



# LearnAble

**Personalized learning for students with dyslexia**

*Sarah Marshall · Michele Miao · Sanjit Rajendiran · Max Tian*



# Problem

- **Dyslexia** affects 5-17% of children in the United States
- Not all dyslexia is the same: **different children** struggle with **different things**
- Teachers have difficulty **personalizing** their instruction, especially in large classrooms





How do we **personalize** reading education for students with dyslexia?

# 2 tasks



Monitor reading progress  
remotely

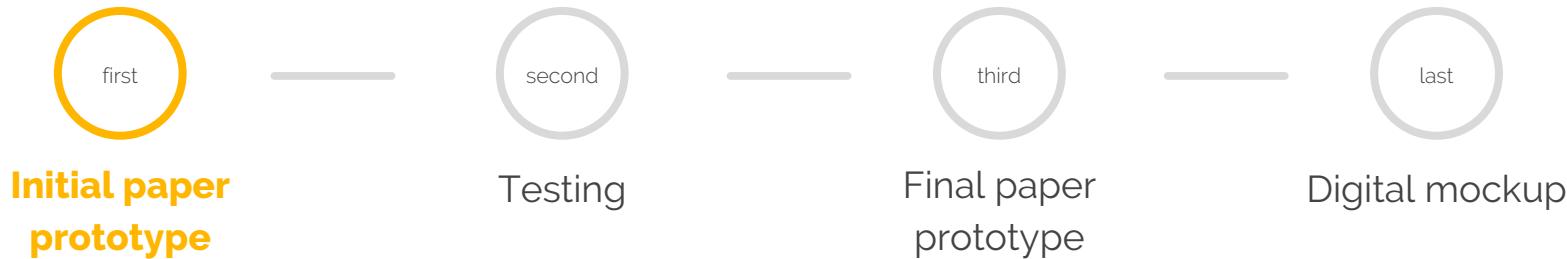


Assign readings personalized  
to the student



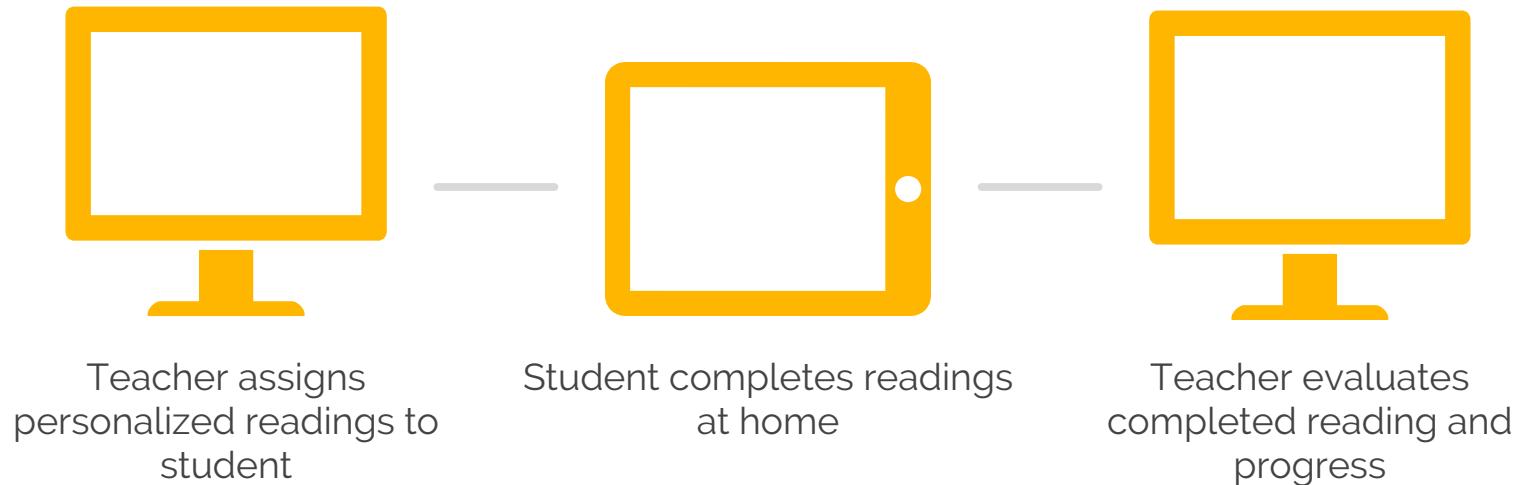


# Getting the design right



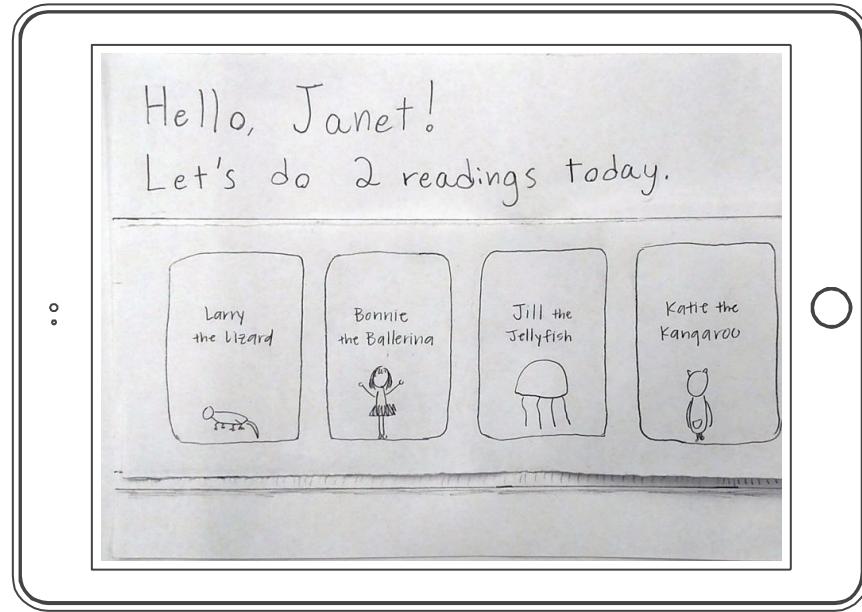


# Initial paper prototype



# Task 1

Monitor reading progress  
remotely

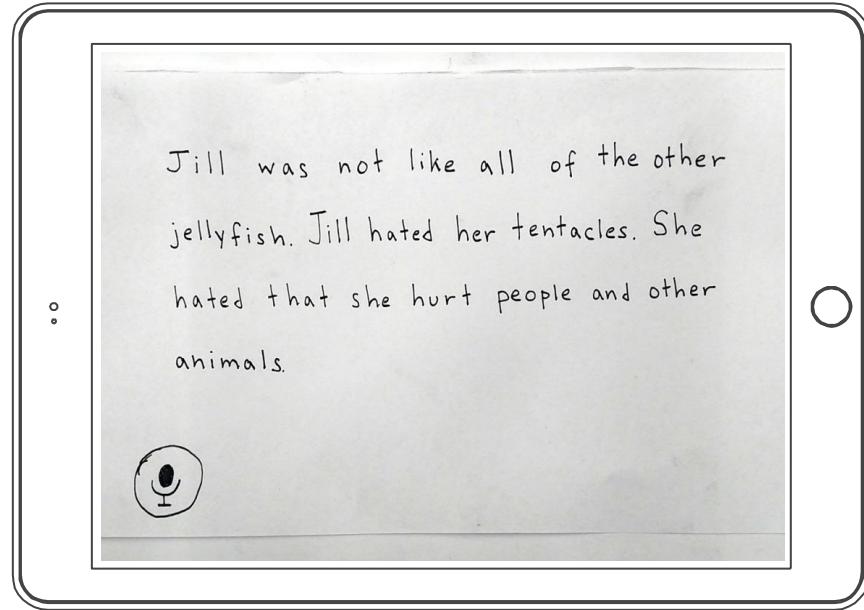


*Student views assigned readings and number of readings to complete.*



# Task 1

Monitor reading progress  
remotely



Jill was not like all of the other jellyfish. Jill hated her tentacles. She hated that she hurt people and other animals.

•

Microphone icon

*Student selects a reading to complete.*



# Task 1

Monitor reading progress  
remotely

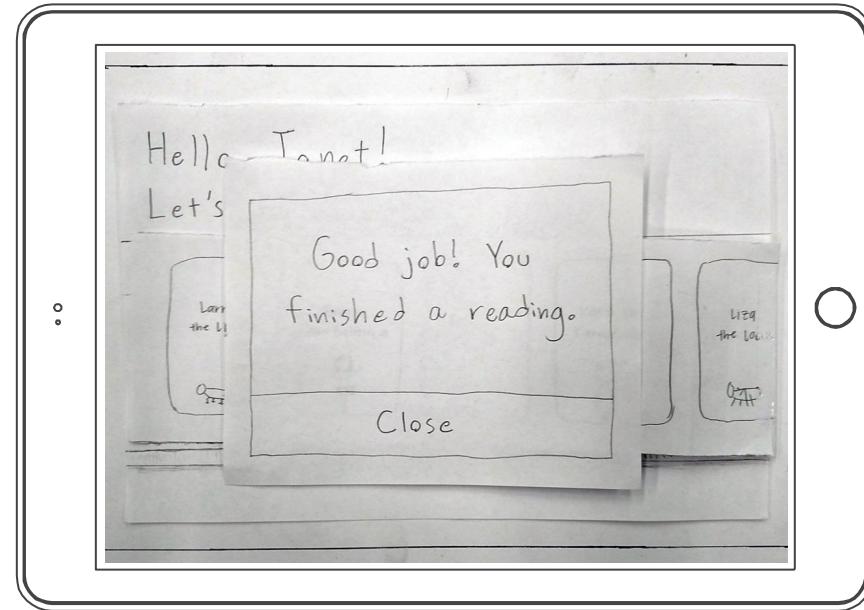
Jill was not like all of the other  
jellyfish. Jill hated her tentacles. She  
hated that she hurt people and other  
animals.

*Student hits record and begins to read aloud.*



# Task 1

Monitor reading progress  
remotely

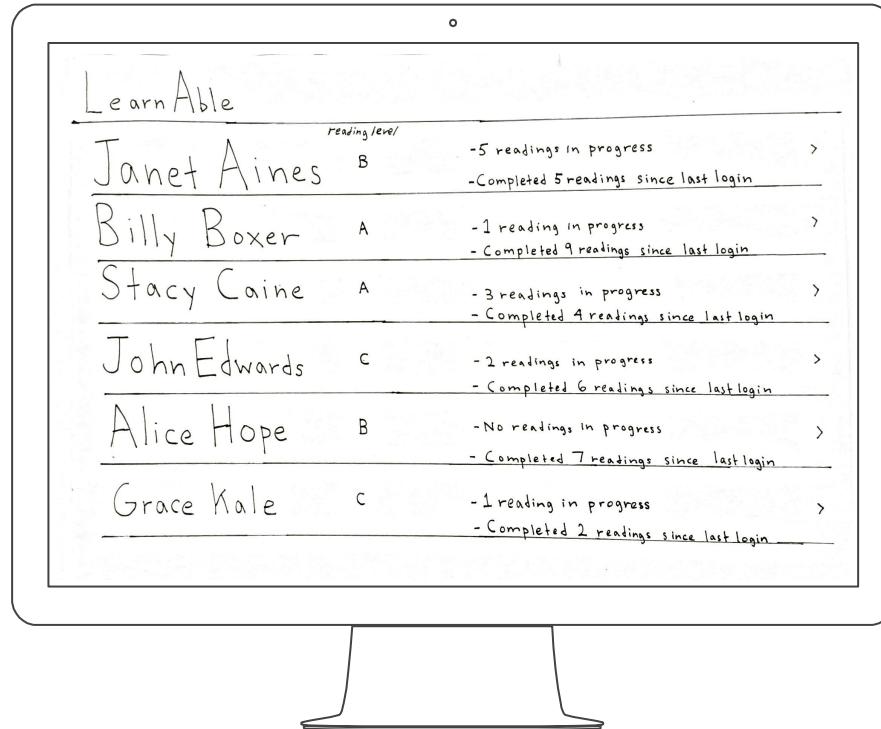


*Student submits completed reading to teacher.*



# Task 1

Monitor reading progress  
remotely

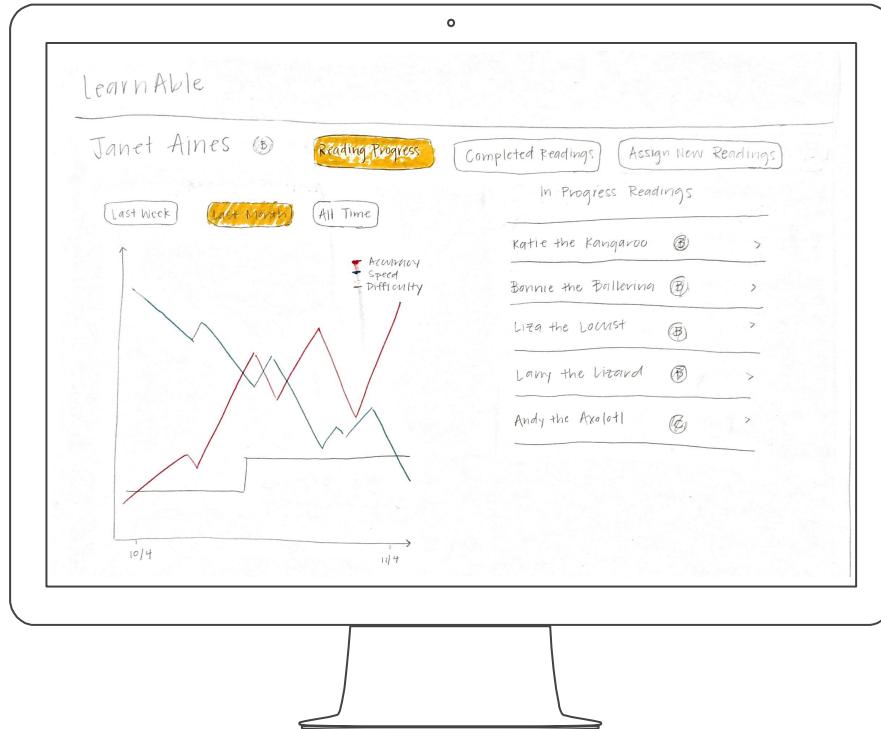


Teacher views list of students and their reading information.



# Task 1

Monitor reading progress  
remotely

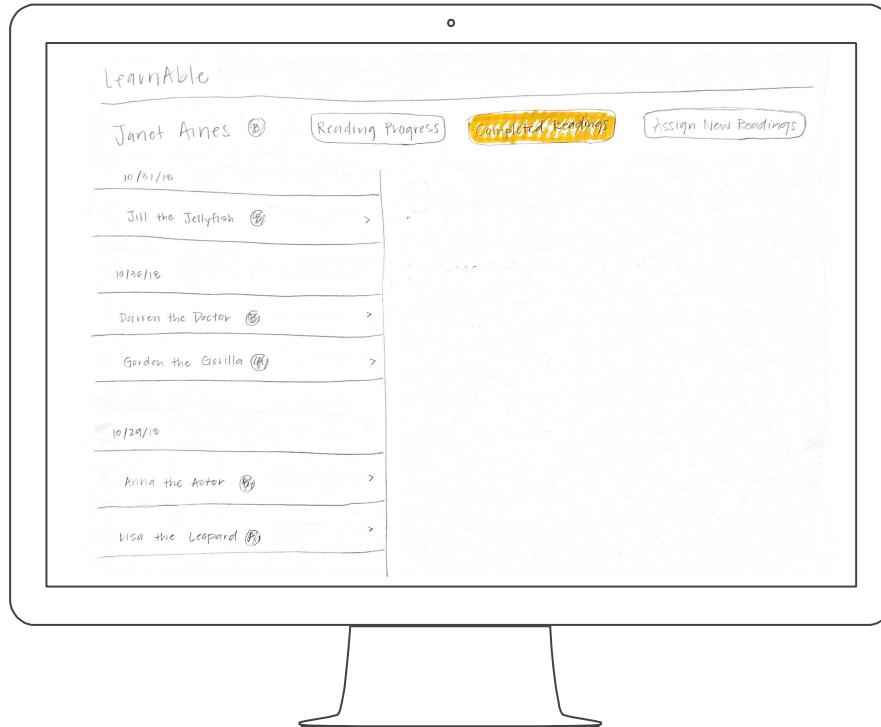


*Teacher selects an individual student to view their reading progress and current readings.*



# Task 1

Monitor reading progress  
remotely



*Teacher views a list of the student's past completed readings.*



# Task 1

Monitor reading progress  
remotely

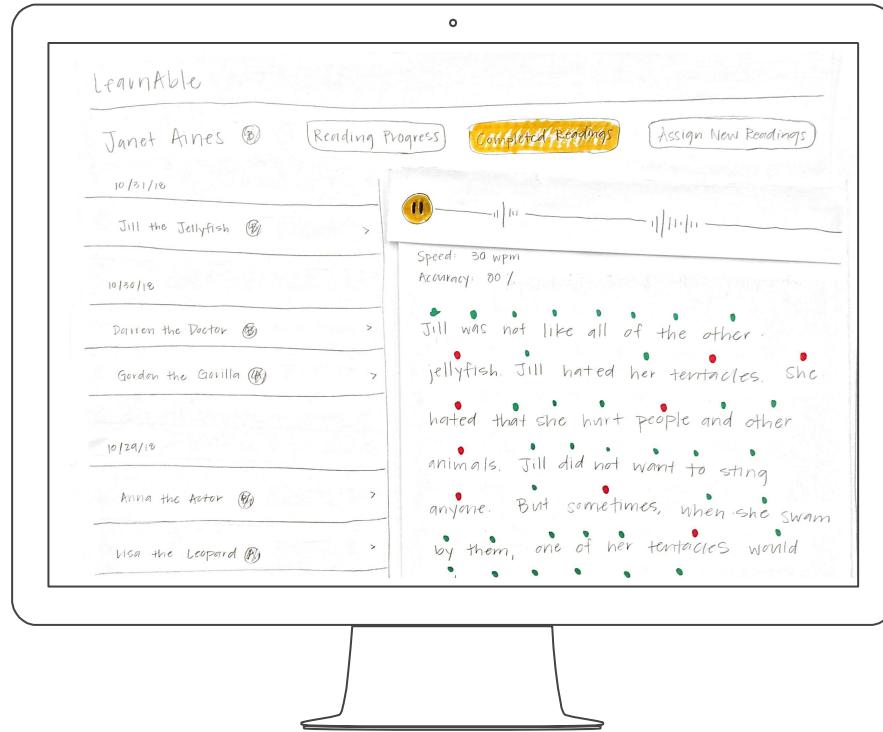
The tablet screen displays a digital reading progress monitoring interface. At the top, it says "Learnable" and shows "Janet Aines" with a progress bar icon. Below this are four other student names: "Jill the Jellyfish", "Daren the Doctor", "Gorden the Gorilla", and "Anna the Actor". Each name has a date next to it: "10/31/18", "10/30/18", "10/29/18", and "10/29/18" respectively. To the right of the student list, there are four buttons: "Reading Progress", "Completed Readings" (which is highlighted in yellow), and "Assign New Readings". Below these buttons, it says "Speed: 30 wpm" and "Accuracy: 80%". The text of the reading for "Jill the Jellyfish" is shown below, with red and green dots under each word to indicate accuracy. The text reads: "Jill was not like all of the other jellyfish. Jill hated her tentacles. She hated that she hurt people and other animals. Jill did not want to sting anyone. But sometimes, when she swam by them, one of her tentacles would not move...".

Teacher selects a completed reading to view in detail. Dots denote accuracy of student's reading.



# Task 1

Monitor reading progress  
remotely



Teacher listens to student's recorded audio.



# Task 2

Assign readings  
personalized to the  
student

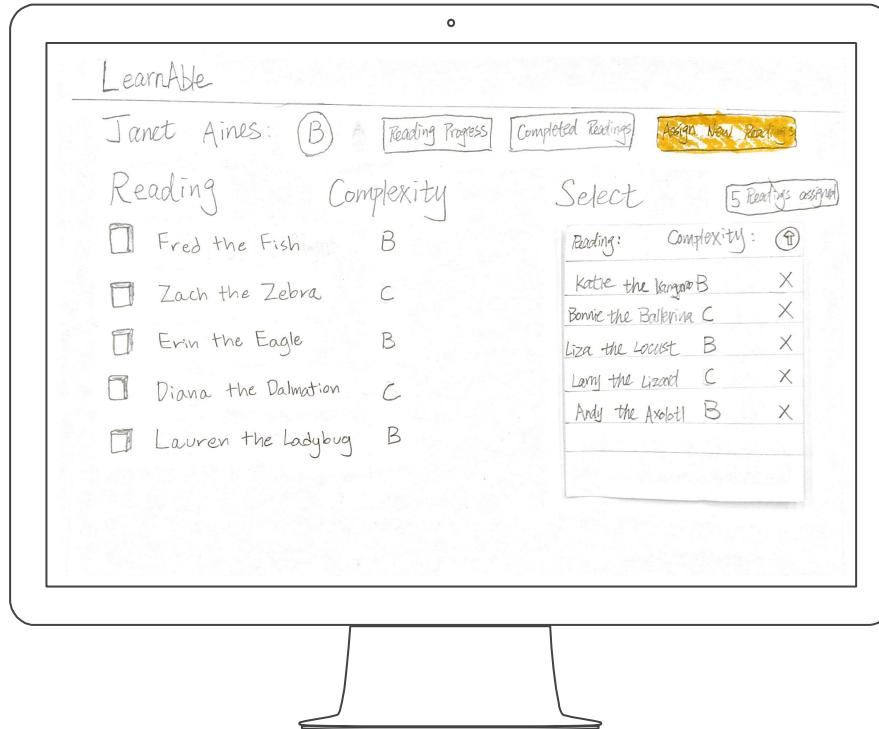


Teacher views list of readings that match student's  
reading level & interests.



# Task 2

Assign readings  
personalized to the  
student

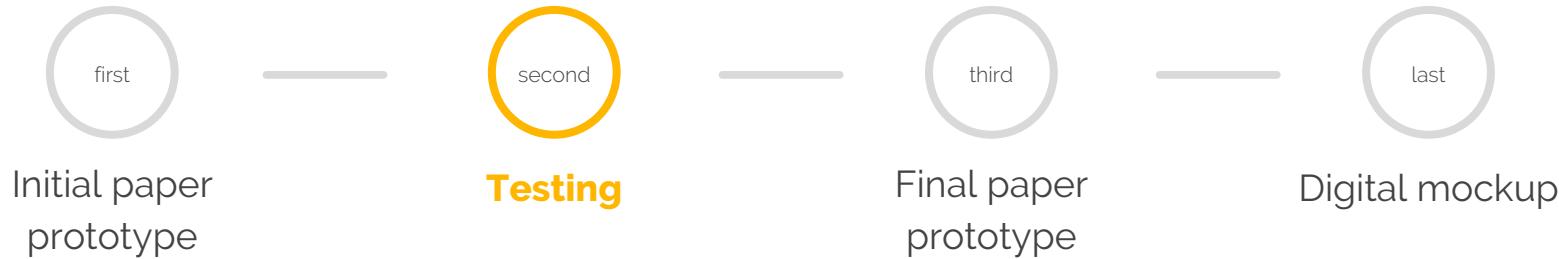


Teacher views and edits list of currently assigned readings.





# Getting the design right





# Heuristic evaluations

## Process

- 2 heuristic evaluations
  - CSE 440 students
- Used Nielsen's heuristics

## Results

- Confirm major actions
- Organize students into classes
- Streamline list displays



# Usability testing

## Process

- 3 usability tests
  - UX designer for dyslexia
  - Adult with dyslexia
  - Adult familiar w/ dyslexia
- 3 tasks
  - Find Janet's reading level
  - Evaluate Janet's reading of "Jill the Jellyfish"
  - Assign "Fred the Fish"

## Results

- Increase student control over submissions
- Add search functionality for large lists
- Decrease clutter by using text color instead of dots



# Getting the design right





## Revision: Increase student control over submissions

Jill was not like all of the other jellyfish. Jill hated her tentacles. She hated that she hurt people and other animals.

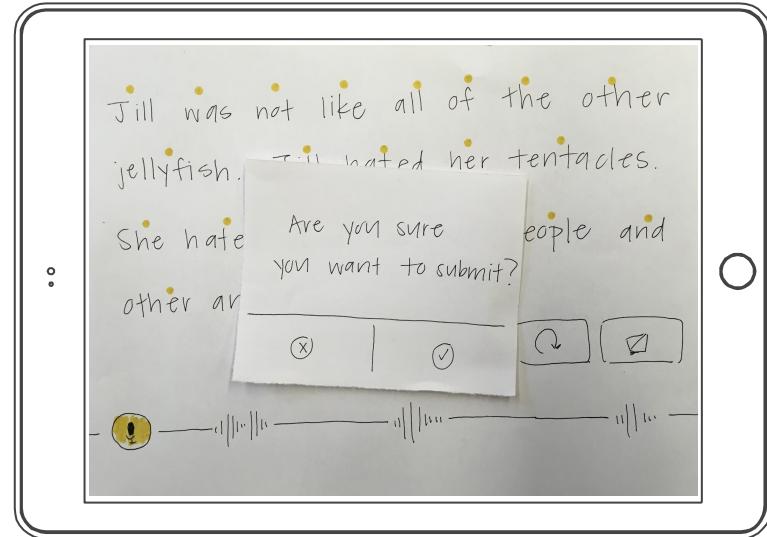
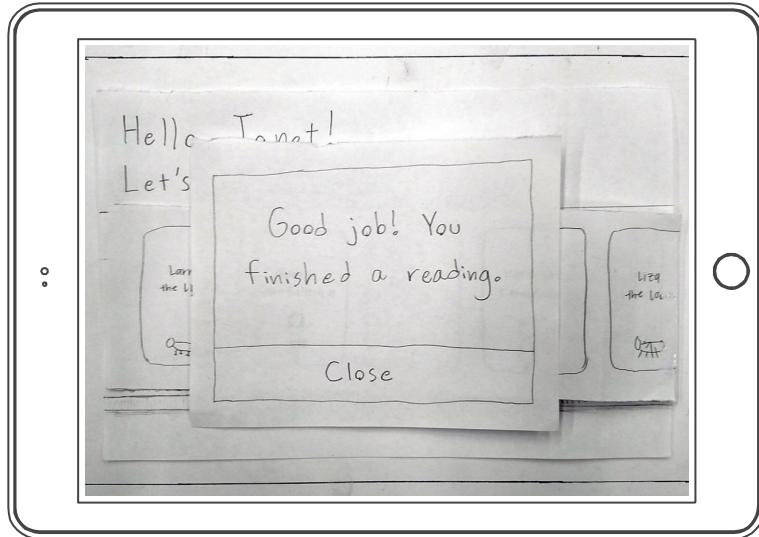
Below the text is a small illustration of a yellow circle with a black dot in the center, resembling a button or a sun.

Jill was not like all of the other jellyfish. Jill hated her tentacles. She hated that she hurt people and other animals.

Two small rectangular input boxes are positioned at the bottom right of the screen. The first box contains a question mark (?) and the second box contains a checkmark (✓).



## Revision: Confirm major actions





# Revision: Organize students into classes

LearnAble

reading level		
Janet Aines	B	- 5 readings in progress - Completed 5 readings since last login >
Billy Boxer	A	- 1 reading in progress - Completed 9 readings since last login >
Stacy Caine	A	- 3 readings in progress - Completed 4 readings since last login >
John Edwards	C	- 2 readings in progress - Completed 6 readings since last login >
Alice Hope	B	- No readings in progress - Completed 7 readings since last login >
Grace Kake	C	- 1 reading in progress - Completed 2 readings since last login >

LearnAble

Students Logout

CLASS A		
Janet Aines	B	- 5 readings in progress - 5 readings completed since last login >
Billy Boxer	A	- 1 reading in progress - 9 readings completed since last login >
Stacy Caine	A	- 3 readings in progress - 0 readings completed since last login >
CLASS B		
John Edwards	C	- 2 readings in progress - 6 readings completed since last login >
Laura Lane	B	- 0 readings in progress



# Revision: Streamline list displays & add search

A hand-drawn sketch of a computer monitor. The screen displays a 'Learnable' interface for a student named Janet Aines. At the top, there are four buttons: 'Reading Progress', 'Completed Readings', 'Assign New Readings' (which is highlighted in yellow), and 'Reading Progress'. Below this, the student's name 'Janet Aines' is followed by a circled grade level '(B)'. There are two columns: 'Reading' and 'Complexity'. Under 'Reading' are five items: 'katie the Kangaroo', 'Bonnie the Ballerina', 'Liza the Locust', 'Larry the Lizard', and 'Andy the Axolotl'. Under 'Complexity' are the letters 'B', 'C', 'B', 'C', and 'B' respectively. To the right of the list is a 'Select' column with five empty checkboxes. Above this column is a box containing the text '# Readings assigned'. The monitor sits on a simple black stand.

A hand-drawn sketch of a computer monitor. The screen displays a 'Learnable' interface for Janet Aines. At the top, there are four buttons: 'Assign New Readings' (highlighted in yellow), 'Completed Readings', 'Reading Progress', and 'Students' (with a dropdown arrow). The student's name 'Janet Aines' is followed by a circled grade level '(B)'. Below this, the text 'In Progress Readings: 5' is followed by a horizontal line with a pen icon. A list of five readings follows, each preceded by a small square checkbox and a circled grade level: 'Erin the Eagle (B)', 'Fred the Fish (B)', 'Lauren the Ladybug (C)', 'Diana the Dalmatian (C)', and 'Zach the Zebra (C)'. Each item has a small right-pointing arrow at the end of its line. The monitor sits on a simple black stand.



# Revision: Decrease clutter by using text color

LearnAble

Janet Aines (B)    Reading Progress    Complete Readings    Assign New Readings

10/31/18  
Jill the Jellyfish (B) >

10/30/18

Darren the Doctor (B) >

Gordon the Gorilla (A) >

10/29/18

Anna the Actor (B) >

Vika the Leopard (B) >

Speed: 30 wpm  
Accuracy: 80%.

Jill was not like all of the other jellyfish. Jill hated her tentacles. She hated that she hurt people and other animals. Jill did not want to sting anyone. But sometimes, when she swam by them, one of her tentacles would

LearnAble    Students    Logout

Janet Aines (B)    Assign New Readings    Complete Readings    Reading Progress

10/31/18  
Jill the Jellyfish (B) > (B)

10/30/18

Darren the Doctor (B) >

Gordon the Gorilla (A) >

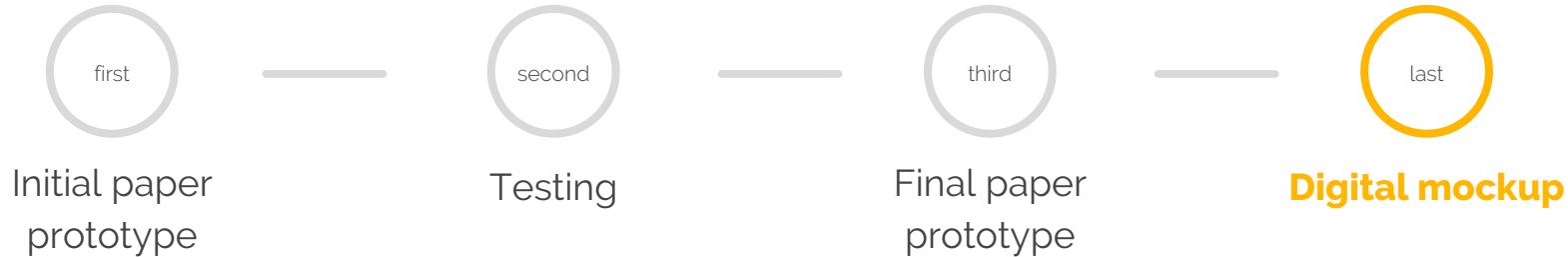
10/29/18

Anna the Actor (B) >

Jill was not like all of the other **jellyfish**. Jill hated her tentacles. She hated that she hurt other people and other animals. Jill did not want to sting anyone. But sometimes, when she swam by them, one of her tentacles would

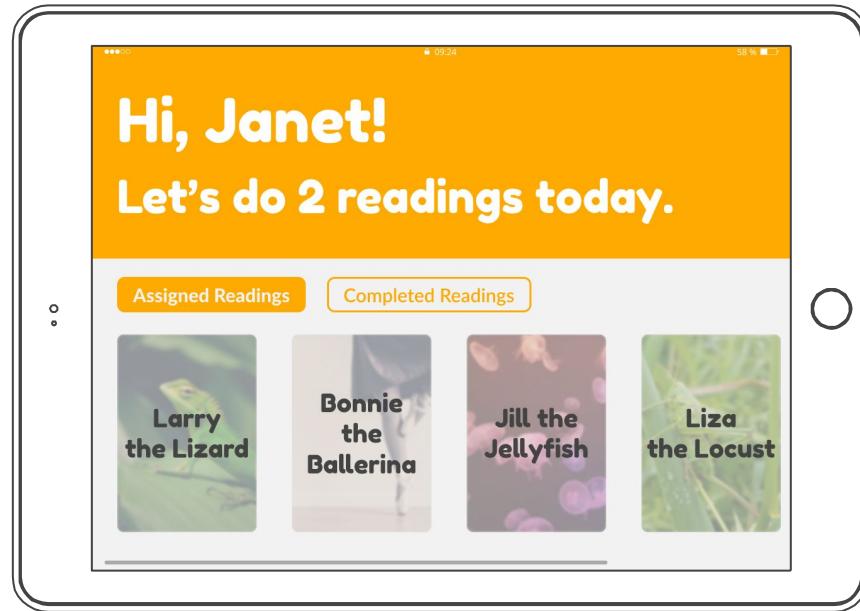


# Getting the design right



# Task 1

Monitor reading progress  
remotely

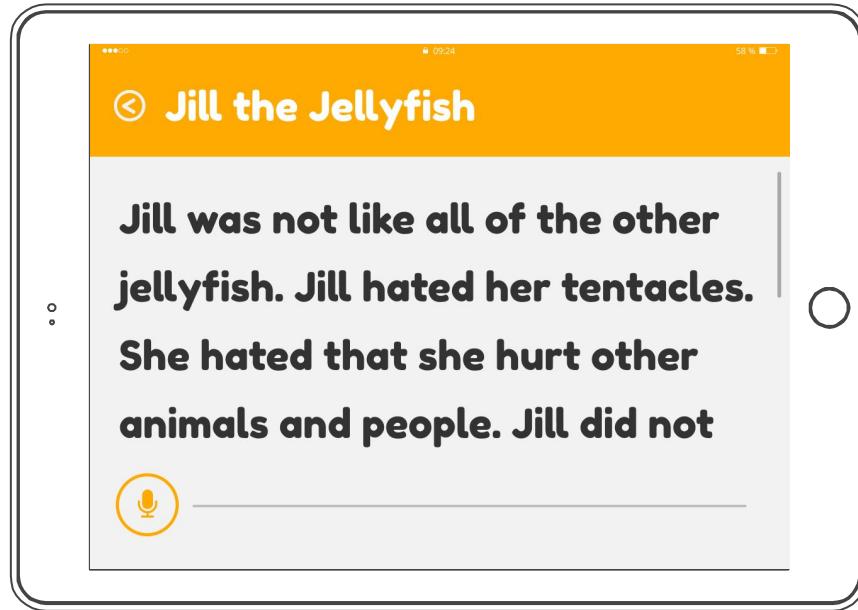


*Student views assigned readings and number of readings to complete.*



# Task 1

Monitor reading progress  
remotely

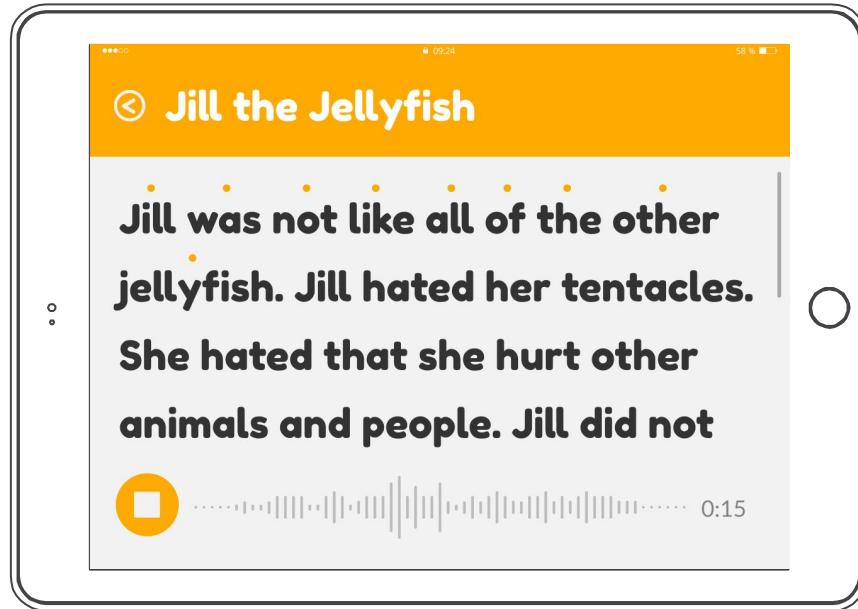


*Student selects a reading to complete.*



# Task 1

Monitor reading progress  
remotely



*Student hits record and begins to read aloud.*



# Task 1

Monitor reading progress  
remotely



*Student has the option to submit or redo reading once they have finished.*



# Task 1

Monitor reading progress  
remotely

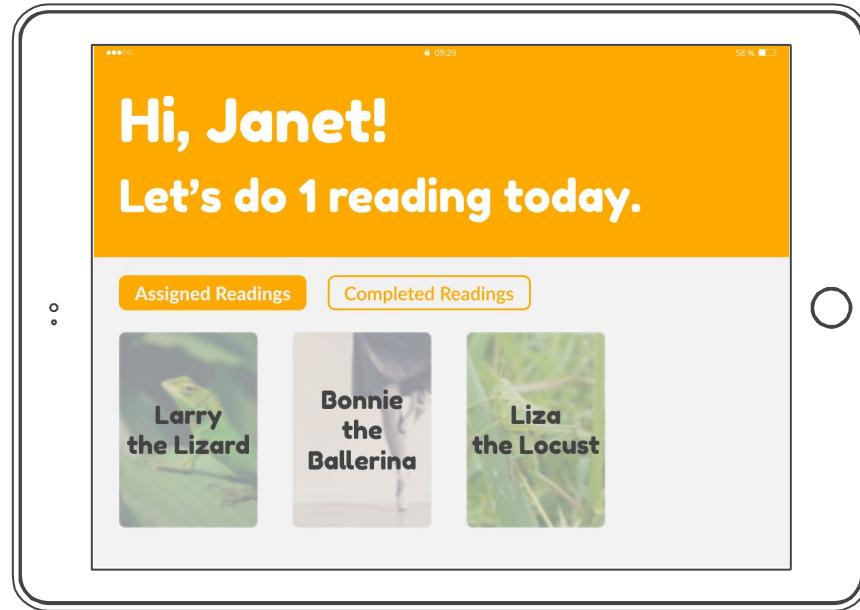


*Student confirms their submission.*



# Task 1

Monitor reading progress  
remotely

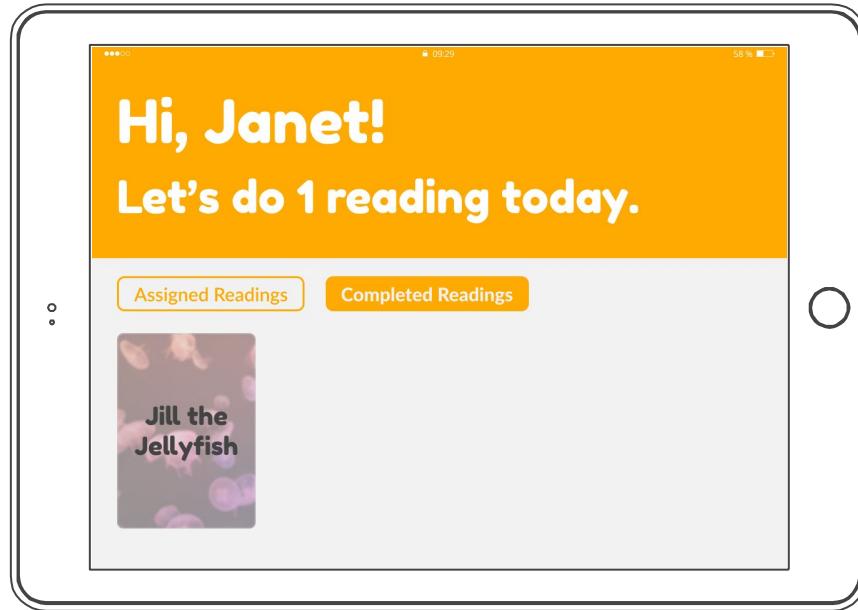


*Student views updated assigned readings and  
number of readings to complete.*



# Task 1

Monitor reading progress  
remotely



*Student views updated completed readings.*



# Task 1

Monitor reading progress  
remotely

The LearnAble software interface on a tablet screen displays two classes of students: Class A and Class B. Each class has a list of students with their names, levels (B or C), and reading progress details.

**Class A Students:**

- Janet Aines (Level B): 5 readings in progress, Completed 5 readings since last login
- Billy Boxer (Level A): 1 readings in progress, Completed 9 readings since last login
- Stacey Caine (Level A): 3 readings in progress, Completed 0 readings since last login
- John Edwards (Level C): 2 readings in progress, Completed 6 readings since last login
- Alice Hope (Level B): 0 readings in progress, Completed 7 readings since last login
- Grace Kale (Level C): 1 readings in progress, Completed 2 readings since last login

**Class B Students:**

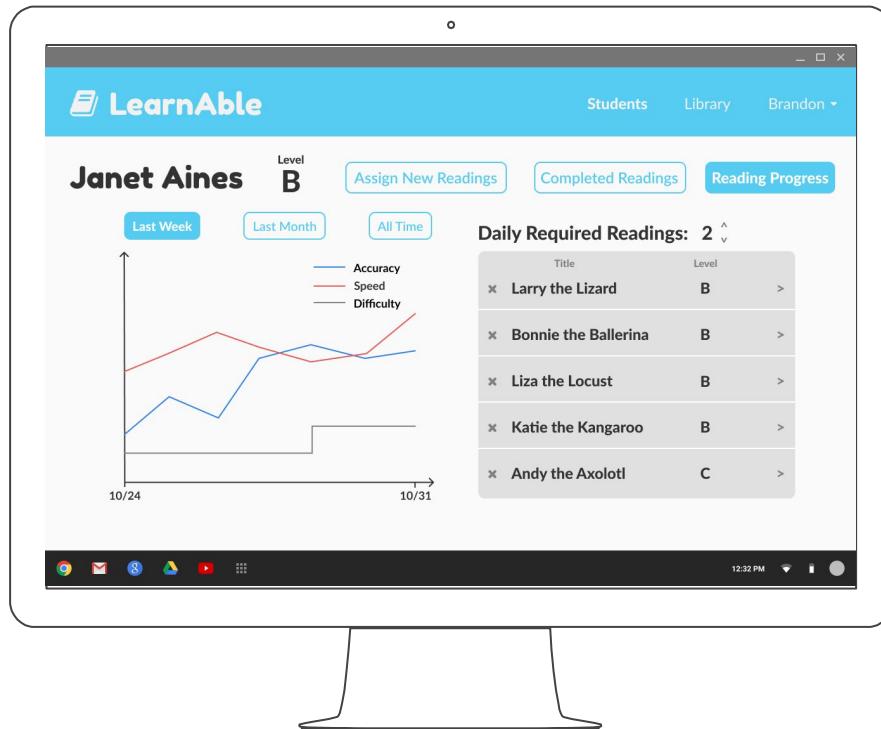
- Alice Bones (Level B): 5 readings in progress, Completed 3 readings since last login
- Katie Cowell (Level A): 1 readings in progress, Completed 9 readings since last login
- Steve Lee (Level A): 3 readings in progress, Completed 1 readings since last login
- Erin Lozenge (Level C): 2 readings in progress, Completed 6 readings since last login
- Lila Mcdonald (Level B): 0 readings in progress, Completed 7 readings since last login
- Kendall Young (Level C): 1 readings in progress, Completed 2 readings since last login

*Teacher views list of students and their reading information, organized into classes.*



# Task 1

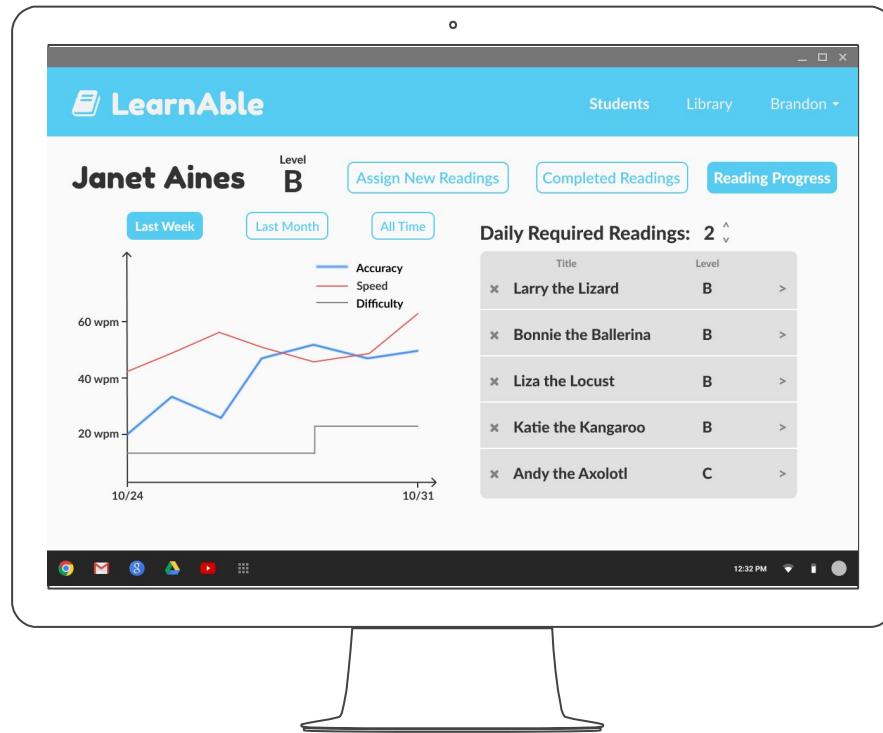
Monitor reading progress  
remotely



*Teacher selects an individual student to view their reading progress and current readings.*

# Task 1

Monitor reading progress  
remotely

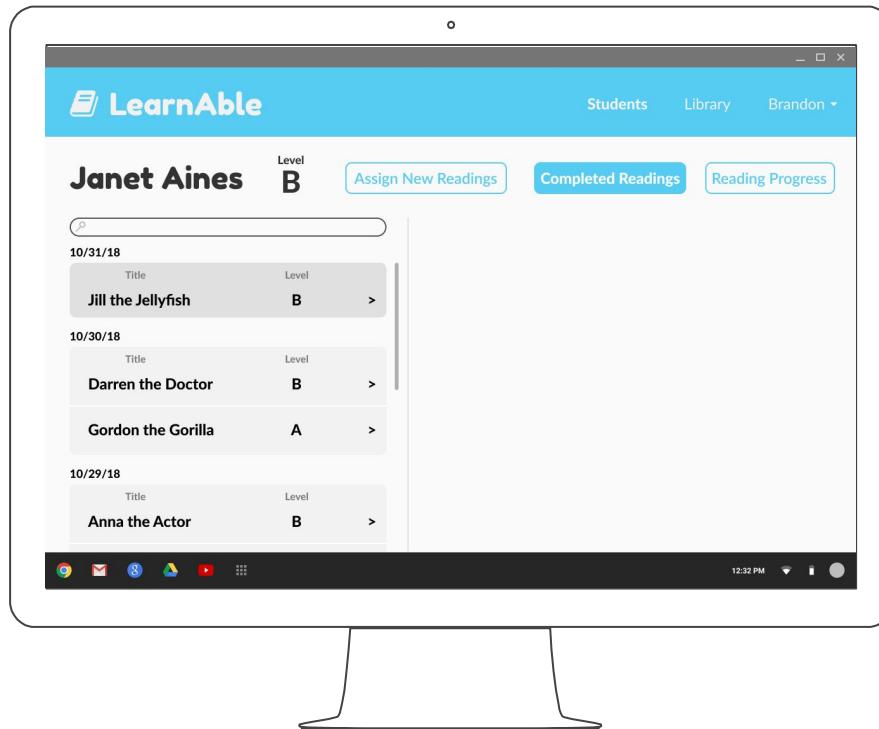


*Teacher hovers over "accuracy" plot to view specifics.*



# Task 1

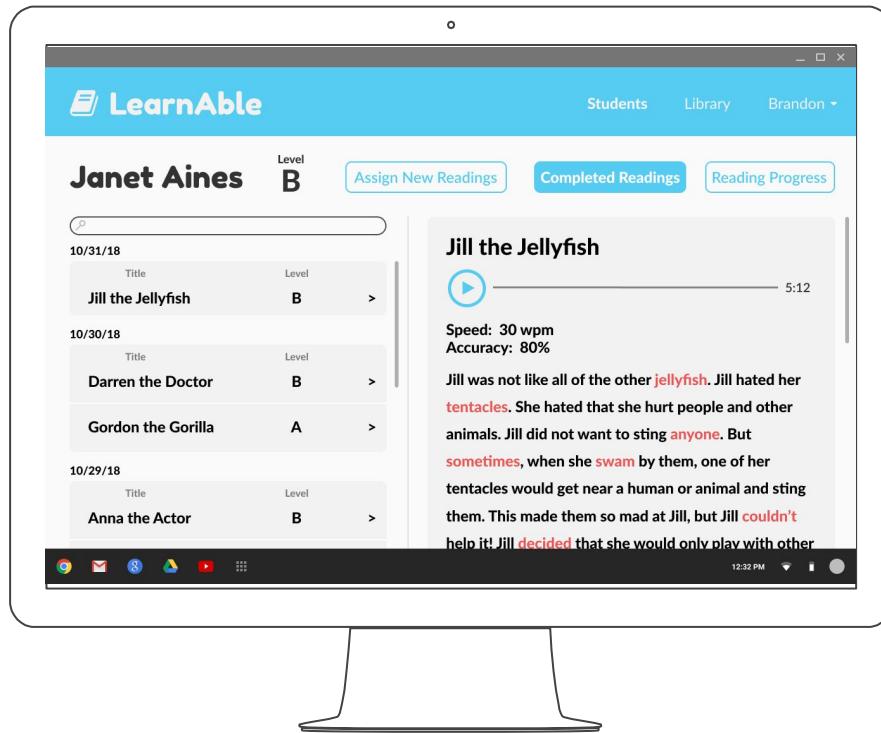
Monitor reading progress  
remotely



*Teacher views a list of the student's past completed readings.*

# Task 1

Monitor reading progress  
remotely



*Teacher selects a completed reading to view in detail. Highlighted words denote inaccurate reading.*



# Task 1

Monitor reading progress  
remotely

The LearnAble software interface is displayed on a computer monitor. The top navigation bar includes 'LearnAble', 'Students' (with 'Brandon'), 'Library', and 'Completed Readings' buttons. The main area shows a list of student readings for Janet Aines, categorized by date:

- 10/31/18: Jill the Jellyfish (Level B)
- 10/30/18: Darren the Doctor (Level B)
- 10/29/18: Gordon the Gorilla (Level A)
- 10/29/18: Anna the Actor (Level B)

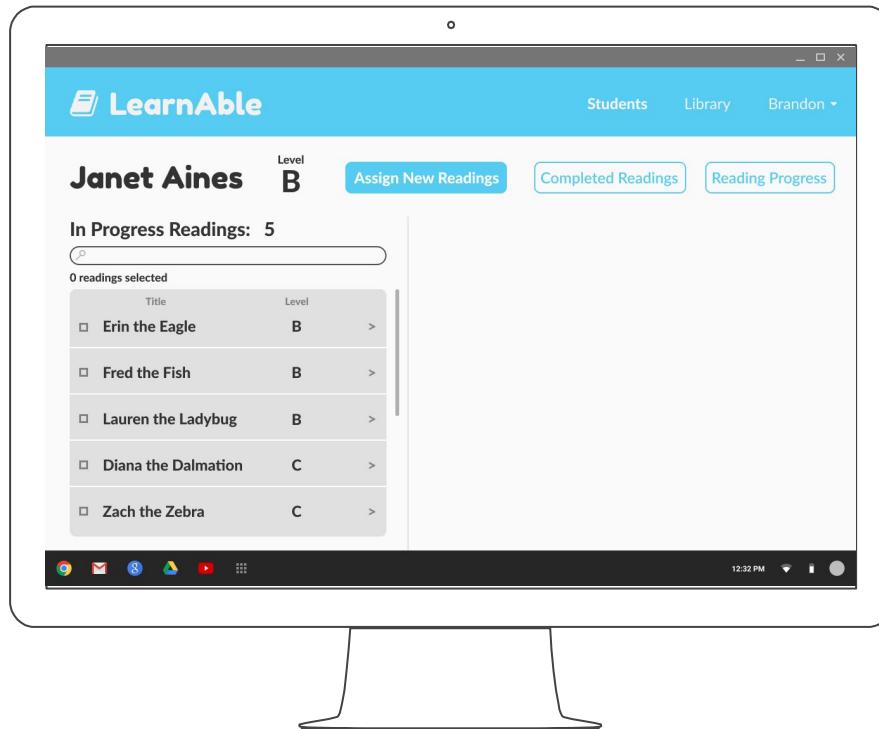
On the right side, a detailed view of the 'Jill the Jellyfish' reading is shown. It includes:

- A recording player showing 0:15 of a 5:12 recording.
- Text: "Jill was not like all of the other **jellyfish**. Jill hated her **tentacles**. She hated that she hurt people and other animals. Jill did not want to sting **anyone**. But **sometimes**, when she **swam** by them, one of her tentacles would get near a human or animal and sting them. This made them so mad at Jill, but Jill **couldn't** help it. Jill **decided** that she would only play with other..."
- Statistics: Speed: 30 wpm, Accuracy: 80%

*Teacher listens to student's recorded audio.*

# Task 2

Assign readings  
personalized to the  
student

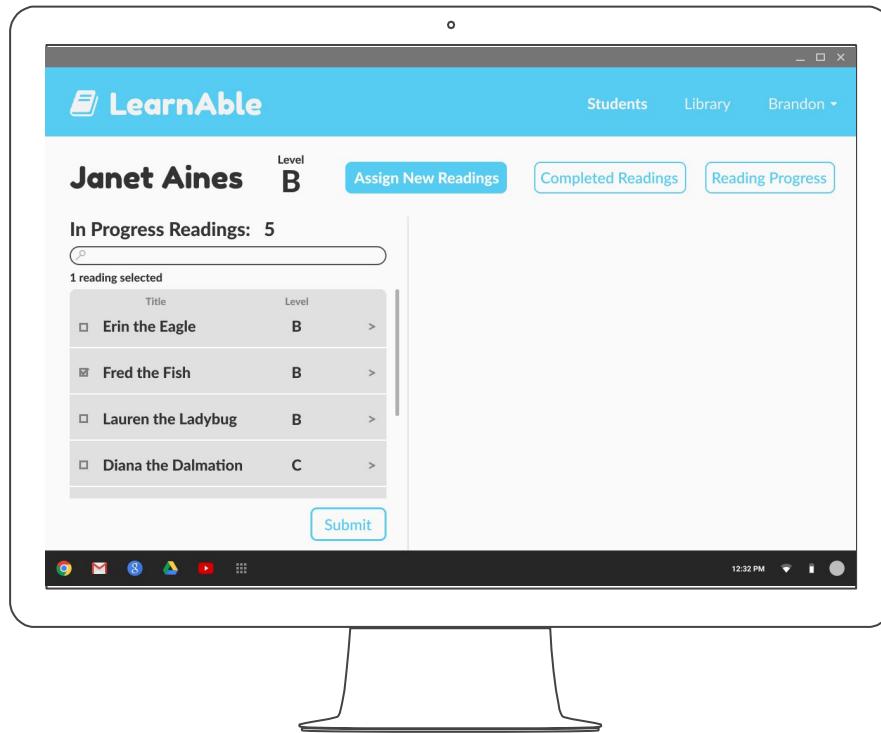


*Teacher views list of readings that match student's  
reading level & interests.*



# Task 2

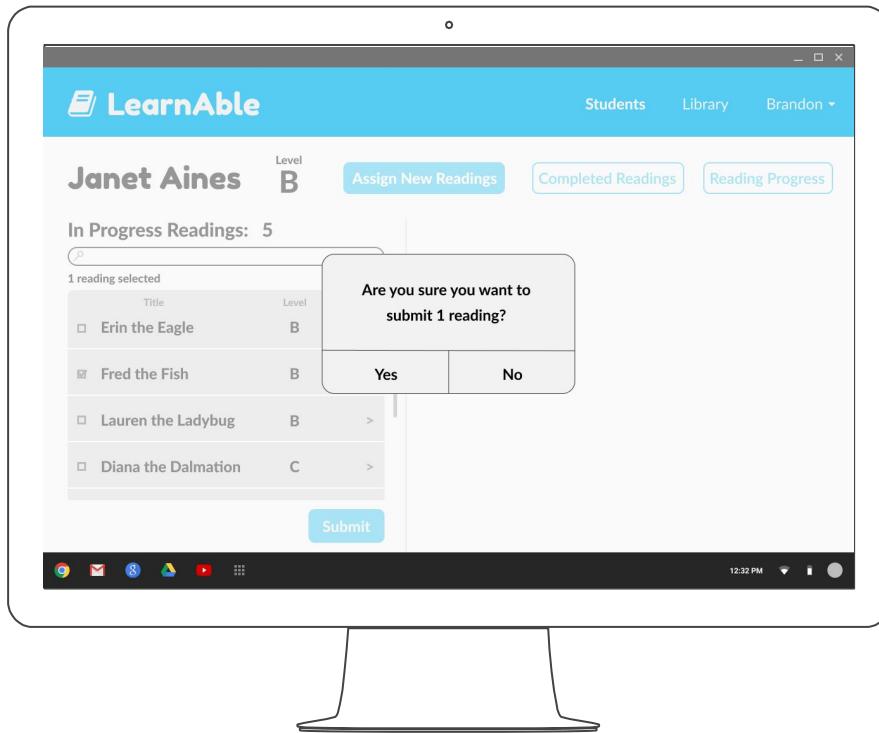
Assign readings  
personalized to the  
student



*Teacher selects reading and submits to student.*

# Task 2

Assign readings  
personalized to the  
student

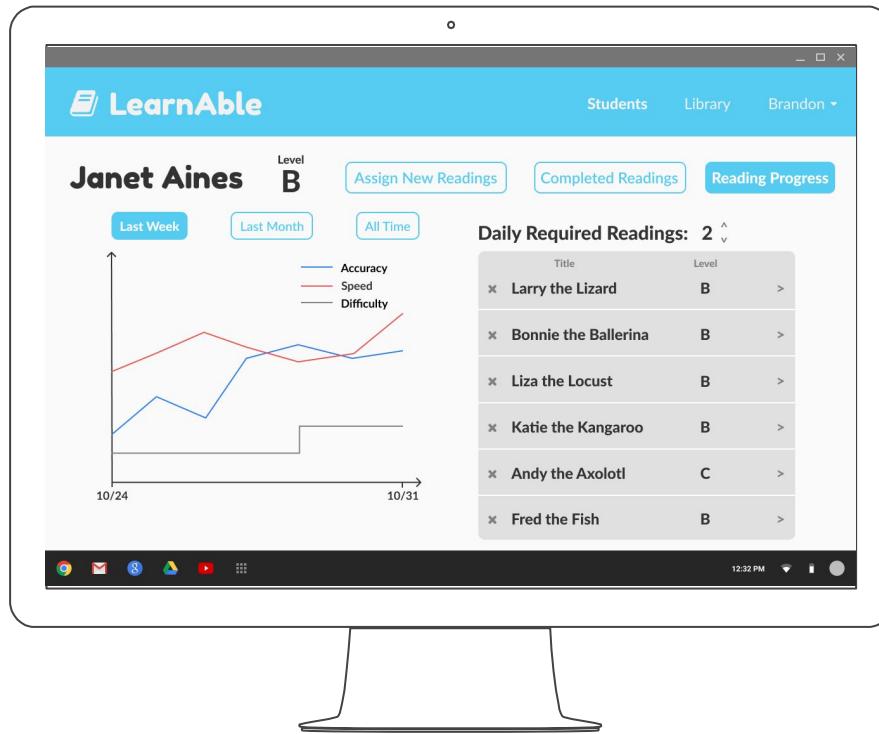


*Teacher confirms their submission.*



# Task 2

Assign readings  
personalized to the  
student



*Teacher views updated list of current readings.*





# Summary

- **Narrowing & clarifying** our problem and tasks produces better solutions
- Heuristic evaluations and usability tests each have their **advantages** and **disadvantages**
  - Both are crucial to **improving** the design



# Thanks!

Any questions?