# ****Project Planning Phase****

## ****1. Introduction****

Project planning is one of the most crucial stages in the software development lifecycle. It ensures that the project is not only executed successfully but also delivered on time, within scope, and with the intended quality. For the **Educational AI Assistant**, project planning was designed to outline the goals, activities, resources, risks, and deliverables in a structured manner. Since the project combines artificial intelligence, natural language processing, and user interface design, careful planning was required to coordinate these components and deliver a working solution.

## ****2. Objectives of Project Planning****

The main objectives of project planning in this project were:

* To define the **tasks and activities** required to complete the project.
* To establish a **timeline** with milestones that reflect steady progress.
* To allocate the **resources** needed, including software tools and hardware.
* To identify **risks and challenges** early and develop strategies to mitigate them.

To ensure the project remains aligned with its overall objectives of delivering an educational assistant capable of explanations and quiz generation.

## ****3. Task Breakdown****

The project was divided into several phases, each containing specific tasks:

* **Ideation Phase** – Identifying the problem, brainstorming solutions, and selecting the AI-based approach.
* **System Analysis** – Studying existing systems, defining requirements, and proposing the system architecture.
* **System Design** – Creating workflow diagrams, interface layouts, and architectural models.
* **Implementation** – Writing Python code, integrating Hugging Face, PyTorch, and Gradio.
* **Testing** – Conducting functional, performance, and stress testing to validate the system.
* **Documentation** – Preparing detailed technical and academic documentation.
* **Deployment** – Launching the application using Gradio with shareable links.

Breaking down the tasks in this way ensured that each activity was manageable and measurable.

## ****4. Timeline and Milestones****

A tentative timeline was created to monitor progress. Each phase was assigned an estimated duration, with key milestones marked along the way.

| **Phase** | **Duration** | **Milestones** |
| --- | --- | --- |
| Ideation & Analysis | 2 weeks | Problem identified, proposed solution finalized |
| Design Phase | 2 weeks | Workflow diagrams and system design completed |
| Implementation | 4 weeks | Model integrated, UI developed, functions coded |
| Testing | 2 weeks | Functional & performance testing completed |
| Documentation | 2 weeks | Report prepared with results and screenshots |
| Deployment & Review | 1 week | Application launched and reviewed by evaluators |

This planning ensured steady progress while leaving buffer time for debugging and revisions.

## ****5. Resource Planning****

The project required both software and hardware resources. On the software side, Python 3.8, PyTorch, Hugging Face Transformers, and Gradio were the primary tools. On the hardware side, a laptop with at least 8 GB RAM was used, with GPU acceleration (CUDA) available for faster inference. In addition, cloud-based platforms like Google Colab were planned as backup environments in case of local hardware limitations.

## ****6. Risk Analysis****

Every project faces potential risks, and identifying them early helps in mitigation. In this project, the major risks were:

* **Model Dependency**: If the IBM Granite model was unavailable, an alternative model would need to be integrated.
* **Performance Issues**: Running on CPU-only machines could lead to delays in response time.
* **Integration Problems**: Compatibility issues between PyTorch, Transformers, and Gradio could disrupt development.
* **User Adoption**: The assistant needed to be simple enough for students and teachers to use without technical barriers.

By anticipating these risks, mitigation strategies were created, such as maintaining backup models, using cloud GPUs, and designing a minimal interface.

## ****7. Deliverables****

The deliverables of the project planning phase included:

* A fully functional Educational AI Assistant with dual functionality (explanation and quiz generation).
* A user-friendly Gradio interface accessible via a browser.
* Documentation covering all phases of development, including ideation, design, implementation, and testing.
* Performance and functional test results confirming the stability of the system.
* A project report and presentation for academic evaluation.

## ****8. Conclusion****

The project planning phase ensured that the Educational AI Assistant was built systematically, with clear tasks, milestones, and risk mitigation strategies. By planning ahead, the team was able to reduce uncertainties, optimize resources, and stay focused on the objectives. This structured approach allowed the project to progress smoothly from ideation to final deployment, ensuring a successful outcome.