**Modules**

The project will be divided into 4 Major Modules.

1. Content Generation and Recommendation Engine (CGRe)
   1. Content Generation
   2. Content Recommendation
2. AI Assisted Evaluation & Preparation System
3. Data Analytics
4. Operational Tasks

**Content Generation and Recommendation Engine (CGRe)**

The CGRe is further classified into two engines.

* Content Generation
* Content Recommendation

The primary users for the **CGRe** are teachers/instructors and students.

Further classifying this, we have use cases for each of the sub-modules of the Main Engine

**Content Generation Module**

Basic uses

* Teachers shall use it to create standard lecture contents.
* The Student can use Generation to create lecture/preparation notes or further understand the topic

The main focus of this generation module will be the teacher.

**Teacher’s Scenarios:**

**1. Teacher Creates a Standard Lecture**

Teacher logs in to the system, the was first view was analytics on the homepage of the dashboard and a menu for all the other tabs.

The teacher then proceeds to select **Courses** option from the side menu.

Here Teacher can view all courses that he teaches currently.

By selecting a specific course, he has an option of “Create Lecture”.

He is then taken to a Content Generation screen with various options and inputs. Ability to add modules as Text, Quick Quiz, Videos, Images all imbeddable and editable in the Lecture Editor.

Other inputs include

Lecture Details such as:

* Tittle, description, Reference from course Book
* Learning Objective
* Knowledge base: Teacher’s content, Course books, pdfs, lectures – Base Data Repository for the Course he is teaching set by default (Provided by the system)
* Other Attachments and Preferences set by the teacher.
* Any Input/Lecture content already added by the Teacher if there is.

Here AI Assistance comes into play. The teacher can manually create all the content but he will have the option to completely generate a Lecture using AI by just hitting the **“Create with AI”** option.

By Selecting this option the teacher leaves all the work to AI, hence a pop will appear asking the teacher for additional metrics. To make it more tailored to Class Performance and Preference data, take other standard preference data from the teacher and at the very end an open input that a teacher can use to input any additional comments.

After Hitting confirmation on this, we hit our backend with all the said data. The System starts generating all the content based on all the user inputted, System Generated and Student preference and performance data, and it is measured against “**Effectiveness”** score.

Another major thing on the **Lecture Creation Screen** would be the effectiveness score which is measured against certain metrics such as Student Performance, Past data, Other generated/used content, relevancy, Multi-Modeling and its effectiveness, Structure and scraping similar content. The teacher can also opt to create or use all of his own lectures which will be measured as well and can be enhanced by AI to be up-to par with the **Effectiveness score.**

This means that if the teacher wants to use/edit or add chunks on his own he can and it will be handled, and can be optimized by the AI Engine.

For Better structuring and making the lecture interactive, the inputs will be divided into simple View and Modular View.

Simple View being the end result in terms of text, Images, Embedded Videos or links, quizzes, short answers or any other interactions, as the end user/student will see.

While the Modular view will make it each look like a module. Adding each module as Text, Image, Quiz section and arranging them by dragging up and down.

Lastly when done AI will also provide Another teacher specific section called “**Lecture Delivery Notes”** that summarize it for the teacher on how to deliver or let him be aware of the gist of each thing to teach.

[Add Concrete Inputs, content types and other useful info]

The teacher can either Save, Cancel, Save and Publish the Lecture. which adds it to that relevant course which will be sequentially added.

In short, a comprehensive lecture creation tool completely assisted by AI.

**Inputs**

Manual

1. Context: Tittle, description, Reference from course Book
2. Learning Objective
3. Knowledge base: Teacher’s content, books, pdfs, lectures – Base Data Repositories.

System Generated Inputs:

1. Class performance Data
2. Class Interaction Data
3. Meta Data

**2. Teacher Creates Notes (Library)**

Another Similar Use Case by the teacher would be to create notes. This is similar to creating a lecture but here this would be course agnostic. Rather the teacher gets full control over the content being generated. It will be saved into his notes, which will be downloadable or attachable with Lectures. These are also completely editable but will not have Lecture Constraints or Effectiveness Measure.

Also all the Inputs will also be different and can vary.

**Student’s Scenarios**

**Manual Inputs (By Student)**:

1. **Topic Selection**: Specific topic or subtopics for the generated content.
2. **Content Preferences**: Format (e.g., summary, practice questions, note style).
3. **Difficulty Level**: To adjust the complexity of AI-generated content.

**System-Generated Inputs**:

1. **Student Performance Data**: Tailors generated content based on the student’s strengths and weaknesses.
2. **Class Interaction Data**: Adapts recommendations to align with course material and learning objectives.

**1. Generating Personal Study Notes (Library)**

From the student’s perspective now, Its similar to if not Exactly the same as generating notes. This will be course agnostic although Context will still be made based on preferences, Metrics and other things set by the student. This will also be completely Customizable by the student. The Student Saves it in the Notes Section for him.

**2. Lecture & Content Summaries**

Same Concept but For Lecture Context Awareness. Added thing would be a Students Own Preferences and Performance Data will be used to generate content instead of Overall Class.

**3. Adaptive View of the Original Lecture Content, Tailored for the student**

**Content Recommendation Sub-Module**

**Student**

Provides relevant Recommendations to the Student at relevant spots.

The recommendations will be based on the content that is already existing in the system. It will not be any Generated Content (For Recommendation).

**Relevant Spots can be:**

* Main Dashboard to recommend Topics/Lectures/Notes/External Resources if the student has a quiz, Assignment, Test or Exam on schedule.
* A pop Up style recommendation if the student is spending too much time on a certain module, topic or a lecture, it should ask to help the student and then upon interaction provide Recommendations and Possibly Ai generated Explanations.

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**AI-Assisted Evaluation System with Manual and AI Options**

**Teacher’s Perspective.**

# 1. Evaluation Options for Assignments and Quizzes

**Objective:**  
As a teacher, I want the flexibility to either manually evaluate student assignments and quizzes or to use AI-assisted evaluation. This allows me to apply my expertise where needed, while also leveraging AI to streamline routine assessments.

**User Story: Choosing Evaluation Mode for Each Assignment/Quiz**

**As a** teacher,  
**I want to** select either manual evaluation or AI-assisted evaluation for assignments and quizzes,  
**So that** I can ensure evaluations align with my teaching objectives while saving time on more routine assessments.

**Scenario**: Teacher selects evaluation mode for a new assignment or quiz

* **Preconditions**: Teacher is creating a new assignment or quiz.
* **Actions**:
  + Teacher navigates to “Assignments” or “Quizzes” in the course menu and selects “Create New.”
  + Enters assignment or quiz details, including title, due date, weightage, and instructions.
  + In the “Evaluation Mode” section, the teacher chooses one of the following:
    - **Manual Evaluation**: The teacher will review and score each submission personally.
    - **AI-Assisted Evaluation**: The AI will provide scores and feedback based on preset criteria and rubric.
  + For AI-Assisted Evaluation, the teacher sets additional preferences such as:
    - **Rubric Criteria**: Key points or concepts the AI should consider.
    - **Feedback Style**: Supportive, neutral, or critical tone.
    - **Threshold for Manual Review**: AI will flag submissions below a certain score for teacher review.
  + Saves and publishes the assignment or quiz.
* **System Actions**:
  + The system saves the selected evaluation mode and preferences.
  + For AI-Assisted Evaluation, it stores rubric criteria and feedback style to apply once submissions are received.

# 2. Manual Evaluation Process

When choosing **Manual Evaluation**, the teacher has full control over grading, feedback, and assessment style. This option is especially useful for assignments that require nuanced feedback or subjective analysis.

**User Story: Manually Grading Assignments and Providing Feedback**

**As a** teacher,  
**I want to** review student submissions and provide personalized feedback manually,  
**So that** I can apply my judgment and tailor feedback to each student’s work.

**Scenario**: Teacher manually evaluates a batch of assignments

* **Preconditions**: Students have submitted their assignments, and the teacher has chosen manual evaluation.
* **Actions**:
  + Teacher navigates to the “Assignments” tab and selects “View Submissions.”
  + Chooses a student submission to review and opens the grading interface.
  + Reviews the content of the submission, marking relevant sections with comments or feedback.
  + Assigns a score based on the rubric and provides detailed feedback, including any improvement suggestions.
  + Saves and moves to the next submission.
  + After completing all submissions, the teacher has an option to “Publish Grades and Feedback” to the students’ dashboards.
* **System Actions**:
  + The system saves the teacher’s score and comments.
  + Once all feedback is saved and published, students are notified of their grades.
* **Outputs**:
  + Students view detailed, teacher-provided feedback for each assignment in their dashboard.
* **Notes**:
  + Teachers retain full flexibility in feedback, tailoring responses to individual performance and learning needs.

# 3. AI-Assisted Evaluation of Assignments/Quizzes

## 1. Setting AI Evaluation Parameters (Teacher Input)

**As a** teacher,  
**I want to** configure specific parameters for AI-assisted evaluation,  
**So that** the AI evaluation aligns with my grading standards and feedback style.

**Scenario**: Teacher sets up AI-assisted evaluation with custom parameters

* **Preconditions**: Teacher is setting up an assignment or quiz with AI-assisted evaluation enabled.
* **Actions**:
  + The teacher inputs key parameters to guide the AI evaluation process, including:
    - **Grading Criteria**:
      * Rubric elements or points of emphasis (e.g., clarity, argument strength, grammar).
      * For objective questions (e.g., MCQs, true/false), correct answers and scoring weight per question.
      * Weightage for each rubric criterion, if applicable.
    - **Feedback Style**:
      * Supportive, neutral, or critical (affects tone and depth of AI feedback).
    - **Threshold for Manual Review**:
      * Score threshold (e.g., below 60%) for AI to flag submissions requiring additional teacher review.
    - **Preferred Feedback Focus**:
      * Key areas for the AI to emphasize in feedback, such as content mastery, organization, and relevance to learning objectives.
  + The teacher saves these settings, which the AI will apply during the evaluation process.
* **System Actions**:
  + The system logs the teacher’s inputted criteria and weights, using them to evaluate each submission and apply feedback accordingly.

## 2. AI Evaluation Execution and Scoring

After students submit their work, the AI performs evaluation tasks based on the criteria set by the teacher. It analyzes each response, compares it to the rubric, and assigns scores.

**Workflow for AI Evaluation Execution**:

* **Objective Questions**:
  + **MCQs/True-False**: The AI checks student responses against the correct answers and calculates scores.
  + **Score Calculation**: AI applies the weightage assigned by the teacher, providing a percentage score and highlighting incorrect answers for feedback.
* **Subjective Questions**:
  + **Short Answer/Essay Evaluation**:
    - **Relevance Check**: AI identifies key concepts and checks if the student has covered the required topics.
    - **Rubric Application**: AI scores each section based on the rubric criteria set by the teacher (e.g., coherence, argument strength).
    - **Grammar and Syntax Analysis**: AI evaluates grammatical accuracy, clarity, and coherence.
    - **Structure & Flow**: AI assesses if the response follows a logical structure and if transitions between points are smooth.
  + **Score Calculation**: Based on rubric adherence and the presence of required concepts, AI assigns a score to each section of the answer and compiles the total score.
* **System Actions**:
  + AI calculates final scores for each assignment and flags submissions below the specified threshold for further teacher review.
  + AI stores scores and preliminary feedback, ready for teacher review or direct publishing.

## 3. AI-Generated Feedback Creation

Once scoring is complete, the AI generates feedback for each submission. This feedback is tailored to match the teacher’s specified style and focus areas, ensuring constructive and personalized responses.

**Feedback Workflow**:

* **Feedback Style and Tone**:
  + **Supportive**: Focuses on encouraging remarks with gentle suggestions for improvement.
  + **Neutral**: Provides factual feedback, pointing out areas for improvement without an emotional tone.
  + **Critical**: Highlights areas of weakness with firm language, offering direct suggestions for improvement.
* **Feedback Focus**:
  + **Content Mastery**: AI evaluates and comments on the student’s understanding and knowledge.
  + **Structure & Organization**: AI provides feedback on how well the answer is organized, covering transitions and logical flow.
  + **Grammar & Clarity**: AI suggests grammar corrections or rephrasing for better clarity.
  + **Additional Resources**: For students scoring below the threshold, AI suggests extra resources or topics for review.
* **System Actions**:
  + AI saves feedback for each submission based on the chosen focus and style.
  + Feedback and scores are displayed in the teacher’s review dashboard, allowing the teacher to approve or refine.

## 4. Teacher Review and Customization of AI Evaluations

Before finalizing, teachers can review and customize AI-generated scores and feedback for any submission. This step ensures alignment with course standards and provides teachers control over the evaluation process.

**User Story: Reviewing and Adjusting AI Evaluations**

**As a** teacher,  
**I want to** review and modify AI-generated scores and feedback as needed,  
**So that** I can ensure each evaluation accurately reflects the student’s performance.

**Scenario**: Teacher reviews AI evaluations and makes adjustments.

* **Preconditions**: AI has completed initial scoring and feedback generation.
* **Actions**:
  + Teacher navigates to “Review AI Evaluations” on the dashboard.
  + Reviews flagged submissions (below threshold) first, with AI suggestions for improvement areas.
  + For each flagged or low-scoring submission, the teacher can:
    - Modify scores based on personal review.
    - Adjust AI feedback, adding additional comments for clarity.
  + For high-scoring submissions, the teacher can approve the AI evaluation without modification.
  + Teacher finalizes and publishes grades and feedback to the students’ dashboards.
* **System Actions**:
  + The system logs teacher adjustments, saving modified feedback and scores for future AI reference.
  + Publishes final scores and feedback to each student.
* **Outputs**:
  + Students receive personalized, AI-enhanced feedback, with teacher-specific adjustments if applicable.

**Summary of Inputs, Parameters, and Outputs in AI Evaluation**

* **Inputs from Teacher**:
  + Grading Criteria and Rubric: Specific points for AI to consider when scoring.
  + Feedback Style: Determines AI’s tone (supportive, neutral, or critical).
  + Threshold for Review: Sets the score level at which AI flags submissions for teacher review.
  + Focus Areas: Indicates where feedback should concentrate (content mastery, structure, clarity, etc.).
* **Parameters for AI Evaluation**:
  + **Objective Questions**: AI matches responses to answer keys and applies weightage.
  + **Subjective Questions**: AI analyzes text based on rubric criteria, grammar, structure, and coherence.
  + **Feedback Generation**: Based on scoring and focus, AI generates targeted feedback per the teacher’s instructions.
* **Outputs**:
  + AI-generated scores and detailed feedback for each assignment or quiz.
  + Notifications of flagged submissions for teacher review.
  + Finalized grades and feedback appear on the student’s dashboard once approved.

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Modules

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a) Content Generation

b) Content Recommendation

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4. Operational Tasks

AI Assisted Evaluation

1. Peer Assessment

Process Overview

When students submit an assessment, they are asked if they would like to receive optional

peer feedback.

If they opt-in, the assignment is randomly assigned to another student for review.

Students can choose either Yes or No based on their preference. Emphasizing that feedback

is optional and won’t impact grades reassures them.

If they choose “Yes,” their assignment will be routed for peer review, where the peer reviewer

is guided by a simple rubric or feedback prompts.

Prompts may include questions like:

▪ “What’s the strongest aspect of this assignment?”

▪ “Is there any part that could be clearer or more detailed?”

▪ “Any suggestions for improvement?”

The feedback remains anonymous to reduce any potential bias and create a safe space for

open, honest suggestions.

When peer feedback is completed, the student is notified and can review it in their

dashboard.

They’ll receive a summary of key points with the option to reflect on or save the feedback for

future reference.

Make it clear in the system that opting for peer review is for learning enhancement only and

does not impact grades or evaluations.

AI Integration

Sarah submits her assignment and opts in for peer feedback. AI identifies a peer who has

shown strong skills in similar areas and assigns Sarah’s work to that peer. (Peer Matching).

As the reviewer completes feedback, AI checks tone for clarity and positivity.

2. Self-assessment

Process overview Students take an AI-generated quiz based on lecture topics.

After submission, the AI evaluates their answers and provides immediate feedback on

strengths and areas for improvement.

The AI analyzes performance patterns to identify individual strengths and weaknesses,

allowing the LMS to recommend tailored resources, practice exercises, or tutorials for

personalized learning.

If a student struggles with specific concepts, the system can offer additional practice

questions or simpler explanations, helping them understand the material before progressing

to more complex topics.

If a student scores below a set threshold, the AI adjusts the content to their level, providing

simpler explanations or extra practice. This rapid feedback enables students to improve

without waiting for instructor reviews.

User Story Flow:

The student navigates to the LMS login page and enters their credentials.

Upon successful authentication, the dashboard appears.

The dashboard shows an overview of the students’ enrolled modules, upcoming deadlines,

recent feedback, and a summary of their progress.

Notifications display recent evaluations completed by AI, any peer review, indicating

assignments that require attention.

The student clicks on a specific course module, which expands to show assignments,

quizzes etc.

For each assessment, the status (e.g., “Not Started,” “In Progress,” “Submitted,” or

“Graded”) is displayed.

For assignments that have been evaluated, the student clicks to view detailed AI feedback

or any peer feedback.

AI feedback includes highlighted areas for improvement, scores, and a summary of

concept mastery.

If the AI evaluation indicates areas for improvement in quizzes or mockups, the student can

access personalized study resources or recommendations.

The student can then attempt practice quizzes or revise and resubmit mockups based on

AI suggestions.

The dashboard updates the students’ progress, with an option to view an in-depth analysis

of their strengths and weaknesses across different modules, informed by AI insights.