

Project Design Phase
Proposed Solution Template

Date	27 February 2025
Team ID	LTVIP2025TMID30136
Project Name	EduTutor AI: Personalized Learning with Generative AI and LMS Integration
Maximum Marks	2 Marks

Proposed Solution Template:

S.No.	Parameter	Description
1.	Problem Statement (Problem to be solved)	<p>Traditional study approaches tend to be non-personalized, don't provide immediate feedback, and fail to engage interactively. Students often find it difficult to re-enforce knowledge, hone competencies, and monitor progress satisfactorily. A definite requirement is a n affordable, AI-based personal learning companion that provides varied tools of learning supporting a variety of learning styles and needs, delivering on-demand support, customized practice, and expansive performance analytics.</p>
2.	Idea / Solution description	<p>The solution proffered is the Edu-Tutor AI, an individualized and interactive learning aid deployed as a Python-based application with an easy-to-use Gradio web interface. It takes advantage of advanced Large Language Models (LLMs) to provide a holistic set of educational tools that encompass:</p> <ul style="list-style-type: none">●Interactive Chat: For real-time questioning and explanation.●Text Transformation: Text summarization and fine-tuning, giving definitions of words, and translating sentences.●Personalized Quiz Creation: Generating multiple-choice quizzes from topics submitted by users or uploaded PDF files.●Performance Monitoring: Allowing students to submit quizzes, get instant in-depth feedback, and monitor progress with a breakdown of weak spots. <p>Edu-Tutor AI is designed for local installation and offers an individual and easy-to-access learning environment with the goal of improving comprehension, vocabulary, and self-evaluation skills for a productive and more interactive learning experience.</p>
3.	Novelty / Uniqueness	<p>The novelty and uniqueness of Edu-Tutor AI are that it can:</p> <ul style="list-style-type: none">●Integrate Diverse AI Tools: It combines a vast collection of AI-based educational functions (chat, summarization, refinement, translation, word search, and dynamic quiz creation) into one, integrated platform that is easy to use.●Private AI Learning Local: Since it's meant for local

		<p>deployment, it provides a local learning environment without relying on external cloud-based APIs at all times for primary AI functions (after an initial model download), which will be attractive for users worried about data privacy or internet connectivity.</p> <ul style="list-style-type: none"> •Direct PDF to Quiz: The direct ability to turn uploaded PDF files into quizzes <p>is a very functional and specialized learning tool, converting passive read material into active testing.</p> <ul style="list-style-type: none"> •Integrated Performance Tracking: It unites real-time learning tools with an internal system to measure quiz performance and pinpoint weak spots, providing a more integrated approach to self-improvement.
4.	Social Impact / Customer Satisfaction	<p>Social Impact:</p> <ul style="list-style-type: none"> •Greater Learning Accessibility: Offers a locally executable and free AI tutor, perhaps filling educational material gaps for those who do not have the means for costly online learning or human tutoring. •Differentiated Learning: Supports individual learning rates and approaches by providing varied tools and customized content (quizzes, explanations). •Increased Self Efficacy: Assists students in becoming masters of their own learning by providing instant feedback and self-evaluation, leading to increased confidence and autonomy in learning. <p>Customer Satisfaction:</p> <ul style="list-style-type: none"> •Targeted & Instant Support: Users are helped through immediate answers, processing of text, and quiz results, which satisfy learning requirements on time. •Interactive Learning Experience: The interactive functionality of the AI chatbot and adaptive quizzes can make learning more interactive and less repetitive. •Enhanced Understanding: Features such as summarization, text editing, and word search directly assist in increased understanding of study content. •Clarity regarding Progress: The performance dashboard enables users to grasp their weaknesses and strengths, resulting in intensified study efforts and a feeling of achievement.
5.	Business Model (Revenue Model)	<ul style="list-style-type: none"> •No Direct Revenue: There are no provisions in the current code for subscriptions, in-app purchases, ads, or paid features. •Future Models (Theoretical): Assuming the project takes a commercial turn, possible revenue models might be: •Subscription Model: For advanced features (e.g., high-end LLMs, cloud-based access, increased storage, analytics).

		<ul style="list-style-type: none"> •Freemium Model: Providing a lite free option with paid upgrades. •Consulting/Support: Charging for support or customization for organizations. •Donations: For open-source community members.
6.	Scalability of the Solution	<ul style="list-style-type: none"> •Vertical Scalability: The system can be scaled vertically by assigning greater computational resources (CPU cores, RAM, more powerful GPUs) to the local machine on which the application executes. This enhances performance for one user or a very small number of simultaneous local users. •Horizontal Scalability Limited: The design here doesn't naturally facilitate horizontal scalability (sharing the load on multiple servers) out-of-the-box. For horizontal scalability in terms of more users or high concurrency, the architecture would need considerable re-design, possibly through: <ul style="list-style-type: none"> •Containerization: The application packaged using Docker. •Orchestration: Container deployment and management using technologies such as Kubernetes. •Microservices: Decomposing the monolithic application into smaller, independently deployable services. •Load Balancing: Balancing user requests among several copies of the application. •Distributed Database: Moving away from local SQLite to a more scalable, reliable database solution. •LLM Scaling: Performance and scalability of the LLM piece are dependent on the model size selected and the hardware. For extremely high-throughput use cases, specialized LLM serving infrastructure may be needed.