Project Background

The flipped classroom model, while pedagogically effective, places a significant burden on educators who must create, curate, and organize a vast amount of digital content. Teachers often struggle with the time-consuming nature of producing lesson plans and videos, the logistical challenge of organizing materials for each class, and the use of multiple disconnected software tools for content creation, hosting, and student practice. This project aims to solve these problems by creating a unified, intelligent platform. It will serve as a powerful new tool within the **FunMA ecosystem**, specifically designed to support teachers by automating the most demanding aspects of flipped classroom management, allowing them to focus more on direct student interaction and personalized support.

Expected Outcomes

The primary outcome will be a functional prototype of the **AI-Powered Flipped Classroom Orchestrator**, a web application with the following core capabilities:

1. **Centralized Content Hub:** Allow teachers to upload, tag, and manage all course materials (e.g., PDFs, documents, external links) in a single, organized repository.
2. **Schedule-Driven Orchestration:** Enable teachers to upload a simple course schedule. The system will automatically parse this schedule and organize all relevant materials into a structured, day-by-day lesson plan that is easy for both teachers and students to navigate.
3. **AI-Powered Content Generation:** Provide a co-pilot tool that uses a Large Language Model (LLM) to generate draft lesson plans, explanatory texts, and other teaching materials based on simple teacher prompts. All generated content will be subject to mandatory teacher review and approval.
4. **Automated Video Briefings:** Include a proof-of-concept module that can generate simple instructional videos by converting an AI-generated script into speech (Text-to-Speech) and synchronizing it with programmatically created visual slides.
5. **Seamless FunMA Integration:** Establish an API connection to the FunMA application, allowing teachers to generate relevant practice exercises for a given topic directly from the lesson planning interface.
6. **Intuitive Teacher Dashboard:** Deliver a user-friendly interface where teachers can manage all the above functions with minimal technical expertise.

Basic Requirements

- The system must be developed as a **web application**. The backend will be built with Python (using a framework like Flask or Django), and the frontend will be a modern, responsive interface (using a framework like Vue.js or React).
- The AI pipeline must integrate three core components:
    - A **Large Language Model (LLM) API** (e.g., Google Gemini, OpenAI) for content and script generation.
    - A **Text-to-Speech (TTS) API** for generating audio for videos.
    - A **Python library** (e.g., `moviepy`) for programmatic video assembly.
- The system must feature a secure **API integration** to communicate with the existing FunMA application for exercise generation.
- A **"human-in-the-loop" design is mandatory**. The teacher must have the final authority to review, edit, and approve any content generated by the AI before it is finalized.
- The user interface must be highly **intuitive and user-friendly**, designed specifically for educators who may not have an extensive technical background.