

No screens



Prof. Lydia Chilton COMS 4170 29 April 2019





### Goal 1 Build websites that suit the needs and abilities of users

#### Visual Information Display



Implementing interactions and feedback

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Home	Log Sales	Party Planning Committee	
People		Party Planning Coloria (1: Angela	
2: Dwight		1: Phyllis	
3: Oscar			
4: Creed			
5: Pam			
6: Jim			
7: Stanley			
8: Michael			
9: Kevin			
10: Kelly			

#### Goal 2

When the needs and abilities of users are unclear, design systems by **learning from iteration** and experimentation.



## Users interact with a system to accomplish a goal

#### Buy a book

The Design of	Everyday Things: Revised	and Expanded Editic	on and milli	ons of other books are available for	
	The Design of Expanded Edit	t <b>ion</b> Paperback			
e DESIGN	by Don Norman ▼ (Aut ★★★★★ ▼ 569	nor) Customer reviews			
EVERYDAY THINGS	<ul> <li>#1 Best Seller ( in Data</li> <li>See all 2 formats and e</li> </ul>			Qty: 1 🛊	
DON NORMAN	Kindle \$11.99	Paperback \$12.92 \pri	<b>ب</b> ب	Add to Cart	
$\mathbf{\hat{n}}$	Read with Our Free App	64 Used from \$7 62 New from \$1 3 Collectible from		or 1-Click Checkout	
	The ultimate guide to		Ţ.	Buy now with 1-Click®	
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#### Set an alarm



#### Send an email

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User Interfaces should be designed to help users accomplish a goal.

Guide users' attention to important bits of information Interact with the system in ways that provide clear actions and feedback. Allow users to navigate through the system in to meet their goal.







We have discussed concrete ways of thinking about goals

### **Grand but not actionable**

"world peace"

"bring the world closer together"

"scale and democratize education"

### Humble but valuable

"register 100 voters in Selma, Alabama"

"let Harvard students see what dorms their friends are in"

"teach my 12-year old cousin Nadia how to multiply fractions" The designer must create the subgoals and interactions to help them accomplish it.

Goal: Buy a book

Subgoal:Find itAdd to cartEnterInteraction:Type, clickclickType



Buy New	\$11.33
Qty: 1 🕈	List Price: \$18.99
	Save: \$7.66 (40%)
<b>√</b> prime	
FREE Shippin	g on orders over \$25
	vo-Day Shipping with
Amazon Prim	1e
In Stock.	
Ships from and s	old by Amazon.com.
Gift-wrap availab	ole.
¥ 4	Add to Cart
Turn on 1-Click o	rdering for this browser
	Jan. 31? Order within choose Same-Day
Delivery at check	-
, at the	
Ship to:	
newyork, 10001	*
Add to List	

Enter payment info Type, click, point

Place order Click

Name (as it appears on your card)
Card number (no dashes or spaces)
Expiration date 01 - January
Security code (3 on back, Amex: 4 on front)

Order Summ	nary
Items:	\$29.95
Shipping & Handling:	\$0.00
Total Before Tax:	\$29.95
Estimated Tax To Be Co	lected: \$0.00
Rewards Points	-\$4.58
Order Total: \$	
How are shipping costs	
How are shipping costs Amazon Prime Shipping	

## Low-level interactions take time and effort. Minimize them because you do them a lot.





Time to move your pointer to a target

 $= a + b * \log($ 

### Know the users' goals and design interactions as: execution and evaluation





## Following instructions sux. Why?

	Videos	Images	Shopping	News	More	Settings	Tools
Abou	t 22,600,000	results (0.59	seconds)				
Clea	n Install						
1. Fi	nter your o	omputer's	BIOS				
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## Every time the user executes an action, the interface should provide feedback





A Payment Information	1
The credit card number is invalid.	
Card Number *	
1234123412341234	
Expiration Date *	
1220	
ccv*	
999	
	PLACE YOUR ORDER

#### High-level actions, like buying a book

#### Mid-level actions, entering paying information



Low-level virtual actions, like clicking a button

## Final Project Rubric

- Interaction:
  - High-level:
  - Mid-level:

- Low-level:
- Technical:
- Visual Information Design:

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## High-level Interaction

Idea and persona

### Idea and persona

What **person** Uses what **media** And has what **interaction** with it To achieve what **goal**?

## Specific Goals are actionable

General Goal: "Clean the house."



Specific Goal: "Fold that basket of laundry."



General goals sound appealing, but specific goals are actionable: What **person** is going to execute what **action** on what **object** and get what **benefit**?

## Mid-level Interaction

States and transitions

# For complex goals, break the task into states, options, and transitions to new states.





## Think of it like a video game and You are designing the experience of your user

MARIO



# Examples of States, Options and Transitions

## Goal: Find "The Design of Everyday Things"

What state am I in? Product Search

### What **options** do I have? All the products

How do I **transition**? Select an product name



## Goal: find "The Design of Everyday Things"

What **state** am I in? **Product search results** 

What **options** do I have? All the products – different editions

How do I transition? Select an product name



## Goal: Decide if I'll buy "The Design of Everyday Things"

What **state** am I in? **Product info page** 

What **options** do I have? Kindle/paper back, Look in book, reviews Add to cart

How do I **transition**? Add to cart OR Go back



## Goal: Decide if I'm done.

What **state** am I in? "Add to cart" feedback

What options do I have?

Check out

See cart

Keep shopping

How do I **transition**? Click one of the options.



The Do-It-Yourself Guide to Findin and Fixing Usability Problems

## Goal: Pay for it.

What **state** am I in? Enter payment

What **options** do I have? Which payment methods

### How do I transition?

**Press Continue** 

amazon.com	SIGN IN SHIPPING & PAYMENT GIFT OPTIONS PLACE ORDE	ER Constant of the second seco
	Secure Payment Info	
$\mathbf{\Omega}$		Continue
2		You can review this order before it's final.
	Name (as it appears on your card)	
5	Bob Ross	
	Card number (no dashes or spaces)	
	123412341234	
	Expiration date	
	01 - January ‡ 2013 ‡	
	Security code (3 on back, Amex: 4 on front) 1234	

## Goal: Buy it.

What **state** am I in? Review and place order

What **options** do I have? Shipping options, Change payment options

How do I transition? Press "Place your order"



## After I buy, what state do I transition to?



# For complex goals, break the task into states, options, and transitions to new states.



## States for the Zumba Playlist maker



Subgoal: Play the playlist

Subgoal: Finalize playlist

Subgoal: Remove songs when it's too long

## Low-level Interaction

Presenting users with options, widgets, and clicks

## Time to move the pointer: Fitts' Law



Time to move your pointer to a target

$$= a + b * \log\left(\frac{2D}{S}\right)$$

## Buttons on the edges are fast to get to because they have infinite size



## Every low-level action times time and effort. How could use improve it?





## Product search: How many options are there?



## Billions

# Search Results: How many (relevant) options are there?

amazon	All - design of ev	veryday things									C	Q	Q	Q	<u>्</u>
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1-16 of over 1,000 results fo	or <mark>"design of everyday t</mark>	hings"													
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Other Formats: Paperback, Audio CD

## Amazon Departments: How many options are

## there?

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## About 100

## When displaying ~10 options, how do you display them to suit the needs and abilities of people?

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## When displaying ~100 options, how do you display them to suit the needs and abilities of people?



10 References 11 Further reading 12 External links
# When displaying ~1000 options, how do you display them to suit the needs and abilities of people?



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# When displaying options, the number of options determines the interaction style.

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~10 items = list

~100 items = tree

~1000 items = search

## Final Project Rubric

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  - Low-level:
    - Widgets: Are the correct widgets used? (lists/search/hierarchy, autocomplete)
    - Low level Interaction: Are they efficient for the user to execute? (target size, number of clicks)

#### • Technical:

- Is there enough media to accomplish the goal?
- Do the technical elements work?
- Visual Information Design:



"I tried **silk chiffon**, but it didn't work."

## "I tried the Google Object Detection, but it didn't work."



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#### • Visual Information Design:

- Does the interface guide users attention through the application?
  - **Primary:** Are there appropriate conceptual groupings?
  - Secondary: within groupings are the most important things emphasized in TWO ways, and less important things de-emphasied?

## All sites display information



What i	eCorrect Photography Tips s your Photography-Related New Year's Resolution?? tes ago · Like · Comment
🖒 Ad	el Gomaa and Richard Schneider like this.
	Sadi Molloy get my business looking more professional: car signed: tick, makeing up portrait folders: tick, stickers & cd covers: still to do its getting there though. 11 minutes ago · Flag
IE <b>CO</b>	PictureCorrect Photography Tips My resolution for 2011 is to capture more landscape photos outside the U.S. and add more countries to my portfolio! What is yours?
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	celebs	legal	religion	cell phones	tools	technical support	us cities
best-of-craigslist	comp	linux	romance	clothes+acc		transport	us states
craigslist TV	crafts	m4m	science	collectibles	toys+games	ty / film / video	canada
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## Users have a spotlight of attention.



Use a visual information hierarchy to guide users' attention

# Every subgoal should have visual information design to guide users through it



## Seven tools for visually indicating importance

You are cordially invited to Robert and Alexandra's delectable after dinner party.

Wine and nibbles will be served.

When: February 20<sup>th</sup>, 2018 at 9:30pm. Where: the pad. If you need directions, ping us.

Kindly let us know if you will be attending by February 1<sup>st</sup>.

#### Conceptual grouping

Priority 1	Prior	ity 2	Priority 3

Location





Whitespace

Size



#### Robert and Alexandra's delectable after dinner party.

Wine and nibbles will be served

A The arrest provided does not appear to be valid

#### Contrast

Color

## Use multiple tools. Use color last.

Use size, whitespace and contrast instead.

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- Does the interface guide users attention through the application?
  - **Primary:** Are there appropriate conceptual groupings?
  - Secondary: within groupings are the most important things emphasized in TWO ways, and less important things de-emphasied?

# Examples



#### Minor Third



#### Step 1: Listen



A Minor Third has 3 half steps between the lower note and the higher note. Try counting the number of lines and spaces between the two notes on the image above.

The "minor" quality indicates that this interval comes from the minor scale of its lower note, and that the interval sounds slightly dissonant or unhappy.



### I like...



## For me..., what if...



I like that there are intermedia quizzes to help me test my knowledge as I learn it.

For me, the navigation wasn't a little constraining, What if you gave user more control for how to get back and forth between intervals?



#### **CHOREO** Formation Maker

Load a YouTube video. Create formations for your choreography.

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

#### I like...

## For me..., what if...





I liked how easy it was to map out the formation. You can see the video, and drag, circles, and name them.

For me, it didn't quite feel done, or like I'd reached my goal.

What if when you're done you could see all the formations in a list?

 $\leftrightarrow \rightarrow$  C  $\triangle$  (i) 127.0.0.1:5000

Ingredient List Fequila		Selected	Disliked	Alcohol Content: Light (1-2 shots) Medium (3-4 shots) Heavy (5-6 shots)
/odka				Taste type:
Friple Sec				
lime				<ul> <li>Bubbly</li> </ul>
Gin				◯ Neutral
Tonic				Sweetness:
Coke	•			
Peach Schnapps				Cost
Grape Juice				
Drange Juice				
emon				
Иint				
Rum				
Club Soda				
Grenadine Syrup				



I like the interaction of dragging ingredients

## For me..., what if...

Ingredient List	Ingredient Info
Tequ	Tequila
Vodka	It has
Triple Sec	the
Lime	flavor
	of
Gin	Agave
Tonic	and
Coke	alcohol.
Peach Schnapps	If it is aged
Grape Juice	it can
Orange Juice	also
Lemon	have a fruitiness
Mint	and
Rum	richness.
Club Soda 🕻	lose
Grenadine Syrup	

#### For me, it was a little hard to read.

What if we used more media and information design here?

#### Drink: Mojito



**Drink details**: Mojito is a traditional Cuban hi mint.[1][2] Its combination of sweetness, citr

Ingredients: ['Rum', 'Lime Juice', 'Mint', 'Sug

For me, this output is a little mysterious.

Maybe you could tell me why I'll like this, and give me a ranked list in case I want to change my preferences a little?

#### ASL for Kids! Learn Mode Quiz Mode

#### Click around the classroom to learn the signs!



You have 11 items left to learn!



#### I like...

### For me..., what if...





I like the interaction of clicking on the objects, And the feedback about how many items left is good.

It gives me a lot of user control and freedom. (but still guides me with feedback)

#### For me, I wasn't sure if I learn them.

What if we had a quiz.



#### I like...

## For me..., what if...



The immediate feedback you get when you pick colors And see them on the map.

I can easily tell when two colors are unreadable together (and I can easily fix it)

For me, it was unclear what this site was about. What if you gave more cues to why I'm selecting a painting



.

Create New Team

#### I like...

### For me..., what if...



I like the interaction of dropping players into their position



For me, it was unclear what this site is about.. What if you gave more cues to what the starting state is.

## Final Project Rubric

- Interaction:
  - High-level:
    - Are the users able to accomplish the goal?
    - Is the persona and goal specific enough to define who the target user is?
  - Mid-level:
    - Navigation:
      - Are there subgoals and interactions that help them accomplish it?
      - Does each state have a clear subgoal, options and transitions?
    - Feedback: do users learn from feedback and can they recover from errors?
  - Low-level:
    - Widgets: Are the correct widgets used? (lists/search/hierarchy, autocomplete)
    - Low level Interaction: Are they efficient for the user to execute? (target size, number of clicks)

#### • Technical:

- Is there enough media to accomplish the goal?
- Do the technical elements work?

#### • Visual Information Design:

- Does the interface guide users attention through the application?
  - **Primary:** Are there appropriate conceptual groupings?
  - Secondary: within groupings are the most important things emphasized in TWO ways, and less important things de-emphasied?

## Is design really this hard?

Or are we just stupid?

Design is hard because requires combining many elements that are dependent on each other.



Design requires synthesizing many elements that are completely dependent on each other.



Idea Resources Design Technical Design Idea Design

Idea: Help NBA fans Recognize the strategy during games

## Graphic design is the final step for designers. Why?



But what do users perceive first? Graphic Design

Is that everything I need to know to be the next tech unicorn?

### Market Research Is there an **audience** I can research that will **pay** for this?

Search: pe 080		Course P	Save Clear All	
PE 080A	Units 373 ►►	Fall	Winter	Spring
Health Advocates	313 11			
1-1-1		Ec 011	Hum/PI 008	APh/EE 009B
Stapf Fall		APh/EE 009A	Ph 008B	Ge 001
•		PE 099	PE 087B	
PE 080B		Units:42	Units:42	Units:39
Health Advocates	Sophomore	PE 099	Hum/H 003B	Bi 001
1-1-1 Stapf		Ma 002	Ma 003	PI/HP \$ 183
Winter		Ph 002A	Ph 002B	Ph 002C
PE 080C		EE 044	EE 045	EE 040
Health Advocates		EE/CS 051	EE/CS 052A	EE/CS 052B
1-1-1 Stapf				
Spring		Units:45	Units:48	Units:42
T	Junior	PE 099	ACM 095A	ACM 095B
		EE 111	P \$ 141A	EE 151
		EE/MedE 124	EE 001	EE 090
		PE 080A	EE 112	En 128

#### Specific user need:

A student at Columbia trying to pick classes that don't conflict

BIO001 Test Course 1 🛕 🚢	Select Meeting	I	
	Selectivieeting	Pattern For BIC	0002
BIO002 Test Course 2	Q Start typing		
BIO1300 General Biology I 😑 🛕	Mo, We, and Fr 9	:00 AM-9:50 AN	A A
BIO2200 Developmental Biology	ATTRIBUTES	USAGE	PREFERENCE FIT
BIO5100 Microbiology In Health And Disea	Non-Prime Time	0	100%
BIO5300 Ecology	Mo, We, and Fr 1	0:00 AM-10:50	AM 🔳
	ATTRIBUTES	USAGE	PREFERENCE FIT
BIO6100 Research Methods	Prime Time	2	99%

#### Specific user need:

The Columbia Law School Registrar finding the right size classrooms to schedule all their classes

## Coursedog

#### Justin Wenig, COMS 4170 Spr 18

crunchbase	Solutions ~ Product	ts ∽ Resources ∽	Pricing	Q	Search Crunchbase			
🕫 Crunchbase Pro	🛅 Coursedo	g						
SEARCH	< Overview Ur	nlock Charts Funding F	Rounds Investors	Related Hubs	Website Tech Stack by BuiltWith	Web Traffic by S		
People	Overview					~		
ঃ Investors								
\$ Funding Rounds	Total Fundin	g Amount	\$1M	CB Rank (	Company)	6,647		
>> Acquisitions								
🕏 Schools	_	Coursedog						
🖬 Events		-	og automates administrative tasks for universities, starting with course scheduling. <, New York, United States					
💢 Hubs								
Q My Searches	Categories		nformation Systems, Pr		, Software			
≔ My Lists	Headquarters Region Founded Date	ons Greater Ne Mar 14, 20	w York Area, East Coas	t, Northeastern US				
	Founders	Justin Wer						
📜 Marketplace	Operating Status	Active						
① Add New Profile	Funding Status	Seed						
	Last Funding Type	Seed						
	Number of Employe	ees 11-50						

## If you start general, you may never start.



If you start specific, you can usually generalize later.

## Don't get stuck.

## Have more ideas.

# Flare and focus: **Explore** many options, **test** them to decide.

#### Web app ideas



#### Sequential Flare and Focus



Ideas

**Technical Elements** 

**User Interface** 

## **Brainstorming**: The idea itself is risky. So we have many ideas before picking one.



#### Don't get too attached to one idea.





You are not your idea

You are an idea machine.

## Perfection is impossible.

## Iterate to add value and mitigate risk

# The Waterfall Model assumes all the the steps will work perfectly. They wont'.



## Iterative Design adds value one step at a time by iteratively testing risking features





## Advanced Web Design Studio

COMS 6998 · Fall 2018

Home Syllabus

#### Goals

1. Master front-end and back-end technologies for making interactive websites.

2. Discover specific user needs by developing a low-level, mechanical model of human behavior.

3. Practice iterative design to meet specific user needs.

Prof. Lydia Chilton
OH: Tuesdays 4-5, CEPSR 612

INSTRUCTOR

Please contact staff through Piazza only

#### TAS

Katy Gero OH: Wed 2:30-3:30, CEPSR 603

Savvas Petridis OH: TBA, CS OH room

#### WEEKLY SCHEDULE

Lecture Friday 2:10–4pm in Mudd 337 (also known as the Engineering Terrace)

**TEACHING METHOD** 

This is a studio style class in the tradition of art and architecture. Students are expected to already know the fundamental techniques. We will practice these techniques as well as give and recieve critique on a weekly basis. Attendance is mandatory. Any absence, excused or otherwise, must be made up

Piazza

# Lastly,

### You have always got me.



#### chilton@cs.columbia.edu