



Collaboration Team

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The Problem

- ❖ Many students have questions in class.



The Problem

- ❖ Not all students ask their questions in class.



The Problem

- ❖ Instructors don't know if students have questions.



Who has a question???





The Problem

- ❖ Students don't remember every topic to study.



The Problem

- ❖ Students don't remember every topic to study.



The Problem

- ❖ Students don't remember every topic to study.



The Problem

- ❖ Many students have questions in class.
- ❖ Not all students ask their questions in class.
- ❖ Instructors don't know if students have questions.
- ❖ Students don't remember every topic to study.

The Tasks

- ❖ Community Driven Questions
- ❖ Data Driven Study Planning

Initial Paper Prototype - Home Screen

Your Classes

Fake Class 10d



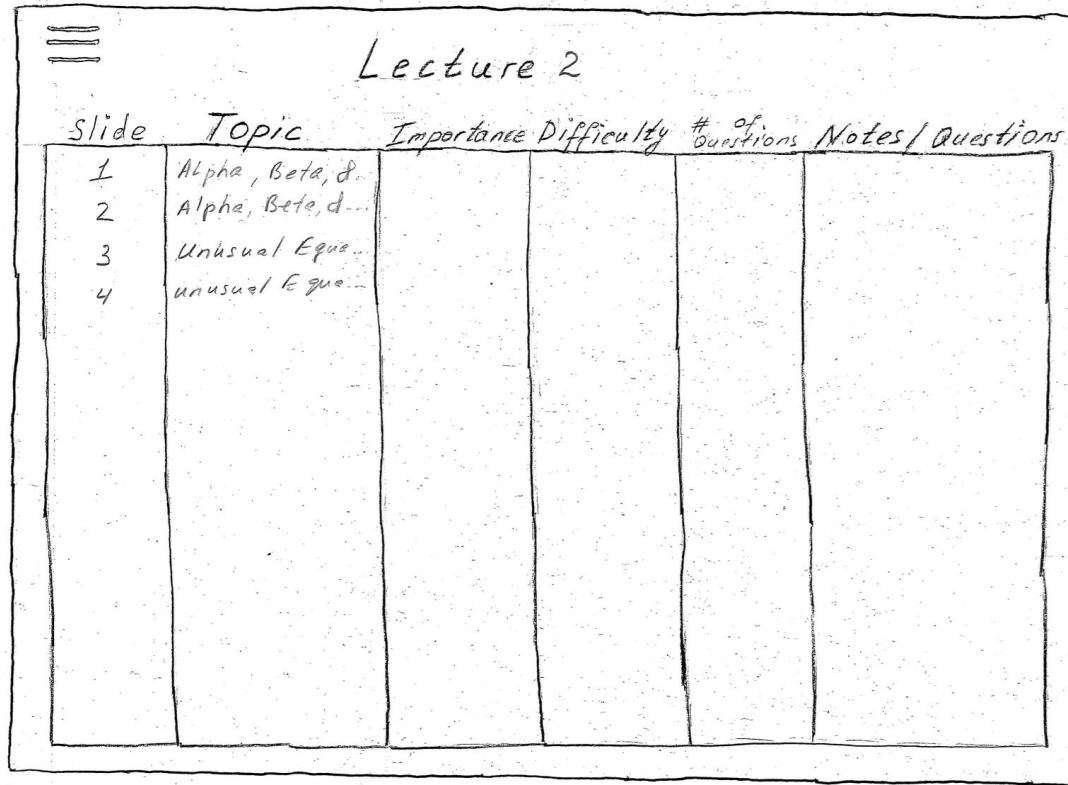
Initial Paper Prototype - Lecture List

☰ Fake Class 102

Lecture #	Topic	Difficulty	Importance
2	Alpha, Beta, & Gamma	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	Unusual Equations	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
1	Introduction	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	α and β	1 ☆	○ ☆
		○ ☆ ☆	1 ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆



Initial Paper Prototype - Lecture Topics

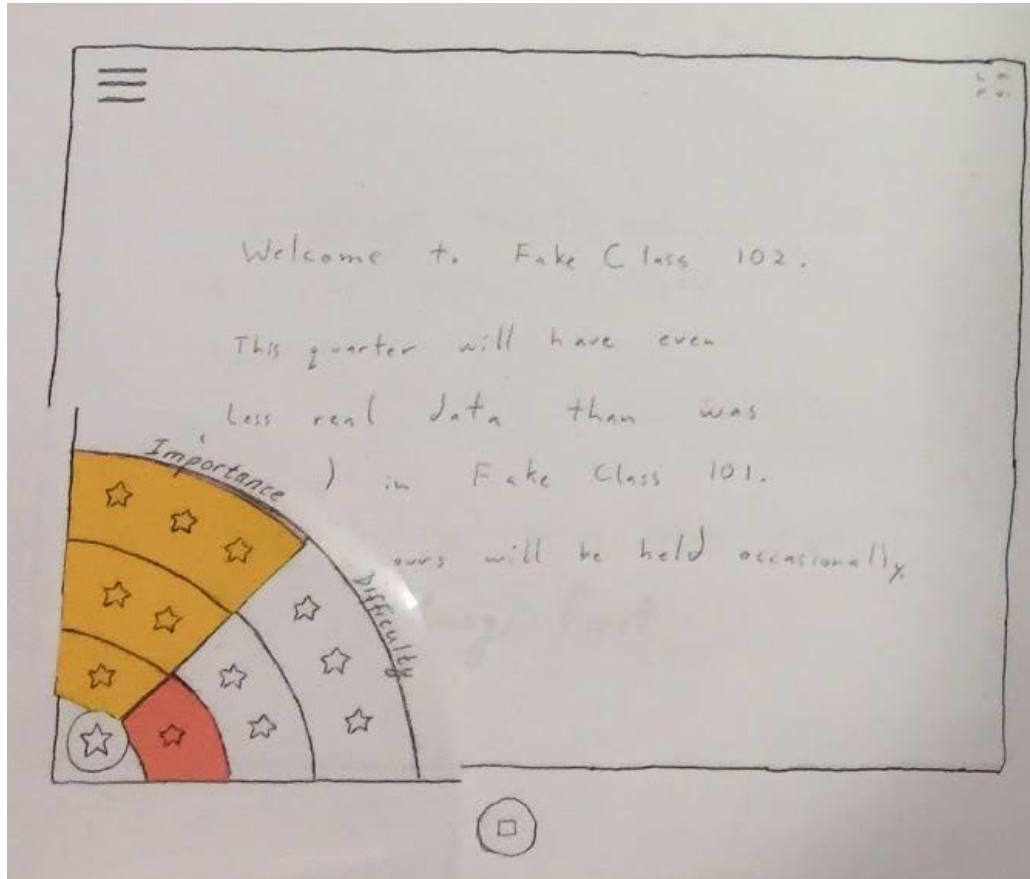


A hand-drawn initial paper prototype for a lecture topic table. The table is titled "Lecture 2" and has a hamburger menu icon in the top left corner. The table has six columns: "Slide", "Topic", "Importance", "Difficulty", "# of Questions", and "Notes/Questions". The first four rows of the table contain the following data:

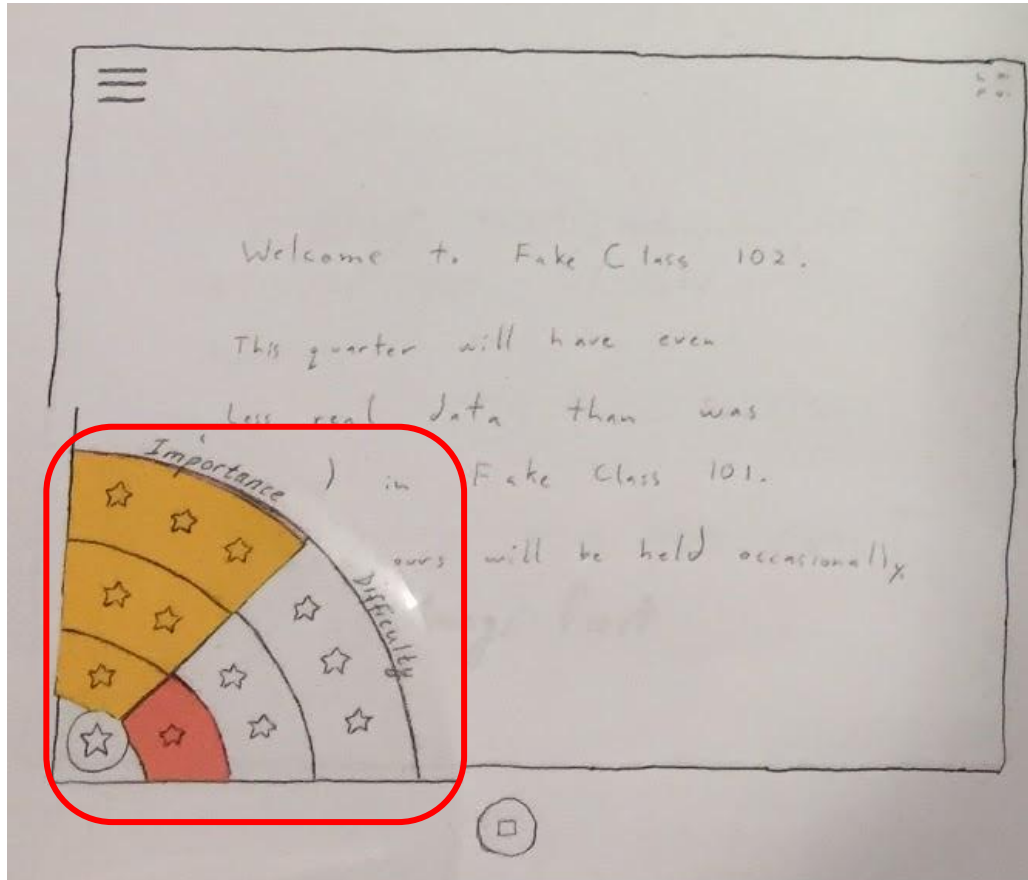
Slide	Topic	Importance	Difficulty	# of Questions	Notes/Questions
1	Alpha, Beta, &				
2	Alpha, Beta, d...				
3	Unusual Equa...				
4	unusual Equa...				

At the bottom center of the page, there is a small circle containing a square.

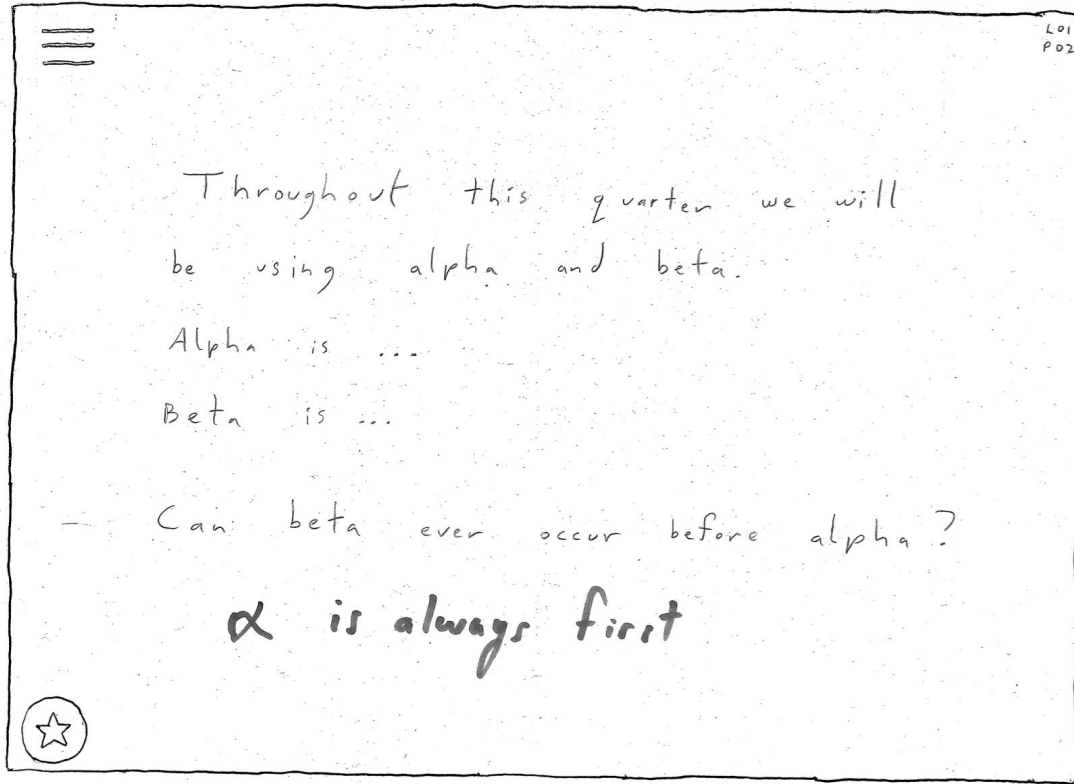
Initial Paper Prototype - Rating Screen



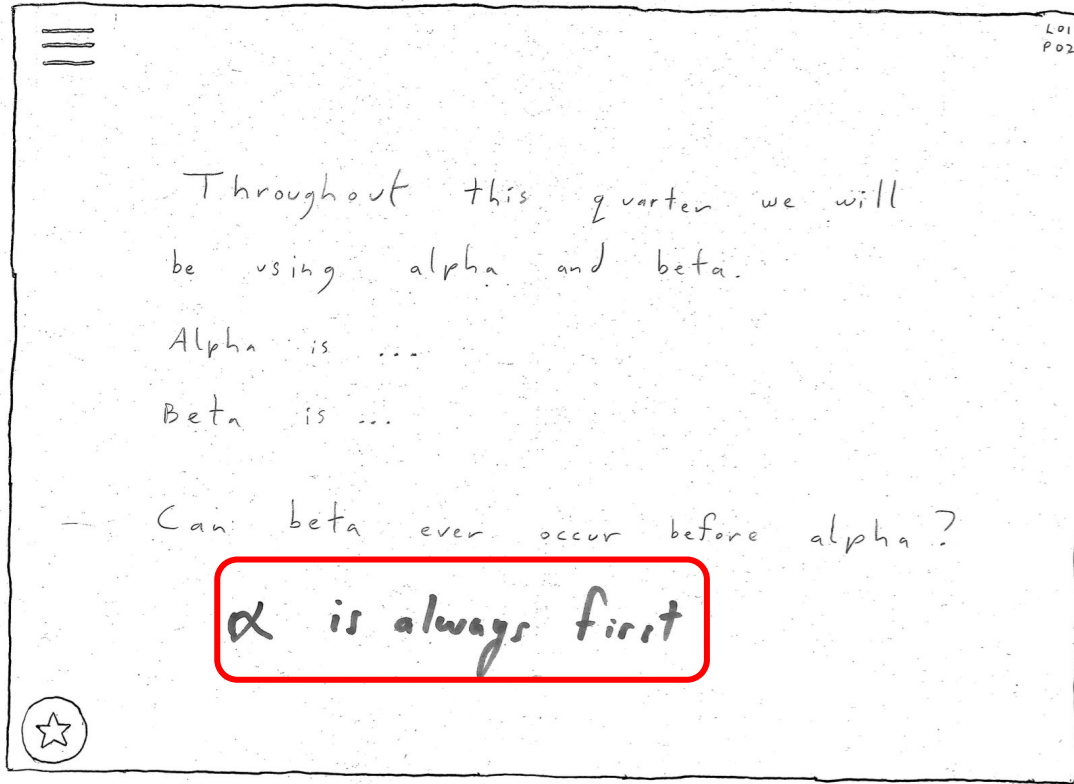
Initial Paper Prototype - Rating Screen



Initial Paper Prototype - Notes/Questions



Initial Paper Prototype - Notes/Questions



Initial Paper Prototype - Help Screen

How To Use Study^Q



- Take notes directly on the slide.
- When you have a question, add a "???" to the end of the note.

What is x???

→ Common questions will be automatically sent to the instructor.

- Use the "★" in the bottom left corner to rate the slide to aid with studying in the future.

← FC 102

🏠 Home

6/8 Lectures

? Help

Initial Paper Prototype - Help Screen

How To Use Study^Q



- Take notes directly on the slide.
- When you have a question, add a "??" to the end of the note.

What is x??

→ Common questions will be automatically sent to the instructor.

- Use the "★" in the bottom left corner to rate the slide to aid with studying in the future.

← FC 102

🏠 Home

6/8 Lectures

? Help

Initial Paper Prototype - Help Screen

What is x ??

Initial Paper Prototype - Lecture info

☰ Fake Class 102

Lecture #	Topic	Difficulty	Importance
2	Alpha, Beta, & Gamma	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	Unusual Equations	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
1	Introduction	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	α and β	1 ☆	○ ☆
		○ ☆ ☆	1 ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆



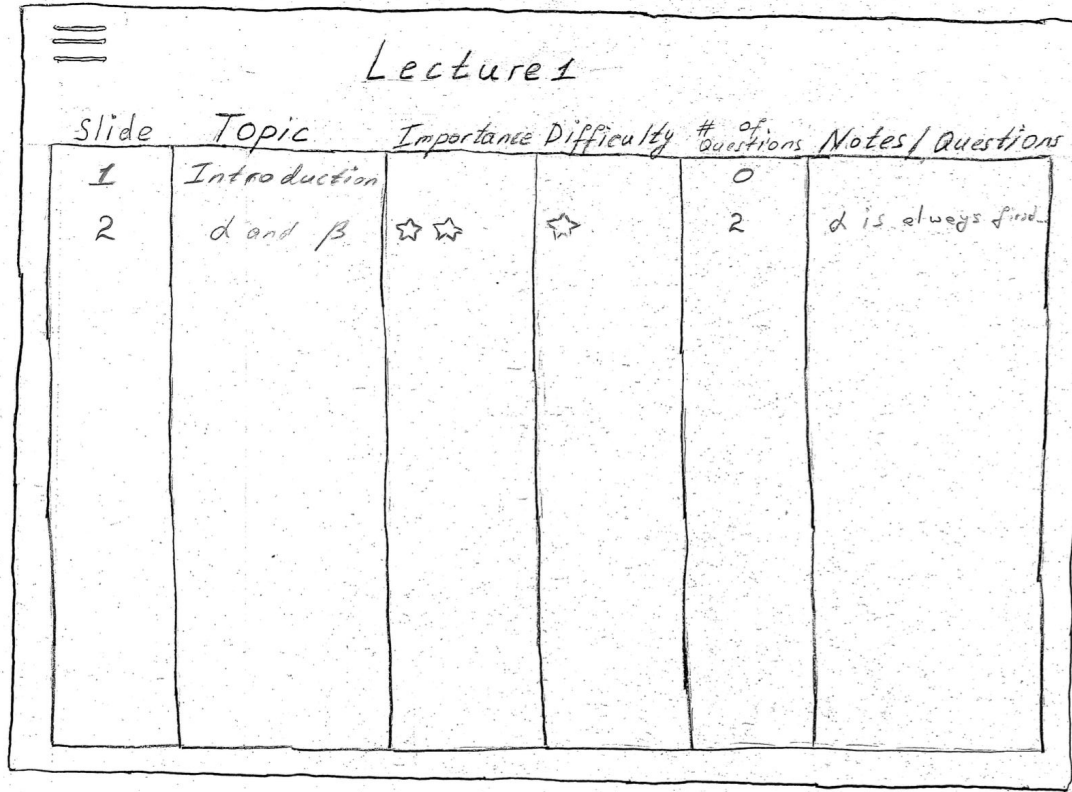
Initial Paper Prototype - Lecture info

☰ Fake Class 102

Lecture #	Topic	Difficulty	Importance
2	Alpha, Beta, & Gamma	<input type="radio"/> ☆	<input type="radio"/> ☆
		<input type="radio"/> ☆ ☆	<input type="radio"/> ☆ ☆
		<input type="radio"/> ☆ ☆ ☆	<input type="radio"/> ☆ ☆ ☆
	Unusual Equations	<input type="radio"/> ☆	<input type="radio"/> ☆
		<input type="radio"/> ☆ ☆	<input type="radio"/> ☆ ☆
		<input type="radio"/> ☆ ☆ ☆	<input type="radio"/> ☆ ☆ ☆
1	Introduction	<input type="radio"/> ☆	<input type="radio"/> ☆
		<input type="radio"/> ☆ ☆	<input type="radio"/> ☆ ☆
		<input type="radio"/> ☆ ☆ ☆	<input type="radio"/> ☆ ☆ ☆
	α and β	<input type="radio"/> ☆	<input type="radio"/> ☆
		<input type="radio"/> ☆ ☆	<input type="radio"/> ☆ ☆
		<input type="radio"/> ☆ ☆ ☆	<input type="radio"/> ☆ ☆ ☆



Initial Paper Prototype - Topic info



A hand-drawn paper prototype of a table titled "Lectures". The table has six columns: "slide", "Topic", "Importance", "Difficulty", "# of Questions", and "Notes/Questions". The first row contains the following data: slide 1, Topic "Introduction", Importance (empty), Difficulty (empty), # of Questions 0, and Notes/Questions (empty). The second row contains: slide 2, Topic "d and β ", Importance two stars, Difficulty one star, # of Questions 2, and Notes/Questions "d is always find...".

slide	Topic	Importance	Difficulty	# of Questions	Notes/Questions
1	Introduction			0	
2	d and β	☆☆	☆	2	d is always find...



Initial Paper Prototype - Topic info

Hand-drawn paper prototype of a 'Lectures' table. The table has five columns: 'slide', 'Topic', 'Importance', 'Difficulty', '# of Questions', and 'Notes/ Questions'. The 'Importance' and 'Difficulty' columns are circled in red. The table contains two rows of data.

slide	Topic	Importance	Difficulty	# of Questions	Notes/ Questions
1	Introduction			0	
2	d and β	☆☆	☆	2	d is always find...



Testing Process

- ❖ Heuristic evaluations within our own team
- ❖ Heuristic evaluations with other students from CSE 440
- ❖ Usability testing with potential users of the end product
 - Aimed to get students of different backgrounds, within STEM
 - For the most part we got the process right
 - Biggest Change was how we presented context

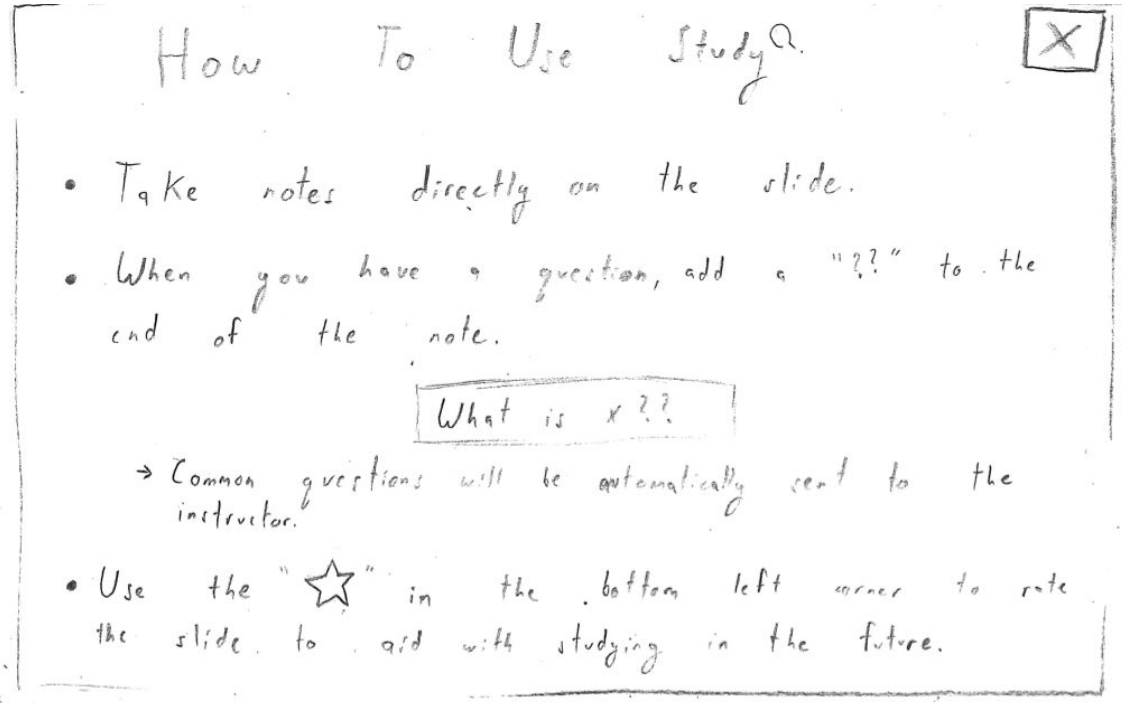
Testing Results

- ❖ At every step of the way, we caught a multitude of bugs
 - Made every effort to correct before the next testing, to ensure that we continued to find more issues with our design

- ❖ A couple areas that we struggled with the most:
 - Question asking Mechanism and associated help menu
 - Ratings on the lecture list screen
 - Lots of other additions based on user feedback

Question Asking System

- ❖ The Question asking mechanism wasn't clear
- ❖ Users didn't like the double questions mark setup, suggested something more graphic/interactive.



How To Use StudyQ. X

- Take notes directly on the slide.
- When you have a question, add a "???" to the end of the note.

What is x???

→ Common questions will be automatically sent to the instructor.

- Use the "★" in the bottom left corner to rate the slide to aid with studying in the future.

Question Asking System

User Guide ✕

- Take notes directly on slides
- when you have a question, drag question mark icon into circled, arrowed or written question.

Example asking questions:

$x + y = z$

$x + y = z$

$x + y = z$

what is y?

• To rate the slide, press the star and tap or drag to select rating

Final Iteration of Community Questions

How To Use



- Take notes directly on slides
- when you have a question, drag question mark icon into the drop target that appears after you circle, arrow, or ask a question with your pen.

Example asking questions:

$$x + y = z$$

(A question mark icon is placed above the circled 'y' in the original image.)

$$x + y = z$$

(An arrow points from a question mark icon to the 'y' in the original image.)

$$x + y = z$$

what is y?

- To rate the slide, press the star and tap or drag to select rating



Drag me to your question

Question Submitted!

Ratings Screen

- ❖ Users thought it was too visually busy
- ❖ Difficult to read
- ❖ Lots of info/little insight

Hand-drawn sketch of a ratings screen for "Fake Class 102". The screen displays a table with columns for Lecture #, Topic, Difficulty, and Importance. The table is divided into two sections for Lecture 1 and Lecture 2. Each section contains multiple rows of ratings represented by stars and empty circles.

Lecture #	Topic	Difficulty	Importance
2	Alpha, Beta, & Gamma	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	Unusual Equations	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
1	Introduction	○ ☆	○ ☆
		○ ☆ ☆	○ ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆
	α and β	1 ☆	○ ☆
		○ ☆ ☆	1 ☆ ☆
		○ ☆ ☆ ☆	○ ☆ ☆ ☆

Ratings Screen

Combined the importance/difficulty, columns now by stars

Issues persisted:

- ❖ Users thought it was too busy
- ❖ Difficult to read
- ❖ Lots of info/little insight

Hand-drawn sketch of a ratings screen for "Fake Class 102". The screen shows a table with columns for "Lectures", "Topic", "Importance" (1 star), and "Difficulty" (2 and 3 stars). Each cell contains a rating of 0/0.

Lectures	Topic	Importance ★	Difficulty ★★	Difficulty ★★★
2	Alpha, Beta, &...	0 / 0	0 / 0	0 / 0
	Unusual Equations	0 / 0	0 / 0	0 / 0
1	Introduction	0 / 0	0 / 0	0 / 0
	a and B	0 / 1	1 / 0	0 / 0

Ratings Screen



Proposed Fix: Minimize number of stars and color-code differences.

Still difficult to read, not quite what we wanted

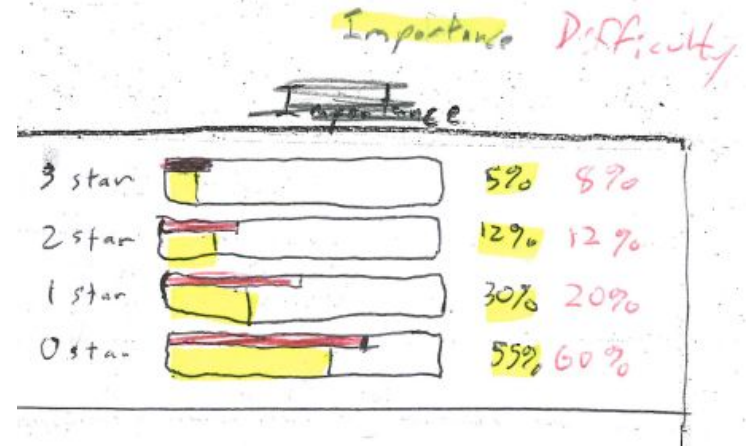
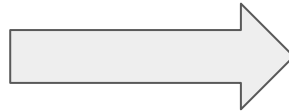
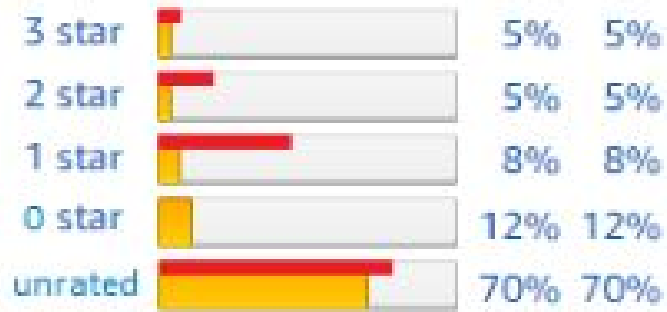
Ratings Screen

Hand-drawn ratings screen for "Fake Class 102". The screen features a hamburger menu icon in the top left. The table below shows ratings for two lectures across two topics each. The "Importance & Difficulty" column uses a 3-star rating system where stars are drawn in yellow, pink, and purple. Many zeros are present, indicating low ratings.

Lecture	Topic	Importance	Difficulty
2	Alpha, Beta, & ...	0★0	0★★0 0★★★0
	Unusual Equations	0★0	0★★0 0★★★0
1	Introduction	0★0	0★★0 0★★★0
	α and β	0★1	1★0 0★★0

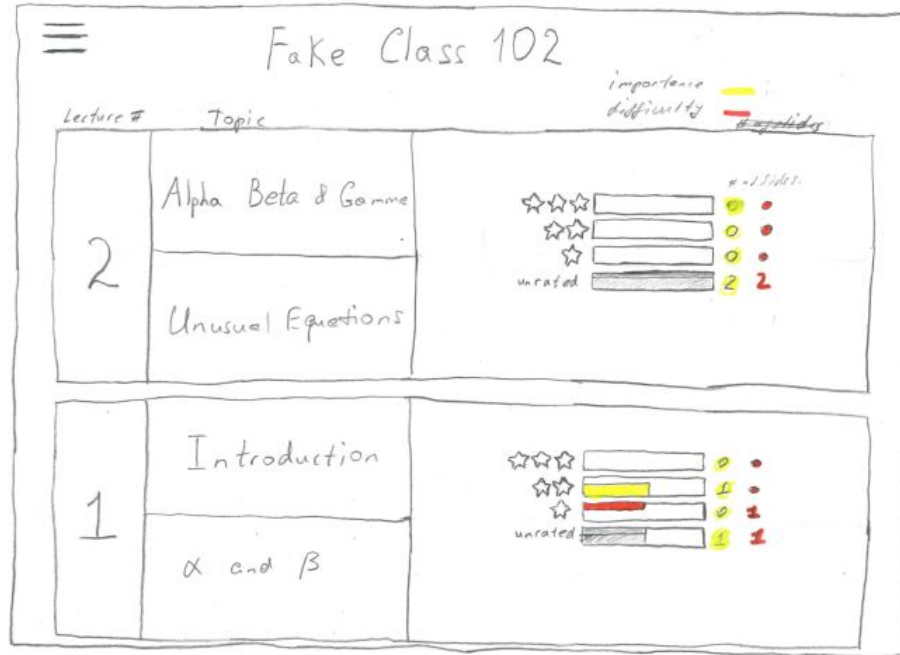
Too many zeros - feels like we are reinventing the wheel

Ratings Screen



Back to a common design pattern - users liked it much more

Ratings Screen



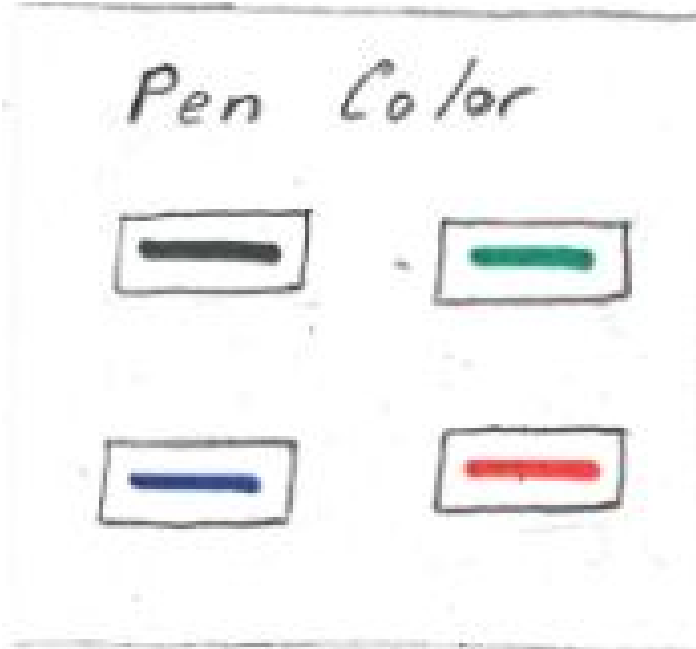
Almost there – percentages were ambiguous

Ratings Screen

Lecture #		Importance	# of slides	Difficulty	# of slides
2	Alpha Beta & Gamma	☆☆☆ <input type="checkbox"/>	0	☆☆☆ <input type="checkbox"/>	0
	Unusual Equations	☆☆ <input type="checkbox"/>	0	☆☆ <input type="checkbox"/>	0
		☆ <input type="checkbox"/>	0	☆ <input type="checkbox"/>	0
		unrated <input type="checkbox"/>	2	unrated <input type="checkbox"/>	2
1	Introduction	☆☆☆ <input type="checkbox"/>	0	☆☆☆ <input type="checkbox"/>	0
	α and β	☆☆ <input type="checkbox"/>	1	☆☆ <input type="checkbox"/>	0
		☆ <input type="checkbox"/>	0	☆ <input type="checkbox"/>	1
		unrated <input type="checkbox"/>	1	unrated <input type="checkbox"/>	1

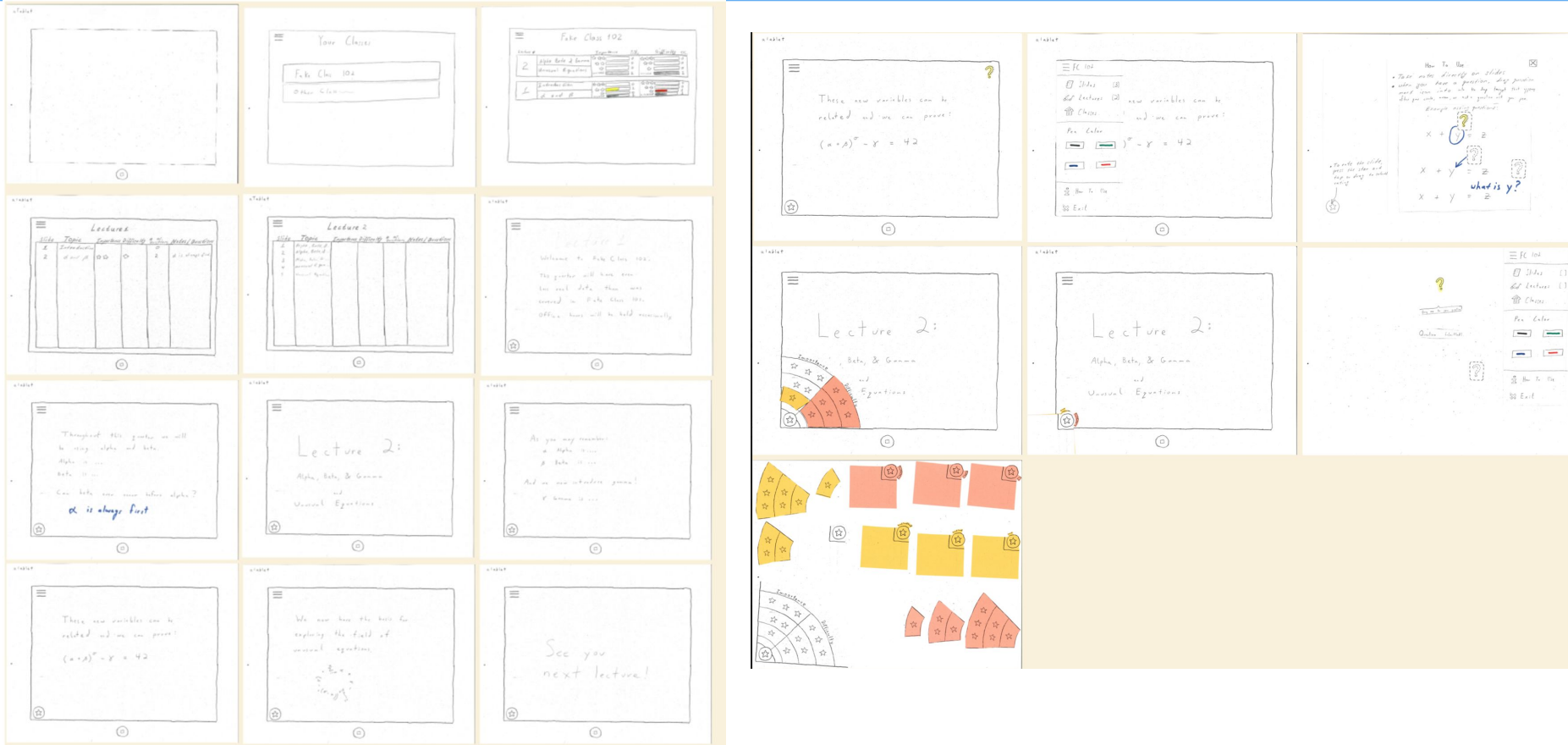
Final iteration – Very readable, easy to interpret information

Testing led to numerous smaller changes



- ❖ Redesigned menu, added pen color options, changes/additions to gestures we supported, etc.
- ❖ Iterative design process meant we got better after each test - which led to users finding more sophisticated and minor problems with the application - didn't all just get hung up on the same thing

Final Paper Prototype



Final Paper Prototype


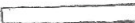







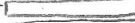






Your Classes

Fake Class 10d

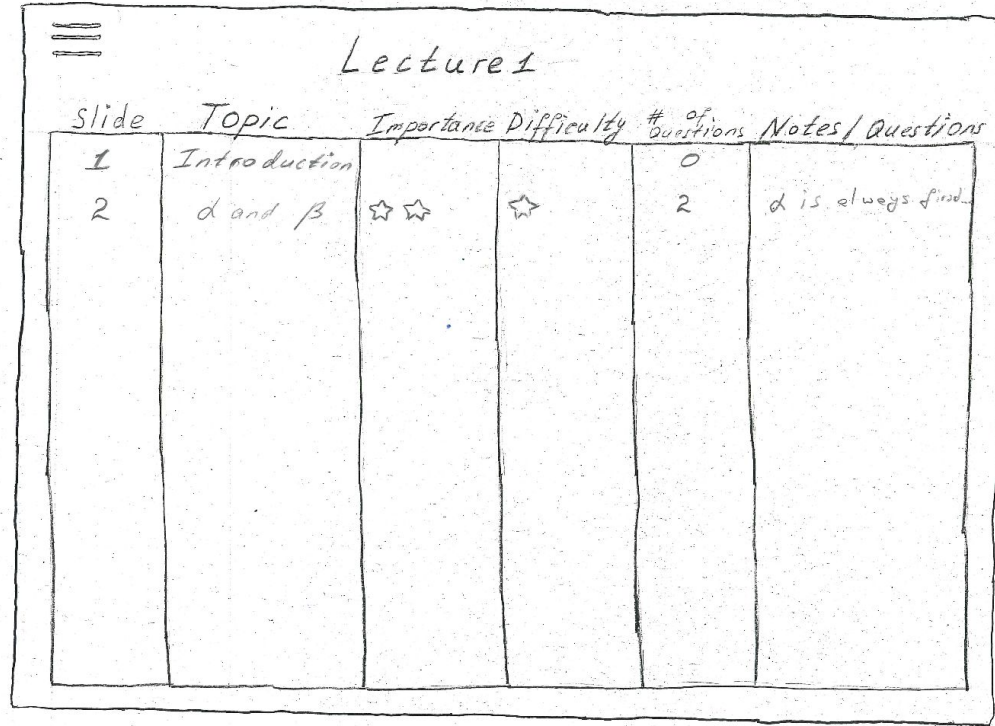


Final Paper Prototype

☰ Fake Class 102

Lecture #		Importance	# of slides	Difficulty	# of slides
2	Alpha Beta & Gamma	☆☆☆ 	0	☆☆☆ 	0
	Unusual Equations	☆☆ 	0	☆☆ 	0
		☆ 	0	☆ 	0
		unrated 	2	unrated 	2
1	Introduction	☆☆☆ 	0	☆☆☆ 	0
	α and β	☆☆ 	1	☆☆ 	0
		☆☆ 	0	☆☆ 	1
		unrated 	1	unrated 	1

Final Paper Prototype



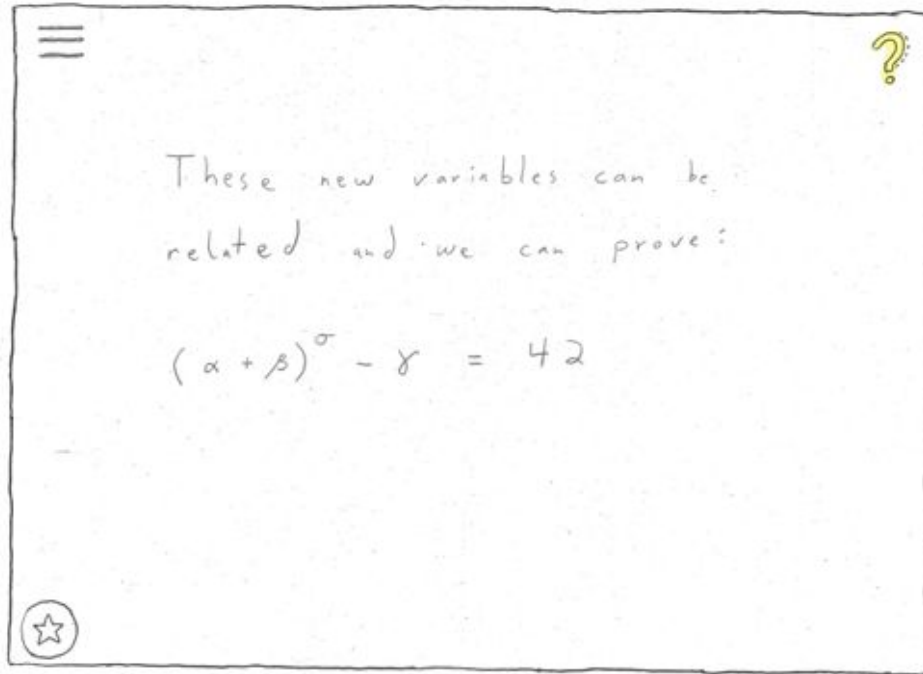
A hand-drawn prototype of a table titled "Lecture 1". The table has six columns: "slide", "Topic", "Importance", "Difficulty", "# of Questions", and "Notes/ Questions". The first row contains the following data: slide 1, Topic "Introduction", Importance (empty), Difficulty (empty), # of Questions 0, and Notes/ Questions (empty). The second row contains: slide 2, Topic "d and β ", Importance two stars, Difficulty one star, # of Questions 2, and Notes/ Questions "d is always first...".

slide	Topic	Importance	Difficulty	# of Questions	Notes/ Questions
1	Introduction			0	
2	d and β	☆☆	☆	2	d is always first...



Final Paper Prototype

a tablet



Final Paper Prototype

How To Use



- Take notes directly on slides
- when you have a question, drag question mark icon into the drop target that appears after you circle, arrow, or ask a question with your pen.

Example asking questions:

$$X + Y = Z$$

$$X + Y = Z$$

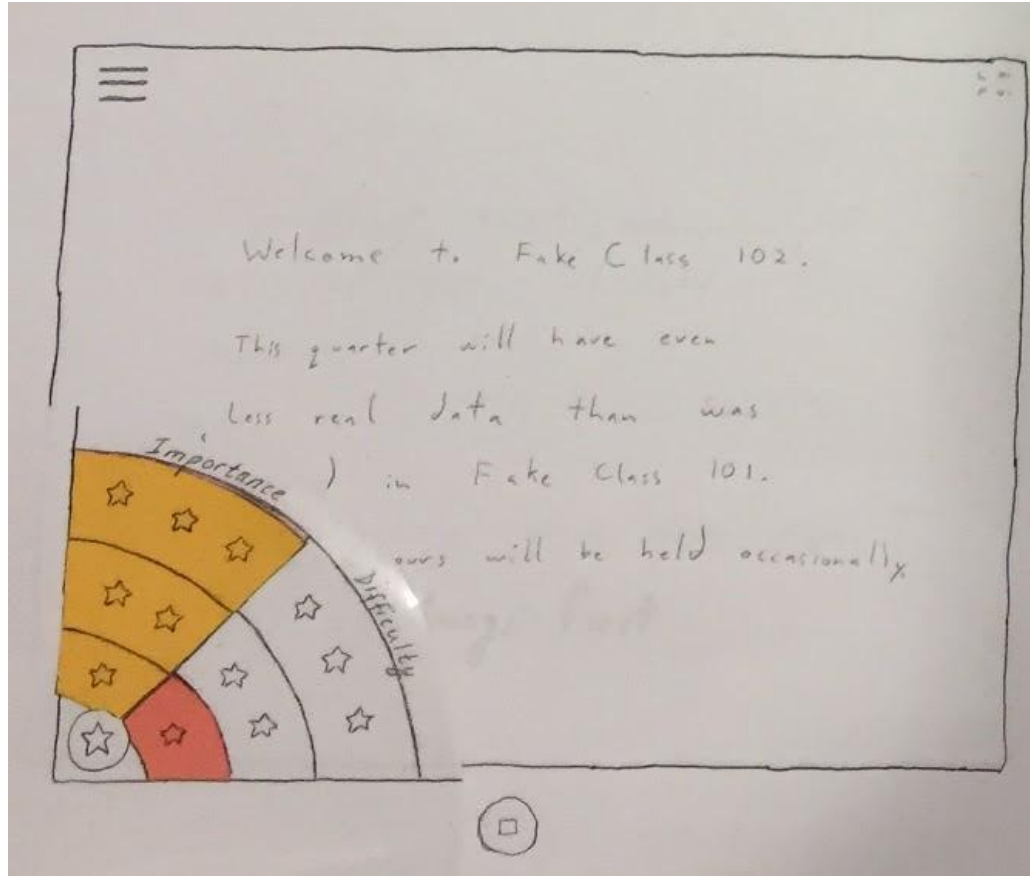
$$X + Y = Z$$

what is y?

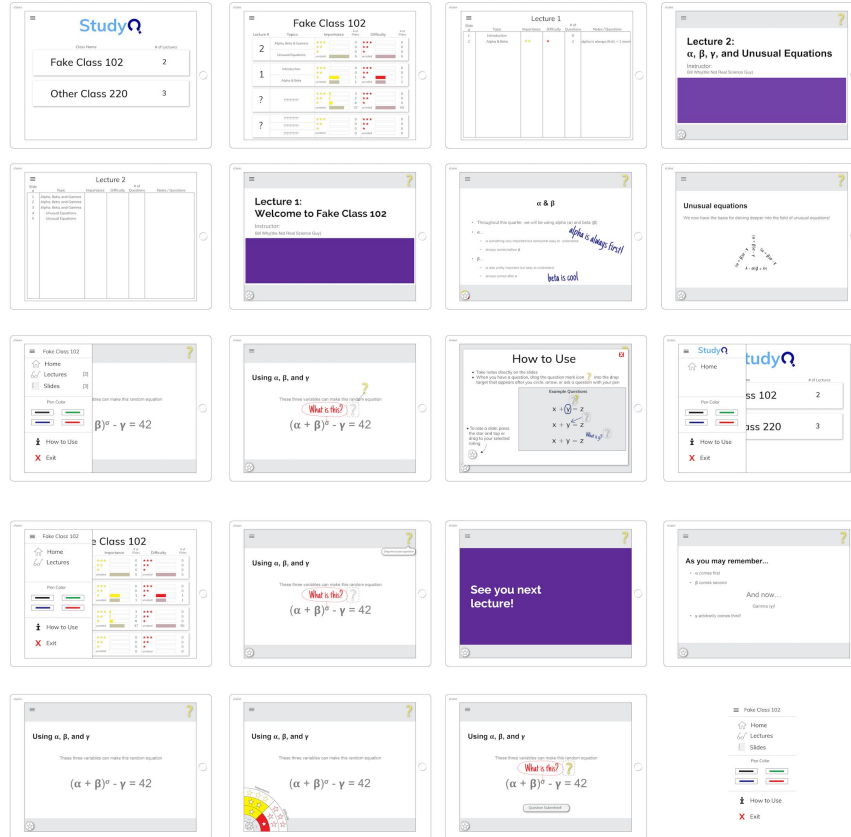
- To rate the slide, press the star and tap or drag to select rating



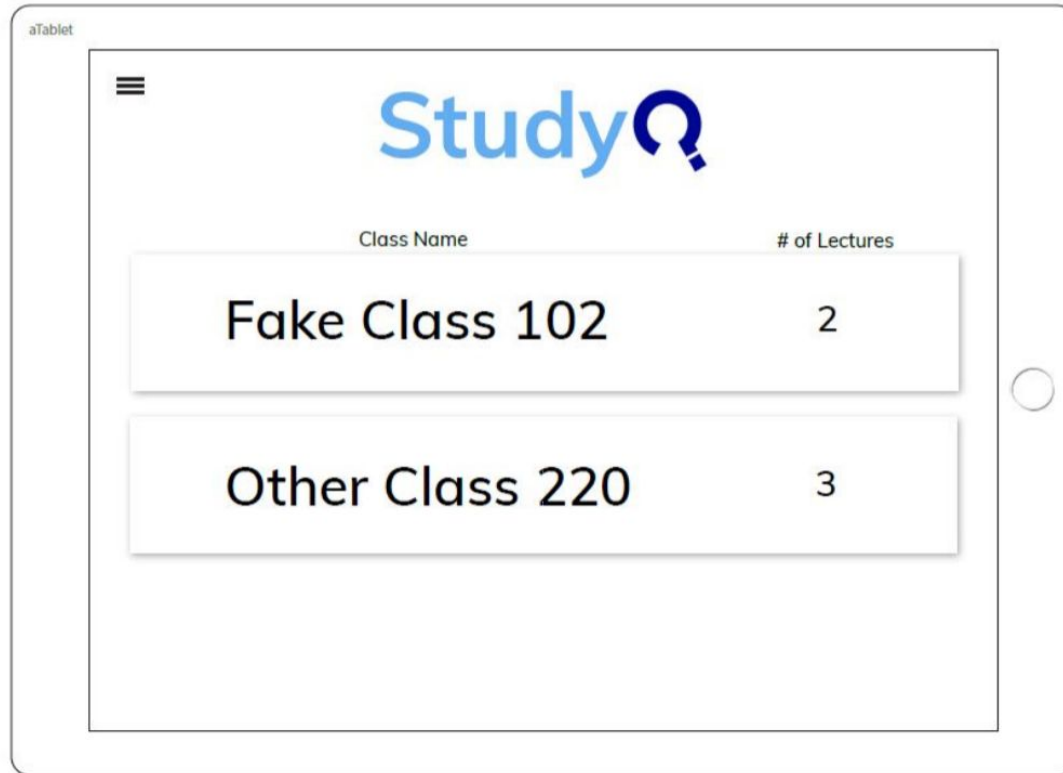
Final Paper Prototype



Digital Mockup



Digital Mockup



Digital Mockup

aTablet

☰

Fake Class 102

Lecture #	Topics	Importance	# of Slides	Difficulty	# of Slides
2	Alpha, Beta & Gamma	☆☆☆ <input type="text"/>	0	☆☆☆ <input type="text"/>	0
		☆☆ <input type="text"/>	0	☆☆ <input type="text"/>	0
	Unusual Equations	☆ <input type="text"/>	0	☆ <input type="text"/>	0
		unrated <input type="text"/>	5	unrated <input type="text"/>	5
1	Introduction	☆☆☆ <input type="text"/>	0	☆☆☆ <input type="text"/>	0
		☆☆ <input type="text"/>	0	☆☆ <input type="text"/>	0
	Alpha & Beta	☆ <input type="text"/>	1	☆ <input type="text"/>	1
		unrated <input type="text"/>	1	unrated <input type="text"/>	1
?	??????????	☆☆☆ <input type="text"/>	3	☆☆☆ <input type="text"/>	0
		☆☆ <input type="text"/>	2	☆☆ <input type="text"/>	0
		☆ <input type="text"/>	8	☆ <input type="text"/>	0
		unrated <input type="text"/>	37	unrated <input type="text"/>	50
?	??????????	☆☆☆ <input type="text"/>	0	☆☆☆ <input type="text"/>	0
	??????????	☆☆ <input type="text"/>	0	☆☆ <input type="text"/>	0
	??????????	☆ <input type="text"/>	0	☆ <input type="text"/>	0
	??????????	unrated <input type="text"/>	0	unrated <input type="text"/>	0

Digital Mockup

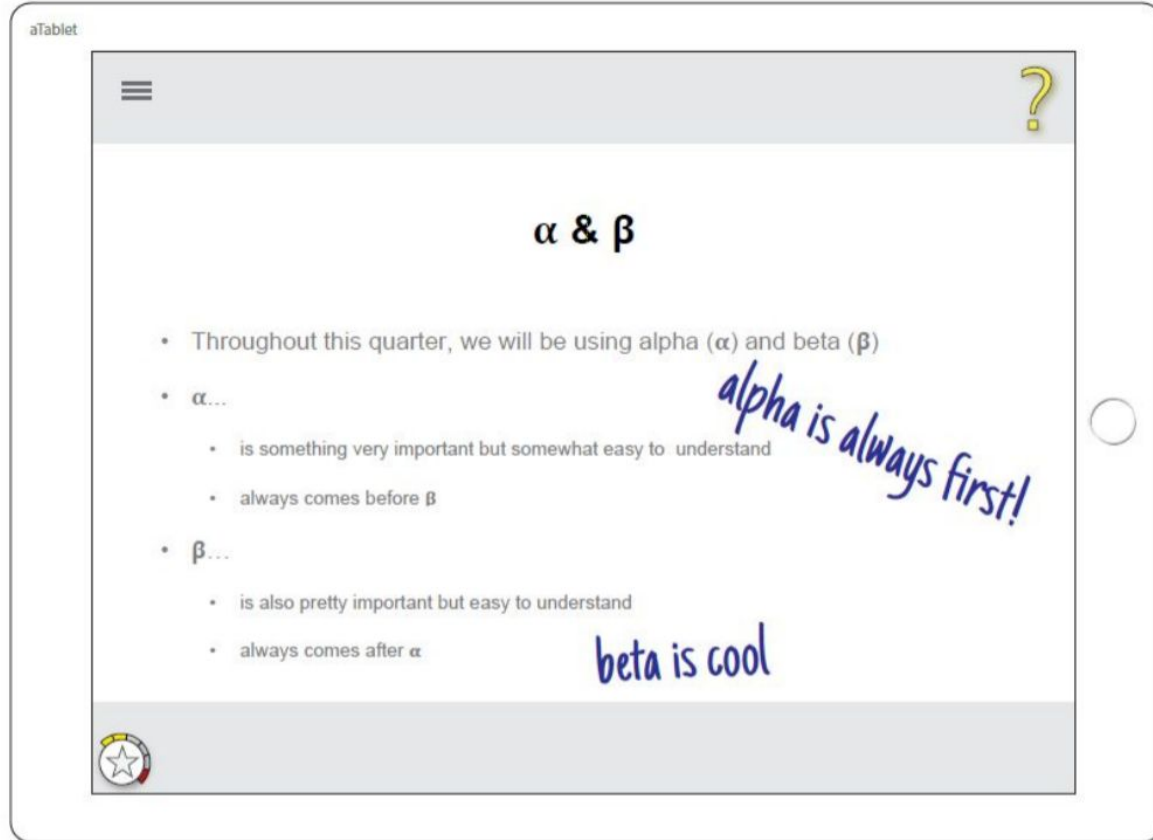
aTablet

☰

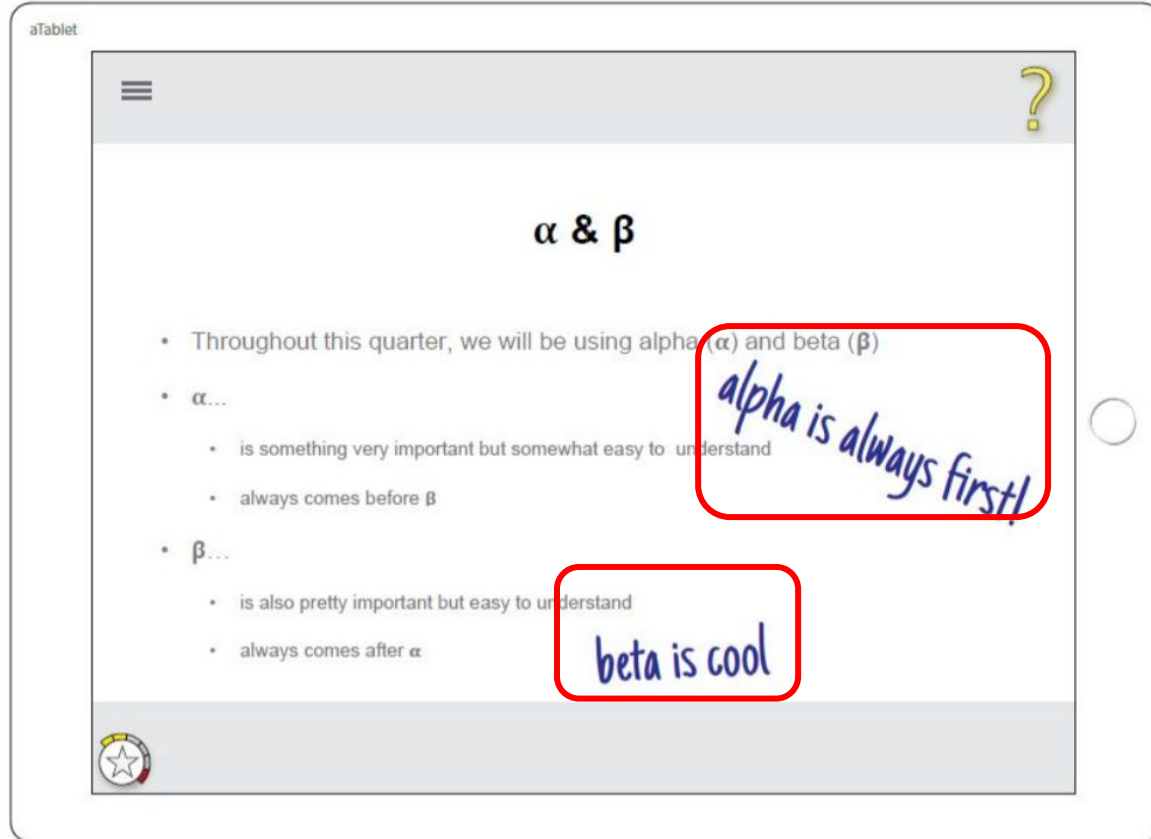
Lecture 1

Slide #	Topic	Importance	Difficulty	# of Questions	Notes / Questions
1	Introduction			0	
2	Alpha & Beta	☆☆	★	2	alpha is always first!, + 1 more

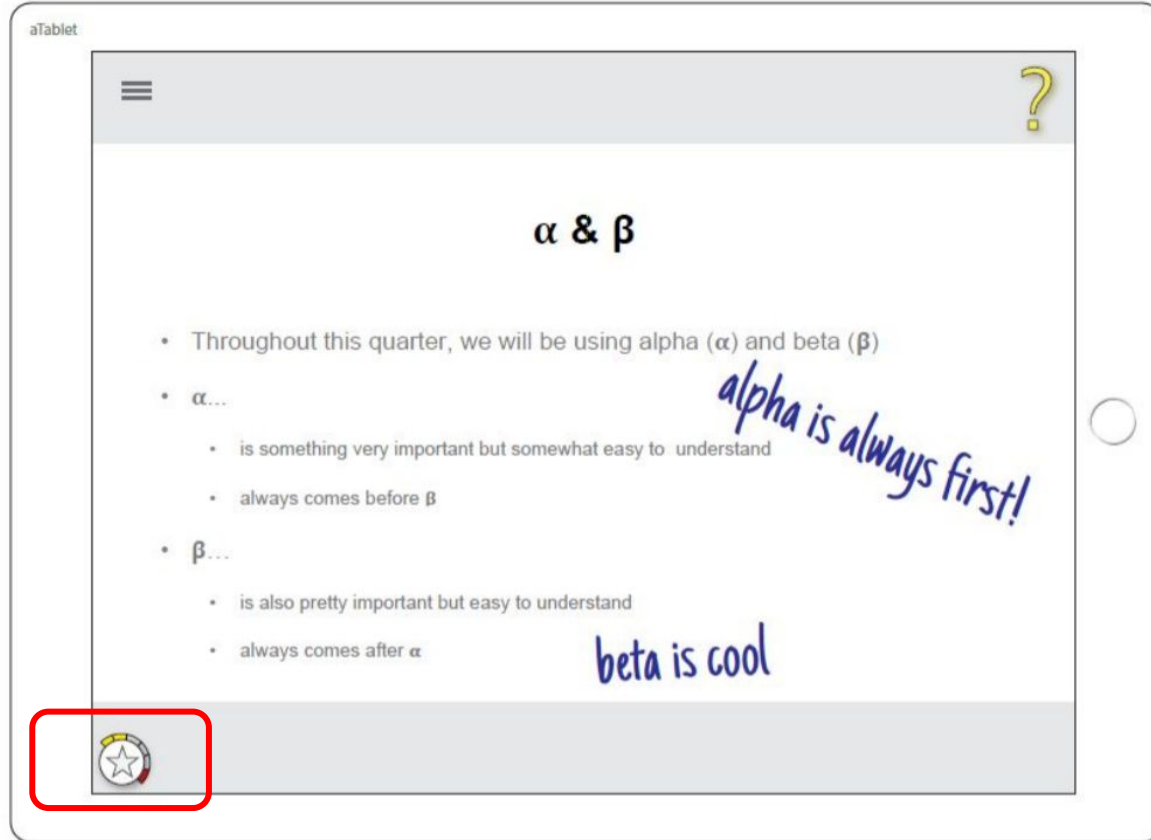
Digital Mockup



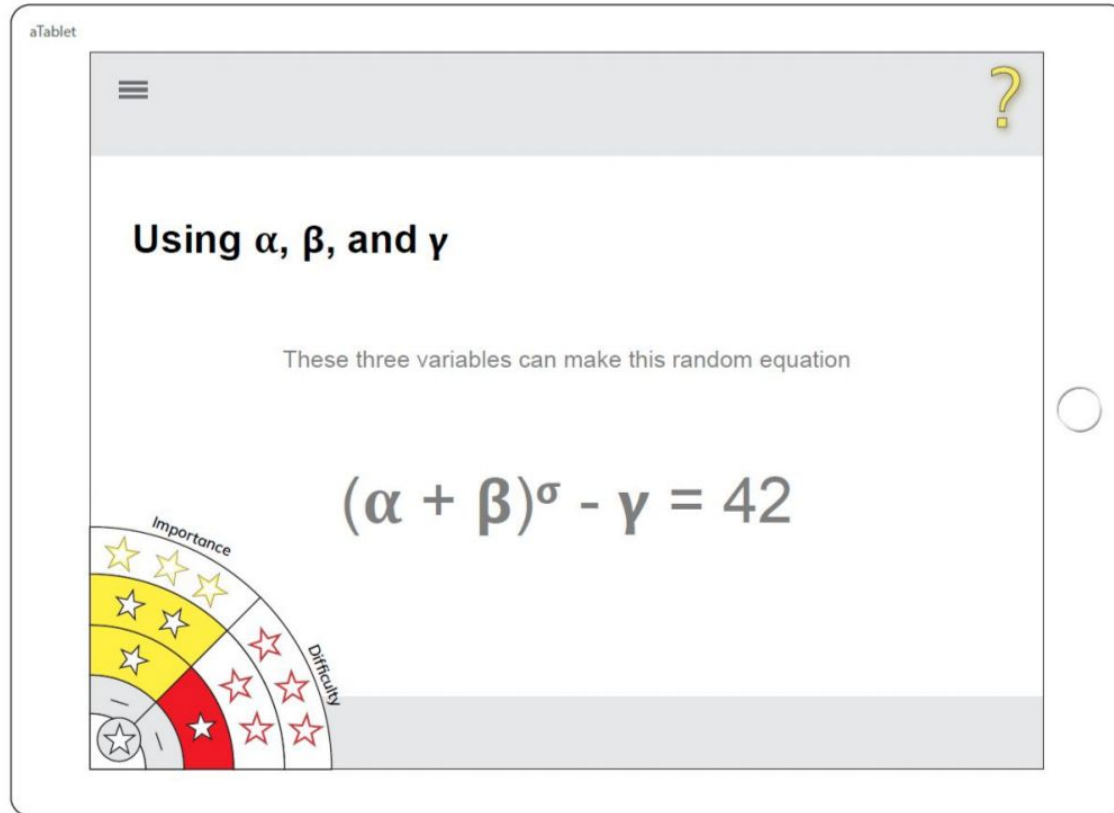
Digital Mockup



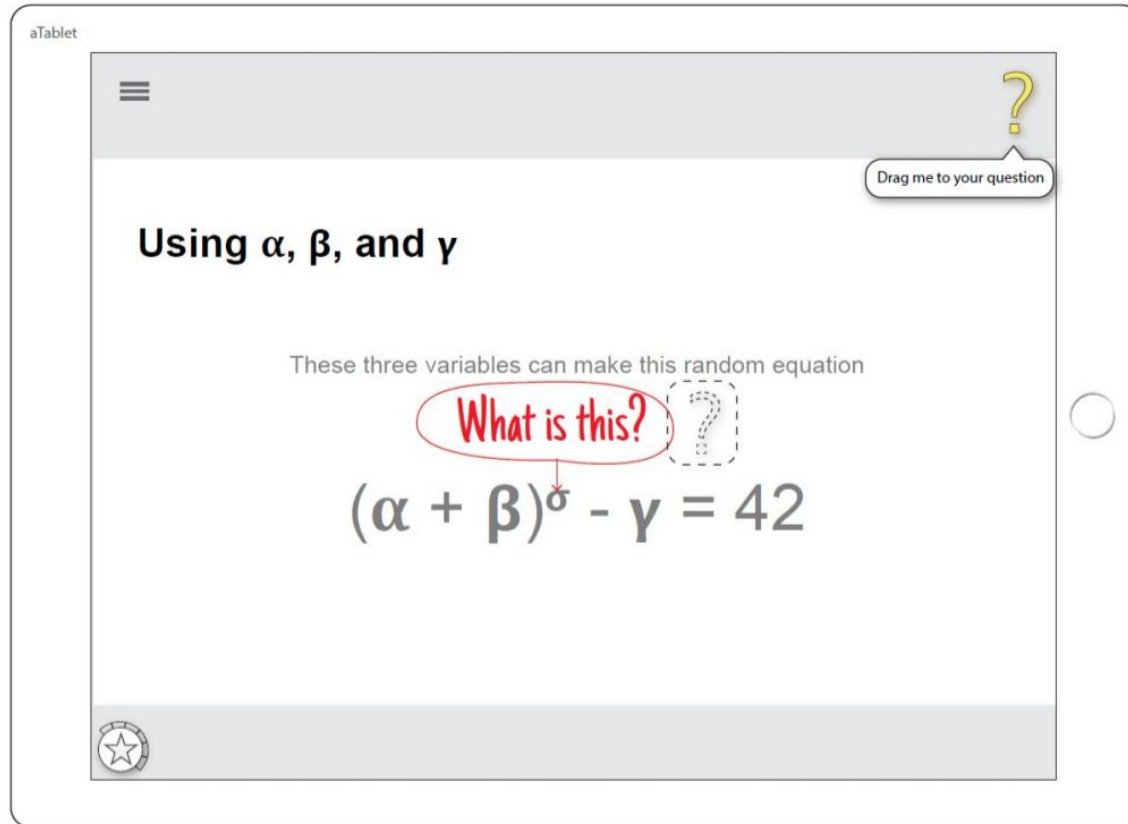
Digital Mockup



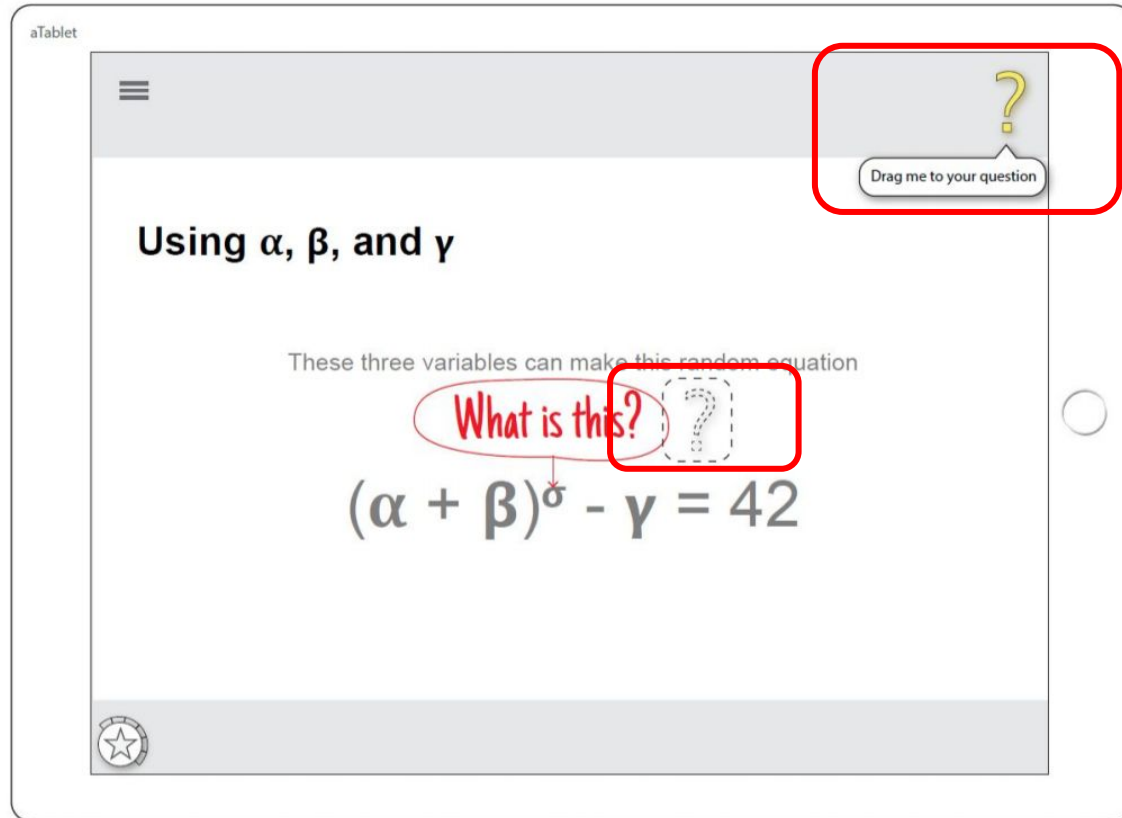
Digital Mockup



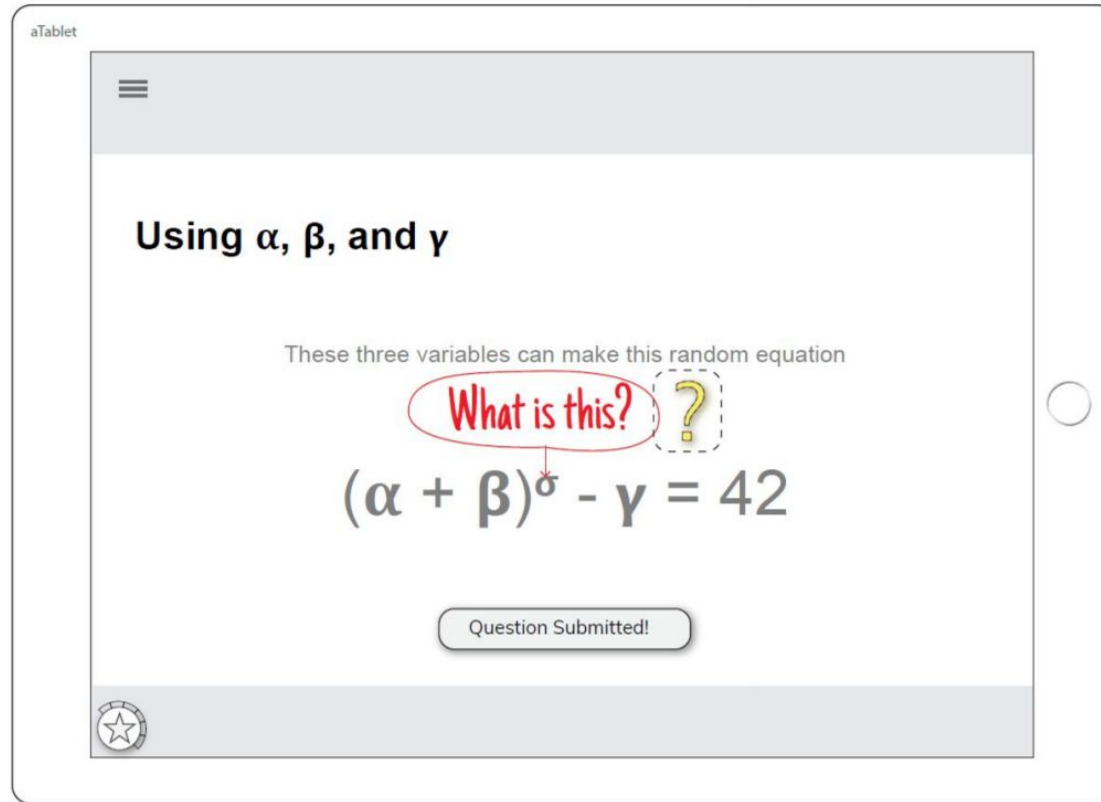
Digital Mockup



Digital Mockup



Digital Mockup



Summary

- ❖ Good context is more important than detailed instructions
- ❖ Iterate as many times as necessary
- ❖ One person's feedback isn't indicative of a design flaw
- ❖ Recognize problem with “paper” prototype vs. problem with design



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