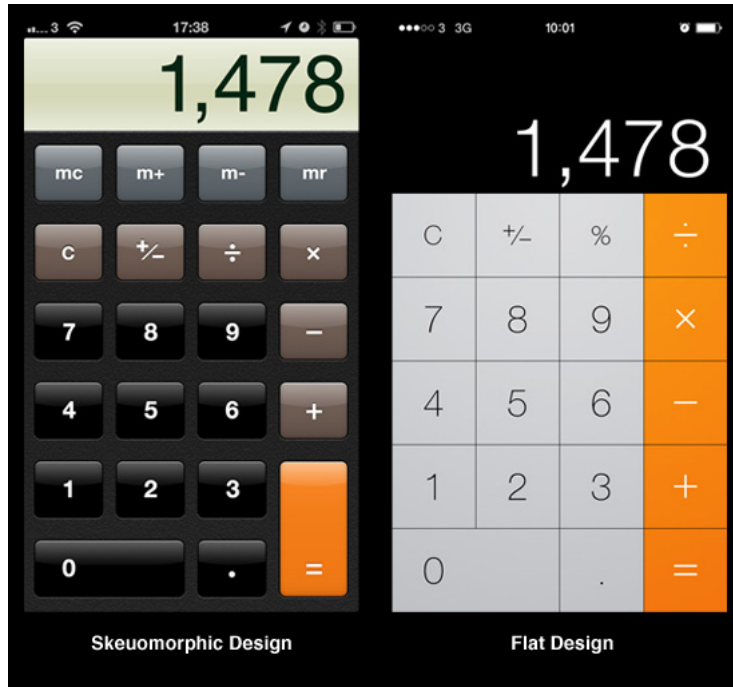


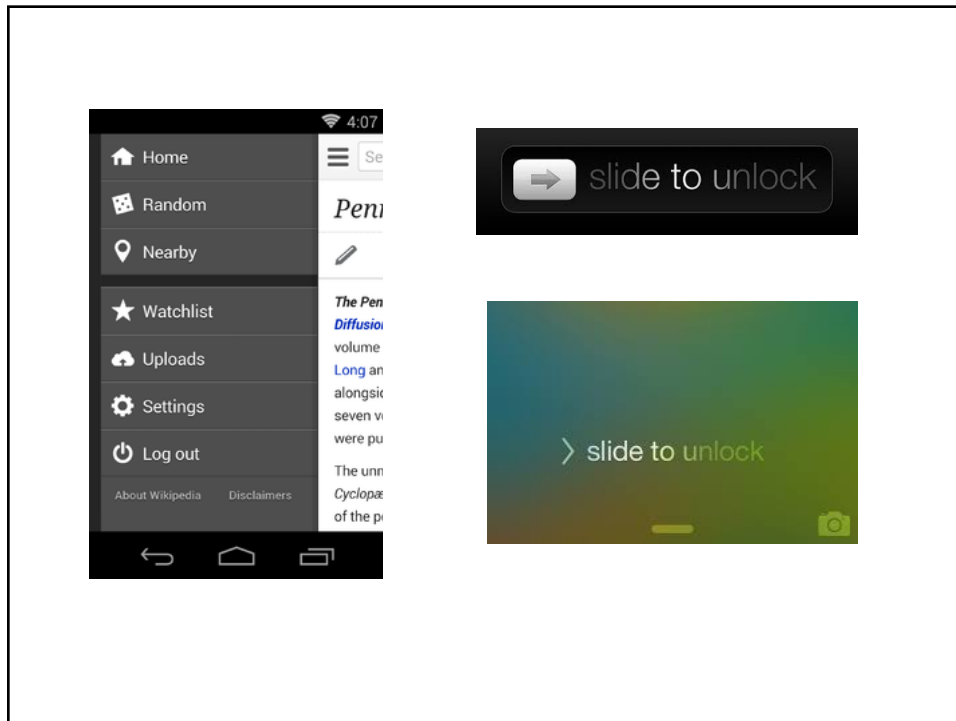
## Affordances

- Don Norman (*Design of Everyday Things*)
- An attribute of an object that allows people to know how to use it
  - e.g. a mouse button invites pushing, a door handle affords pulling
  - e.g. scrollbars to afford moving up and down, icons to afford clicking on
  - Learned conventions or arbitrary mappings between action and effect at the interface
  - Some mappings are better than others

# Physical Affordances

How do the following physical objects afford?  
Are they obvious?





## The User Experience

- How a product behaves & is used in the real world
  - how people feel about it
  - Pleasure, stimulation, engagement, satisfaction when
    - using, looking, holding, opening or closing
  - Quality
    - “quick”, “leisurely”, “invigorating”, “trustworthy”, “empowering”
- Cannot design a user experience, only design *for* a user experience

## DESIGN FOR TRUST

- [https://www.ted.com/talks/joe\\_gebbia\\_how\\_airbnb\\_designs\\_for\\_trust?language=en](https://www.ted.com/talks/joe_gebbia_how_airbnb_designs_for_trust?language=en)

## ACTIVITY

Create an updated user experience for Snapchat by brainstorming features that encourage a user experience focused on your assigned value + action.

*(can use the given action or the opposite)*

- What data gathering methods might you utilize to inform your design process (what RQs would you ask)?
- How would you redesign the app to facilitate this user experience?
  - What changes would you make to existing features?
  - What new features would you introduce?
  - How do existing features conflict with your new X goals? What values do these existing features represent?
- What usability goals are also important as you address this UX goal (value)?

## DATA ANALYSIS

### ANALYSIS

- Making sense out of the piles of data
  - What can we learn from our data?
- Qualitative data
  - Content analysis
  - Discourse analysis
  - Case Study analysis
  - Grounded Theory analysis
  - **Affinity Diagramming**
- Quantitative data
  - Descriptive statistics
  - Inferential statistics

## COMPILING & ORGANIZING DATA

- Continuously throughout study
  - Legible
    - Surveys, field notes, other documents
  - Fully-completed (no missing data)
  - Backing up data
  - Transcription
  - Organize & transfer raw data
    - Excel, SPSS, SAS
    - Nvivo, ATLAS.ti, Dedoose

## AFFINITY DIAGRAMMING

- Contextual Design
  - UCD method
    - Collecting, interpreting & synthesizing data
    - Ethnographically-based (contextual inquiry)
- Affinity Diagramming
  - Technique widely used in HCI
  - Inductive (bottom up)
  - Iterative
  - Rapid

# AFFINITY DIAGRAMMING

- Goal
  - Synthesize data
  - Characterize themes, issues, needs etc.
- Analyze qualitative (written) data
  - Field notes
  - Interview transcripts





## AFFINITY DIAGRAMMING

- Building the affinity
  - Logistics
    - Get a conference room, library room, etc.
    - Area with lots of wall space
    - Hang butcher paper
    - Gather colored note cards/post-its
    - Create “affinity notes”
      - one note (observation, quote, etc.) per card/yellow post-it
    - Print notes in order

## AFFINITY DIAGRAMMING

- Starting the affinity
  - Divide affinity notes amongst team
  - Start a column
    - One team member reads & places an affinity note on the wall
    - Others look for related notes & place in column
    - Holtzblatt:
      - 300-400 affinity notes: 1-3/column (not too many 1-note)
      - 500-1000 notes: 4-6
      - **Why not many more in a column?**
    - If no more related notes found, start a new column

## AFFINITY DIAGRAMMING

- Starting the affinity *cont.*
  - Once team gets the hang of it, stop reading aloud and just do it
  - Reorganization is necessary and will happen!
  
- What if a note can go in more than one pile? Move if doing so will
  - illuminate a new issue
  - make the existing category clearer

## HOW WOULD YOU GROUP THESE?

U02-4 Writes items down so she remembers them, not to check them later

U12-3 Keeps list on fridge, adding items as notices they are missing

U04-4 Writes items on list first from memory

U03-2 Made list in morning (before work), shopped after work

U05-1 making a list is triggered by decisions to go shopping

U08-1 Keeps mentally then writes down day she decides to go shopping

U01-3 Builds list over the month—adding items as needed

## AFFINITY DIAGRAMMING

- Adding Blue labels
  - When?
    - Once all affinity notes are up
    - Start with longest columns
  - What?
    - Describe what's happening in affinity notes
    - Don't need to read notes to understand blue label
    - Has design relevance
    - In user's voice

## HOW WOULD YOU GROUP THESE?

U02-4 Writes items down so she remembers them, not to check them later

U12-3 Keeps list on fridge, adding items as notices they are missing

U04-4 Writes items on list first from memory

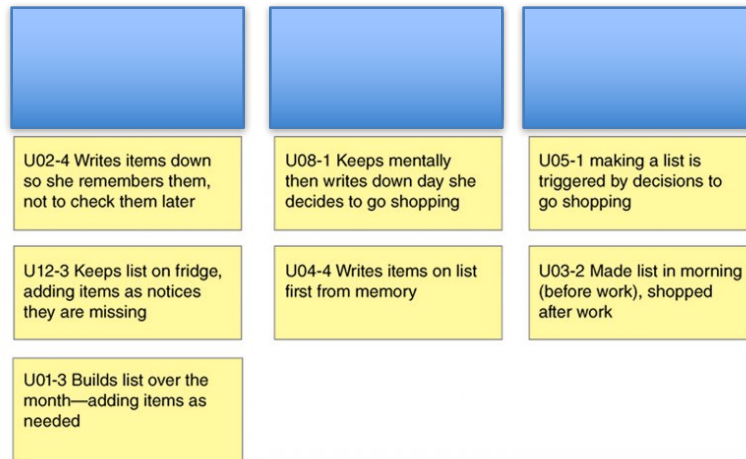
U03-2 Made list in morning (before work), shopped after work

U05-1 making a list is triggered by decisions to go shopping

U08-1 Keeps mentally then writes down day she decides to go shopping

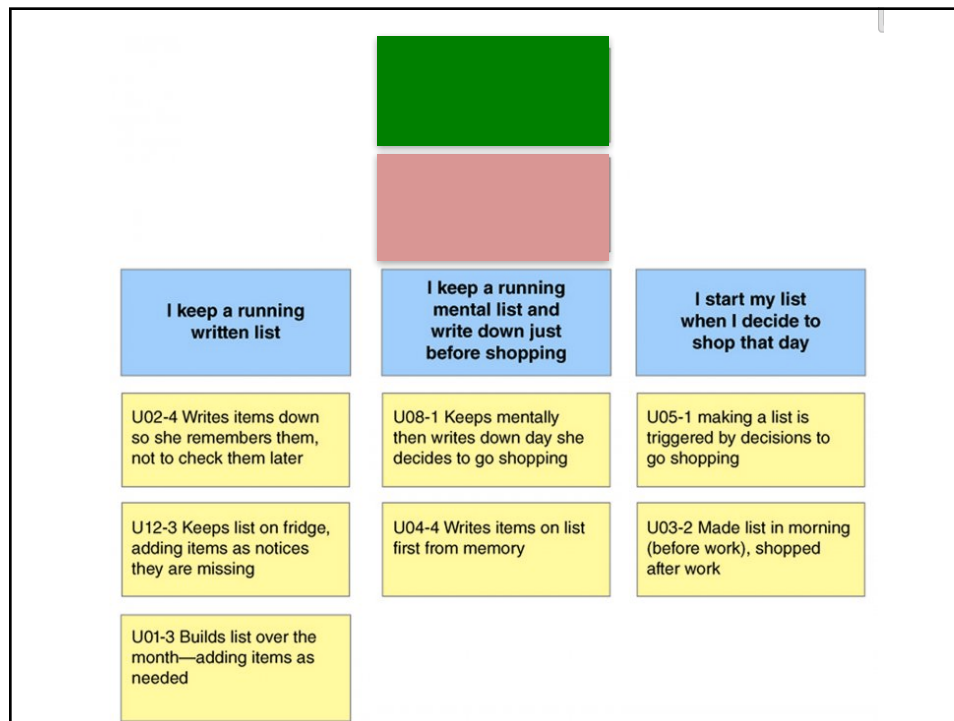
U01-3 Builds list over the month—adding items as needed

## AFFINITY DIAGRAMMING



## AFFINITY DIAGRAMMING

- Create temporary Green Labels
  - Look at groupings
  - Place above relevant blue labels
  - These labels reflect broad categories
    - “preparing for the market”
  - Shoot for 4-6 of these
- Add Pink Labels
  - These are an abstraction of blue labels
  - Each pink label is comprised of 2-6 Blue
  - Descriptive enough where you don’t need to read blue labels underneath to get key idea



## AFFINITY DIAGRAMMING

- Create final Green Labels
  - Should have 4-8 pink labels underneath It
  - Green labels group pink labels to “form a coherent piece of story that is important to the project focus”
    - Make sure that labels are actually related!

## AFFINITY DIAGRAMMING

- Remember
  - Look beyond keywords in affinity notes
    - “email”, “menu”
  - Focus on the actual issues & behaviors
    - “I use email as a to do list”
    - “I want menus to have just a few important items”
  - Be wary of hiding distinctions in groupings
    - Separate out if more than one important idea in one group

## AFFINITY DIAGRAMMING

- Remember
  - Blue & Pink labels
    - In the voice of the user, “I...”
  - Green labels
    - Categorical
  - This is a collaborative effort
    - No one “owns” sections of the wall
  - There is no single “right” affinity
    - Validity based on
      - rigor of your method & process
      - qualifications of your team

## FOR NEXT WEEK

- Read
  - Establishing Requirements (PSR CH10)
  - CRC Ch 4 (Scenarios)
- Research paper circles
- Boston Home Center Interviews
- T2 (due 10/12 @ 6pm)