2Sigma School

e-learning Platform • Case Study

PHASE 1

Discovery

Introduction

Problem Statement

Personas

Goals

Use Cases

Market Research

Introduction

Data Driven Experience

Data-Driven Personalisation Experiences For Students And Teachers

IA/NL/ML Integration

Prominent Integration Of **AI And NL** Technologies

Adaptive E-Textbook

Adaptive, Instructional, Interactive **E-Textbook Platform For Enhanced Student Learning Experience**

Transform Education

Aims To **Transform Education By Tailoring Learning Experiences** And Improving Teaching Practices.

Mastery Based Learning

Support **Mastery Based Learning** And Helps The Users To Monitor There Performance

Personas → Problem Statement

Gurpreet (23 y.o)

CSC 8th Grade

NYC

Application POV

How can we foster learning computer science (or any other subject) in a highly adaptive, instructional, interactive **E-Textbook** platform that can **increase student engagement**, Provide **personalised** tasks and activities to motivate them, based on students performance like what they have already mastered and what they need to put more focus on

Students

Teachers

Personas → Problem Statement

Teachers

Application POV

Help teachers to **keep track** of student **progress** and **manage & organise** classes , plus also help them to **assign** students with **insightful** reviews/tasks/activities to **help them master** the Unit/sub-unit

- **Name**: Ms. Sarah Adams (39 y.o)
- **Background**: Experienced educator with a master's degree in Educational Technology, teaching for eight years in a New York City middle school.
- **Teaching Style:** Emphasizes **hands-on, interactive learning**. Encourages exploration beyond the curriculum, providing additional resources and challenging coding projects. Promotes group activities to foster teamwork and problem-solving skills.

Key-words cloud

Interactive Textbook

Engagement

Confidence

Tasks & Activities

Navigate

AI Integration

Personalisation

Motivate

Adaptive

Analysing

Learning & Struggles

Performance

Instructions

Status indication

Key-word

Interactive Textbook

Confidence

Task

AI Integrati

Adaptive

Analy

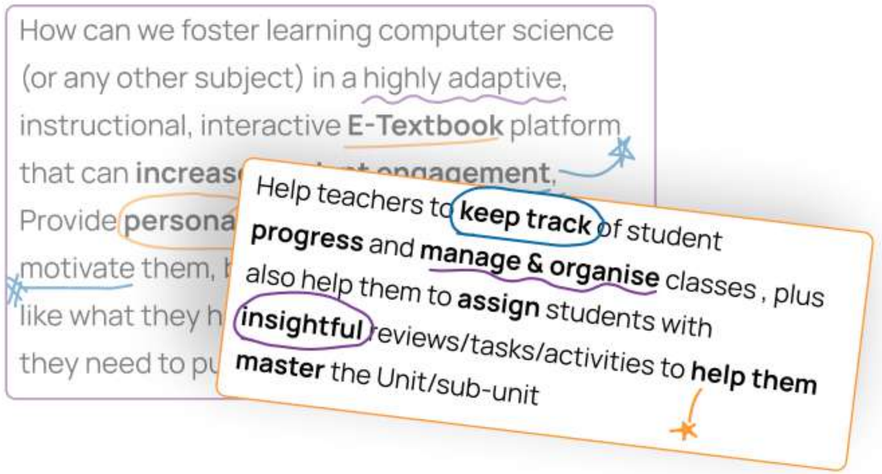
Learning & S

Instructions

Status indication

How do we derive this cloud?

In this Word cloud, we gathered all the key works and highlighted them according to their priority in the **Problem Statement.** This gives us a **better understanding** of the importance of each work and how they contribute to the overall solution. We can also use it to identify **potential areas of focus.**



Goals

for student

- Curriculum Topic Flexibility
- Tailored Tasks and Activities
- Practice Assignments
- Curriculum Status Tracking
- Progress Monitoring
- Constructive Remarks

Design Should Focus on

- Adaptive layout
- Scalable and futuristic
- Personalisation of system
- Easy Workflow
- Content bucketing
- Intuitive interface.

Goals

for Teachers

- Analytical Overview
- Student Engagement and Performance
- Assignment and Task Management
- Ability to add new tasks
- Badge Assignment and motivate Students
- Progress Stats & Task Review

Design Should Focus on

- Clear Data Visualisation
- Quick & Easy AI Driven Flow
- Scalable
- Balanced

Market Research Key Take-aways

for student

Upfront Progress bar for better visualisation	Unit information - Name and Description	Clear Information About the duration, Number of Modules/Sub units and other information	Approx. time to complete Unit
Number of items completed and the total progress of the unit	Milestones Marked in our case we can have different tasks Marked on the Progress bar	Reward system	Index for better visualization
Screen Segregation Index, Content, Activities	Previous and Next button with Progress bar	Icon to Collapse	Collapsable menu Icon

Market Research Key Take-aways

for Teachers

Unit information - Name and Description	Adding Rubric for a problem	Upfront Progress bar for better visualisation
AI integrations and Text to prompt Implementation	Number of items completed and the total progress of the unit	Data driven Design
Visualisation of grade book	Assessment of Activities that matches the user's mental model	Clean and Easy flow

PHASE 2

Define

Structuring

Modules

Flow

Priority Matrices

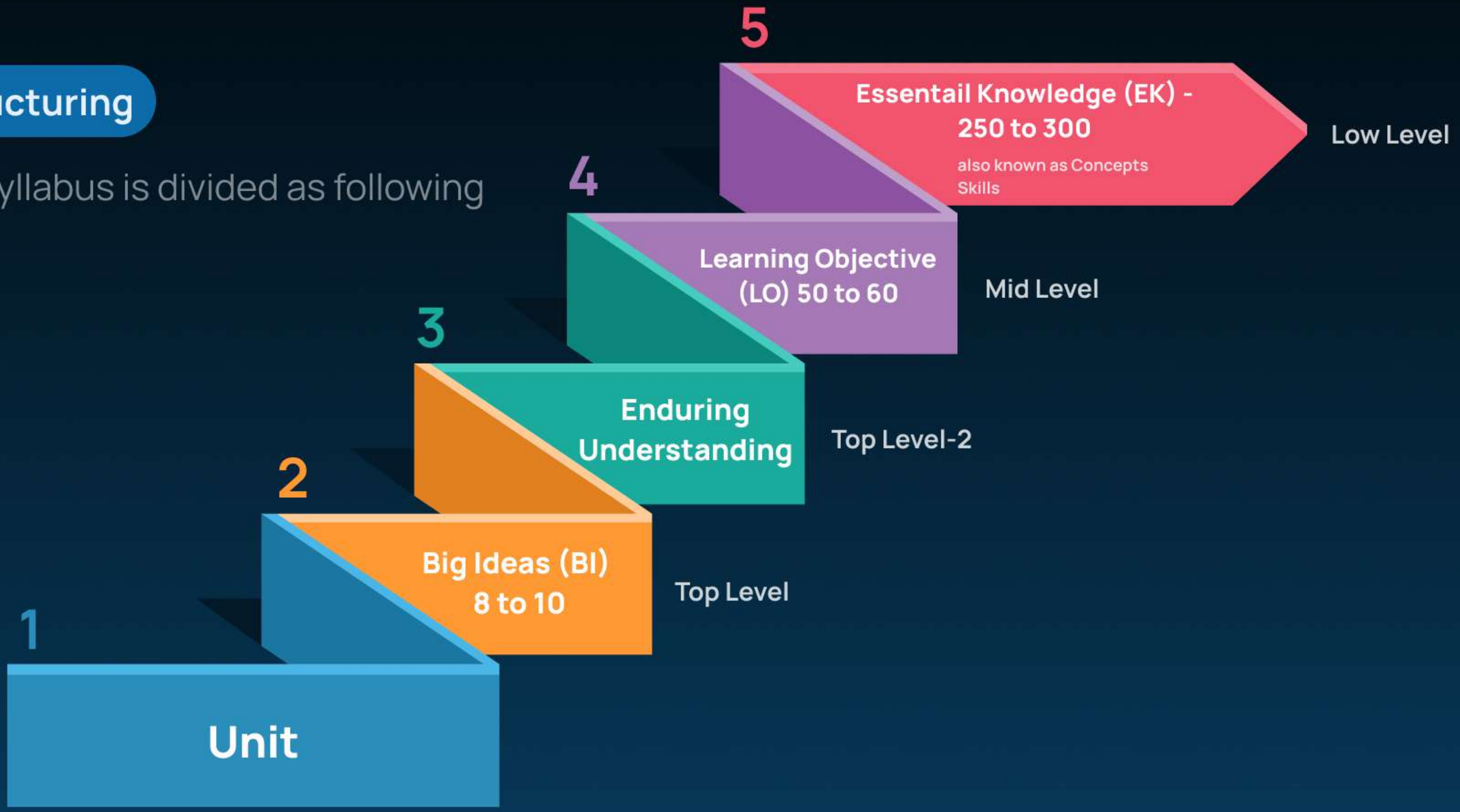
Use Cases

User Journey

Feature List

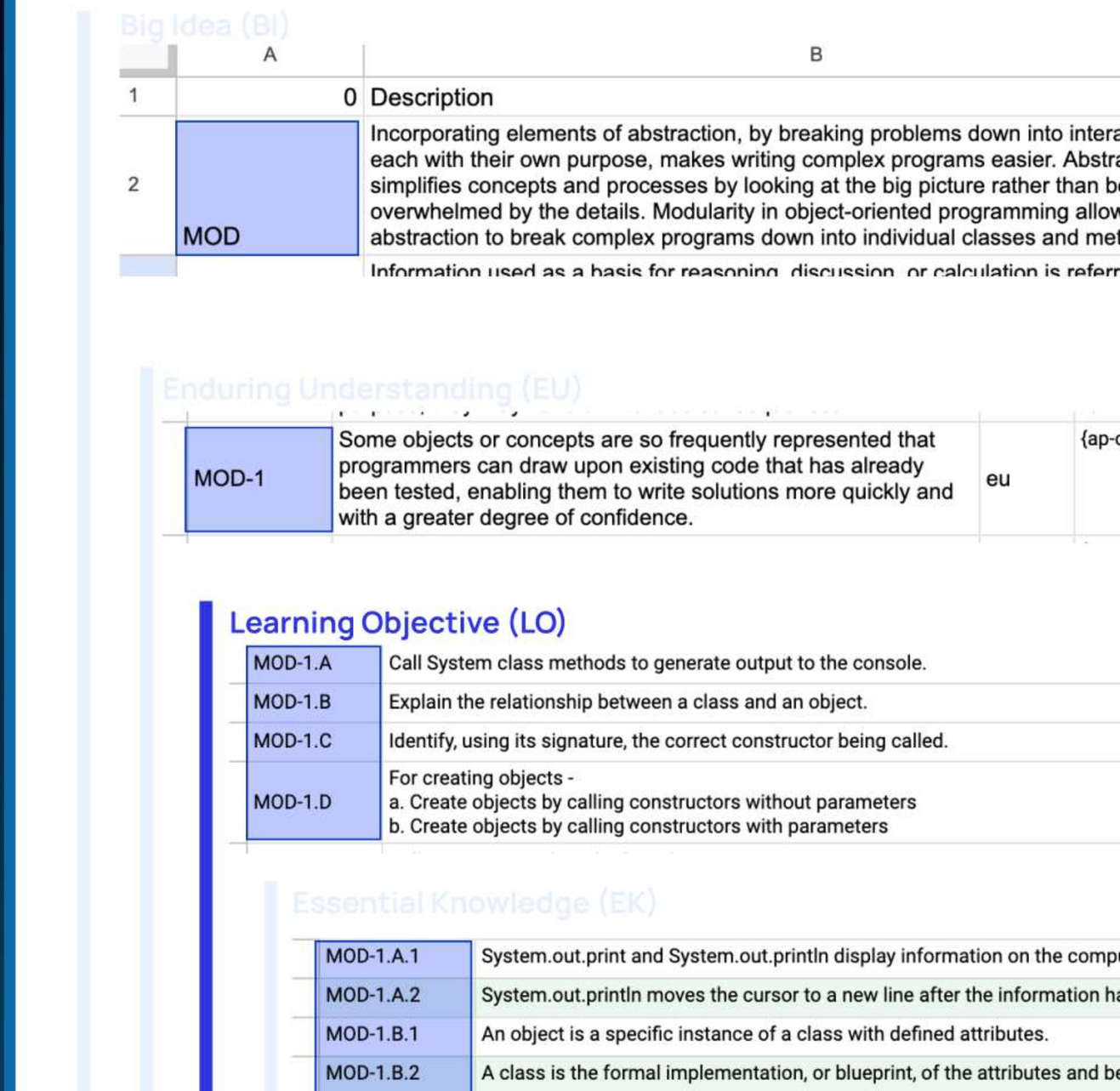
Structuring

Our Syllabus is divided as following



So for Example :

1. Big Ideas are like the man topics or you can say Chapter with in a Unit.
2. Enduring Understanding or the EU are like the Topics with in the chapters
3. Learning Objects are the Sub-topics within those topics
4. Last but not the least we have Essential Knowledge , these are the Skills that the Users will get from those Topics or subtopics



Modules Defined

for student

- Analytical Overview
- Focus mode
- E-Textbook Detail page
- Your Board (personalisation)
- Task page

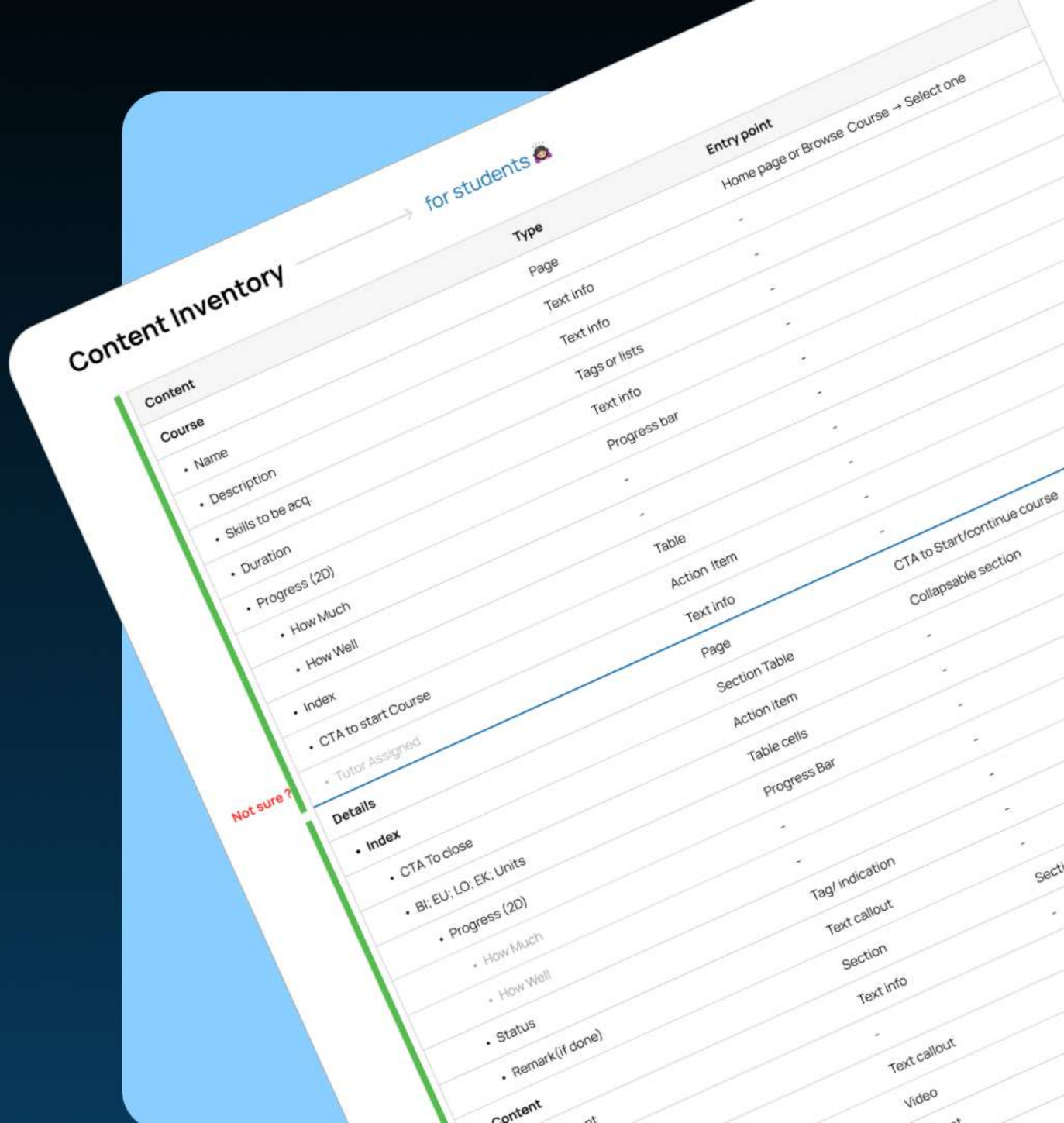
Modules Defined

for teacher

Incorporate the Suggestions	Data Visualisation	Hierarchy vise data division
Time based Student Progress	Easy visualisation of the syllabus	Mastery of topics

Now based on this we created our content Inventory

This content inventory works as a buliding blocks for our workflow



Stage 1

User clicks on a course/ e-textbook and enters the detail page

Stage 2

Analyse the progress,

- See where he/she stands in his/her class/study group
- View the Action items for today
- View skills to be achieved in that particular section

Stage 3

Analyse his/her Board (Personalised board)

- Daily Progress
- Skills mastered vs not yet mastered
- Badges
- Study group etc.

This Section plays an Secondary role in this experience

User Journey

For Student

Stage 4

Goes to the Actual Content -

- Put the content in a focus mode if need
- Goes through the text, examples etc type of content

Stage 5

Attempt Tasks and Activity associated with the unit/ subunit

Stage 6

Task/ Activity Result

- If pass - show time spent, accuracy
  - Show Explanation
  - Up-next
  - Suggest another task
- If Fail - show time spent, accuracy
  - Show Skills that the user needs to focus more on
  - Explanation
  - Suggest task

Stage 7

User performs Suggested tasks or activity and Proceed to next item

User Journey

For Student

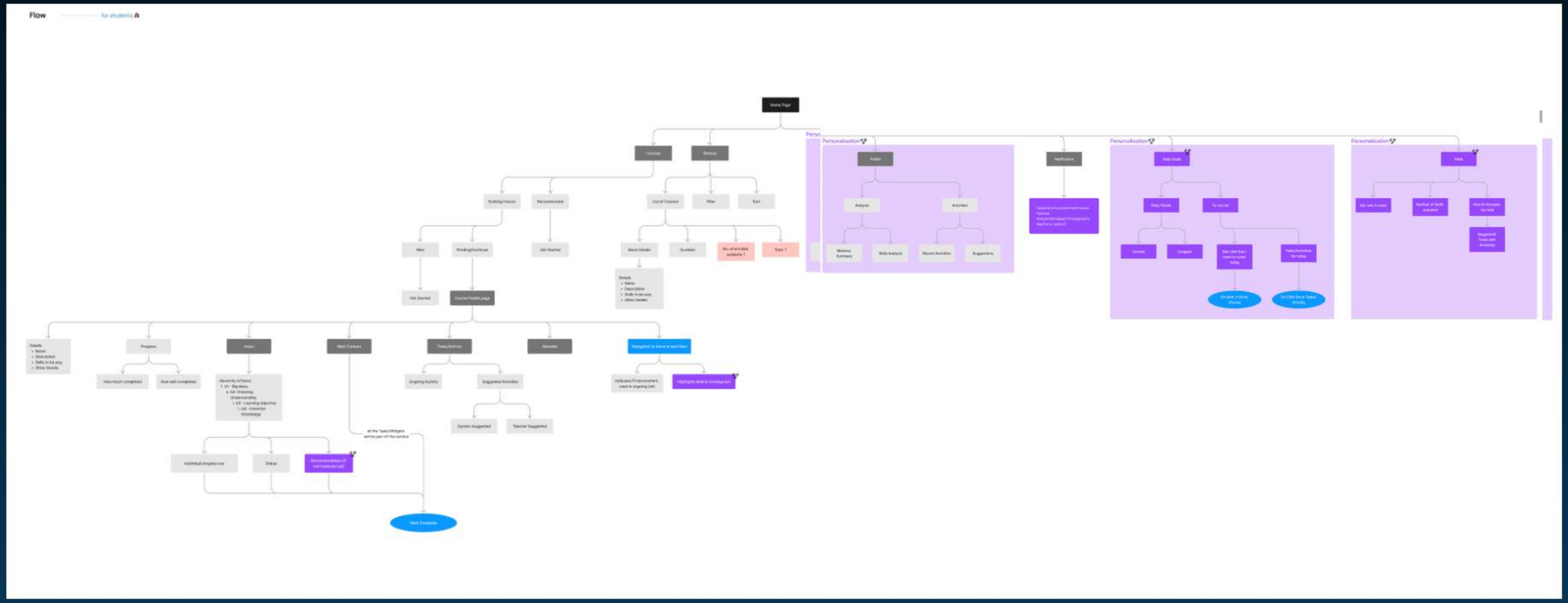
Stage 8

Review & Done all the Content and Tasks

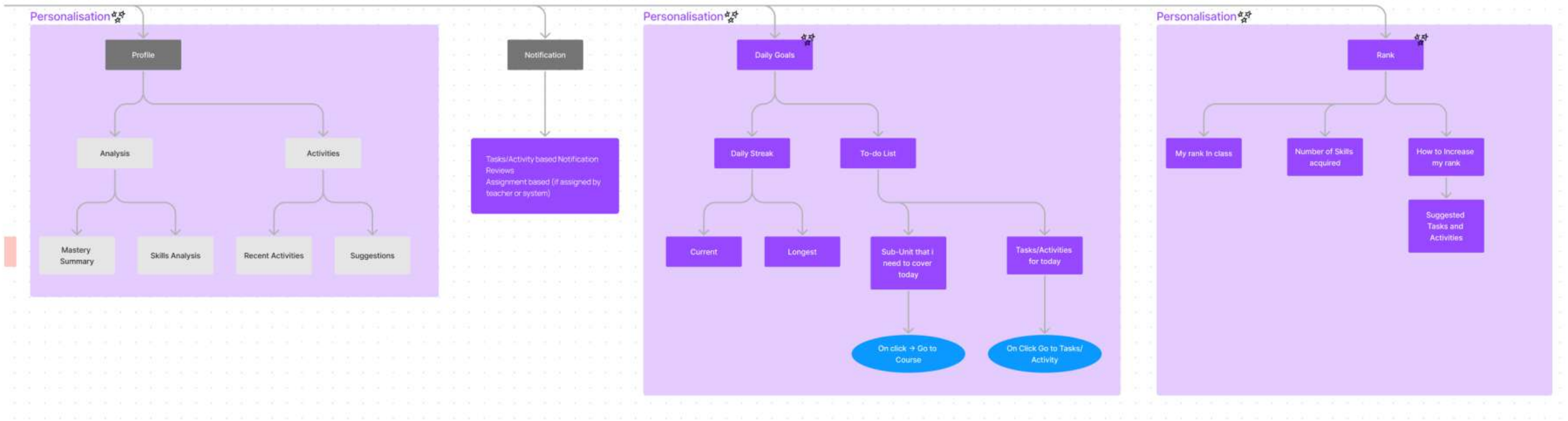
- Check Progress and Review Skills Achieved

Once everything is done proceed to next Unit ->

User Flow aka IA



i.e Artificial Intelligence/ Machine Learning Magic



Stage 1

Entry Point: Clicks on “Create or Add Activity”

Stage 2

User selects the Type of task

- Activity
- Test
- Homework
- Capstone

Add the Goal and the estimated time

Goal will be Contextual to type of task selected

Stage 3

once the base information is done then the user will lead to adding topics

- Units
- Subunits
- Learning objective
- and Skills

and simentansly add difficulty and estimated time

Stage 4

Once everything is added now the AI will recommend a bunch of activities from which the user can select and add onto the actual activity panel

can also add variations for an individual question, with the help of AI

User Journey

For Teacher

Stage 5

Now the user will add basic details like

- Set Time and date
- activity parameters

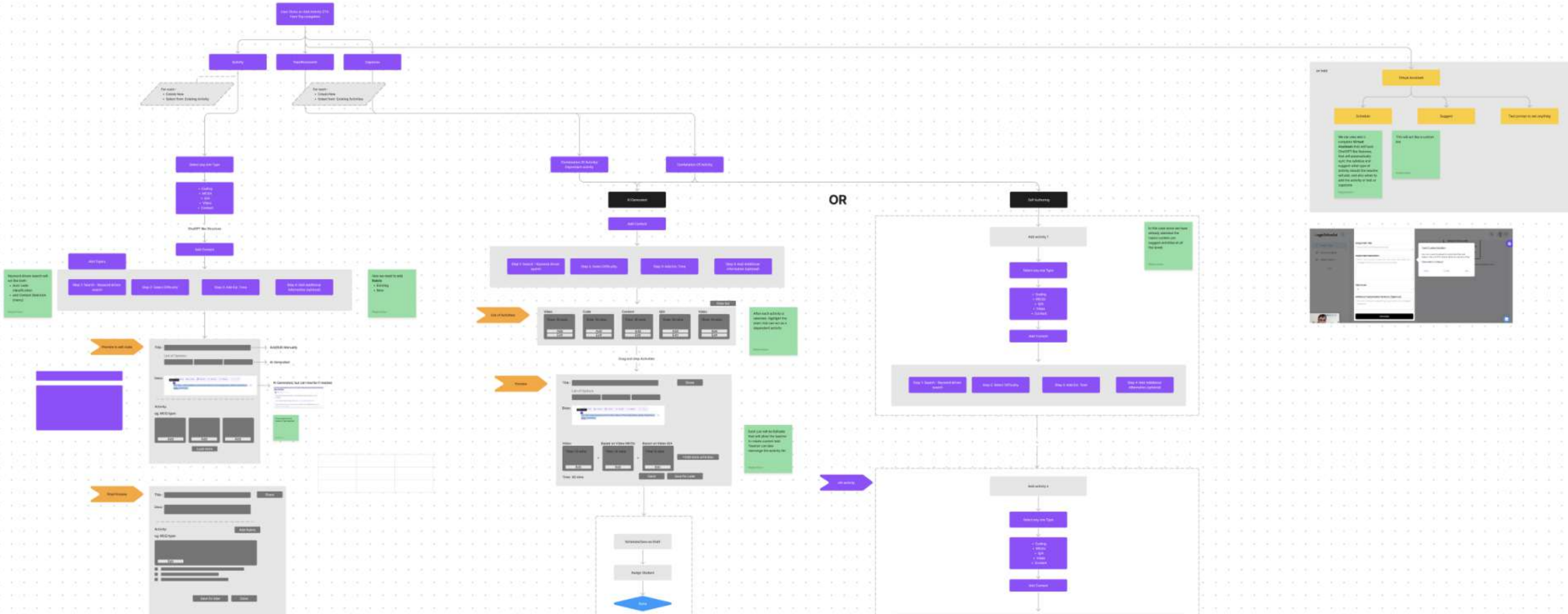
User Journey

For Teacher

Stage 6

Assign it to students and DONE

User Flow aka IA



PHASE 3

Ideate

Initial Iterations

Research

Data Visualisation

Assembling the Wires based on Flows

We started with the Student Dashboard - **Detail page view** and the Feature list based on initial research was set as

Primary

- Personalise Assignment (if lacking)
- Skills Acquired
- Gamification
- peer to peer learning experience
- Awards and Badges
- beginner to expert levels (easy med hard)
- Daily goals - pacing
- AI Study Buddy - progress assessment in NL - Optional

Secondary

- Student interest topics - sports, fashion etc. ->Examples contextual to interests - optional
- Suggest (not part of main syllabus , optional)

We started with the Student Da
and the Feature list based on the

Primary

- Personalise Assignment (if lacking)
- Skills Acquired
- Gamification
- peer to peer learning experience
- Awards and Badges
- beginner to expert levels (easy med hard)
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Why E-Textbook Detail first?

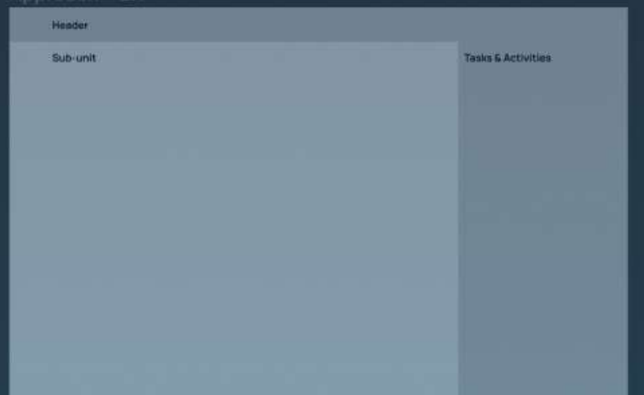
The detail pages for e-textbooks are at the bottom of the hierarchy, **with maximum complexity**, which gave us a **broader perspective** of the project since we were just getting started. The detail pages were an essential step in understanding the project's scope. They also **allowed us to identify potential issues early on in the project lifecycle**, allowing us to make necessary adjustments. This allowed us to create a more **efficient workflow.**

1. Iterated Based on structure

Student E-Textbook Detail page

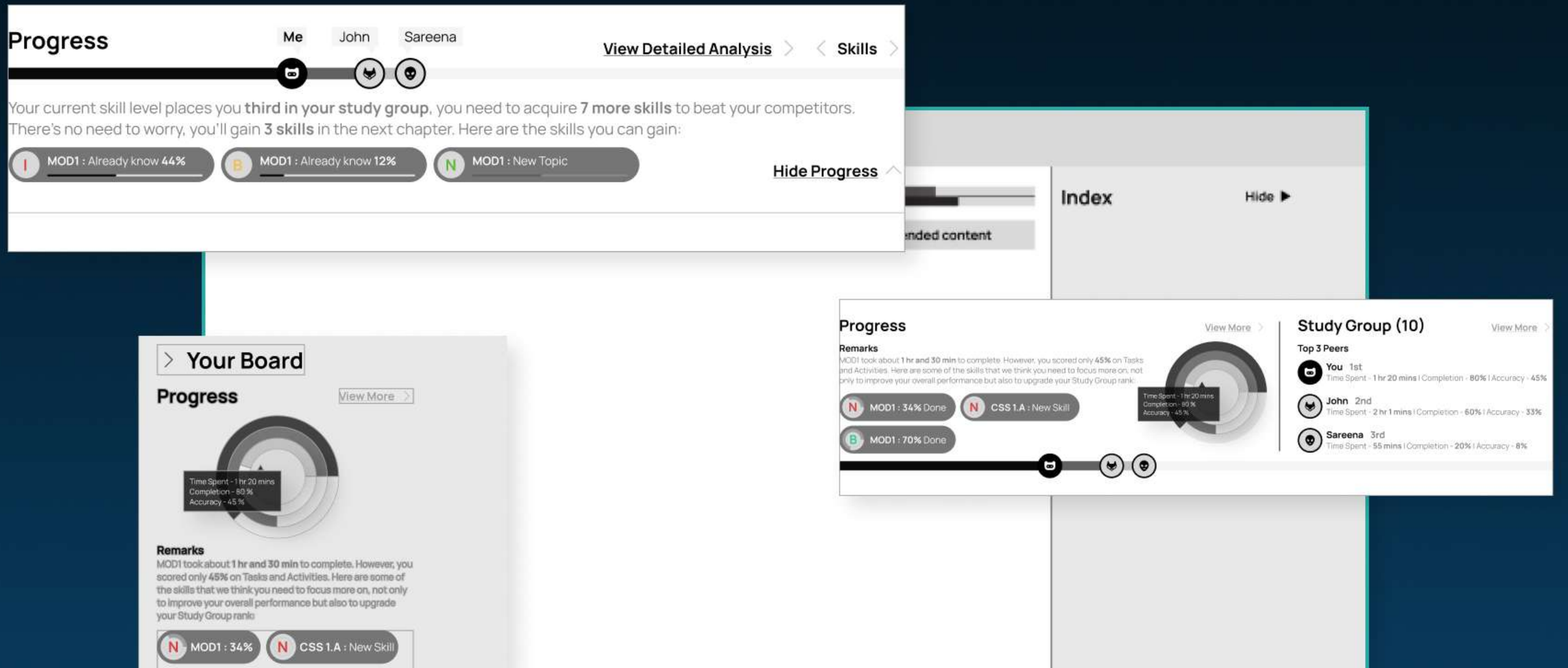
Approach - 3

Approach - 2.1

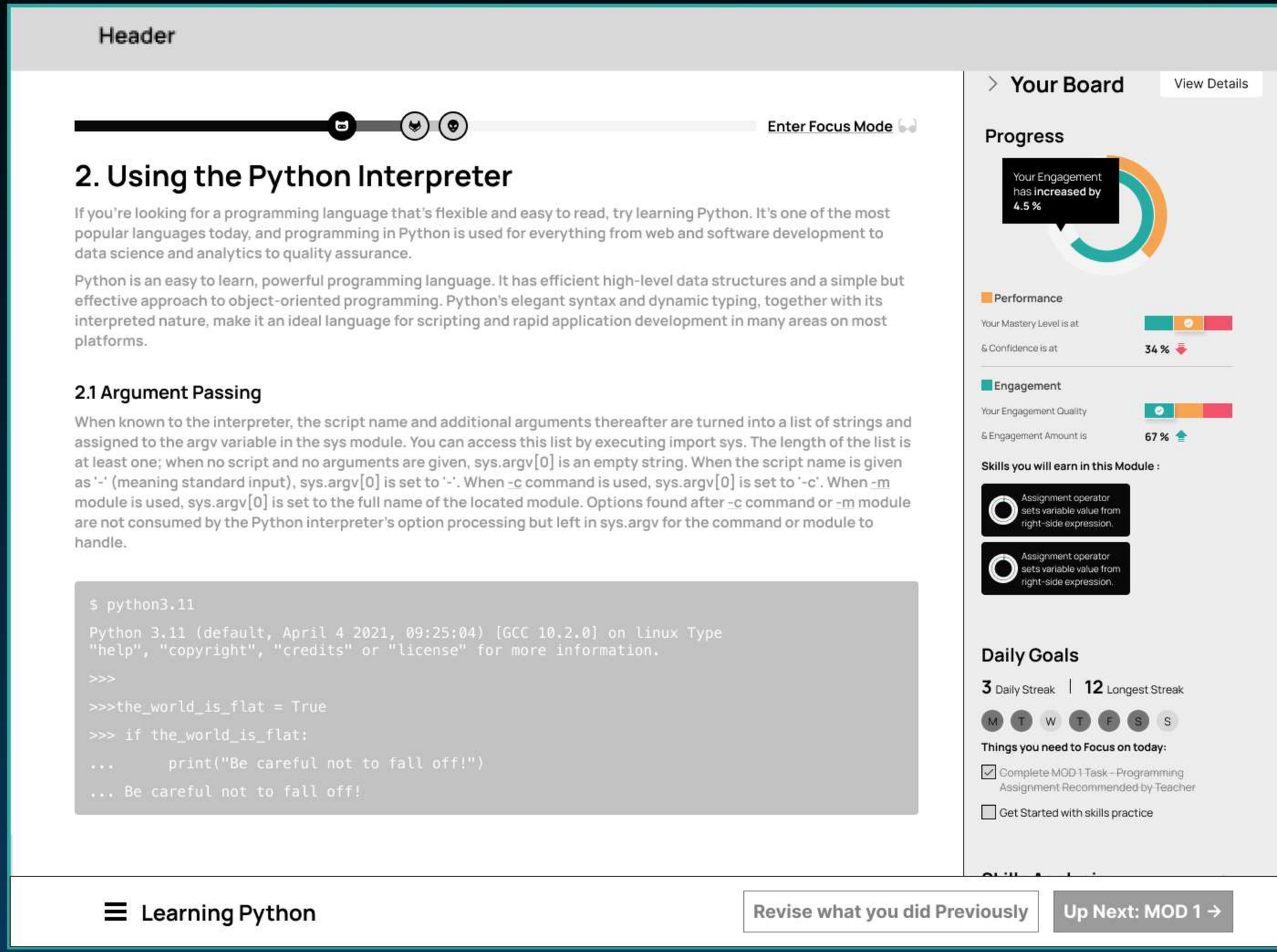


2. Started with the actual content and the elements that will come under each

Student E-Textbook Detail page



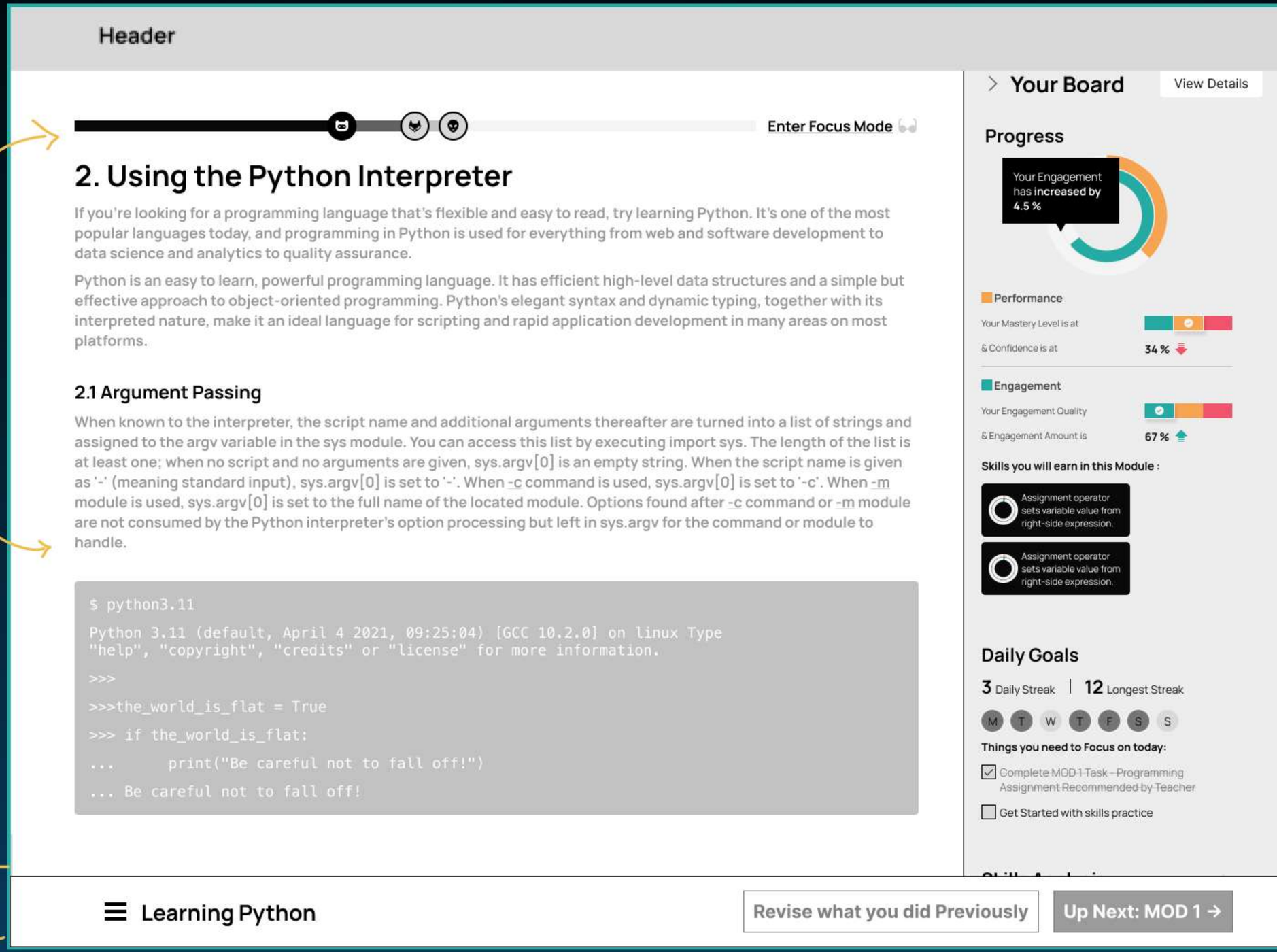
3. For each element we did a lot of iterations and landed onto this screen

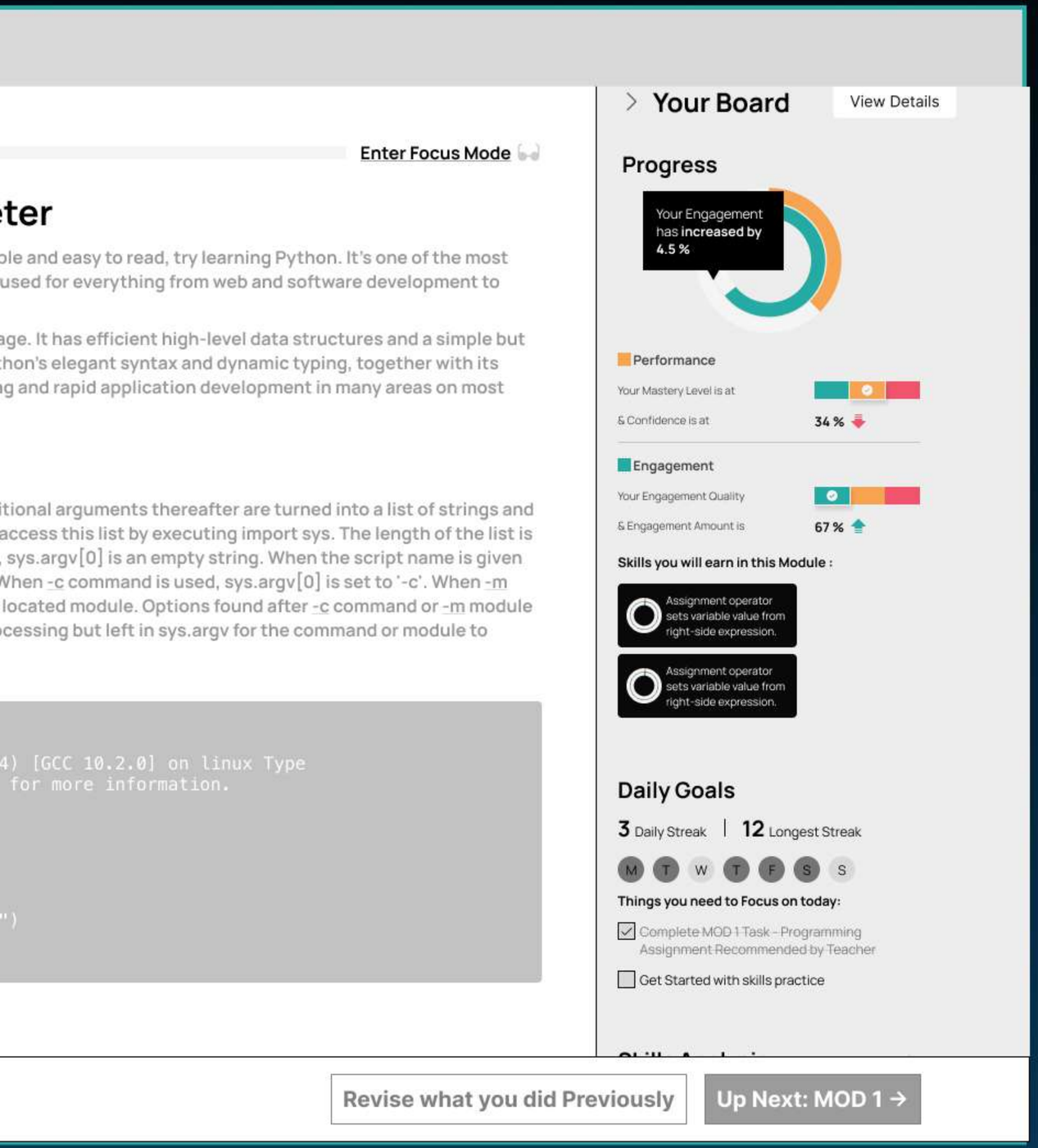


On top we have **comparison** window where we show My progress vs class or study group progress

Then here is the **actual content** of the course, we have interactive elements in built in this content area

And on the bottom we are showing the **Main course content** entry point, history, and upcoming CTA's





Student E-Textbook Detail page

This is where we are showing the power of AI/ML.
This board will act like a **personalised board** for the student to view there own **progress** vs the class, also view **struggles and strengths**.
Plus the daily goals etc are also added to bring in the aspect of **gamification**

Student Analysis Page

Once done with the E-Textbook detail page, we went up in the hierarchy to **Analysis and Overall Textbook wireframes**

Student Analysis Page

Our project involved studying data visualisation and iterating concepts for a Birds-eye view of e-textbooks, since numeric data was prevalent on the analysis page

Visualisation for :

Syllabus
Overview Hierarchy Visualisation

Performance & Confidence
Progression Chart

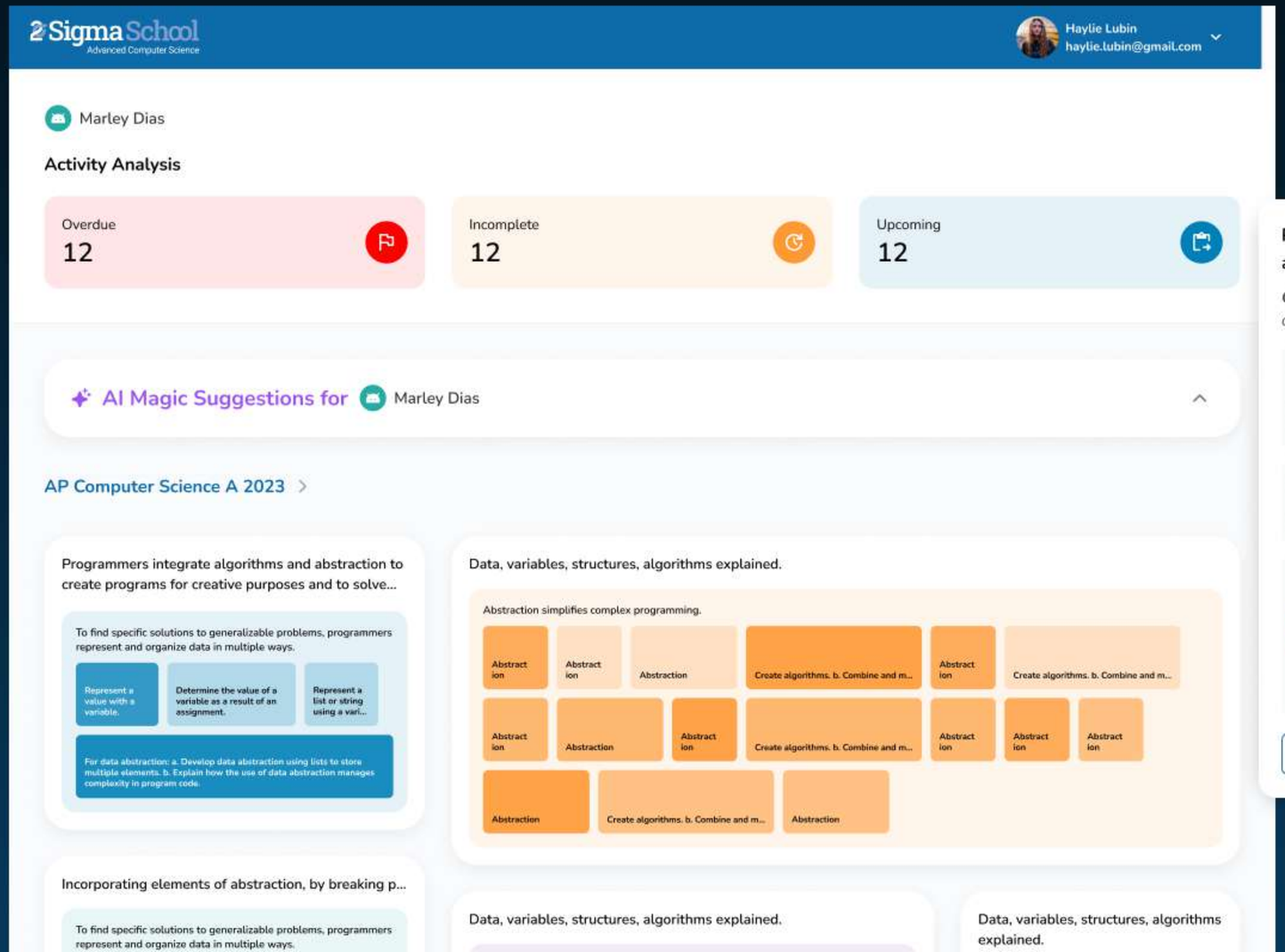
Mastery Over Time
Progression Chart

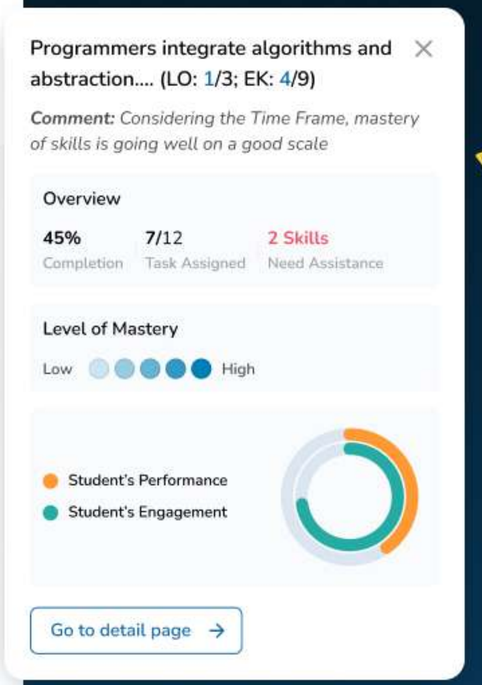
Engagement Quality
Progression Chart

Activity Progress
Progression Chart

Here are few UI outcome of Different Dashboards

Student Analysis Page





On hover on tree map this is what the user will see

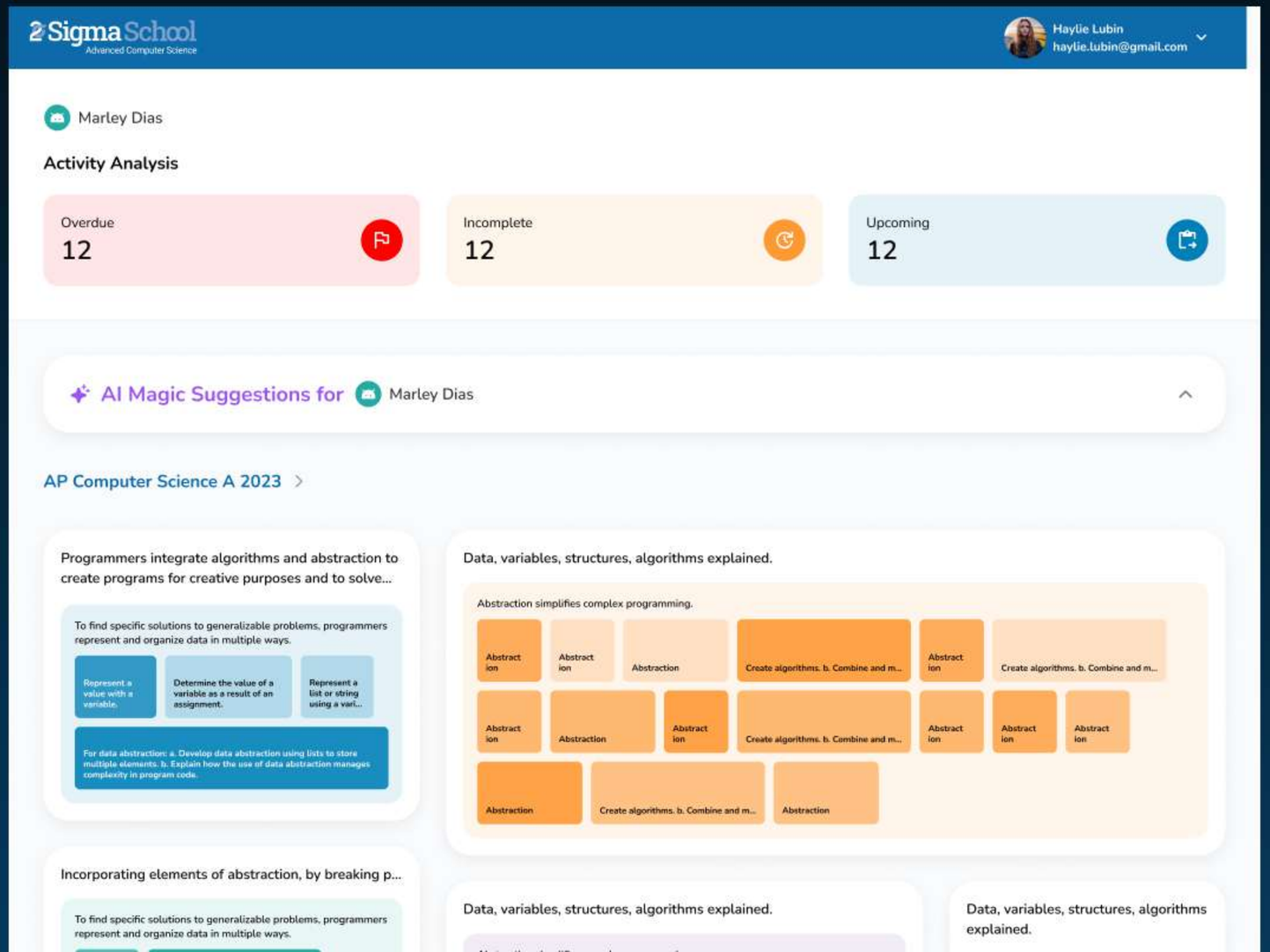
Currently this is were we are at

Student Analysis Page

On Top we can see the overview analysis of students, Mostly based on the Activity Performance

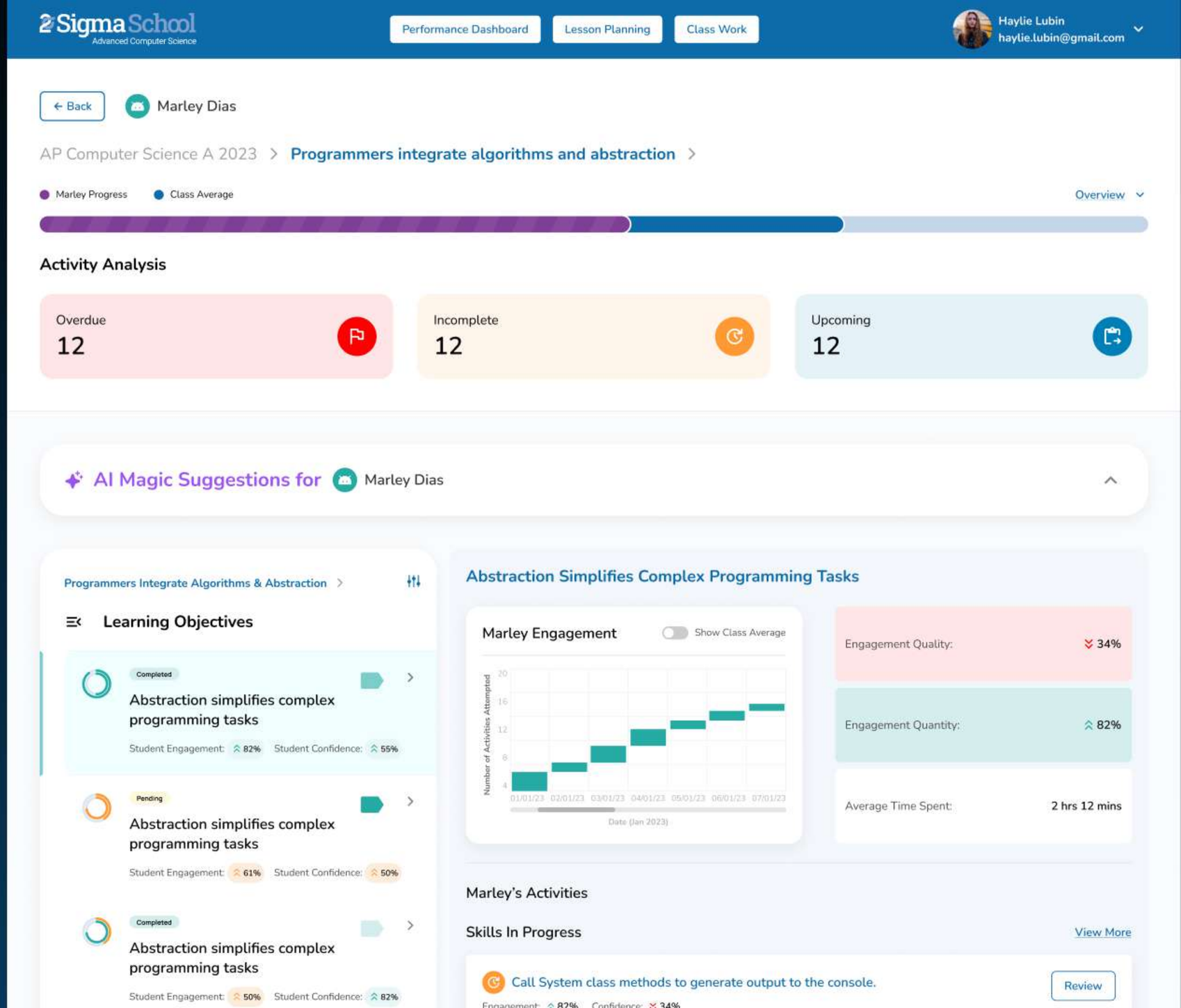
The ai magic will give customised Activity suggestions based on the performance, mastery, engagement of student

Bird eye view or tree map of the Total syllabus



Level 2 Dashboard

Student analysis, all the subtopics are available to the student



AI Magic Suggestions for Marley Dias

Programmers Integrate Algorithms & Abstraction

Learning Objectives

Completed
Abstraction simplifies complex programming tasks
Student Engagement: 82% Student Confidence: 55%

Pending
Abstraction simplifies complex programming tasks
Student Engagement: 61% Student Confidence: 50%

Completed
Abstraction simplifies complex programming tasks
Student Engagement: 50% Student Confidence: 82%

Needs Attention
Abstraction simplifies complex programming tasks
Student Engagement: 30% Student Confidence: 100%

Capstone Project
Abstraction simplifies complex programming tasks
Duration: 1 Hr 20 mins
Scheduled for: 24th Sept, 2023
Assigned to: +12 more

Needs Attention
Abstraction simplifies complex programming tasks
Student Engagement: 100% Student Confidence: 100%

Abstraction Simplifies Complex Programming Tasks

Engagement — Show Class Average

Engagement Quality: 34%

Engagement Quantity: 82%

Average Time Spent: 2 hrs 12 mins

This is where the student can see his/her performance contextual to a specific Sub-topic and also can compare with class

Skills In Progress

View More

Call System class methods to generate output to the console. — Review
Engagement: 82% Confidence: 34%
Task Attempted: 0/10 • Average Score: 0/0 Last Attempted on: Jun 5, 2023
Code Practice 2 Tasks Python Practice | Video Introduction to Chat GPT | Code Practice 4 Tasks Python Practice 2 | Vid Intr

The Math class is part of the java.lang package. — Review
Engagement: 82% Confidence: 34%
Task Attempted: 0/10 • Average Score: 0/0 Last Attempted on: Jun 5, 2023
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The arithmetic operators consist of +, -, *, /, and %. — Review
Engagement: 82% Confidence: 34%
Task Attempted: 0/10 • Average Score: 0/0 Last Attempted on: Jun 5, 2023
Code Practice 2 Tasks | Video | Code Practice 4 Tasks | Vid

Detailed view of the skills to work on etc
in this case the AI suggestions are also there, it will show up in case of student struggles

Student Analysis Page level 2

List of all the Subtopics with detailed analysis

12 | 12 | 12

AI Magic Suggestions for Marley Dias

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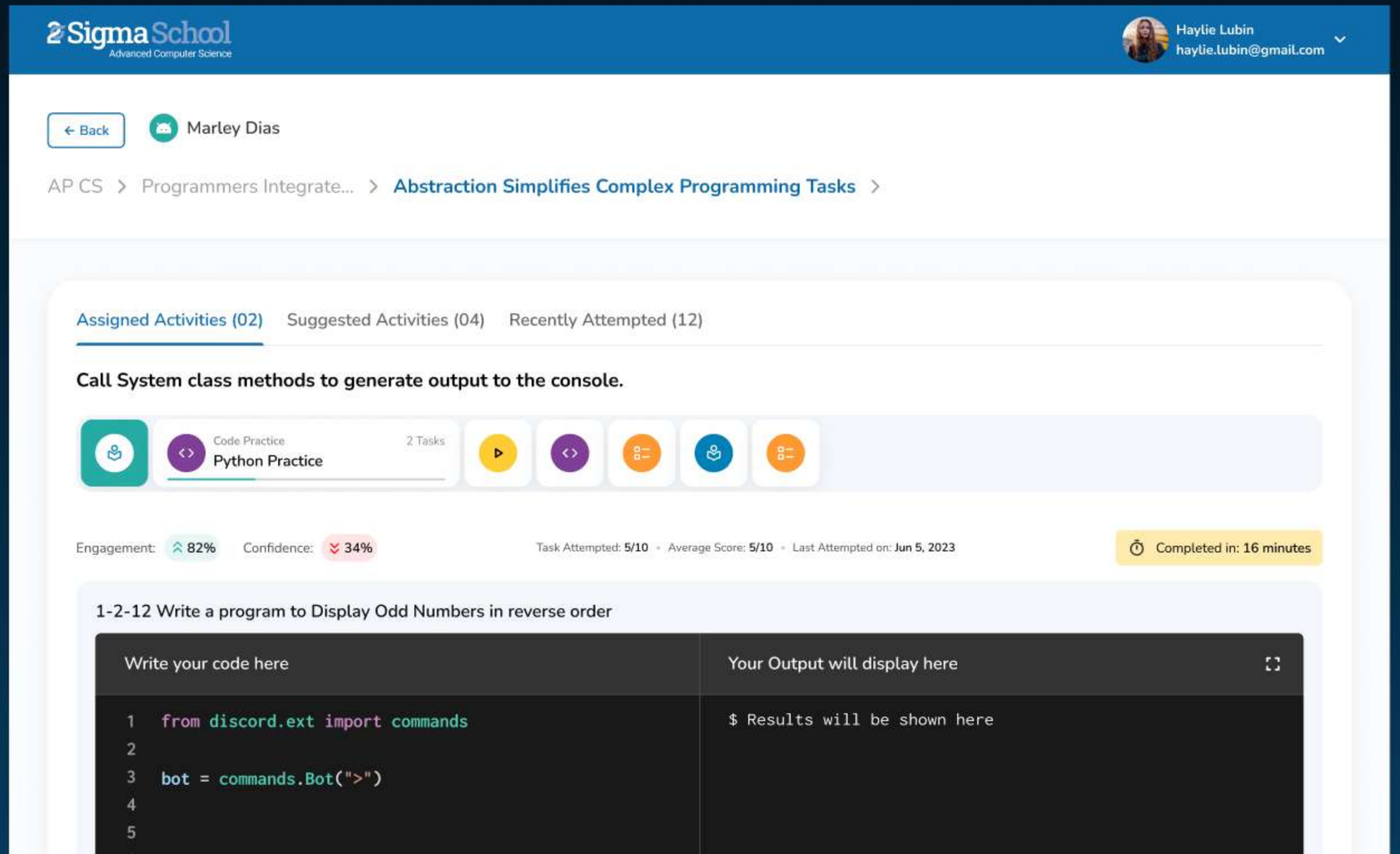
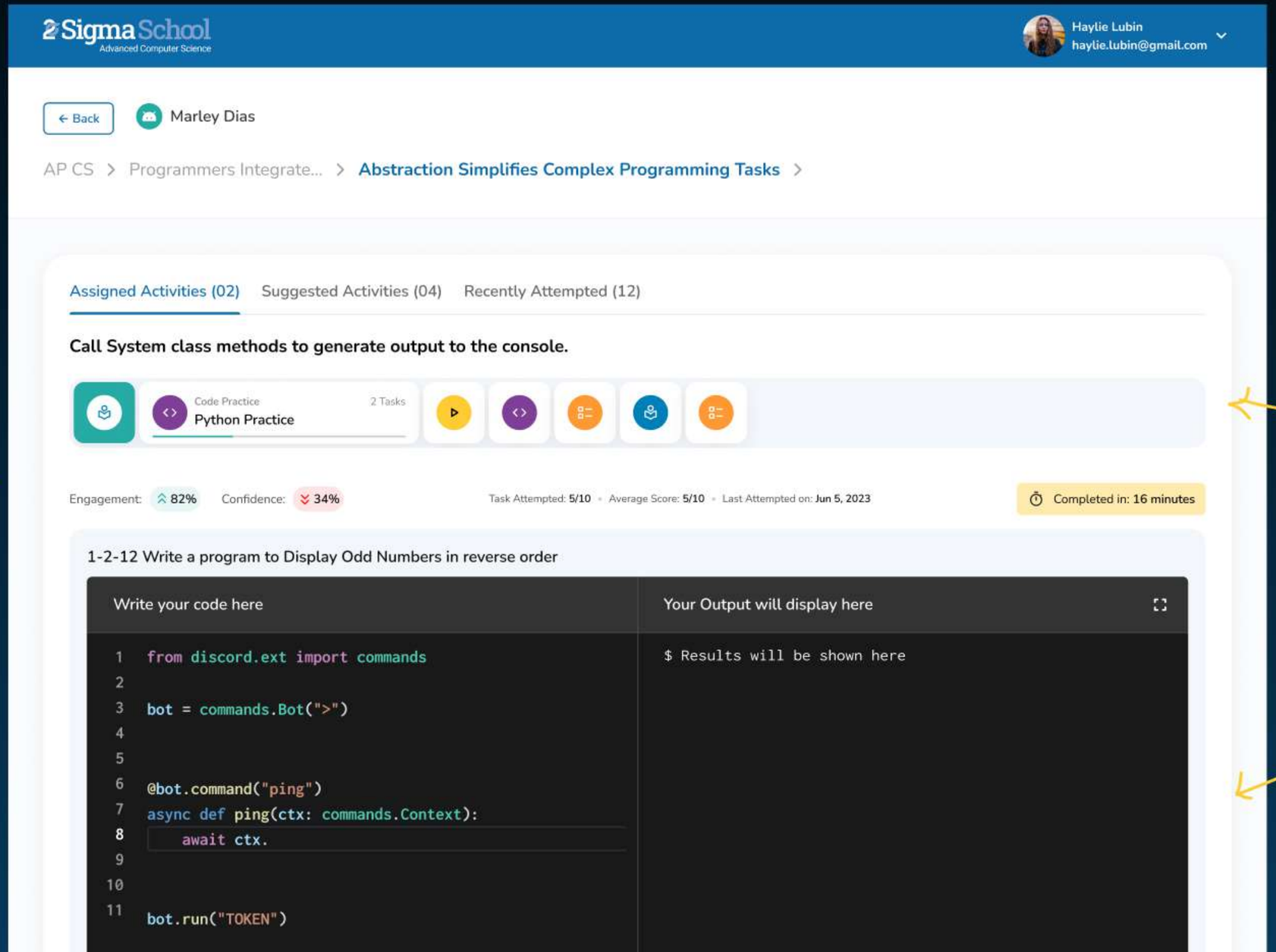
Activity Screen, this is where the students can perform and view AI suggested activities

Student Analysis Page level 3





AI Suggested activity plus the history

AI Will analyse the engagement and confidence in any particular activity

Progress in a particular activity

Actual Activity

Thanks

Walkthrough of all the wireframes can be discuss over a call