User-Centered Design Review

Summarizing the Semester

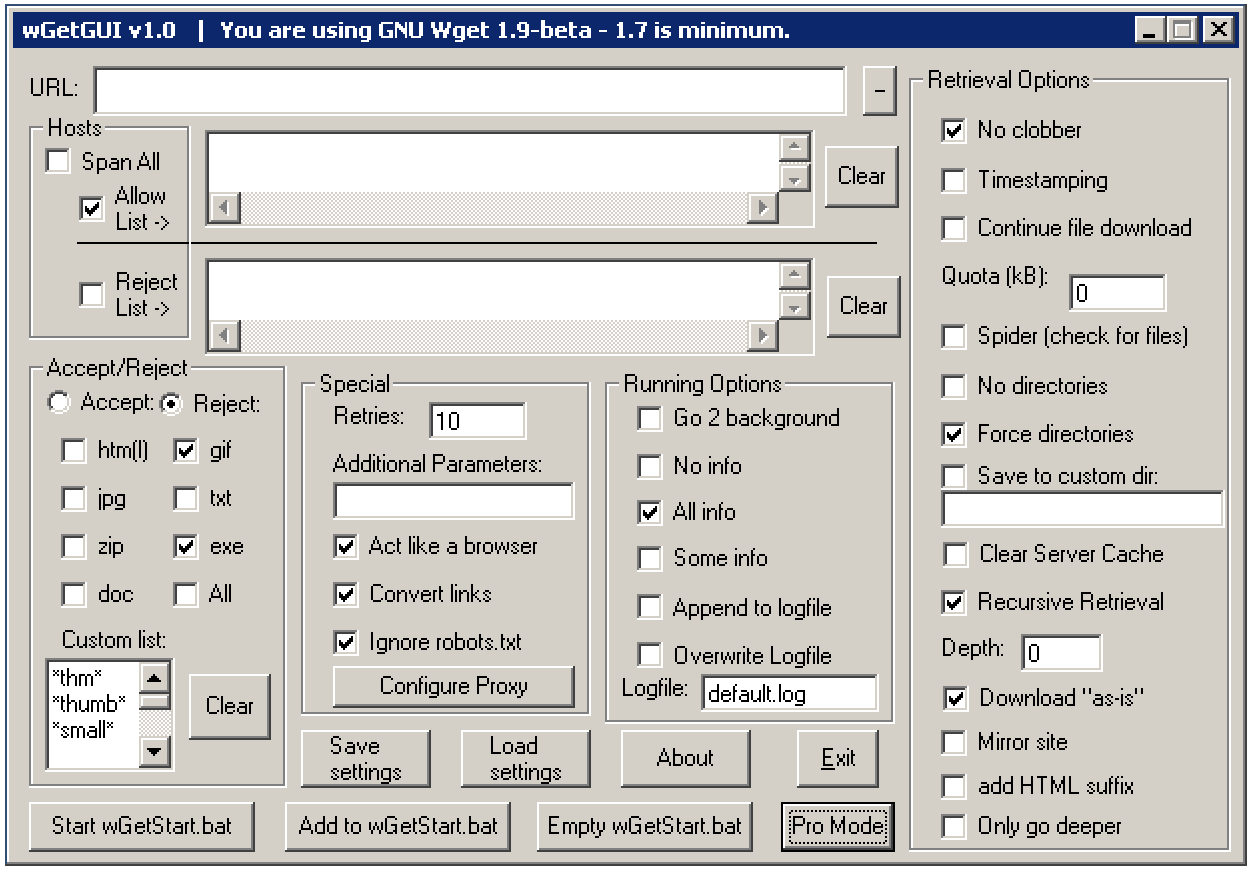
- We’ve covered a lot of stuff this semester.
- How does all this stuff tie together?

“The delivery meets all the requirements”

WE COULDN'T POSSIBLY HAVE USABILITY PROBLEMS. THE SOFTWARE'S BEING USED!
BUD IS CONFIDENT ABOUT UX, BUT PRIVATELY SHIRLEY HAS HER DOUBTS...

http://www.stellman-greene.com/2010/11/20/inflict-bad-ux-on-users-you-secretly-hate/

Developers as Designers



wGetGUI v1.0 | You are using GNU Wget 1.9-beta - 1.7 is minimum.

URL:

Hosts
- Span All
- [✓ Allow List ->]
- Reject List ->

Clear
Clear

Accept/Reject
- Accept: [✓ Reject:]
- htm(l) — [✓ gif]
- jpg — txt
- zip — [✓ exe]
- doc — All

Custom list:
```
*thm*
*thumb*
*small*
```
Clear

Special
- Retries: 10
- Additional Parameters:
- [✓ Act like a browser]
- [✓ Convert links]
- [✓ Ignore robots.txt]
- Configure Proxy

Running Options
- Go 2 background
- No info
- [✓ All info]
- Some info
- Append to logfile
- Overwrite Logfile
- Logfile: default.log

Retrieval Options
- [✓ No clobber]
- Timestamping
- Continue file download
- Quota (kB): 0
- Spider (check for files)
- No directories
- [✓ Force directories]
- Save to custom dir:
- Clear Server Cache
- [✓ Recursive Retrieval]
- Depth: 0
- [✓ Download "as-is"]
- Mirror site
- add HTML suffix
- Only go deeper

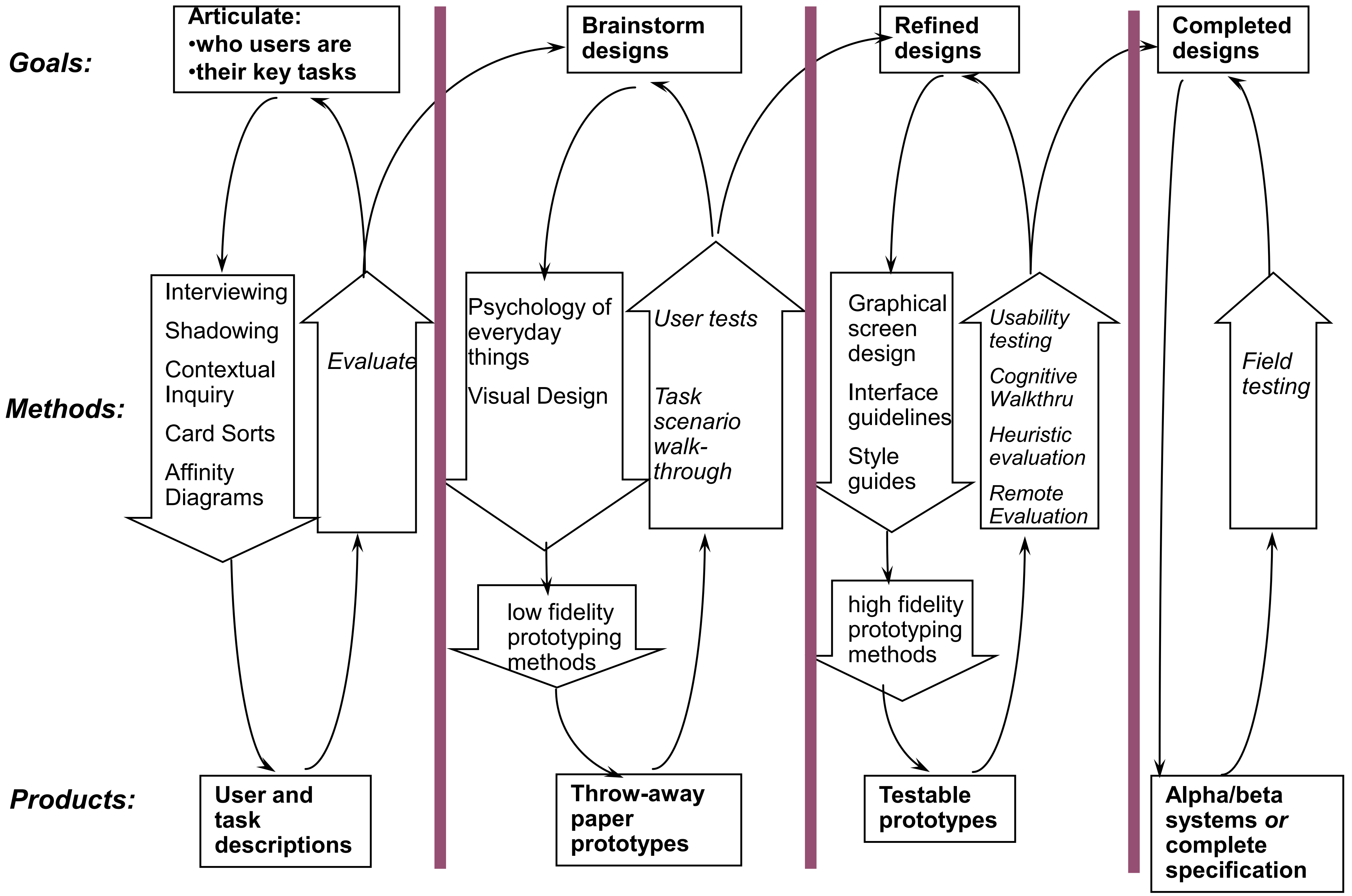
Save settings | Load settings | About | Exit

Start wGetStart.bat | Add to wGetStart.bat | Empty wGetStart.bat | Pro Mode

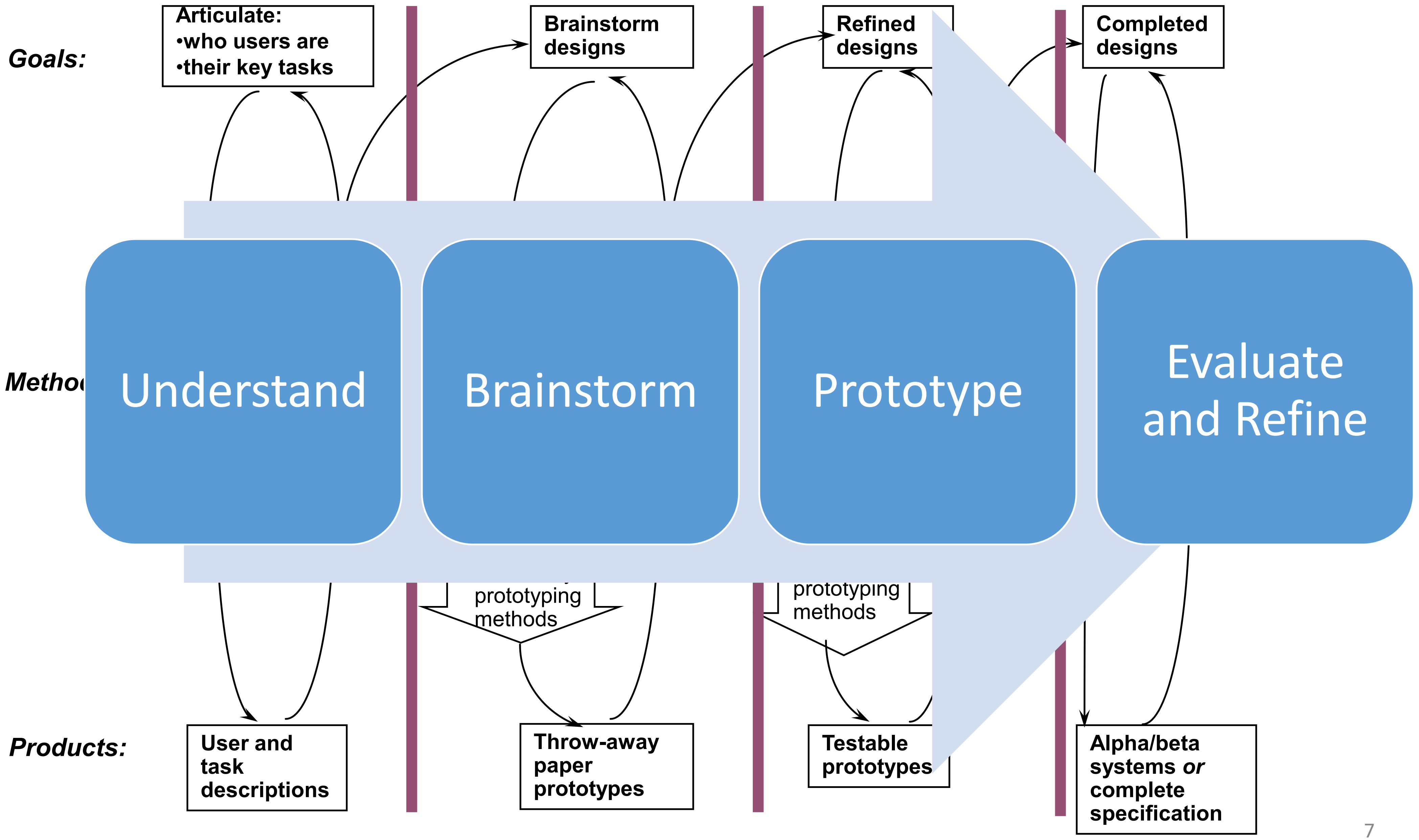
https://blog.codinghorror.com/this-is-what-happens-when-you-let-developers-create-ui/

Our Design Process

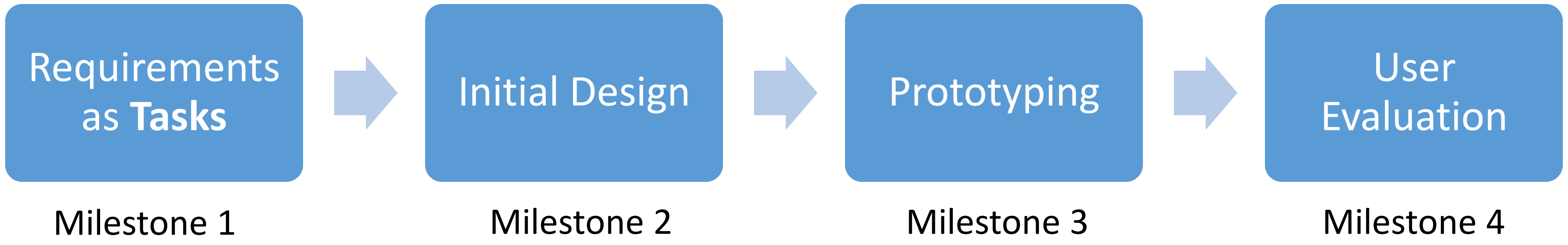
An interface design process

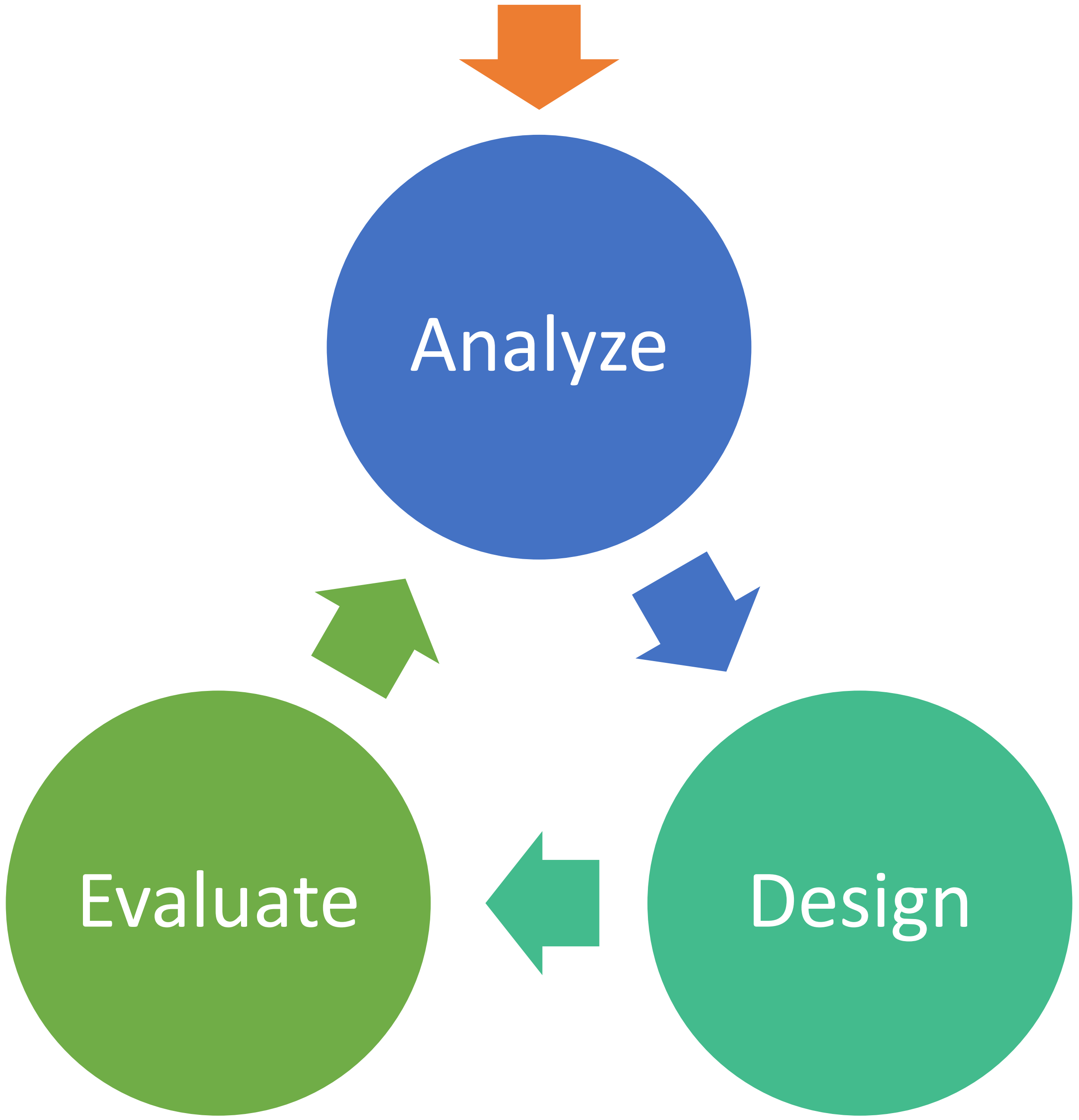


An interface design process



Semester Project



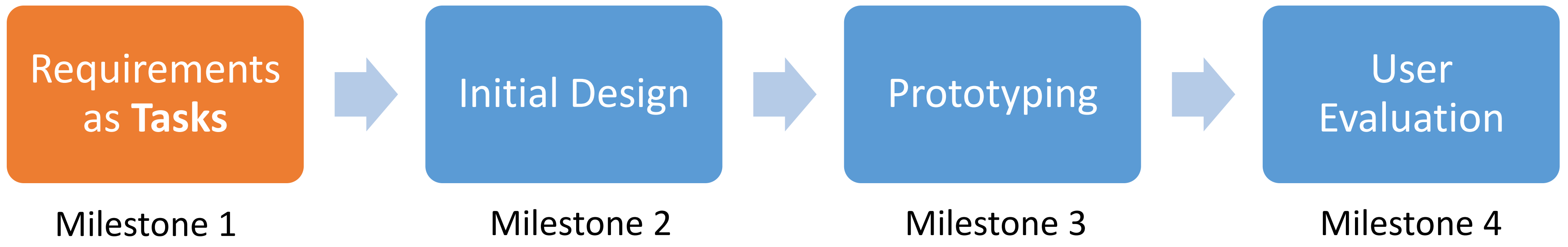

Analyze
Design
Evaluate

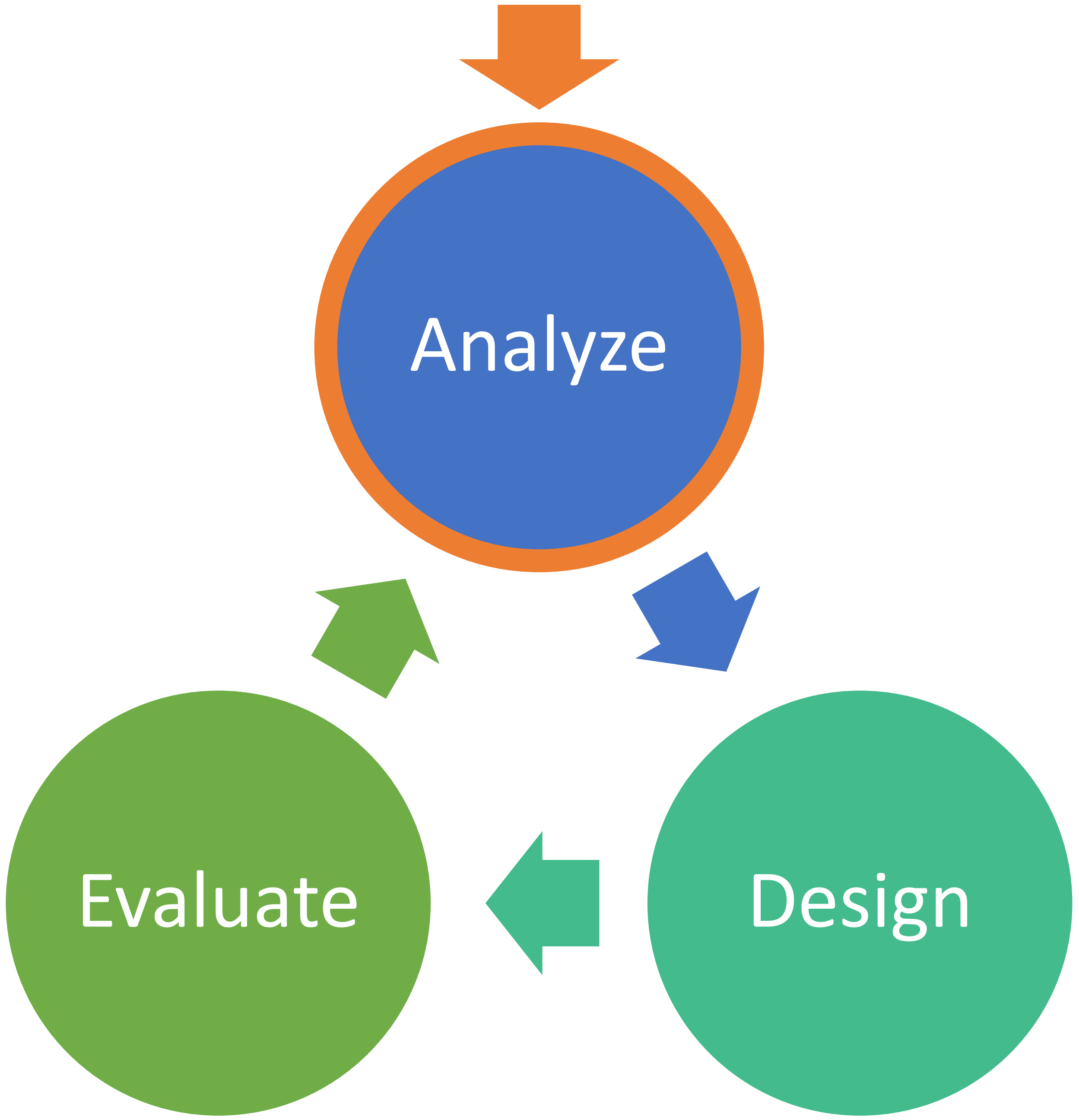
Startup Failure

- 9/10 Startups fail.
- #1 Reason (according to Fortune): They build a product that no one wants.

Gathering Requirements: Milestone 1

Semester Project




Analyze
Design
Evaluate

Milestone 1 Goal: Generate Tasks

- Gathering requirements:
    1. Recruit Participants
    2. Collect & Analyze Data
    3. Author Tasks

1. Recruit Participants

Recruitment/Sampling Strategies

- Purposive – recruit based on meeting a set of criteria
  - Computer science majors @ wash u
- Quota – criteria based, but with quotas for subgroups
  - Computer science majors @ wash u, x% female, y% male (or racial group, club participation, religion, etc)
- Snowball – chain referral sampling
  - “Can you refer me to some other computer science majors you know?”

How Many Participants?

- Representative samples are key
  - Comparing against known demographics
  - Recruiting from organizations with known and diverse properties
- Rule of thumb: keep recruiting until you aren’t learning new things from each participant

2. Collect & Analyze Data

Interviewing & Organizing Interview Responses

Understanding Your User Population

- You probably think about this differently
- Listen to your users
- Try to understand their point of view

Surveys

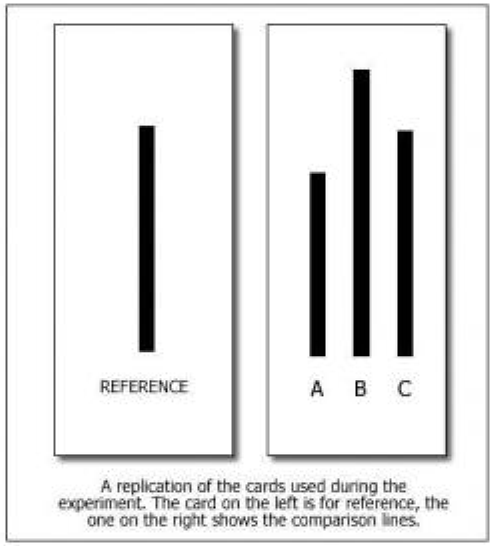
- Surveys can be really problematic in early design
  - Which would you prefer: X, Y, or Z?
  - Be careful that you aren’t making assumptions that limit the design space in the survey.
- Most effective when
  - You have a specific question and there are a concrete, known set of answers.
- Rarely gives good general design constraints
- Can sometimes be useful to establish that there a problem or need exists in a user community.
- Can you trust it? It is validated/tested?

Focus Groups

- Effectively group interviews
- Typically 3-10 participants
- Provide a diverse range of opinions
- Need to be managed to:
  - ensure everyone contributes
  - discussion isn’t dominated by one person
  - the agenda of topics is covered

White and Kules

Bias



A replication of the cards used during the experiment. The card on the left is for reference, the one on the right shows the comparison lines.

- Asch Experiment
  - 8 people
  - 7 paid confederates, one actual participant.
  - Variety of answers given, some deliberately incorrect to look at influence of peer pressure.
  - At least 75% gave the wrong answer to at least one question.

http://www.experiment-resources.com/asch-experiment.html

Contextual Inquiry

- “Contextual Design makes data gathering from the customer the base criterion for deciding what the system should do…”
- “The core premise of Contextual Inquiry is very simple: go where the customer works, observe the customer as he or she works, and talk to the customer about the work. Do that, and you can’t help but gain a better understanding of your customer.”
- Through collaboration and cooperation.

Source: Beyer and Holtzblatt, Contextual Design

User/Direct Observation

- Observe the user doing work
  - Sometimes this will be in their own context
  - Other times you may want to ask them to do something specific with an existing system
  - In general, you are going to try not to interrupt much, if at all.

  - Best suited to situations where the why is evident through their natural interactions.

Interviewing

- Pre-introduction – introduction, a bit of getting to know each other.
- Introduction - explain the goals of the interview, reassure about the ethical issues, ask to record, present an informed consent form.
- Warm-up - make first questions easy & non-threatening.
- Main body – present questions in a logical order
- A cool-off period - include a few easy questions to defuse tension at the end
- Closure - thank interviewee, signal the end,
  e.g, switch recorder off.

White and Kules

The Interview

- Who are the users?
- What are their tasks?
- How do they complete those tasks?
- Why? What are the goals behind the tasks?
- Where? In what context do these tasks occur?

Interviewing Types

- Unstructured
  - Are not directed by a script. Rich but not replicable.
- Structured
  - Are tightly scripted, often like a questionnaire. Replicable but may lack richness.
- Semi-structured
  - Guided by a script but interesting issues can be explored in more depth. Can provide a good balance between richness and replicability.

Closed vs. Open Questions

- Closed questions are useful when you really are looking for a fact
    - Do you own or rent your current house? [and now I'll ask you to go into depth on how you manage finances or something]
    - Vs. Describe your current living situation.
- If you are looking to gain an understanding, start open…but it's ok to ask some closed questions based on their answers.
    - Describe what you do at work on a typical morning.
    - Do you have the same routine every day? Or does it vary sometimes?
    - Open questions are in general better at getting people to actually talk.

It’s not about you.

- The interview should be all about your interviewee. Your opinion is only a hindrance and a distraction at this stage.
- The questions you choose to ask and the ways you interact with interviewees can color their answers. So, you want the constant “am I biasing this?” in your head.

Avoid

- Jargon & language that the interviewee may not understand
- Leading questions that make assumptions e.g., why do you like …?
  - “If I asked people what they wanted, they would have said faster horses” – Henry Ford
- Unconscious biases e.g., gender stereotypes

White and Kules

Some Don’ts

- Don’t assume that you already know the answer, present it, and ask for support.
- Don’t ask your user to design for you.
- Don’t limit the kinds of answers your user can give you.

Some Dos

- Build Rapport
  - Interviewees should feel comfortable with you.
- Where possible, ask for specific examples
  - What were you working on at work this week? Did you need to gather any info as part of that? What was your process?
  - What kinds of information do you search for in your job?
- If you hear something interesting or surprising, ask follow on questions.

Questions to ask **constantly**

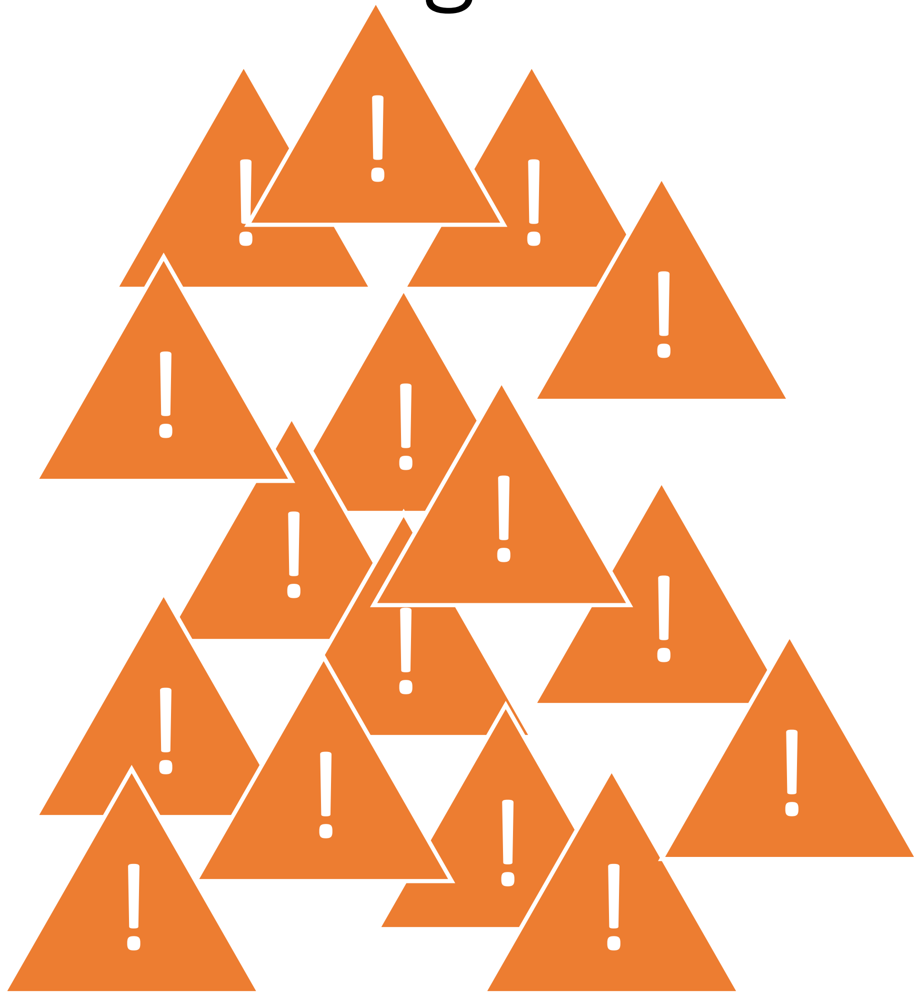
- Is this a representative set of tasks?
- Is this a representative set of users?
- Is there something about my specific methodology that could cause bias?
- Am I leading the witness?
- Am I asking my user to be a designer?

Pilot and Iterate

- You should be trying to eliminate as much bias as you can before you start collecting data from users.
- Realistically, you won’t get it all.
- So, when you start to run your early sessions, you need to ask all of these questions again and again until you believe that you are getting complete, representative data.

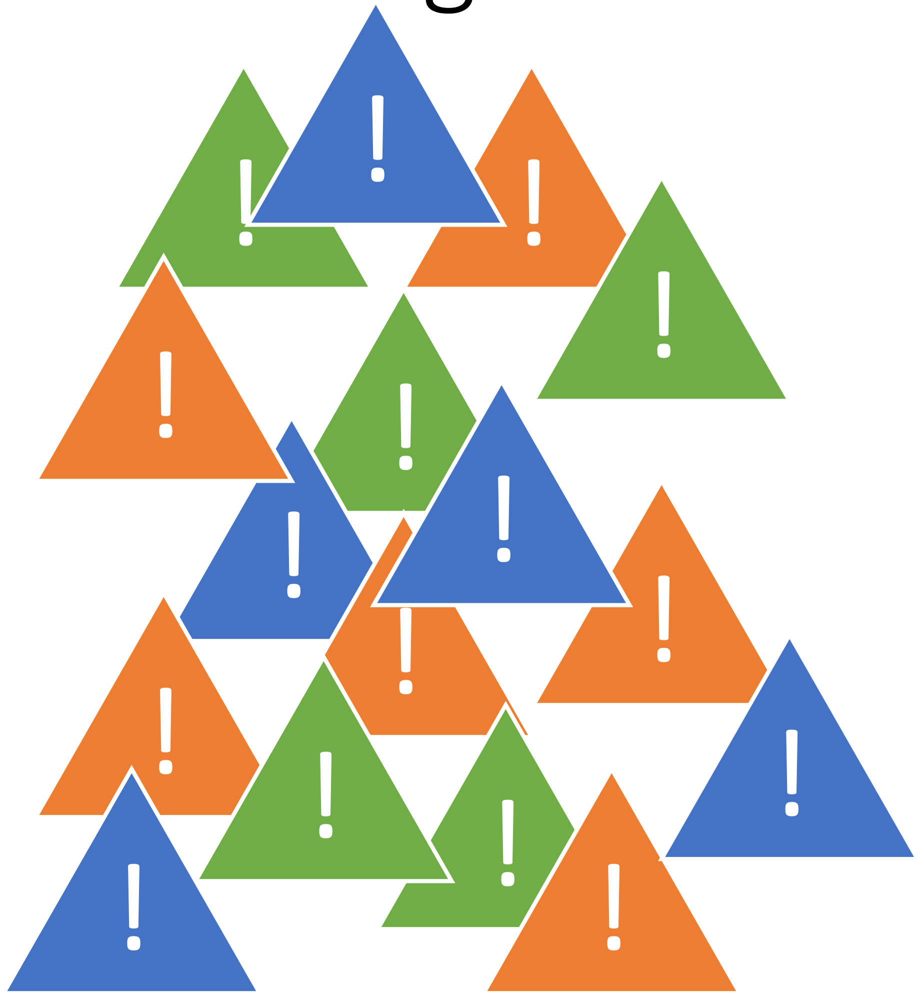
Analyzing Requirements Data

Understanding the Problem Space



- Are there consistent themes?
- Are there common groupings?

Understanding the Problem Space



- Are there consistent themes?
- Are there common groupings?

Why not Tasks First?

User Task

Problem to Solve

Task Describing Problem

- Reasonable interviewing produces many problems, often scattered and contradictory
- Pare down, let themes emerge
- Themes can be focal point, provide direction

Affinity Diagramming

Image Source: http://www.adamatorres.com/gallery-project/?page_id=106

Affinity Diagramming

- Team-based method for organizing facts into related themes

- Observed facts are data for making decisions
- Team reduces potential bias of your intuition

- “Shows in once place the common issues, themes, and scope of the customers problems and needs”

Affinity Diagramming in Practice

- Build notes into columns based on observational relationships
- Eventually label columns into groups

- There is no “right” affinity
- Anyone can move a note, no ownership
- Some groups impose silence rule

- Spatial locality can be important

Process

1. Generate Ideas - capture facts from our interviews; go for at least 20 facts from each interview.
2. Display Ideas – Get together with others; lay out all of the facts.
3. Sort them into groups – find two related ideas, put them together, look for others. Repeat. Anyone can move something if they disagree.
4. Create header cards that summarize the idea captured by each group.

3. Author Tasks

Requirements as *Tasks*

Tasks

- Says what the user wants to do but does not say how they would do it
  - no assumptions made about the interface
  - can be used to compare design alternatives in a fair way
- Are very specific
  - says exactly what the user wants to do
  - specifies actual items the user would somehow want to input

Tasks

- Describes a complete job
  - forces designer to consider how interface features work together
  - contrasts how information input / output flows through the dialog
    - where does information come from?
    - where does it go?
    - what has to happen next?

  - Do not
    - create a list of simple things the system should do
    - present a sub-goal independent of other sub-goals

Tasks

- Says who the users are
  - name names, if possible
  - says what they know

  - Why?
    - design success strongly influenced by what users know
    - can go back and ask them questions later
    - reflects real interests of real users
    - helps you find tasks that illustrate functionality in that person’s real work context

Tasks

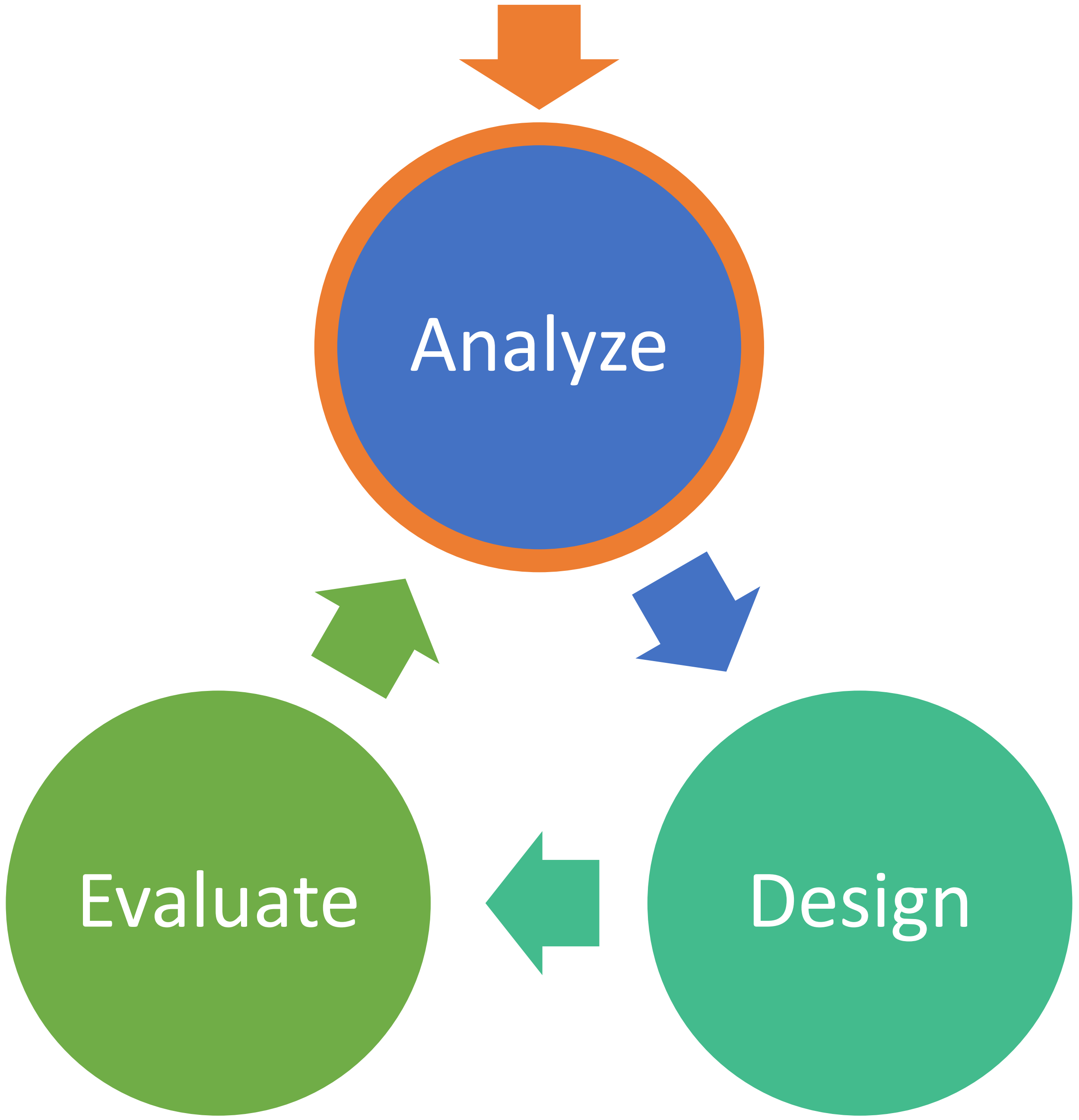
- As a set, identifies a broad coverage of users and task types
  - the typical ‘expected’ user
    - typical routine tasks
  - the occasional but important user
    - infrequent but important tasks
  - the unusual user
    - unexpected or odd tasks

Tasks Summary

- Say what user wants to do, not how
- Are very specific
- Describe a complete job
- Say who users are
- Are evaluated (will be by us)
- As a set, describe a broad coverage of users and tasks

Requirements as Tasks

- Why?
  - We capture an entire event and all its sub-goals
  - We can relate to our users
  - We can actually test our requirements in an evaluation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Milestone 1 Goal: Generate Tasks

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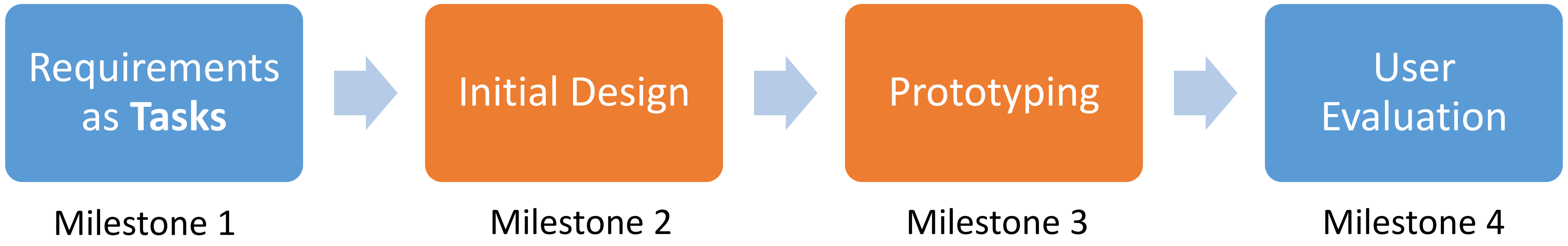
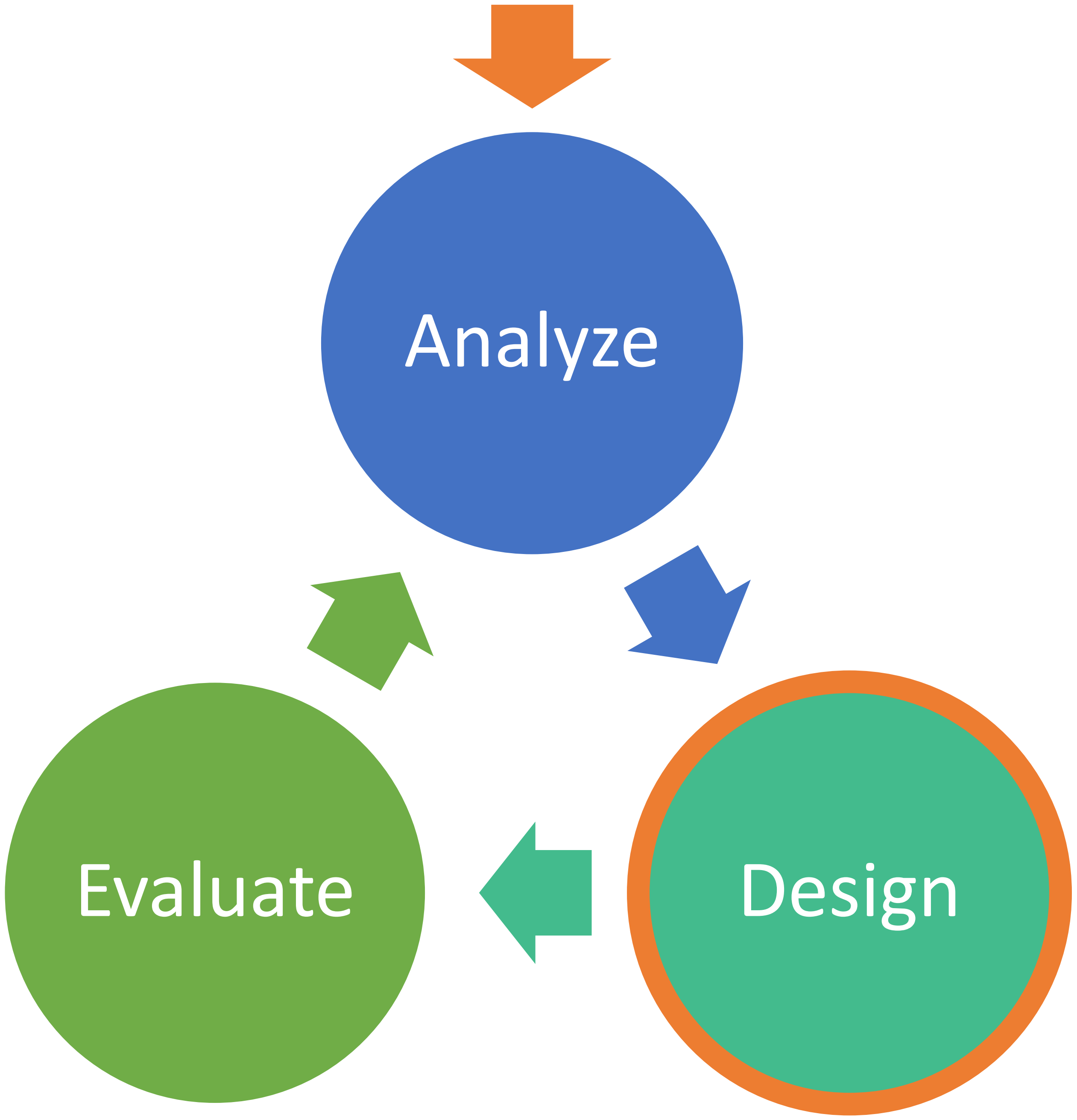
Design & Prototype: Milestones 2 & 3

Semester Project




Analyze
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Evaluate

Milestone 2 & 3 Goal: Create a Prototype

1. Understand How Humans Approach Problems
2. Design/Sketch it
3. Create Lo-Fi Prototype

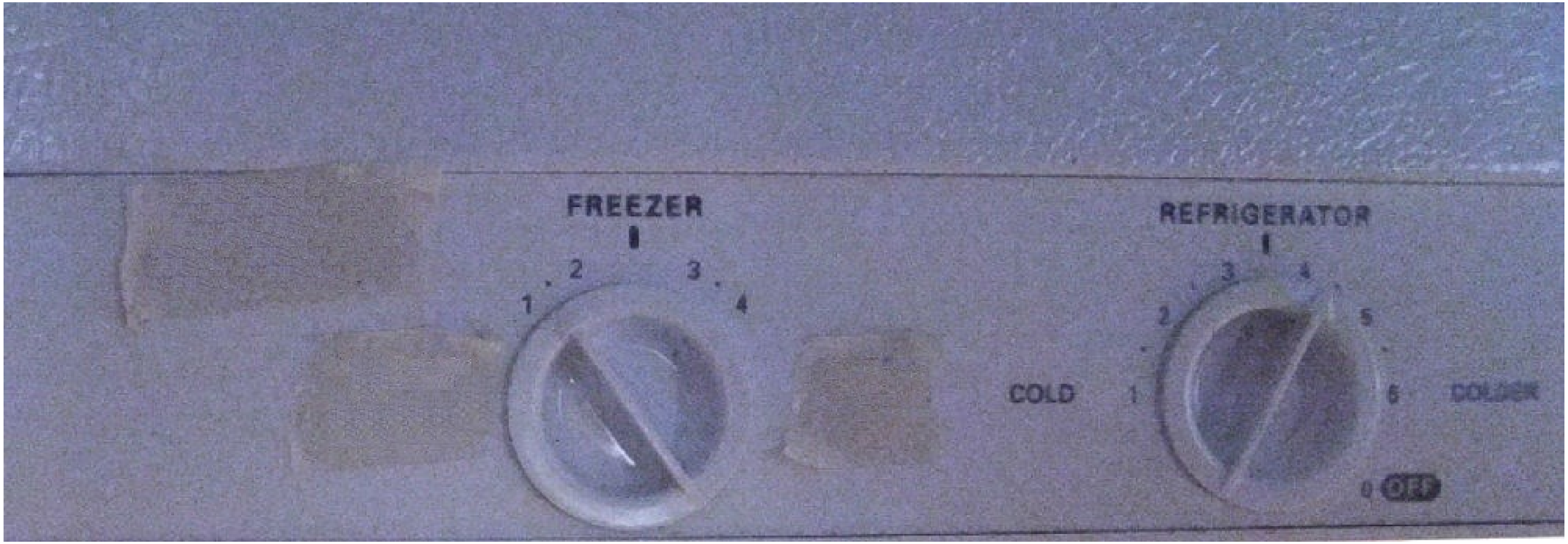
1. Understand How Humans Approach Problems

Mental Models

- "In interacting with the environment, with others, and with the artifacts of technology, people form internal, mental models of themselves and of the things with which they are interacting. These models provide predictive and explanatory power for understanding the interaction.“ – Don Norman

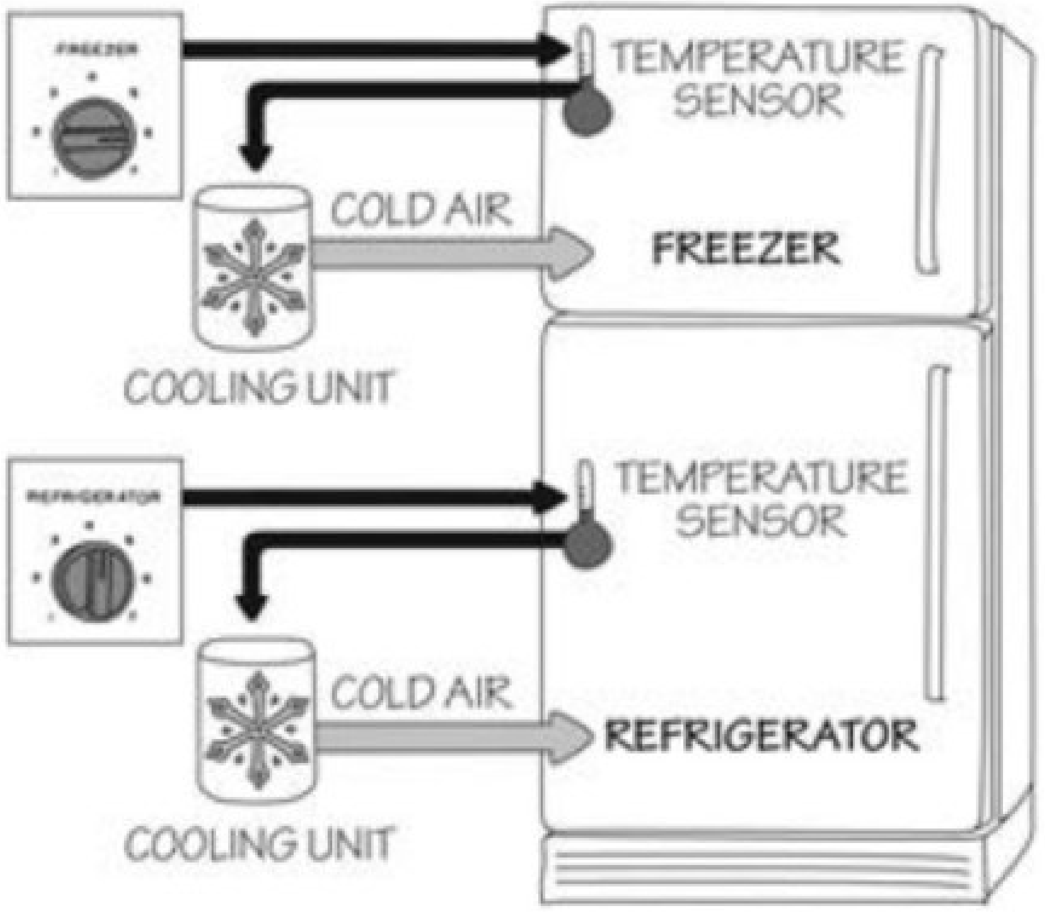
Gentner, D. & Stevens, A.(1983). Mental Models. Hillsdale, NJ: Erlbaum.

Mental Model: Adjusting Freezer Temperature

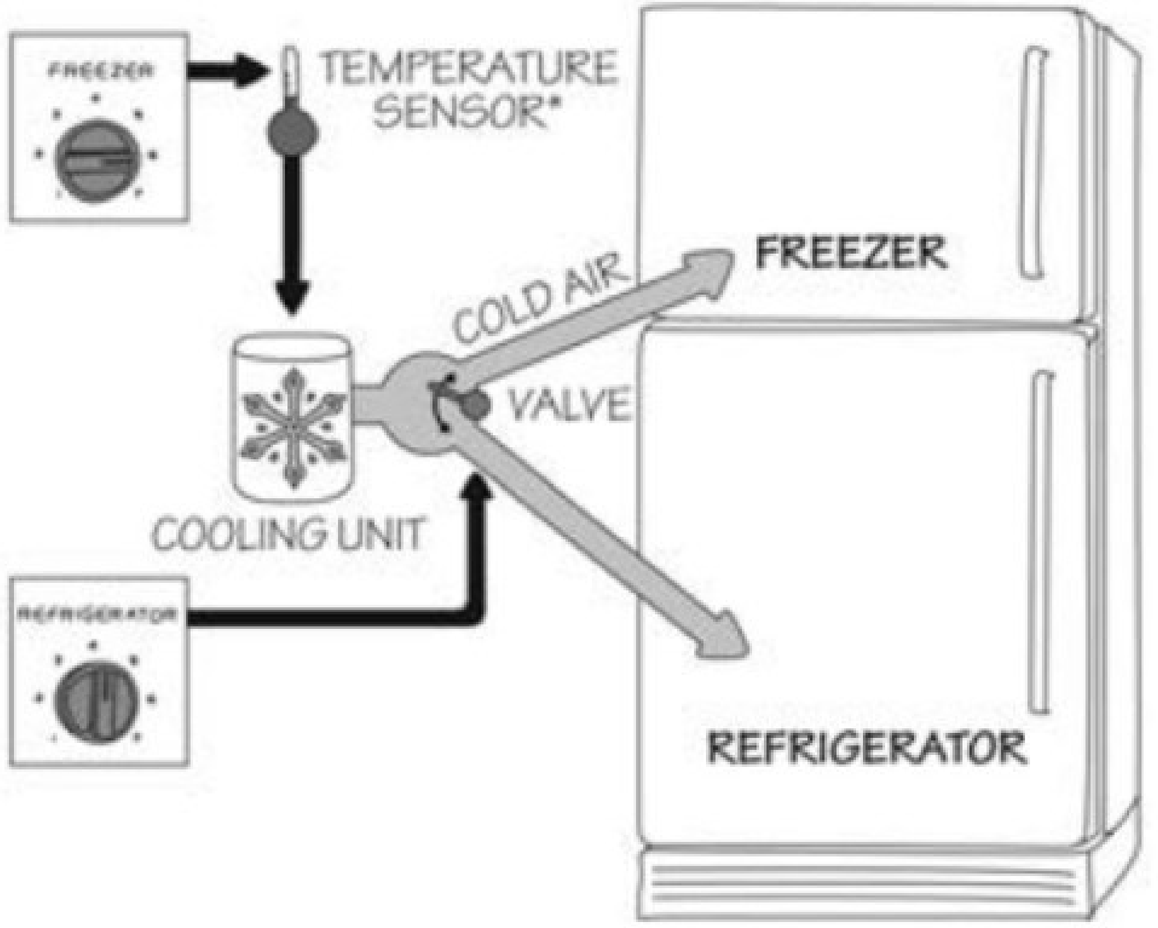


Mental Model: Adjusting Freezer Temperature

A.



B.



Novice

Expert

Mistakes

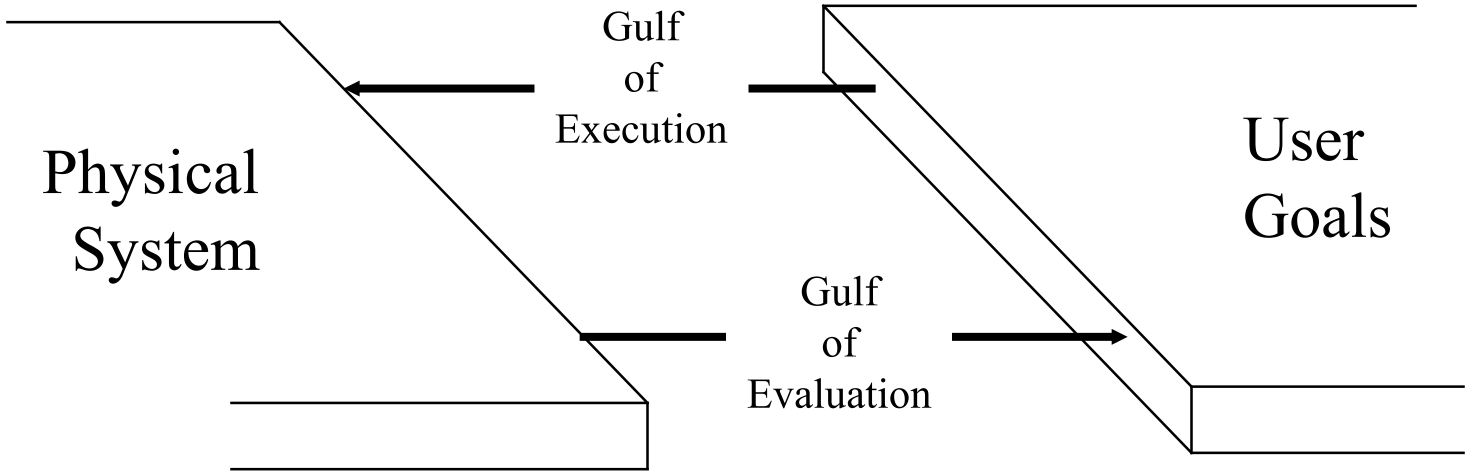
We often blame ***users***
when we should blame ***designers***.

The Action Cycle

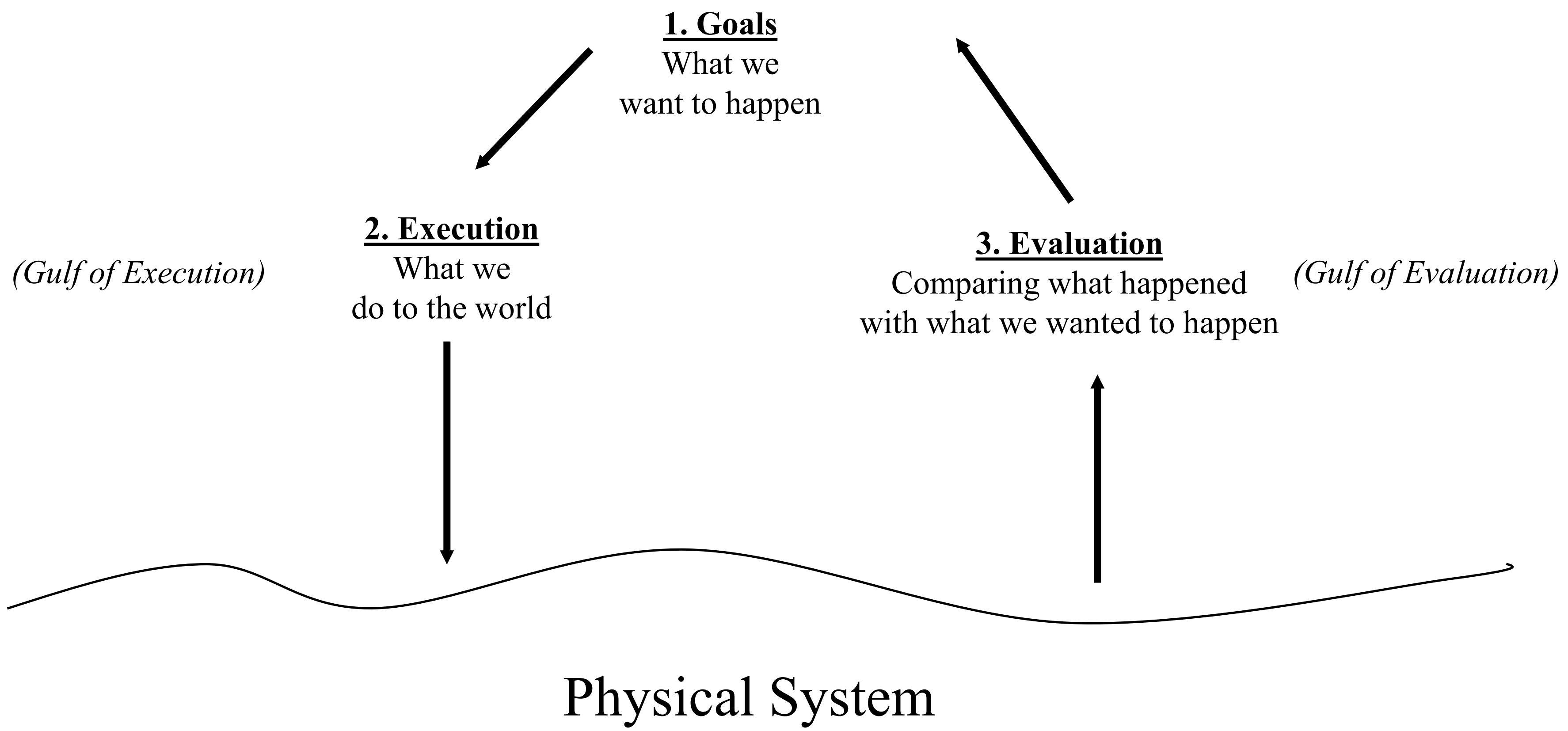
https://www.youtube.com/watch?v=ahtOCfyRbRg

Execution-Evaluation cycle

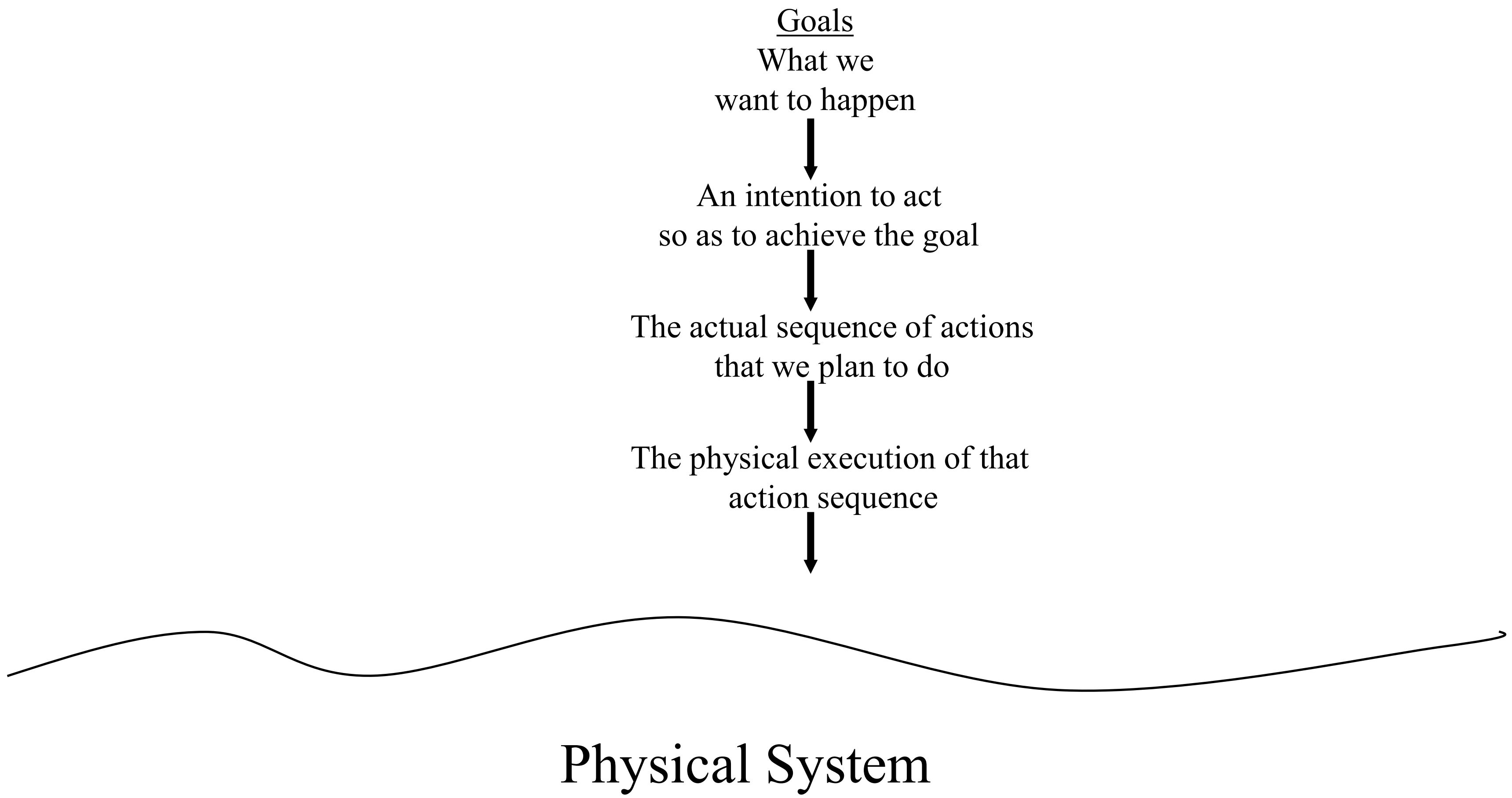
Norman (DOET, p. 46)



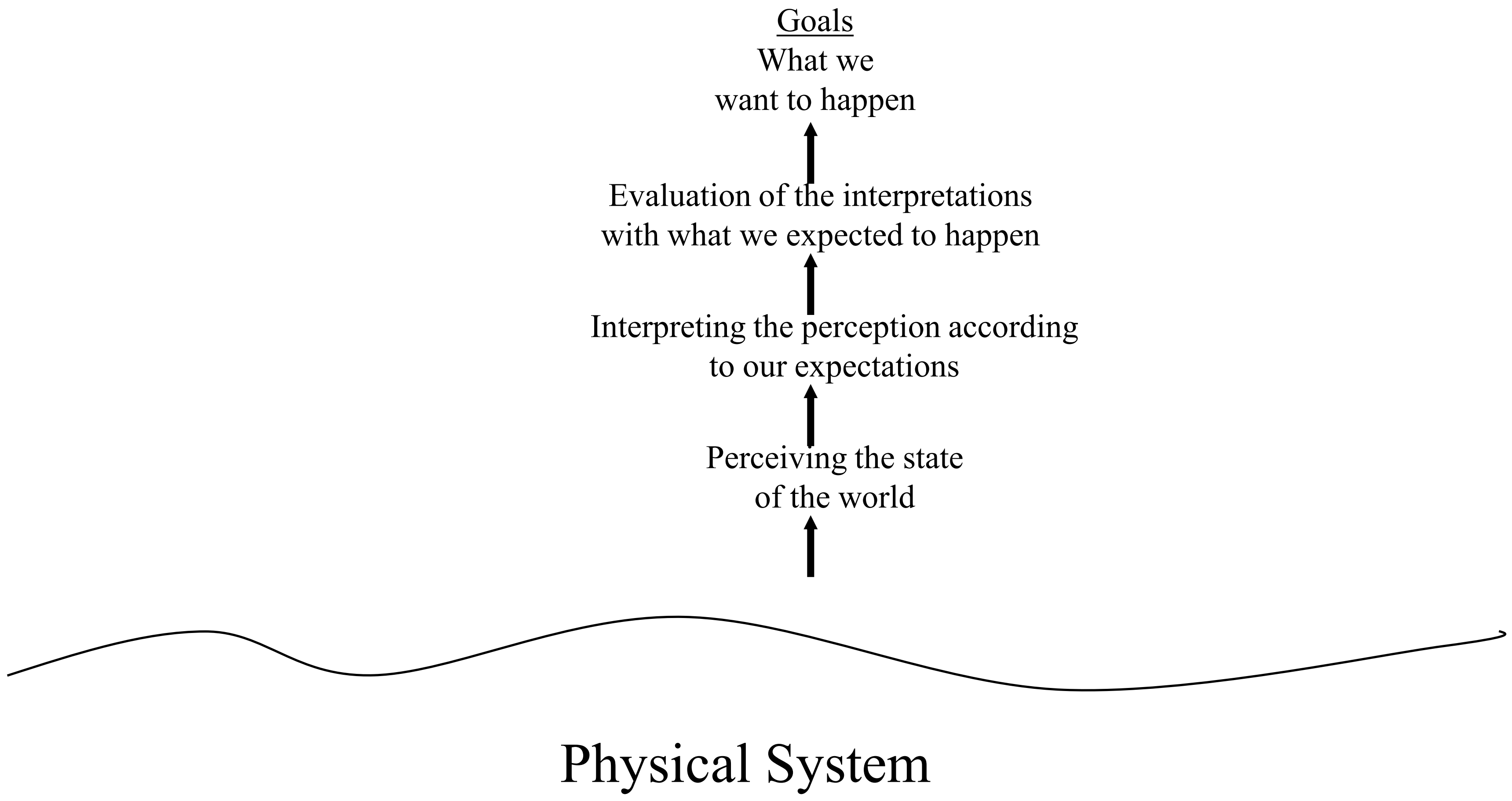
3 Stages: Goals, Execution, Evaluation



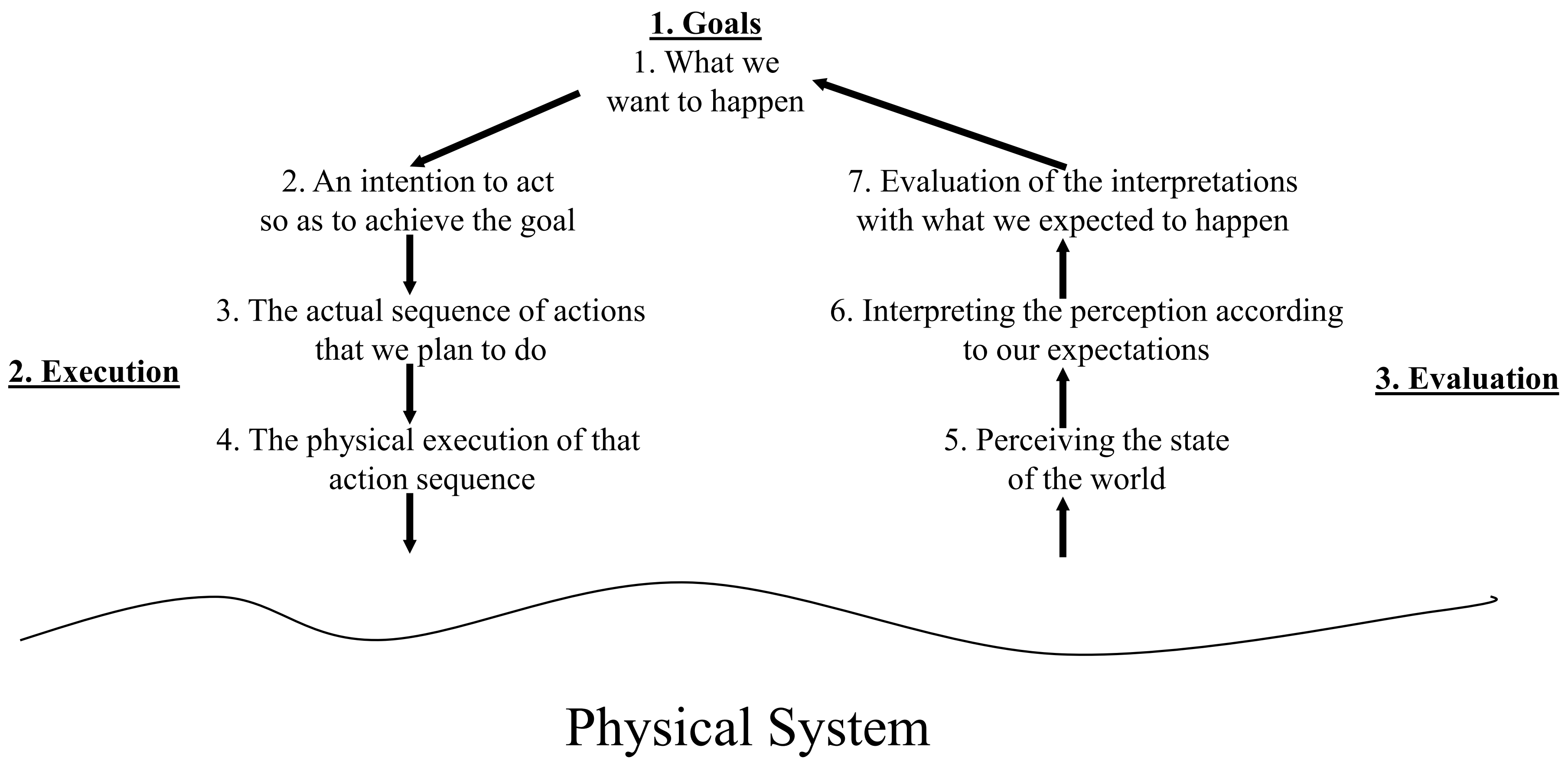
Stage 2. Execution


Goals
What we want to happen
An intention to act so as to achieve the goal
The actual sequence of actions that we plan to do
The physical execution of that action sequence
Physical System

Stage 3. Evaluation


Goals
What we want to happen
Evaluation of the interpretations with what we expected to happen
Interpreting the perception according to our expectations
Perceiving the state of the world
Physical System

7 Steps: All Together



1. Goals
1. What we want to happen
2. An intention to act so as to achieve the goal
3. The actual sequence of actions that we plan to do
4. The physical execution of that action sequence
2. Execution
7. Evaluation of the interpretations with what we expected to happen
6. Interpreting the perception according to our expectations
5. Perceiving the state of the world
3. Evaluation
Physical System

Revisit: Reading a Book Example

- 1. Forming a Goal
  I can’t read my book because the room is dimly lit. I need more light in order to read my book.
- 2. Intention to Act
  There is a light next to my chair. Turning on the light would allow me to read my book.
- 3. Planning the Action
  I need to reach over and turn on the light.
- 4. Executing the Action
  I reach over to turn on the light.
- 5. Feedback from the Action
  The light turns on.
- 6. Interpret the Feedback
  Am I now able to see the text and can read my book?
- 7. Evaluate the Outcome
  Positive – I’m able to read my book. No further action is needed.
  Negative – The light doesn’t work. The Action Cycle is either repeated or a new goal is formed.

http://petekinser.com/norman-action-cycle/

2. Design/Sketch It

Don Norman’s Principles of Design for Understandability and Usability

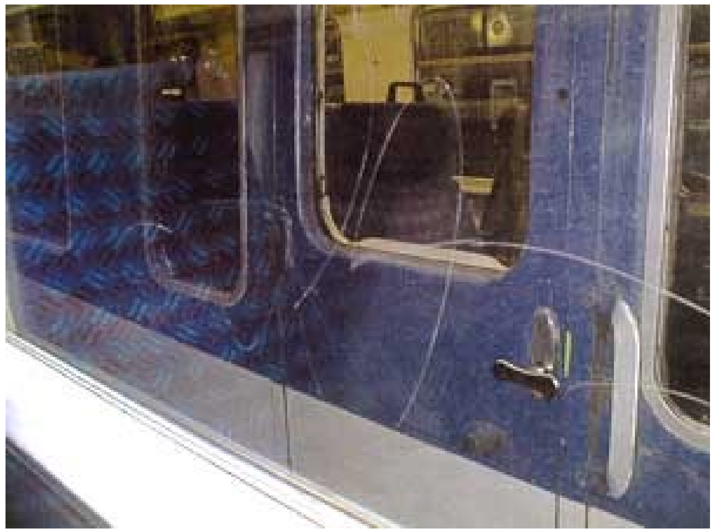
- Effective affordances (provide a good conceptual model)
- Visibility
- Natural mappings
- Feedback to the user

Affordances

- Physical affordances:

  How do the following physical objects afford?

  Are they obvious?

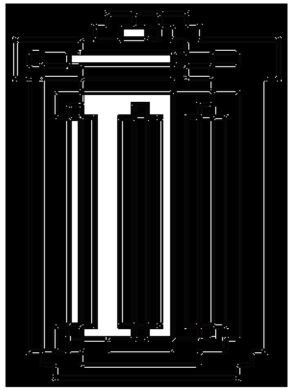


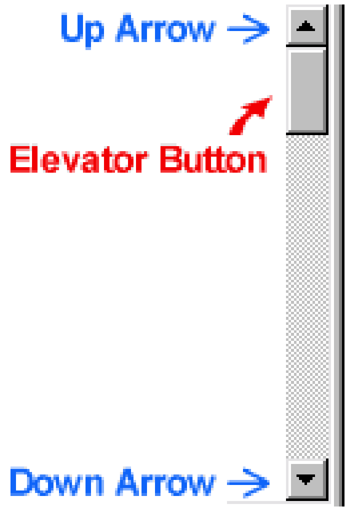
Preece 2002

From Palmiter

UI Affordance

- It should be obvious how a control is used.
- Does the user perceive that clicking on that object is a meaningful, useful action?

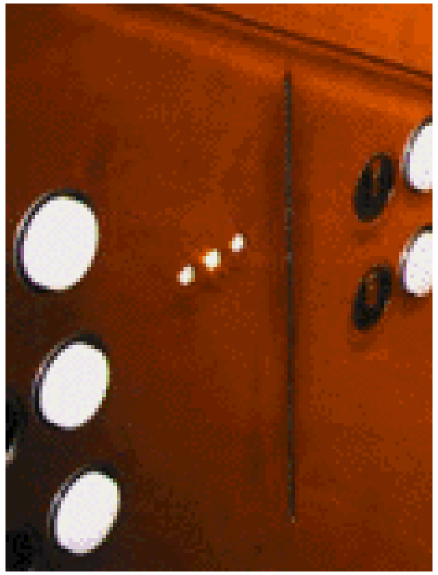




Preece 2002

From Palmiter

Visibility



- This is a control panel for an elevator.
- How does it work?
- Push a button for the floor you want?

- Nothing happens. Push any other button? Still nothing. What do you need to do?

It is not visible as to what to do!

From:
www.baddesigns.com

Preece 2002

Visibility

…you need to insert your room card in the slot by the buttons to get the elevator to work!

How would you make this action more visible?

- make relevant parts visible
- make what has to be done obvious

Preece 2002

Affordance vs. Visibility

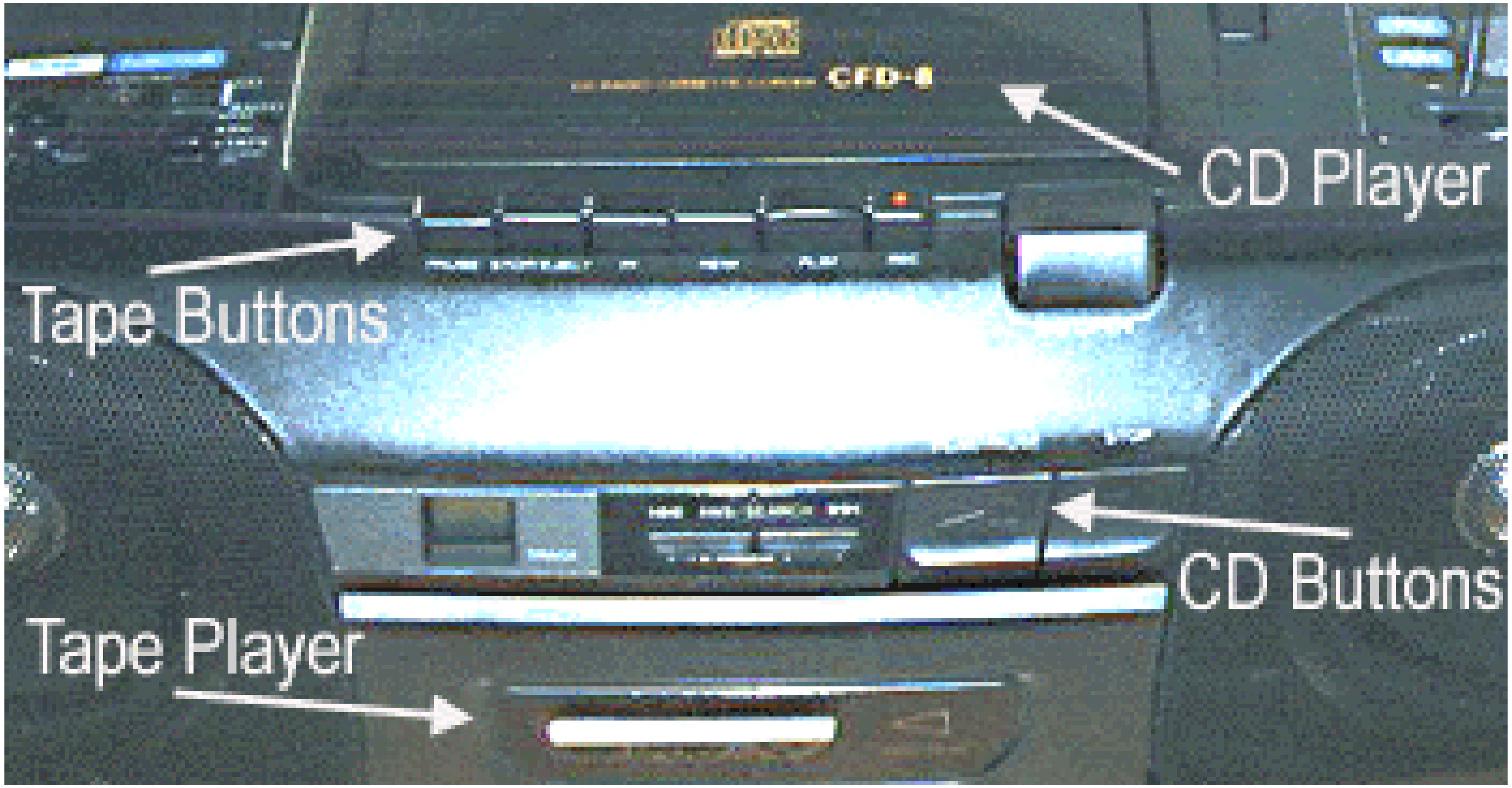
- Affordance: how do you interact with these?

hyperlink

- Visibility: what do they do?

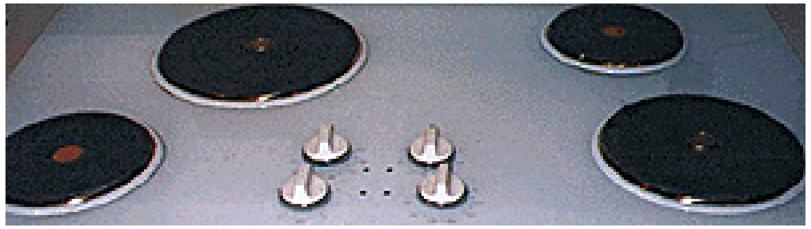
Class Roster

Natural Mappings



From Palmiter

Natural Mappings



Preece 2002

From Palmiter

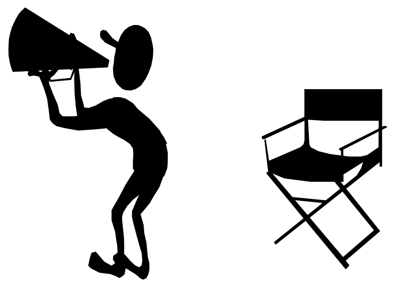
Feedback

- Is the action I just took, understood by the device or system?
- Did I do the right thing?
- Is the system ready for the next step?

From Palmiter

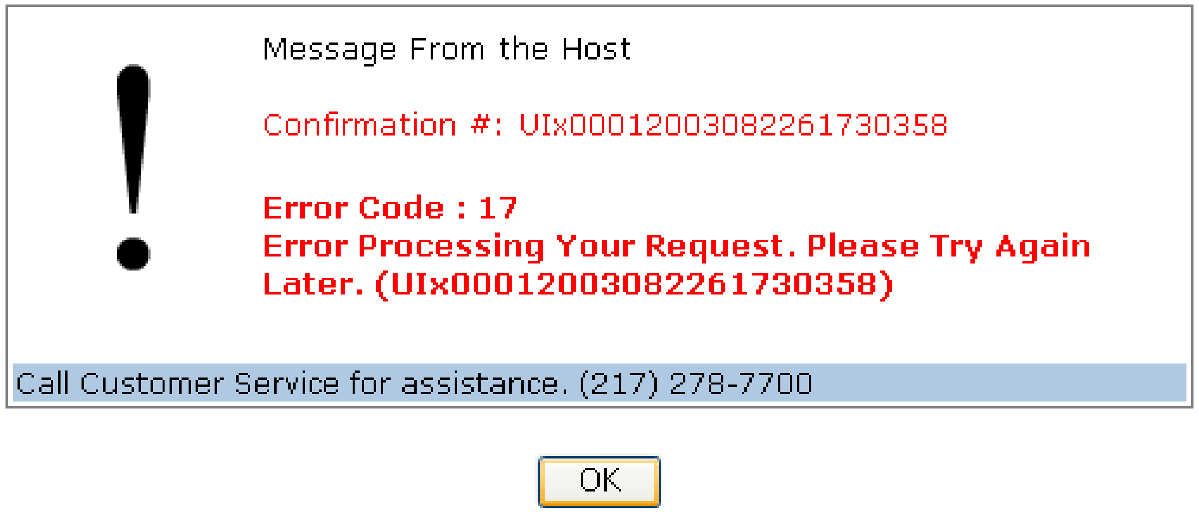
Feedback

- Let the user always know where they are in the process
- Feedback about where you can go and where you are (feedback and feed forward)
- Tell them what's happening
- Tell the user how to recover
- Make error messages clear with alternatives for action



From Palmiter

Unhelpful feedback


Message From the Host

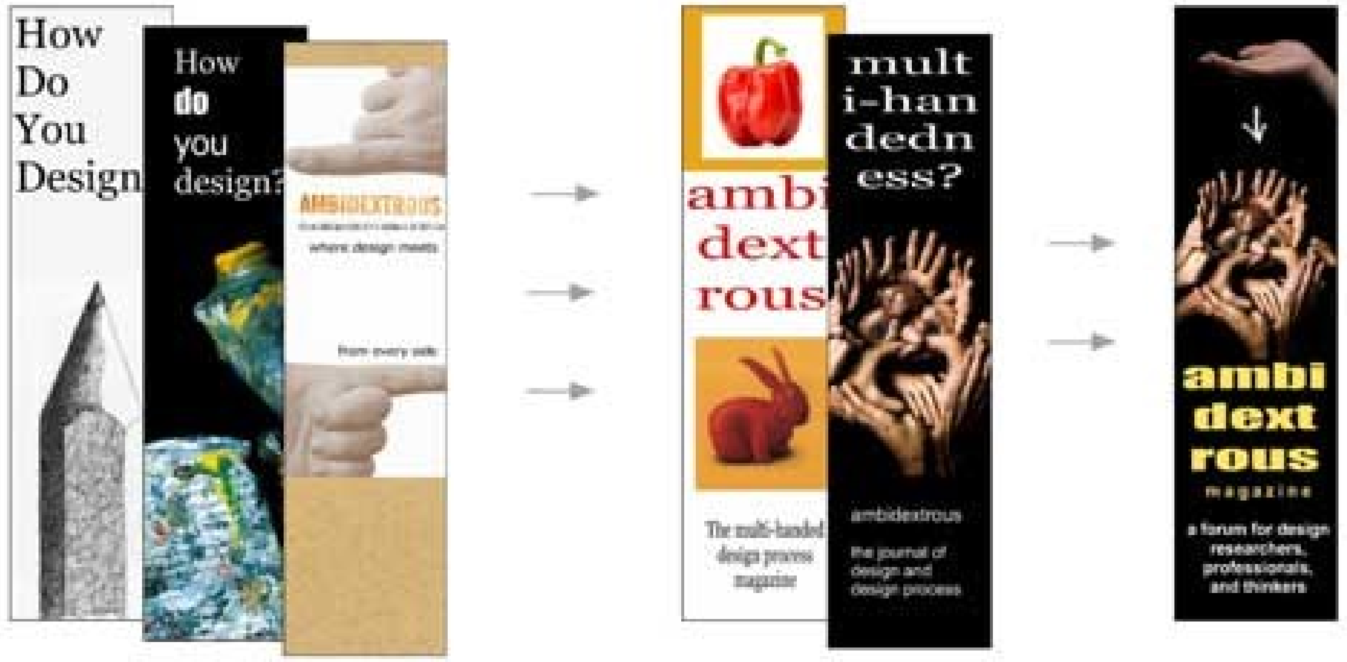
Confirmation #: UIx00012003082261730358

Error Code : 17
Error Processing Your Request. Please Try Again Later. (UIx00012003082261730358)

Call Customer Service for assistance. (217) 278-7700

From Bailey

Parallel Design



Wireframing

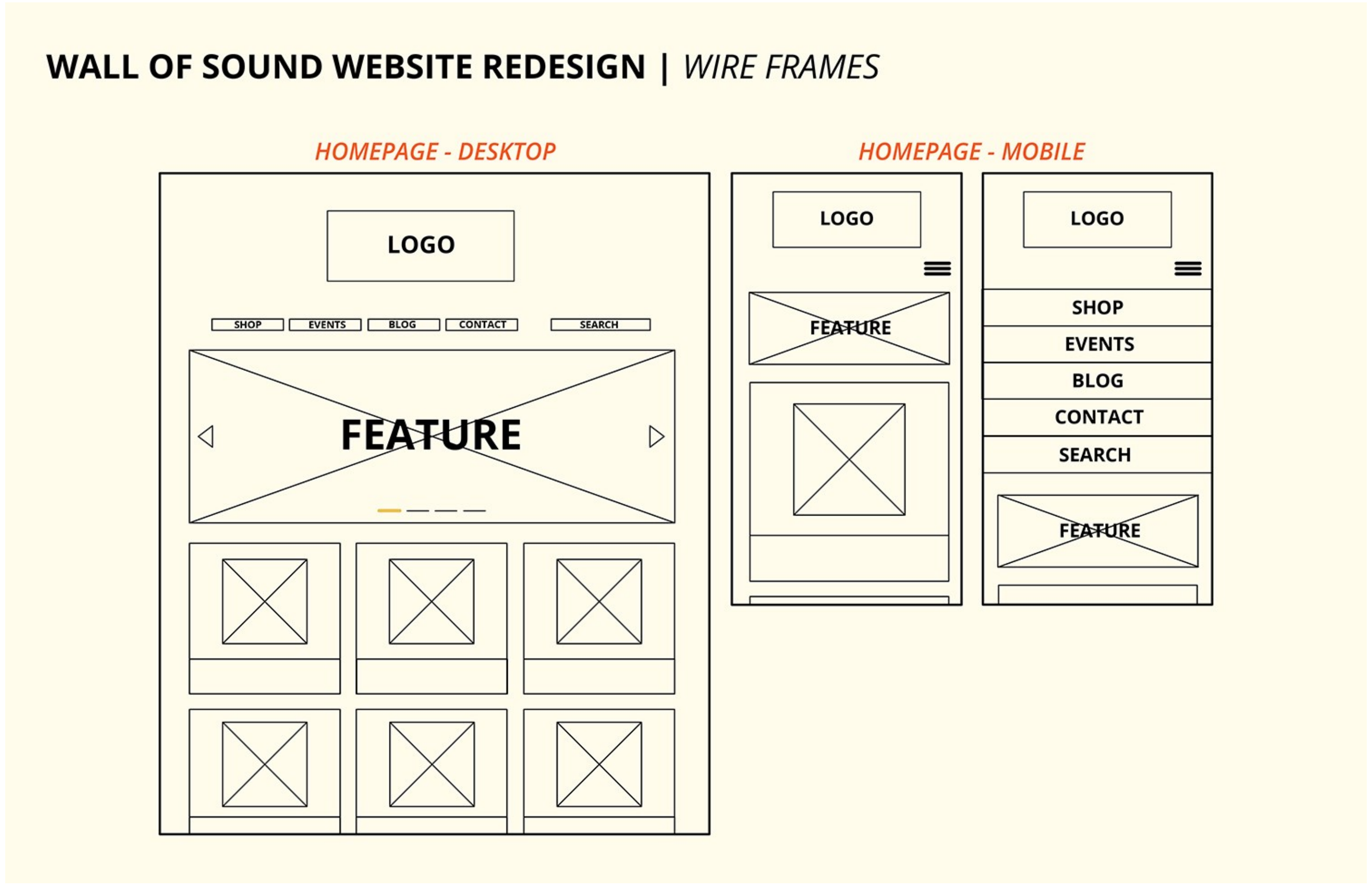
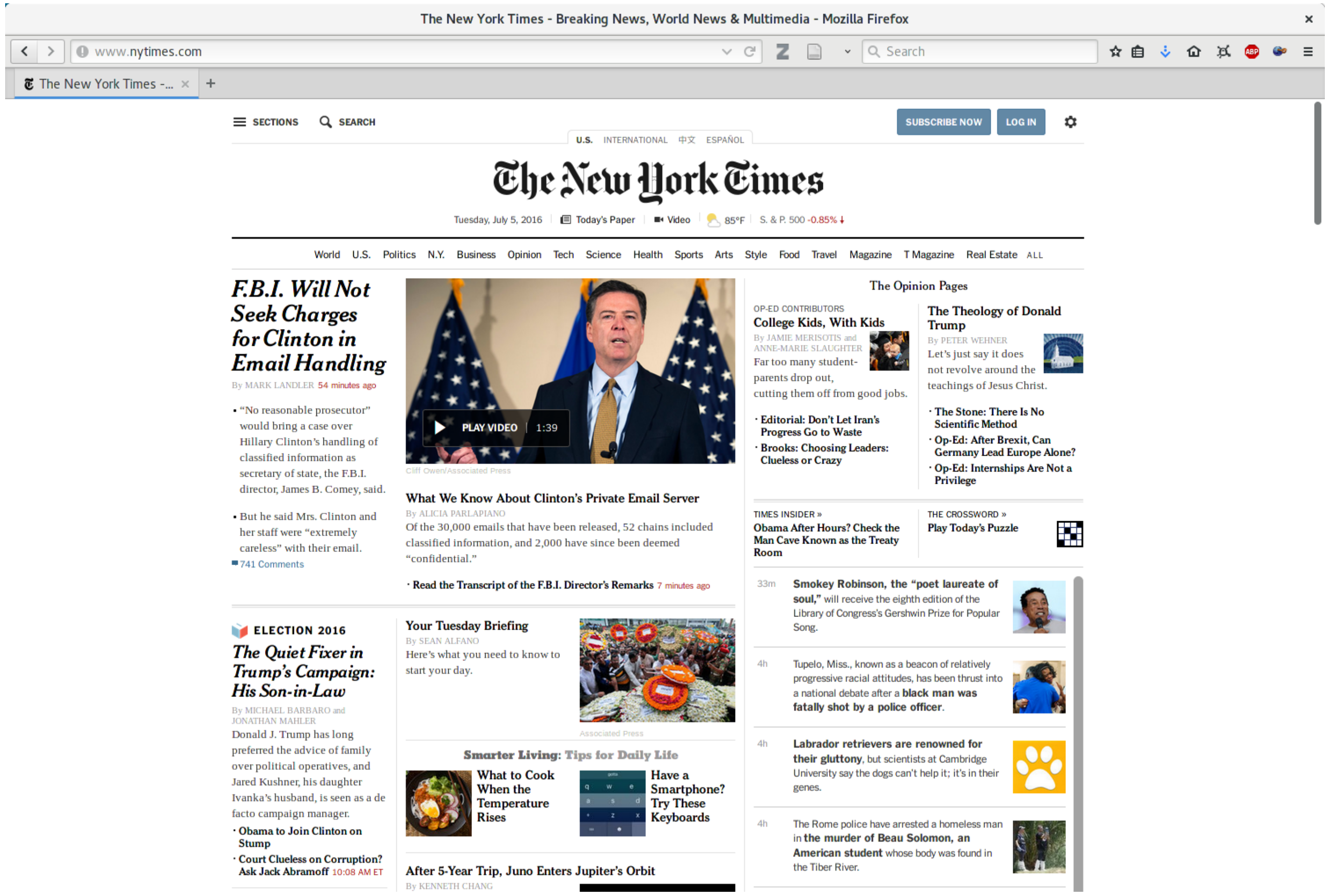


Image from: https://britzerbo.files.wordpress.com/2013/11/wos_wf_home.jpg

Design Guidelines

- Layout
  - Grids
- Whitespace
- Alignment
- Color
- Icons & Labels

Layout: Grids



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F.B.I. Will Not Seek Charges for Clinton in Email Handling

By MARK LANDLER 54 minutes ago

- “No reasonable prosecutor” would bring a case over Hillary Clinton’s handling of classified information as secretary of state, the F.B.I. director, James B. Comey, said.
- But he said Mrs. Clinton and her staff were “extremely careless” with their email.

741 Comments

PLAY VIDEO | 1:39

Cliff Owen/Associated Press

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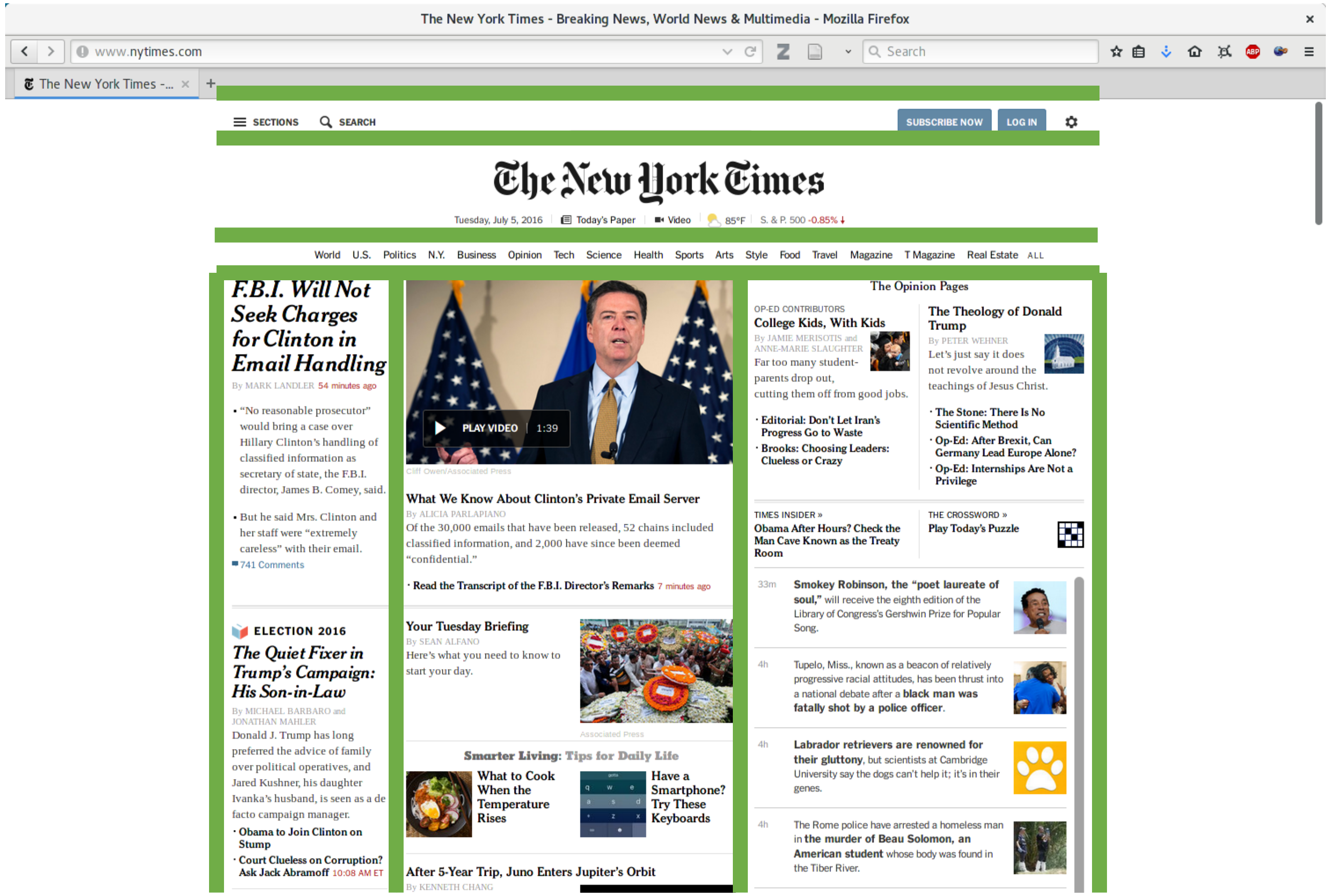
4h The Rome police have arrested a homeless man in **the murder of Beau Solomon, an American student** whose body was found in the Tiber River.

Layout: Grids



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Whitespace

- Improves Legibility
- Aids Comprehension
- Provides Hierarchy

Whitespace: Legibility

Dmitriy Vyacheslavovich Klokov (Russian: Дмитрий Вячеславович Клоков) (born February 18, 1983)[1] is a former Russian weightlifter. He competed in the 105 kg category. He is 182 cm tall.

Klokov was born in Balashikha, Moscow Oblast.[2] He is the son of World Champion Vyacheslav Klokov, who also competed in the Heavyweight category.[3][4]

He became world champion at the 2005 World Championships, with a total of 419 kg.[1][3]

Klokov also participated at the 2005 and 2006 Arnold Sports Festivals in Columbus, Ohio.[5]

At the 2006 World Championships and 2007 World Championships he ranked 3rd.[3][6]

Klokov won the silver medal at the 2008 Summer Olympics, with a total of 423 kg.[1]

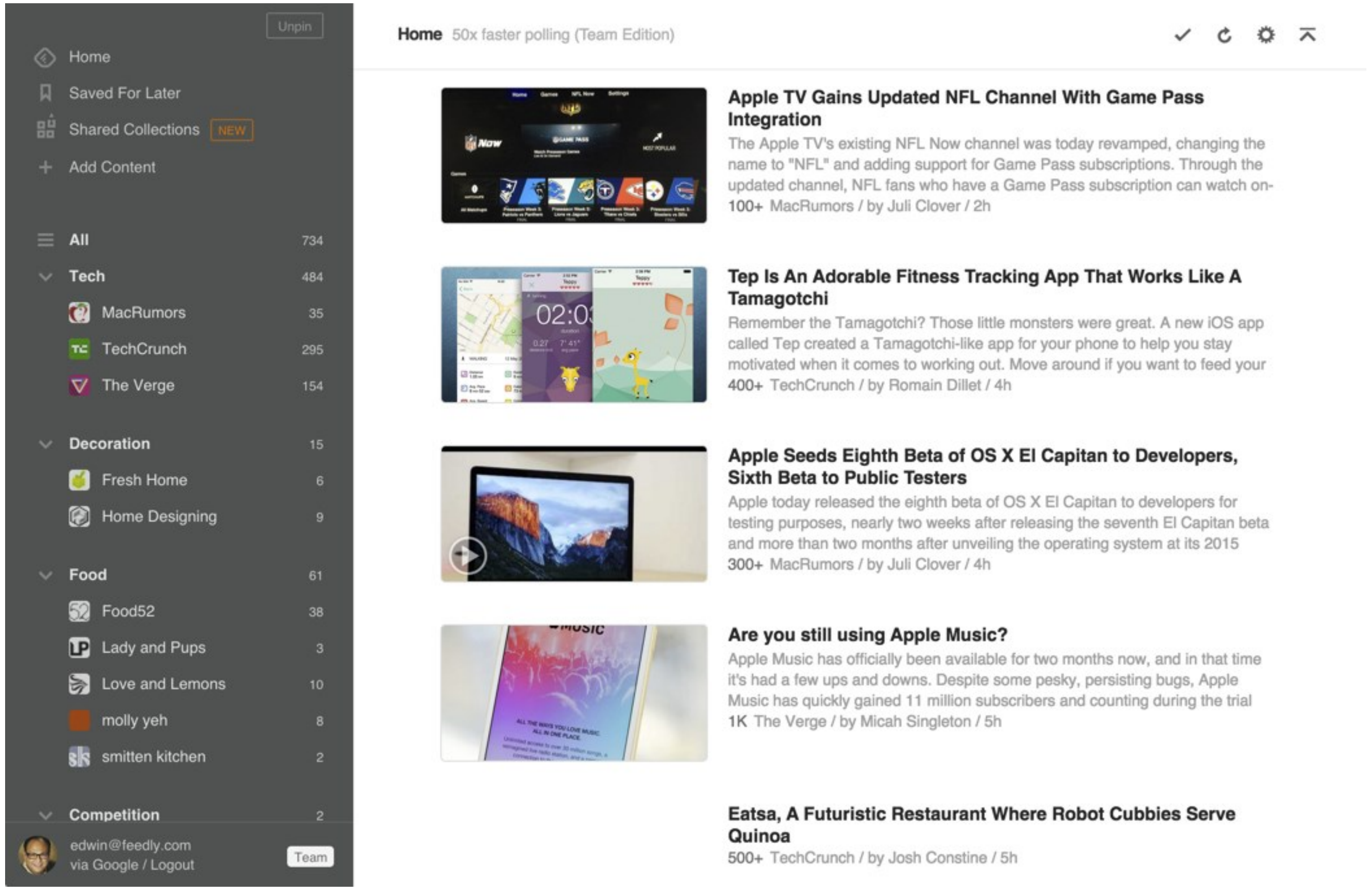
Klokov won the silver medal at the 2011 World Weightlifting Championships, with a 196 kg snatch, 232 kg clean and jerk for a total of 428 kg at a body weight of 104.6 kg. He lost to a fellow Russian, Khadzhimurat Akkayev by 2 kilos (on the snatch).

Klokov was scheduled to compete at the 2012 Summer Olympics in the 105 kg class but was forced to withdraw due to undisclosed medical reasons.

In May 2015, Klokov announced his retirement from international competition.[7] Klokov recently signed with the Baltimore Anthem of the National Pro Grid League.

https://en.wikipedia.org/wiki/Dmitry_Klokov

Whitespace: Comprehension



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via Google / Logout
Team

Home 50x faster polling (Team Edition)

Apple TV Gains Updated NFL Channel With Game Pass Integration
The Apple TV's existing NFL Now channel was today revamped, changing the name to "NFL" and adding support for Game Pass subscriptions. Through the updated channel, NFL fans who have a Game Pass subscription can watch on-
100+ MacRumors / by Juli Clover / 2h

Tep Is An Adorable Fitness Tracking App That Works Like A Tamagotchi
Remember the Tamagotchi? Those little monsters were great. A new iOS app called Tep created a Tamagotchi-like app for your phone to help you stay motivated when it comes to working out. Move around if you want to feed your
400+ TechCrunch / by Romain Dillet / 4h

Apple Seeds Eighth Beta of OS X El Capitan to Developers, Sixth Beta to Public Testers
Apple today released the eighth beta of OS X El Capitan to developers for testing purposes, nearly two weeks after releasing the seventh El Capitan beta and more than two months after unveiling the operating system at its 2015
300+ MacRumors / by Juli Clover / 4h

Are you still using Apple Music?
Apple Music has officially been available for two months now, and in that time it's had a few ups and downs. Despite some pesky, persisting bugs, Apple Music has quickly gained 11 million subscribers and counting during the trial
1K The Verge / by Micah Singleton / 5h

Eatsa, A Futuristic Restaurant Where Robot Cubbies Serve Quinoa
500+ TechCrunch / by Josh Constine / 5h

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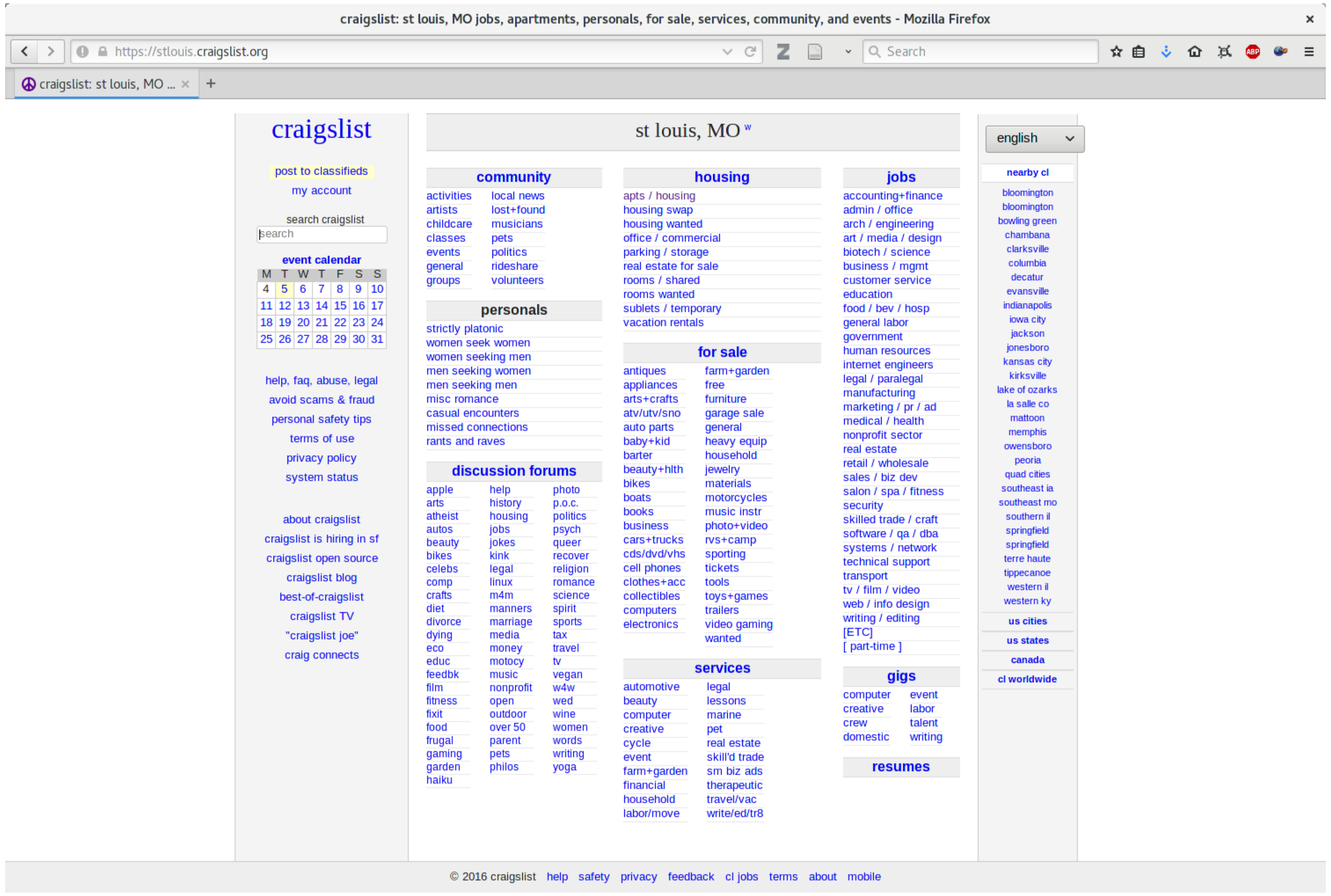
Whitespace: Hierarchy



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event calendar

M	T	W	T	F	S	S
4	5	6	7	8	9	10
11	12	13	14	15	16	17
18	19	20	21	22	23	24
25	26	27	28	29	30	31

help, faq, abuse, legal
avoid scams & fraud
personal safety tips
terms of use
privacy policy
system status

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community

activities, artists, childcare, classes, events, general, groups, local news, lost+found, musicians, pets, politics, rideshare, volunteers

personals

strictly platonic, women seek women, women seeking men, men seeking women, men seeking men, misc romance, casual encounters, missed connections, rants and raves

discussion forums

apple, arts, atheist, autos, beauty, bikes, celebs, comp, crafts, diet, divorce, dying, eco, educ, feedbk, film, fitness, fixit, food, frugal, gaming, garden, haiku, help, history, housing, jobs, jokes, kink, legal, linux, m4m, manners, marriage, media, money, motocy, music, nonprofit, open, outdoor, over 50, parent, pets, philos, photo, p.o.c., politics, psych, queer, recover, religion, romance, science, spirit, sports, tax, travel, tv, vegan, w4w, wed, wine, women, words, writing, yoga

housing

apts / housing, housing swap, housing wanted, office / commercial, parking / storage, real estate for sale, rooms / shared, rooms wanted, sublets / temporary, vacation rentals

for sale

antiques, appliances, arts+crafts, atv/utv/sno, auto parts, baby+kid, barter, beauty+hlth, bikes, boats, books, business, cars+trucks, cds/dvd/vhs, cell phones, clothes+acc, collectibles, computers, electronics, farm+garden, free, furniture, garage sale, general, heavy equip, household, jewelry, materials, motorcycles, music instr, photo+video, rvs+camp, sporting, tickets, tools, toys+games, trailers, video gaming, wanted

services

automotive, beauty, computer, creative, cycle, event, farm+garden, financial, household, labor/move, legal, lessons, marine, pet, real estate, skill'd trade, sm biz ads, therapeutic, travel/vac, write/ed/tr8

jobs

accounting+finance, admin / office, arch / engineering, art / media / design, biotech / science, business / mgmt, customer service, education, food / bev / hosp, general labor, government, human resources, internet engineers, legal / paralegal, manufacturing, marketing / pr / ad, medical / health, nonprofit sector, real estate, retail / wholesale, sales / biz dev, salon / spa / fitness, security, skilled trade / craft, software / qa / dba, systems / network, technical support, transport, tv / film / video, web / info design, writing / editing, [ETC], [part-time]

gigs

computer, creative, crew, domestic, event, labor, talent, writing

resumes

english

nearby cl

bloomington, bloomington, bowling green, chambana, clarksville, columbia, decatur, evansville, indianapolis, iowa city, jackson, jonesboro, kansas city, kirksville, lake of ozarks, la salle co, mattoon, memphis, owensboro, peoria, quad cities, southeast ia, southeast mo, southern il, springfield, springfield, terre haute, tippecanoe, western il, western ky

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Alignment

Alignment guides the eye.

We noticed patterns; deviate from patterns strategically.

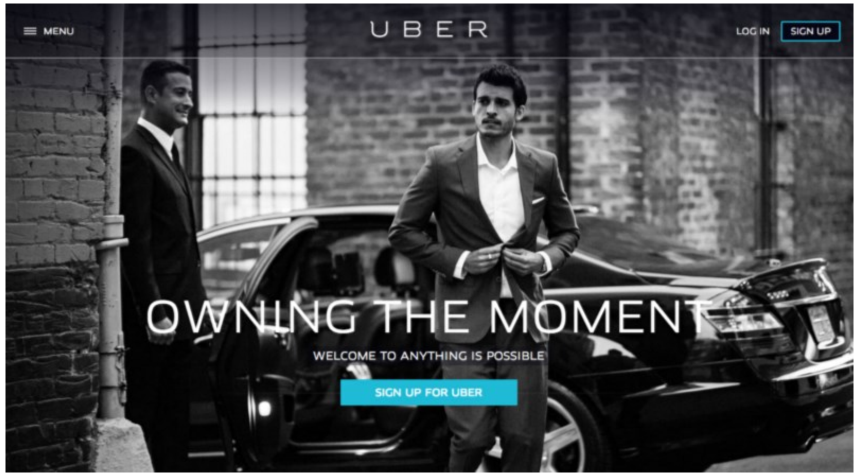
Avoid slight misalignments.

Visual proximity suggests relationship.

Small / Large; scale communicates importance.

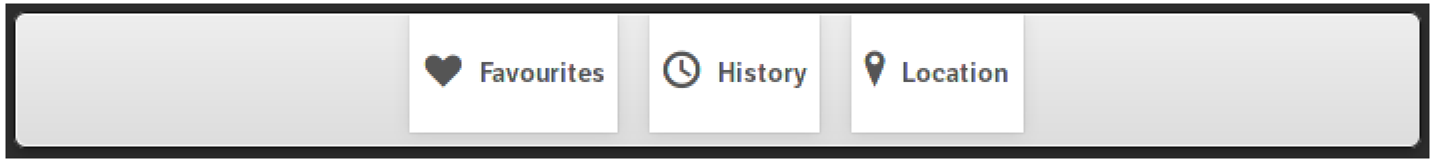
Color

- Use minimal color palette
- Use colors consistently
- Draw attention with contrast
- Use bold colors to draw attention sparingly



Icons & Labels

Time?
Set Clock Time?
Set Alarm?
New Meeting?



Rating?
Heart Monitor?
Send Love Note?

Ice Cream?
Set Address?
Setup GPS?

Designing for Novices & Experts

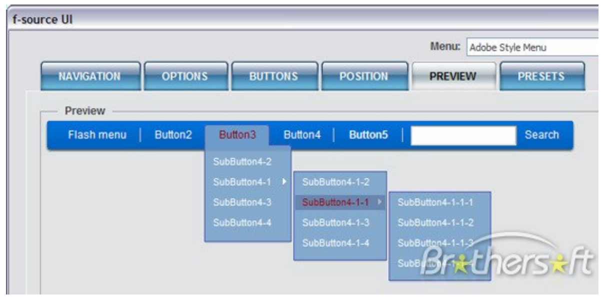
Novice

- **Search for the menus**
- Decide what to do
- Navigate to the chosen option

Experts

- Decide what to do
- **Navigate to the chosen option**

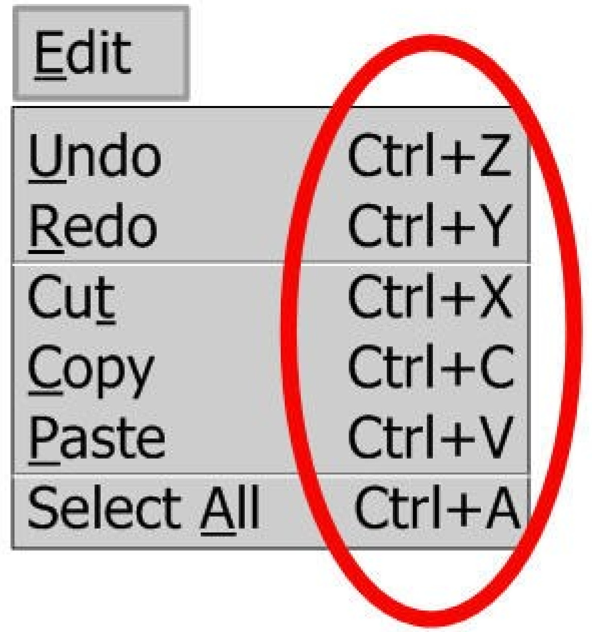
Linear Menus



Good for Search

Relatively Slow
for Navigation

Accommodate Novices & Experts



- Shortcut Keys
  - Make it possible to learn a more efficient way to trigger an action.
  - But this learning doesn't just happen.

Organizing your Design: Card Sorting

- Method to identify latent structure in ideas by having users sort statements into groups of their choosing
  - Can also have set groups

- How users want information organized, how they expect it to be organized

Card Sorting

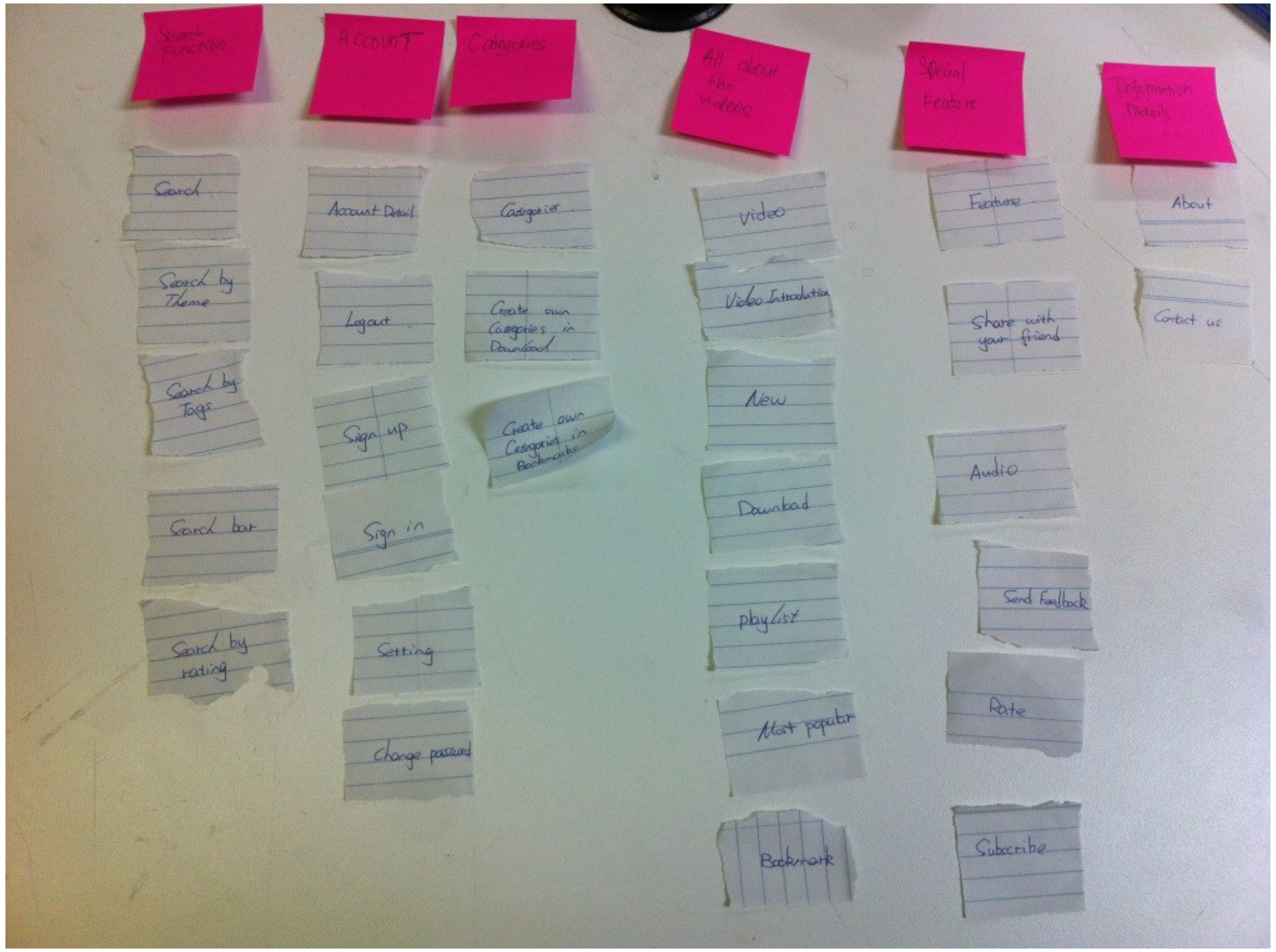


Image Source: http://lydiafelicia.wordpress.com/2012/08/23/23082012-card-sorting/

Initial Sketch

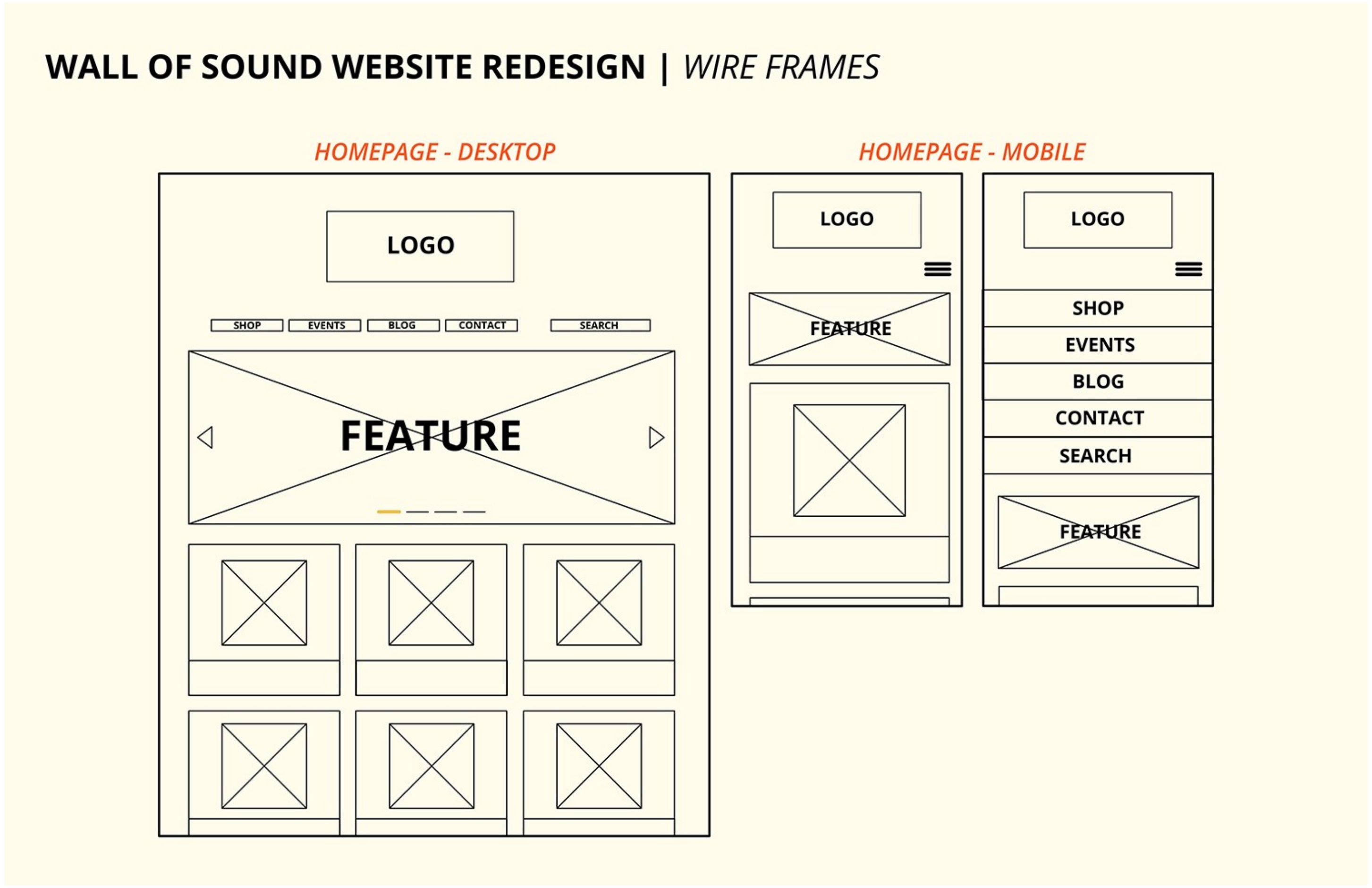
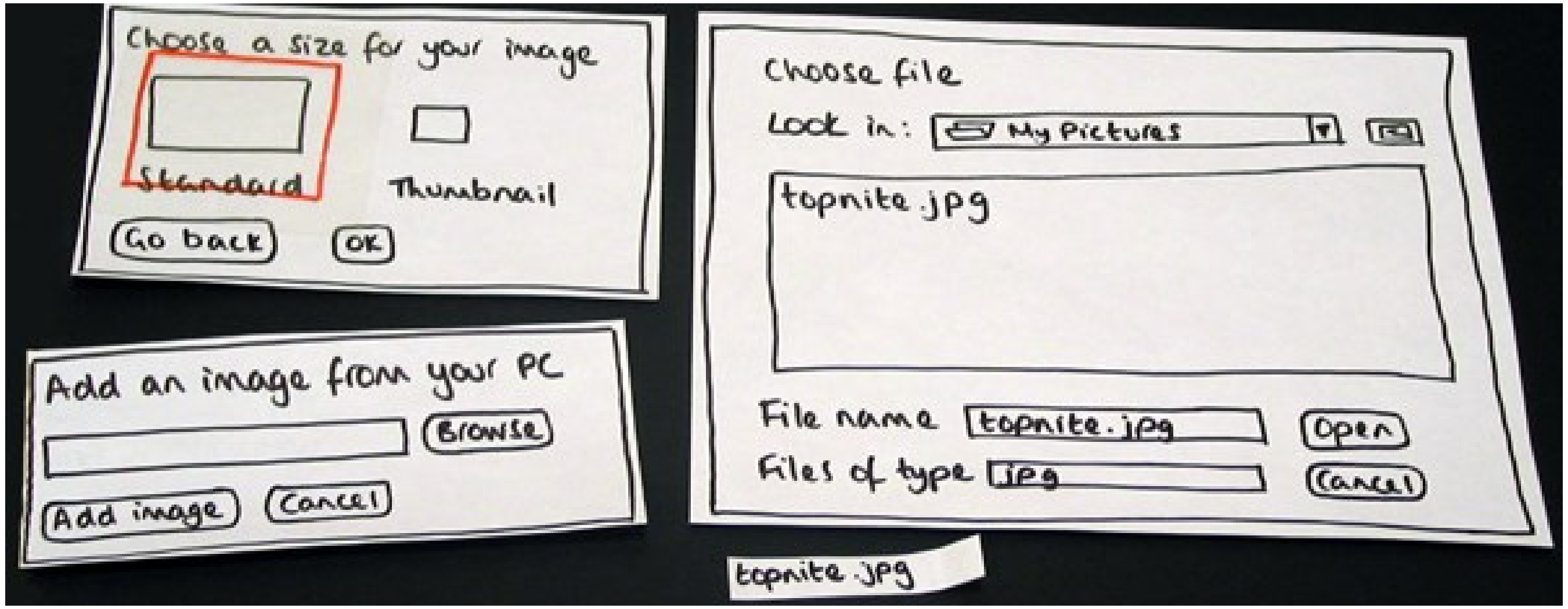


Image from: https://britzerbo.files.wordpress.com/2013/11/wos_wf_home.jpg

3. Create Lo-Fi Prototype

Lo-Fi/Paper Prototype



Paper prototypes are great for…

- Evaluating mental model, language and functionality choices
  - Does the general flow of things make sense to your user?
  - Do they recognize what they can do and how?
- Getting honest feedback
  - If you show someone a highly polished thing, they often don’t want to tell you it stinks.
  - Kindergarten nostalgia?

Paper Prototypes are not so great for…

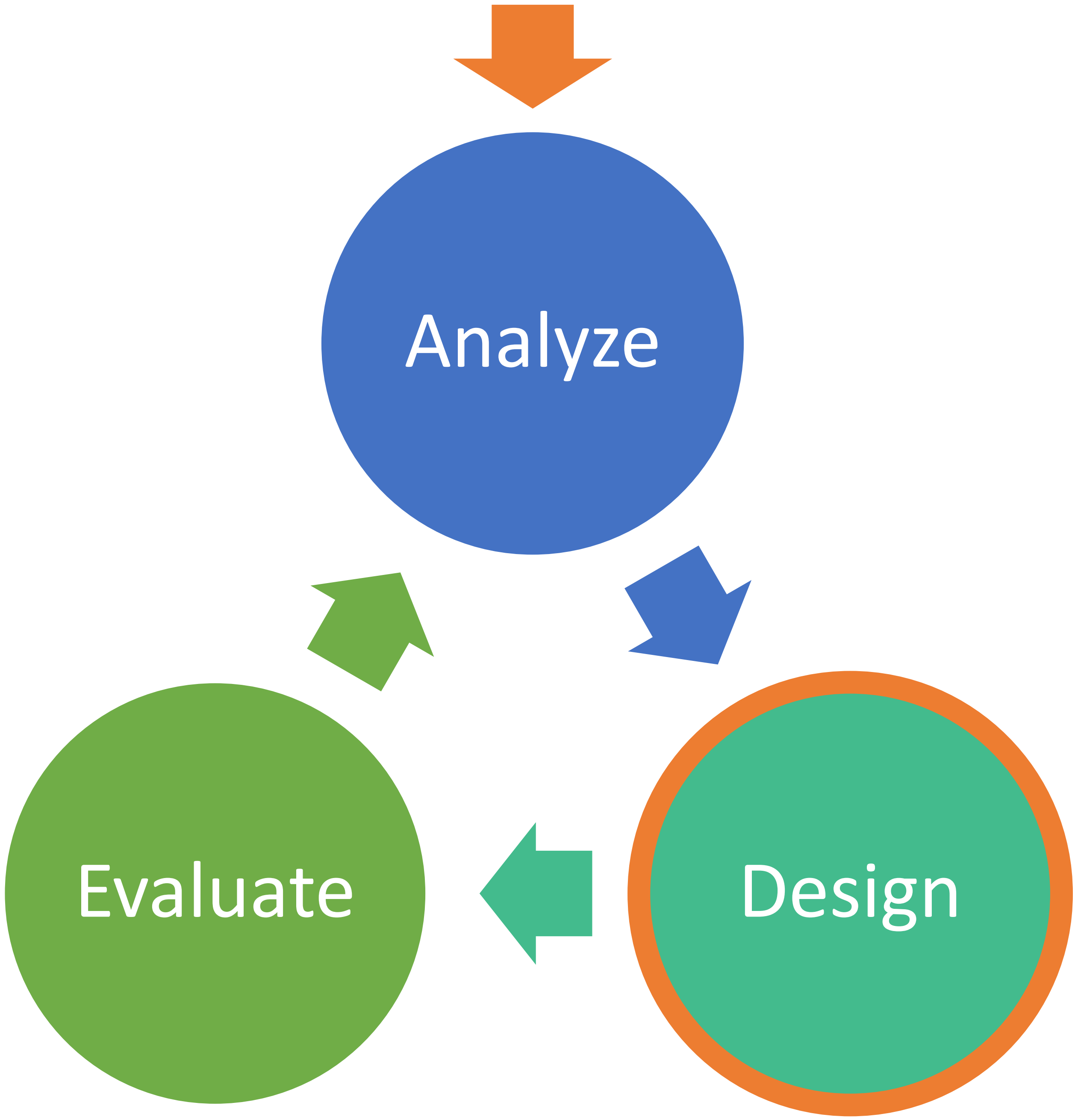
- Highly dynamic interface elements
    - Animations
    - Gestural interfaces (sometimes).
        - It’s worthwhile to try here, but sometimes you’ll get the sense that people haven’t really absorbed the idea you are trying to communicate.
        - iPhone swipe motion
    - Games (sometimes)
        - Tracy Fullerton: Prototyping via board game to get balance and flow worked out.
        - Wii sports?

Good Paper Prototype

- Accurately captures the tasks that you intend to test.
- Users should be able to click the buttons, interact with the menus, scroll….whatever your interface needs to do.

Good Paper Prototype

- Concentrate on supporting the tasks you will be testing, not arbitrary actions
  - if your task will ask people to look up the details for a given event, you need the details for that event, not all events
- But, **everything** the user will naturally see should be **fully** fleshed out.
  - No squiggly lines; use actual text
- Should look like you didn’t put a lot of effort into it… even though you probably did.

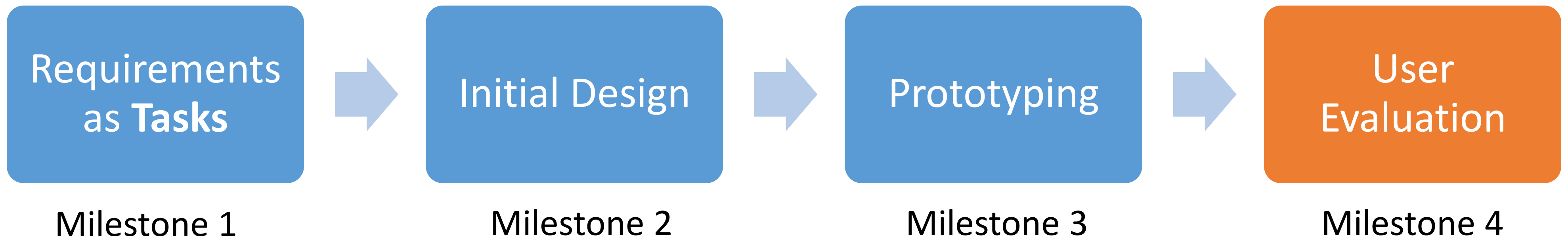

Analyze
Design
Evaluate

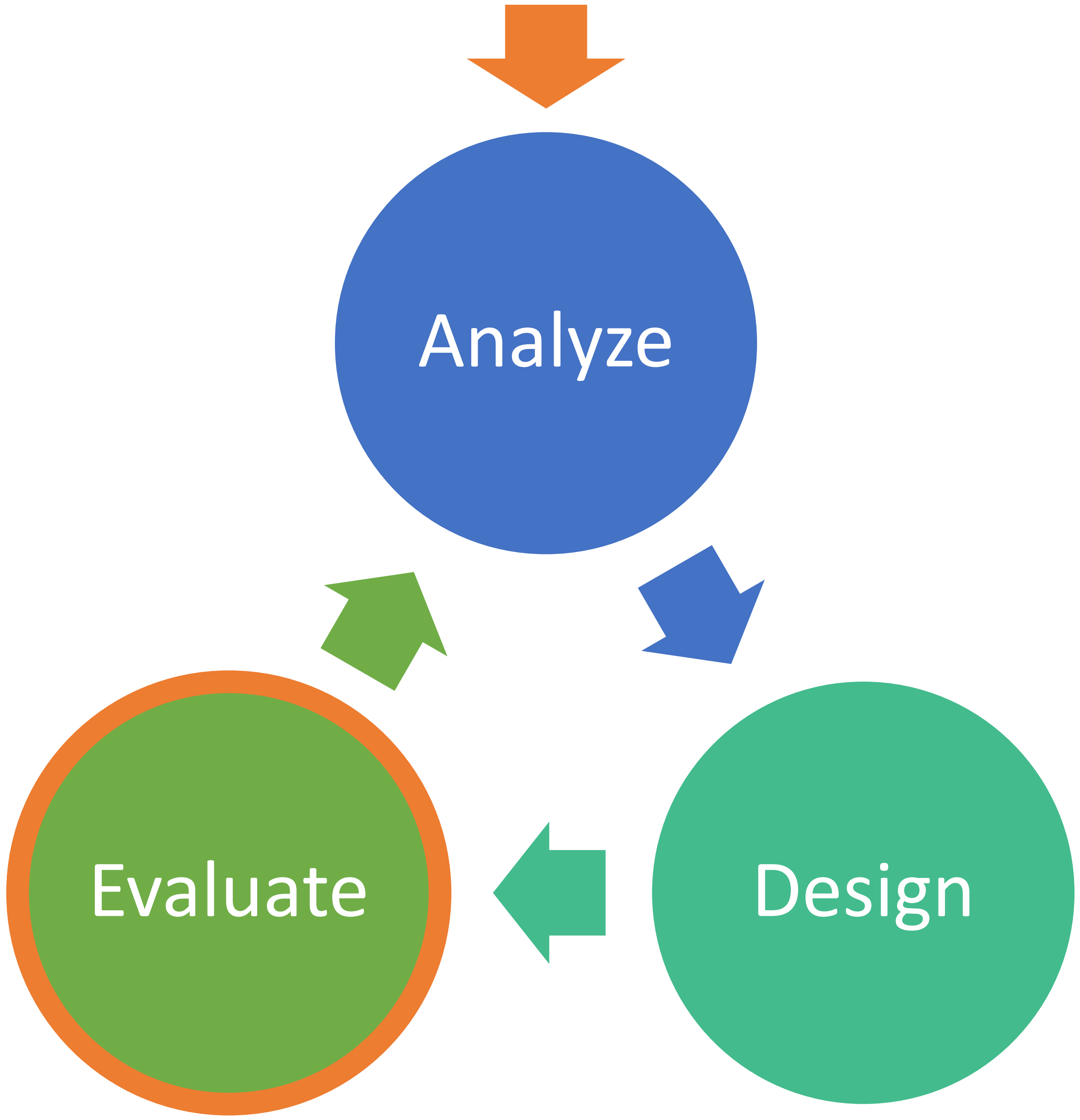
Milestone 2 & 3 Goal: Create a Prototype

1. Understand How Humans Approach Problems
2. Design/Sketch it
3. Create Lo-Fi Prototype

Evaluation: Milestone 4

Semester Project




Analyze
Design
Evaluate

Milestone 4 Goal: Evaluate Design

1. Conduct an Evaluation
2. Analyze the Problems, Design Solution, & Evaluate Again

1. Conduct an Evaluation

Cognitive Walkthrough

Phase 4: Walk-through Evaluation

Process

1 Select one of the task scenarios <- Each has a **Persona**

2 Write out the correct sequence/system responses

3 For each user's step/action in the task:

a) can you build a believable story that motivates the user's actions?
b) can you rely on user's expected knowledge and training about system?
    - Will they see the control?
    - Will the recognize that it does what they want?
    - After they perform the action will the understand the feedback?
c) if you cannot:
    - you've located a problem in the interface!
    - note the problem, including any comments
    - assume it has been repaired
d) go to the next step in the task

Cognitive Walkthrough Questions

- Will users be trying to produce whatever effect the action has?
- Will users notice the correct action is available?
- Once users find the correct action in the interface, will they know it is the right one for the effect they want to produce?
- After the action is taken, will users understand the feedback they get?

GOMS

GOMS

- Goals – what the user wants to do
- Operators – actions performed to reach the goal
- Methods – sequences of operators that accomplish a goal
- Selection Rules – describe when to choose one method over another

GOMS Strengths

- GOMS techniques are most useful for systems where
  - There will be experts
  - Users repeatedly perform a (relatively) small number of tasks
- GOMS is good for streamlining the efficiency of a process

How to do a GOMS Analysis

- Generate task description
  - Pick high-level user Goal
  - Write Method for accomplishing Goal - may invoke subgoals
  - Write Methods for subgoals
    - This is recursive
    - Stops when Operators are reached
- Evaluate description of task
- Apply results to UI
  - Look for ways to remove steps (learning + execution)
  - Look for ways to reuse sub-methods (learning)
  - Make sure that the end state is the goal (error prevention)
- Iterate

Adapted from Chris Long

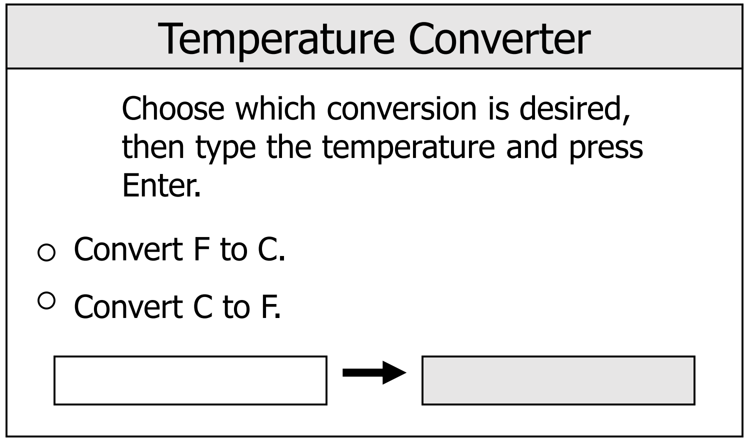
Keystroke-Level Model (KLM)

- Model was developed to predict time to accomplish a task on a computer
- Predicts expert error-free task-completion time with the following inputs:
  - a task or series of subtasks
  - method used
  - command language of the system
  - motor-skill parameters of the user
  - response-time parameters of the system
- Prediction is the sum of the subtask times and overhead

KLM Accuracy

- Widely validated in academia
- KLM predictions are generally within 10-20% of actual expert performance
- Simplified cognitive model

KLM Example



Choose which conversion is desired, then type the temperature and press Enter.

○ Convert F to C.

○ Convert C to F.

K	0.2
B	.10/.20
P	1.1
H	0.4
D	-
M	1.35
R	-

HPB (select F to C) PB (click in text box) HKKKKK Apply Rule 0

HMPMB PMB HMKMKMKMK MK Apply Rules 1 and 2

HMPB PB HMKKKKMK Convert to numbers

.4+1.35+1.1+.20+ 1.1 + .2 +.4+1.35+4(.2)+1.35+.2

=8.45

Heuristic Evaluation

Heuristic Evaluation

- Developed by Jakob Nielsen
- Helps find usability problems in a UI design
- Small set (3-5) of evaluators examine UI
    - independently check for compliance with usability principles (“heuristics”)
    - different evaluators will find different problems
    - evaluators only communicate afterwards
        - findings are then aggregated
- Can perform on working UI or on sketches

Heuristic Evaluation Process

- Evaluators go through UI several times
  - inspect various dialogue elements
  - compare with list of usability principles
  - consider other principles/results that come to mind
- Usability principles
  - Nielsen’s “heuristics”
  - supplementary list of category-specific heuristics
    - competitive analysis & user testing of existing products
- Use violations to redesign/fix problems

Heuristics

- H1: Visibility of system status
- H2: Match between system & real world
- H3: User control & freedom
- H4: Consistency and standards
- H5: Error prevention
- H6: Recognition rather than recall
- H7: Flexibility and efficiency of use
- H8: Aesthetic and minimalist design
- H9: Help users recognize, diagnose, and recover from errors
- H10: Help and documentation

Phases of Heuristic Evaluation

- 1) Pre-evaluation training
  - give evaluators needed domain knowledge and information on the scenario
- 2) Evaluation
  - individuals evaluate and then aggregate results
- 3) Severity rating
  - determine how severe each problem is (priority)
    - can do this first individually and then as a group
- 4) Debriefing
  - discuss the outcome with design team

Debriefing

- Conduct with evaluators, observers, and development team members
- Discuss general characteristics of UI
- Suggest potential improvements to address major usability problems
- Dev. team rates how hard things are to fix
  - 0 – Trivial; 4 – Reengineer the entire system
- Make it a brainstorming session
  - little criticism until end of session

User Testing (Usability Evaluation)

Recruiting Users

- Find people with the same experience level as the typical user
- Don’t get people who are familiar with the product or your views on it.
    - Be careful about “friends and family” testing
    - Public places like libraries, dining halls, coffee shops can be good places to find people who wouldn’t mind helping for a few minutes.
    - Some companies have user testing labs that they set up and they handle recruiting users.
    - In academia, we often post fliers or set up agreements with local organizations.
    - A small budget to give out gift certificates or something can help.

Realistic Situation

- If you can, find a quiet, distraction free room for user testing.
- Consider recording audio or video of the user tests.
  - This can be useful, but you can get lots of great info without recording.

User Instructions

- Tell users:
  - You are testing a piece of software, not them.
  - It’s ok for them to stop at any time.
    - How do you handle cases where people do leave?
  - Demonstrate equipment that users will need to use (unless the equipment is what you are testing)

Think Aloud Protocol

- Ask users to “think aloud” as they are working.
  - Explain why – rich information source for you
  - You may need to model it once for them
  - You may also want to get them to practice once with an unrelated task

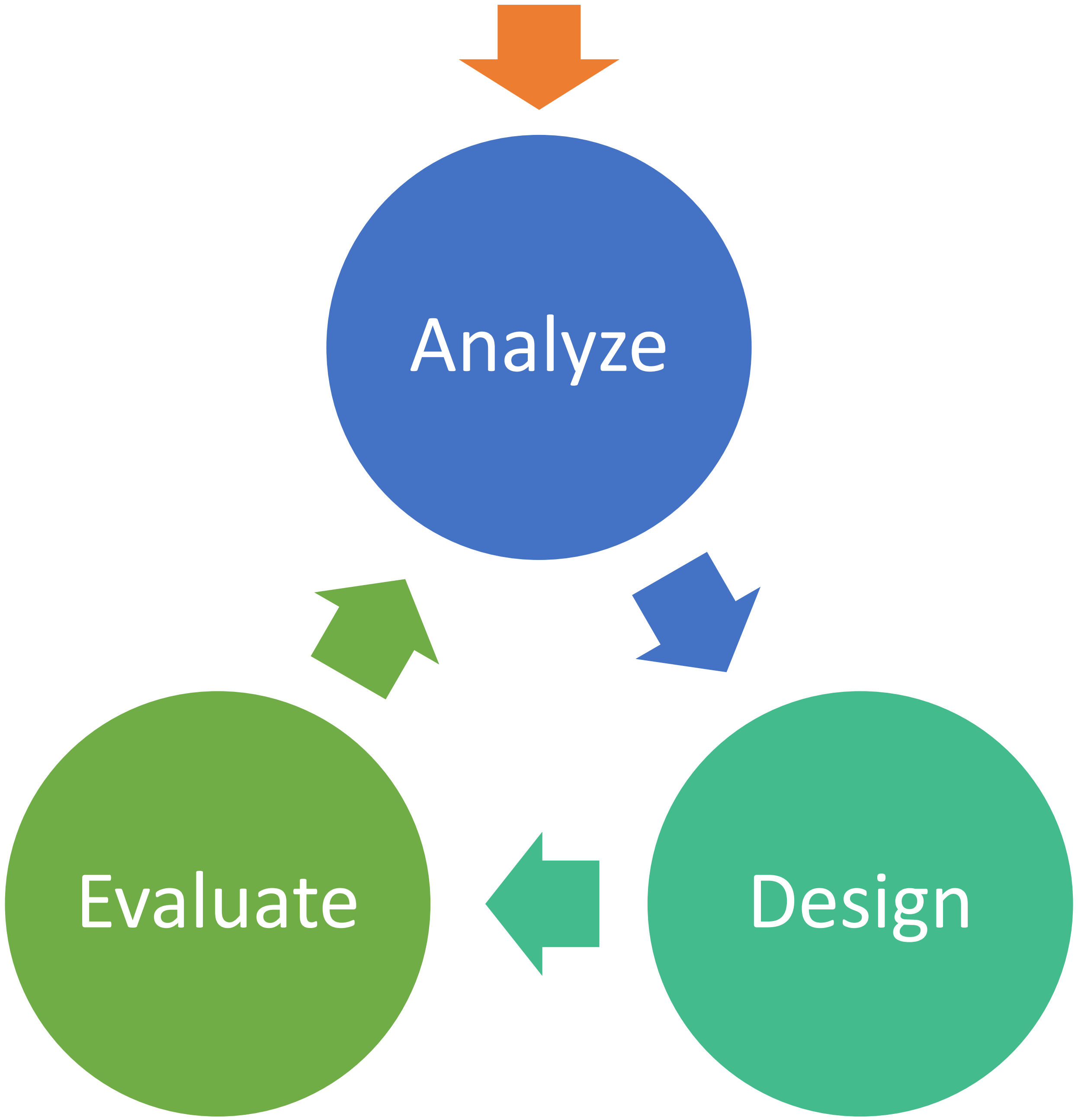
No Help

- You *cannot* provide help.
  - Do not tell users.
  - When users have questions, they should ask them anyway – you can note the question and answer it at the end.
  - In some cases, you can intercede. But. Know in advance when you'll step in.
    - For example, users have to be making no progress for 3 minutes for the experimenter to help.

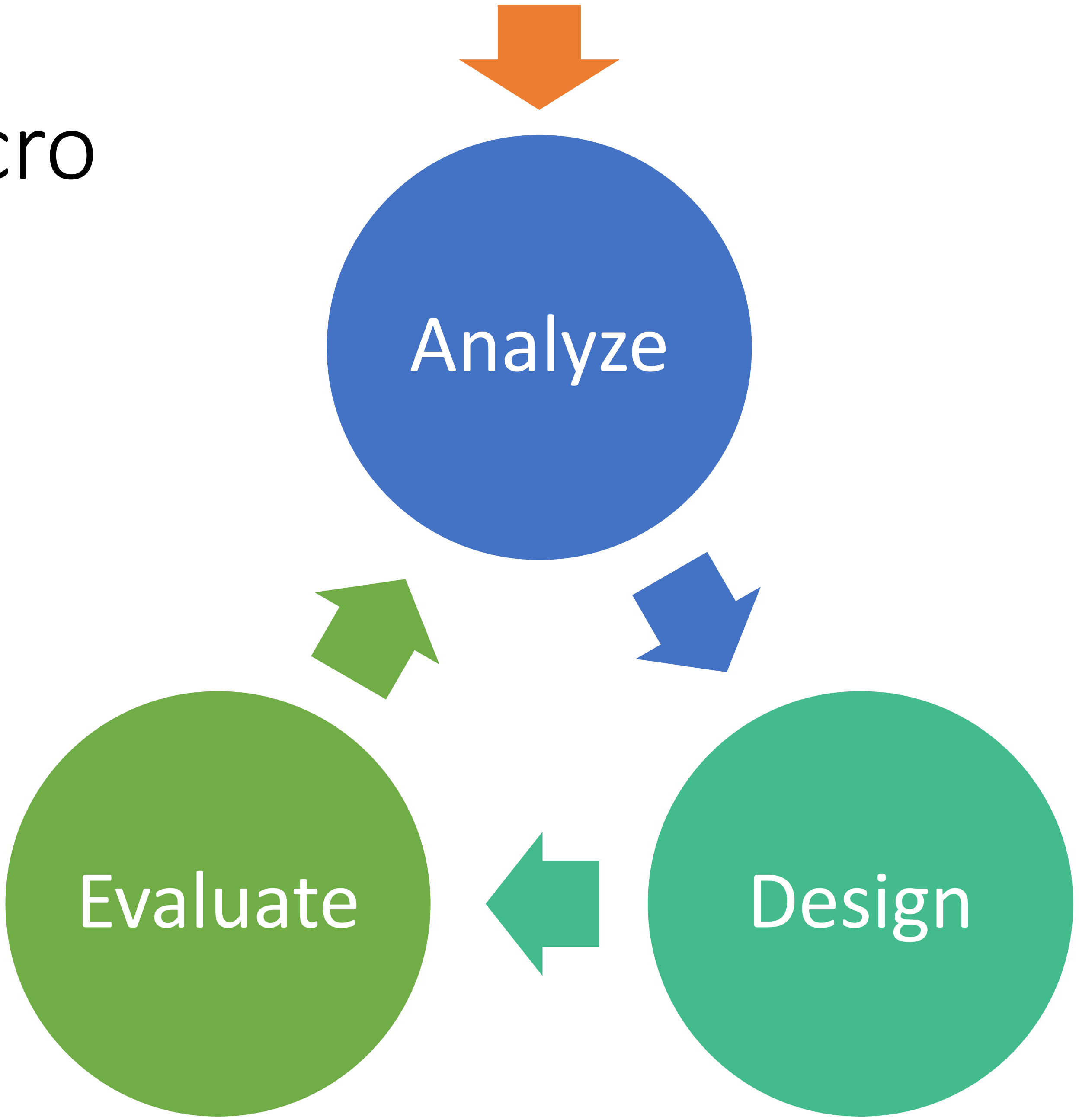
Evaluating Results

- You should find lots of problems – what do you go after?
  - Importance – is this a nit, a minor hurdle, or a complete showstopper in terms of users completing tasks.
  - Difficulty – is this an easy fix or a major rewrite
  - (note major rewrite can to come into play when there's a digital prototype, not on paper. That's the point of the low-fi – you have to be willing to pitch it).

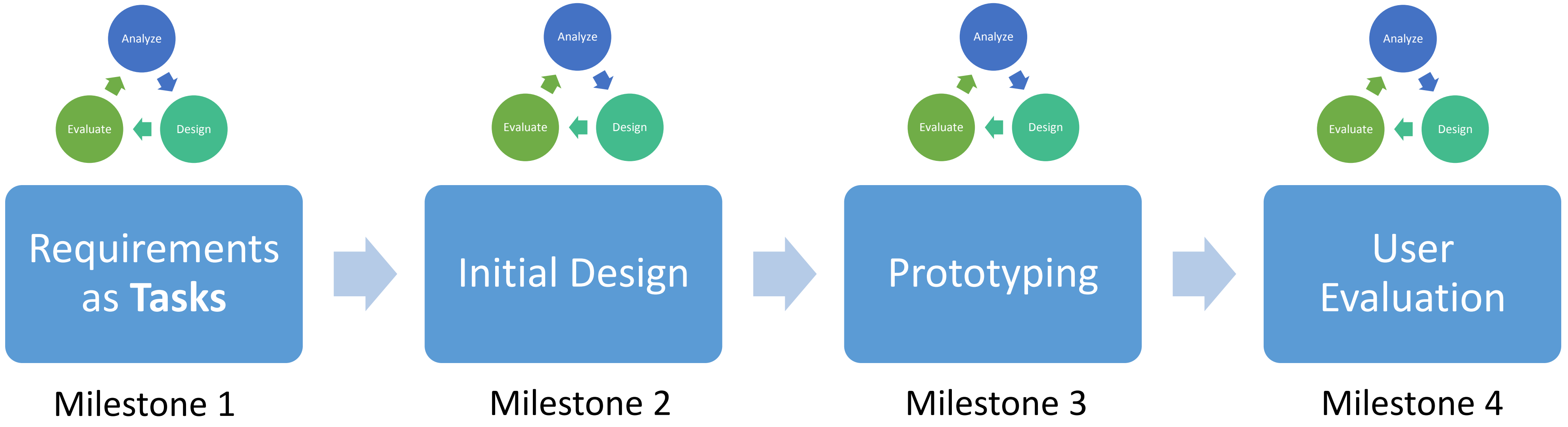
2. Analyze the Problems, Design Solution, & Evaluate Again

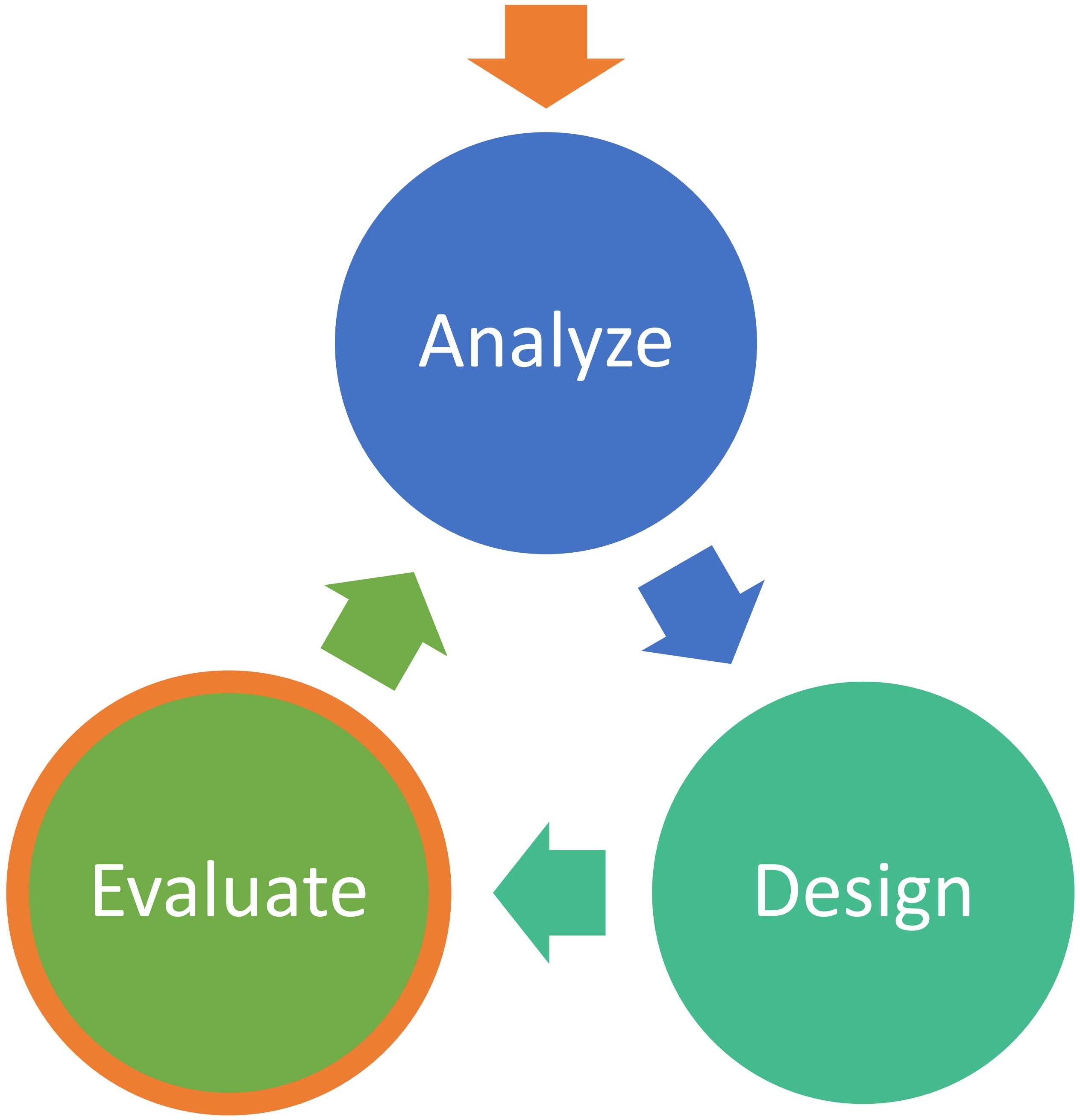

Analyze
Design
Evaluate

Macro vs. Micro



Semester Project

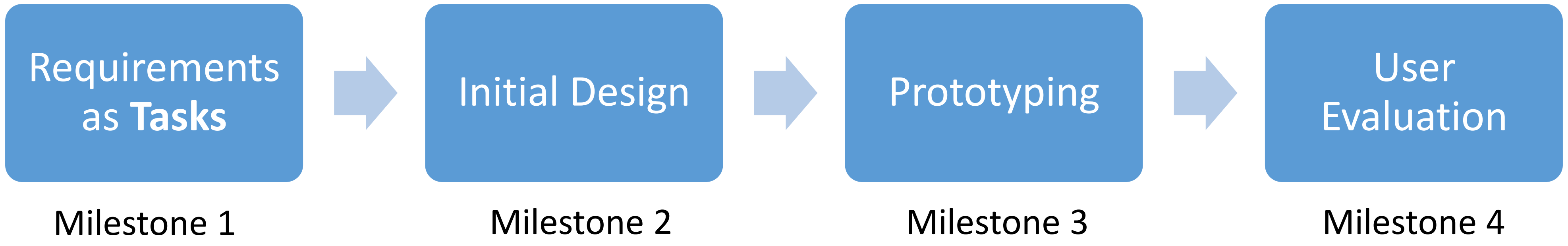


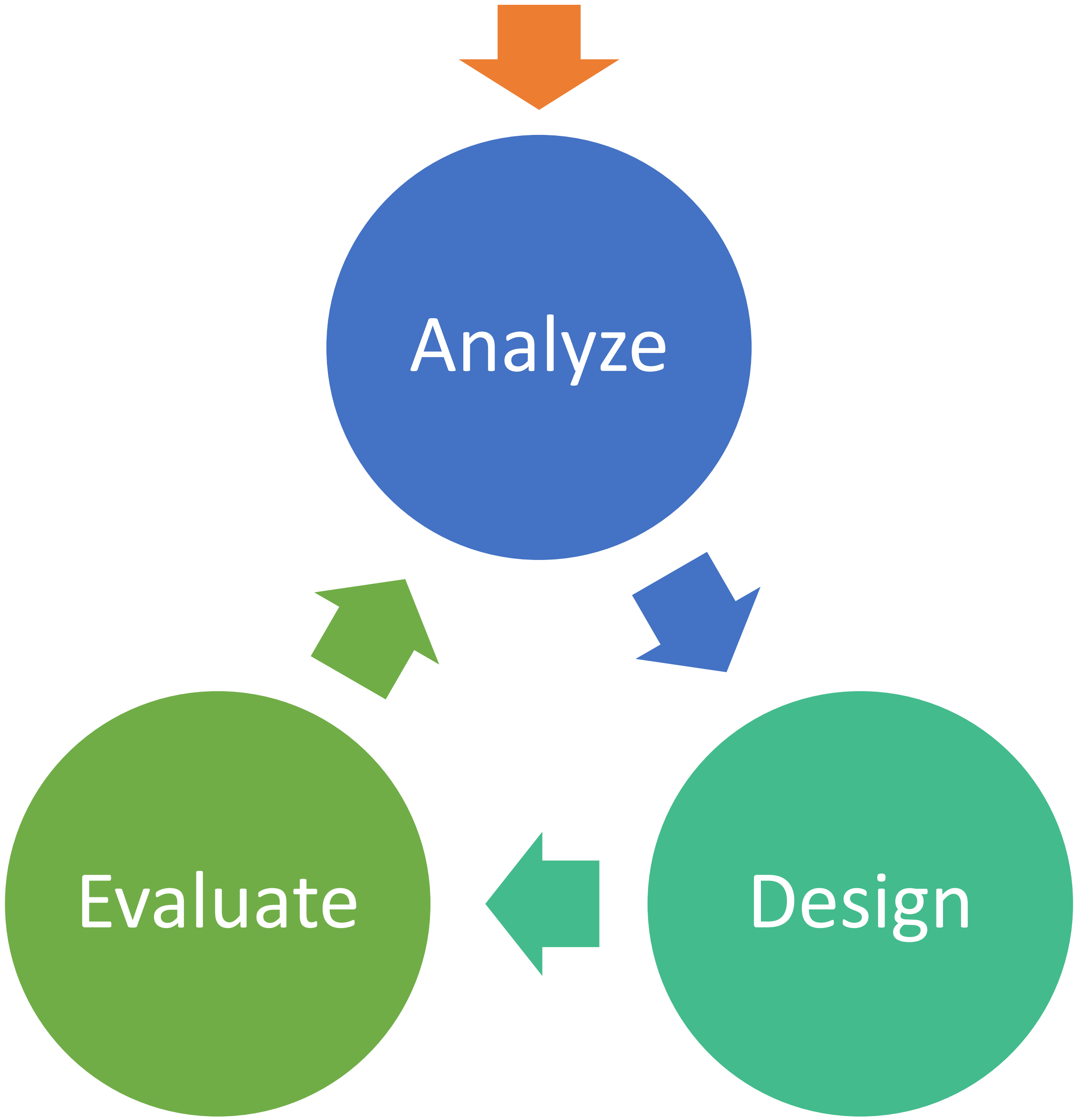

Analyze
Design
Evaluate

Milestone 4 Goal: Evaluate Design

1. Conduct an Evaluation
2. Analyze the Problems, Design Solution, & Evaluate Again

Semester Project

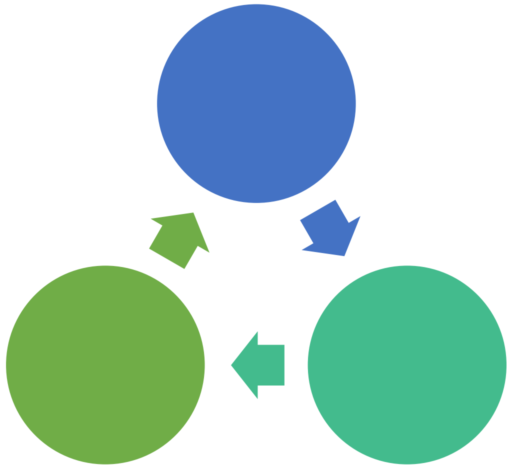


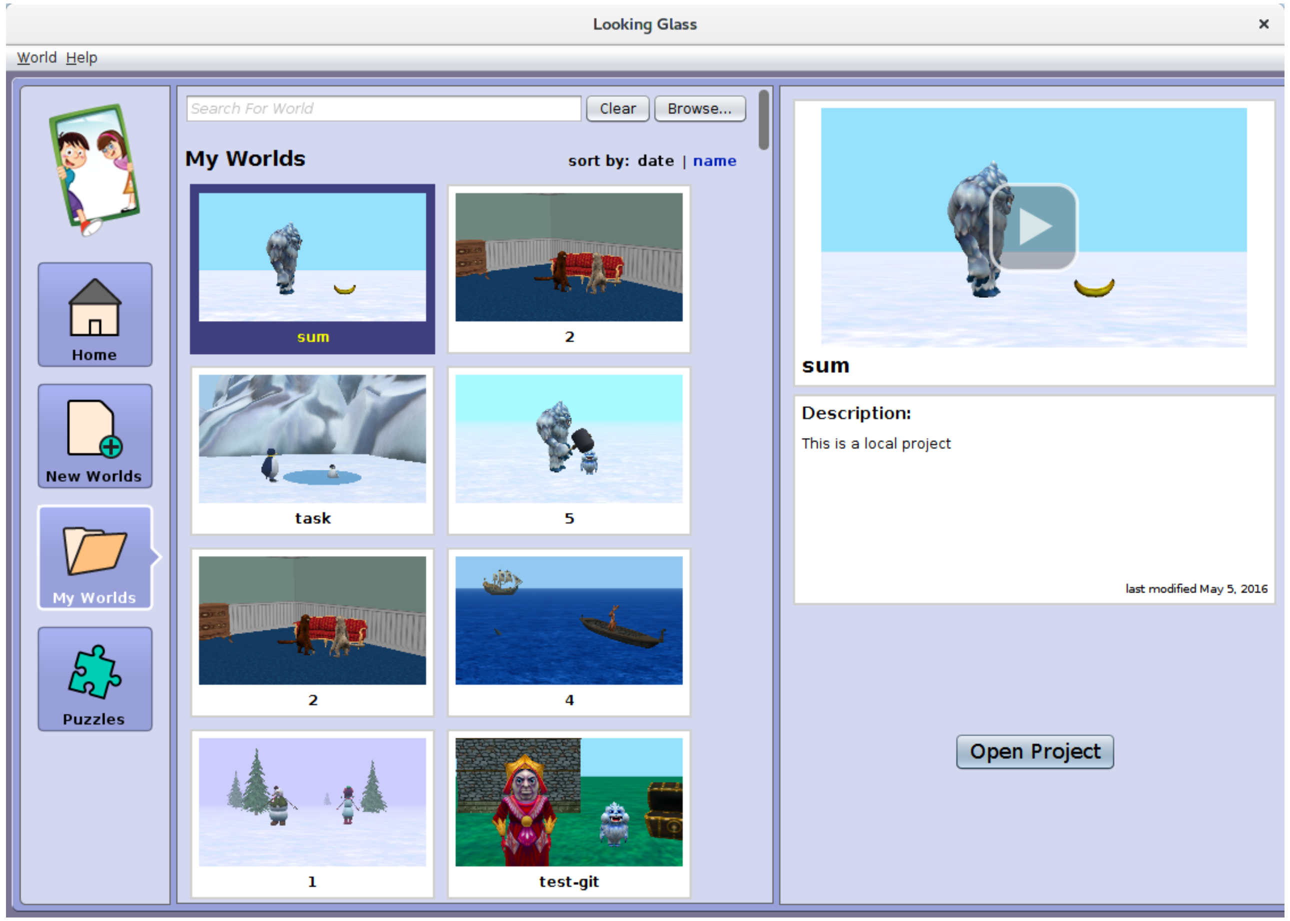

Analyze
Design
Evaluate

Adding a Feature to an Existing System

- The process is the same…
- However, you likely have to leave most of what’s there…
  - Your users already know how to use the system
- Make Compromises

Example: Document Synchronization





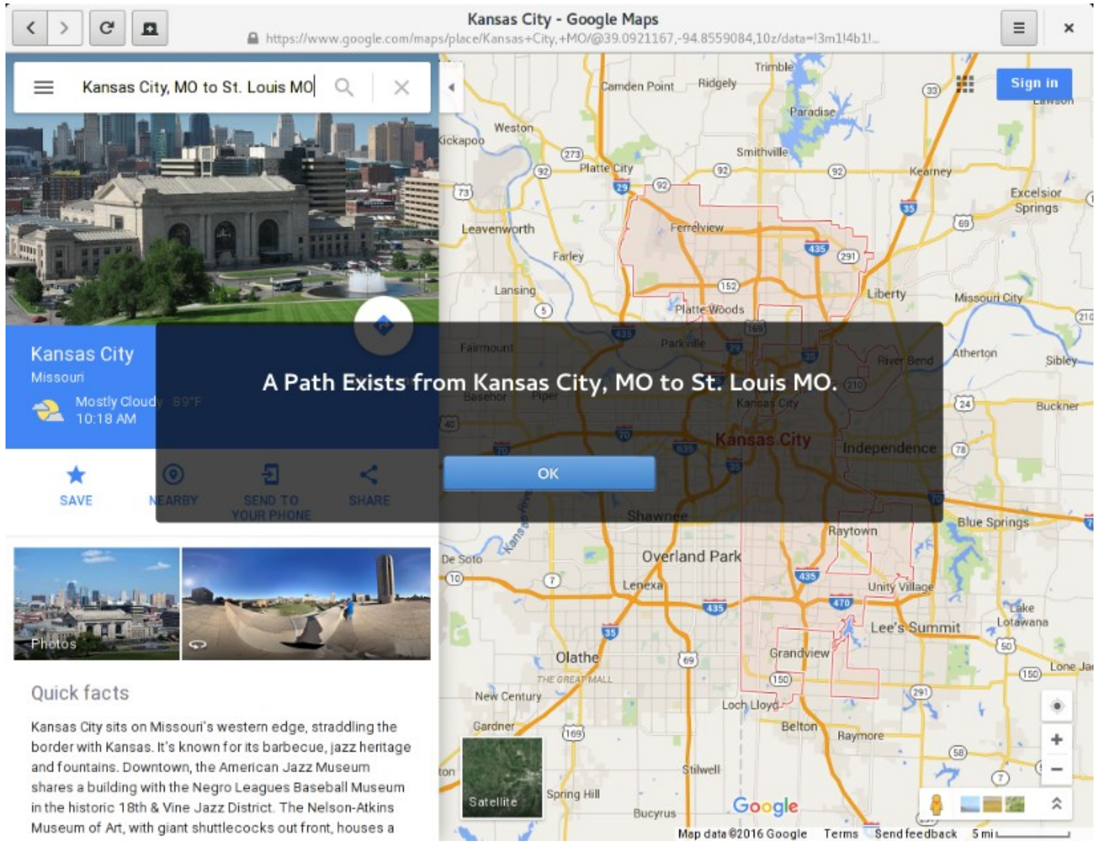
Description:
This is a local project

last modified May 5, 2016

Beyond Graphical User Interfaces

Algorithm Usability

- Dijkstra's shortest path algorithm
  - A → F → P → C → D
- Instead of giving the path
  - “There is a shortest path from A to D”



A Path Exists from Kansas City, MO to St. Louis MO.

Quick facts

Kansas City sits on Missouri's western edge, straddling the border with Kansas. It's known for its barbecue, jazz heritage and fountains. Downtown, the American Jazz Museum shares a building with the Negro Leagues Baseball Museum in the historic 18th & Vine Jazz District. The Nelson-Atkins Museum of Art, with giant shuttlecocks out front, houses a

API Usability – Scale an Image

```
private float xScaleFactor, yScaleFactor = ...;
private BufferedImage originalImage = ...;

public void paintComponent(Graphics g) {
        Graphics2D g2 = (Graphics2D)g;
        int newW = 
(int)(originalImage.getWidth() * xScaleFactor);
        int newH = 
(int)(originalImage.getHeight() * 
yScaleFactor);
        g2.setRenderingHint(RenderingHints.KEY
_INTERPOLATION, 
RenderingHints.VALUE_INTERPOLATION_BILINEAR);
        g2.drawImage(originalImage, 0, 0, 
newW, newH, null);
}
```

```
from PIL import Image

i = Image.open("/tmp/c.jpg")
i.thumbnail([220, 133], Image.ANTIALIAS)
i.save('/tmp/c-thumb.jpg', quality=90)
```

https://paulbuchheit.blogspot.com/2007/05/amazingly-bad-apis.html

Programming Language Usability: Quorum

- https://quorumlanguage.com/
  - Evidence-based programming language
  - Designed for all users, but especially important for blind and visually impaired users.
- No brackets or semi-colons
- == vs. =
- number vs. float/double
- text vs. string

```
integer a = 1
integer c = 0
if a = 1
     c = 1
elseif a > 1
     c = 2
else
     c = 0
end
output c
```