# Introduction

This chapter provides an overview of the project, beginning with the challenges of transforming raw learning materials into meaningful assessments and summaries. It highlights the project’s goals, scope, and boundaries, alongside the software and hardware requirements necessary for both development and deployment. In addition, it outlines the limitations, expected outputs, project schedule, and associated risks. Together, these sections establish the foundation for understanding the motivation, objectives, and constraints guiding the design and implementation of the AI-powered quiz-generation system.

**1. Problem Statement: Successfully Translating Raw Learning Materials into Assessments and Summaries**

The digital learning age has brought the creation of course material in a wide variety of formats, from audio and video files to PDFs, Word documents, and presentations. Translating this blended content into official quizzes and brief summaries is normally time-consuming, hard work, and prone to human error.

A majority of the existing tools are limited to one file type or must be pre-prepared beforehand by hand, which is inefficient and discourages frequent use. This creates a problem for students as well as teachers in accessing interactive, stimulating, and useful study material, thus slowing down the learning process within hectic academic as well as training environments.

**2. Project Goal: From Formats to Knowledge — AI for Intelligent Learning Tools**

The aim of this project is to develop an AI-driven system capable of extracting important details from various content forms and converting it into quizzes and abstracts. Through the automation of assessment and summarization, the system will help students, instructors, and self-learners save valuable time, promote active learning, and enable the easy creation of good-quality learning materials.

In the long term, the solution is designed to reduce teaching load, improve knowledge retention, and promote more individualized, adaptive learning experiences across different learning environments.

**3. Project Scope: Establishing the Boundaries for AI-Powered Content Transformation**

This project is designed to develop an AI system that can accept various types of content like MP3, MP4, PDF, MS Word files, and PowerPoint presentations, and perform real-time audio and video content transcription. The system will automatically generate quizzes and summaries from the inputs via an easy, intuitive web-based interface.

**Key Features**

* Content parsing and intelligent file format handling
* Natural Language Processing (NLP) to pull out major points and ideas
* Robot quiz creation from various question types (e.g., multiple choice, true/false, short answer)
* Fast revision-boosted summary creation

**Within Scope**

* File uploading in accepted formats
* Real-time transcriptions
* English-language content
* Arabic-language content
* Exporting quizzes in common formats
* Interactive in-platform quiz-taking

**Out of Scope**

* Third-party LMS integration (e.g., Blackboard, Moodle)
* Non-English and non-Arabic language support
* Mobile app development in this release

**Project Software and Hardware Requirements**

**Hardware Requirements**

Hardware requirements can be split into two parts: requirements for development and requirements for end-users.

**Requirements for Development**

* **Minimum requirements for React:**  
  • CPU: Intel Core i3  
  • RAM: 8 GB  
  • Storage: 10 GB (Kinsta, n.d.)
* **Minimum requirements for C# development using the Visual Studio IDE:**  
  • Processor: 1.8 GHz or faster processor (dual-core or better recommended)  
  • RAM: 2 GB (4 GB recommended, 2.5 GB minimum on a virtual machine)  
  • Hard Disk Space: Up to 130 GB depending on features installed; typical installations require 20–50 GB. SSD recommended for performance  
  • Video Card: Supports a minimum display resolution of 720p (1280 × 720); WXGA (1366 × 768) or higher recommended (Microsoft, 2025)
* **Minimum requirements for TinyLlama:**  
  Normally, an AI model like TinyLlama would require a minimum of 16 GB VRAM. However, by utilizing QLoRA, we can bring the minimum requirements down significantly with these being our estimates (InsightReactions, 2025).

| **Hardware Component** | **Minimum Requirement** | **Recommended** | **Notes** |
| --- | --- | --- | --- |
| GPU VRAM | 6 GB | 8 GB+ (e.g., RTX 3070, 4060 Ti, 3080) | This is the most critical factor. 6 GB is the absolute floor with heavy optimizations. 8 GB is comfortable. |
| System RAM | 16 GB | 32 GB | Needed for loading the dataset and handling background processes. |
| Storage | ~10 GB Free | 20–50 GB Free | Space for the base model (~2.2 GB for TinyLlama-1.1B), datasets, and saved adapter weights. An SSD is highly recommended. |

**Table 1** Hardware requirements for running TinyLlama locally (InsightReactions, 2025).

**Hardware Requirements for End-Users**  
Since we will not be using a server to host our program, the minimum requirements to run our program locally are dependent on TinyLlama’s. They are:  
• CPU: 4 cores or more  
• System RAM: at least 16 GB  
• GPU: NVIDIA GPUs only, 12 GB VRAM or higher to enjoy AI products offered by TinyLlama’s default configuration at full speed  
• Storage: 60 GB SSD (250 GB or more recommended for additional models and future functionality)  
• Wired internet connectivity during setup; wired LAN connectivity afterwards (InsightReactions, 2025)

**Software Requirements**

Software requirements can be split into two parts: requirements for development and requirements for end-users.

**Requirements for Development**

* **React:** Windows 10/11, Ubuntu 16, or macOS 10.10 (Kinsta, n.d.)
* **C# development using the Visual Studio IDE:** Windows 10/11 (Microsoft, 2025)
* **TinyLlama:** Windows 10/11, Ubuntu 16, or macOS 10.10 (InsightReactions, 2025)

**Requirements for End-Users**

* Windows 10/11, Ubuntu 16, or macOS 10.10

**Project Limitations**

**• Technical Limitations**

1. The model uses an open-source model agent as a base.

An internet connection is required to use Quiz AI, which limits its target since only 67.9% of the total world population has internet access (ITU, 2025).A graph of blue bars with numbers

AI-generated content may be incorrect.

**Figure 1:** Global internet penetration in 2025, highlighting the 67.9% population with access (Source: ITU, 2025).

1. There is no application version of Quiz AI, which means it may not be as attractive to most of the population (GSMA, 2025).

A graph of green rectangular bars

AI-generated content may be incorrect.

**Figure 2:** Lack of a Quiz AI mobile app may limit user adoption, illustrated by global mobile app engagement trends (Source: GSMA, 2025).

**• Functional Limitations**

**1. Unsupported Features**

* Extracting audio from video is not implemented.

**2. Workarounds**

* Using a third-party API to achieve the operation.

**• Security Limitations**

1. Currently, no security measures have been planned for the log-in system.
2. The system doesn’t have encryption for the login database.

**• Usability & Accessibility**

1. The end-user can only submit files in the following formats: **txt, pdf, pptx, mp3**.

**Project Expected Output**

**• Functional Outputs**

1. A responsive web dashboard for real-time visualization.
2. On-website notification for when the output is being processed.
3. On-website notification for when the output is finished being processed.

**• Non-Functional Outputs**

1. A relatively fast output time based on the data inputted.
2. A 4-chapters worth of project documentation in PDF format.
3. A GitHub repository containing the source code of the project and its documentation.

**1. Project Schedule**

The project schedule outlines the key milestones, activities, and deliverables required to complete the AI-powered quiz-generation website. It ensures each stage of the development process is completed on time, with clear dependencies between tasks.

A chart with multiple colored bars

AI-generated content may be incorrect.

**Figure 3:** Project schedule Gantt chart illustrating key milestones, activities, and deliverables for the AI-powered quiz-generation website (Source: Project Team, 2025).

**2. Project / Product Schedule Risks**

**Schedule Risk**

* Risk of longer-than-expected project duration is one of the key risks.
* It might be due to challenges in AI model integration, handling different file types (PPT, PDF, video transcription), or unforeseen bugs during frontend-backend communication.

**Impact**

* Any postponement in AI model readiness or system integration could reduce the amount of test time available, resulting in reduced stability and quality of the output.

**Mitigation Strategies**

1. Begin AI research and experimentation concurrently with UI/UX design.
2. Use pre-trained NLP models to accelerate development.
3. Implement fallback mechanisms for simplified quiz generation in the event of AI delay.
4. Add buffer periods between hard milestones and conduct weekly progress reviews.

**3. Report Organization**

The remaining parts of this report are organized as follows:

* **Chapter 2** – Theoretical Background & Literature Review: Introduction to similar works and existing learning tools utilizing AI for content processing and quiz generation.
* **Chapter 3** – Requirements Analysis: Functional and non-functional system requirements.
* **Chapter 4** – Software Design: System architecture, database schema, and user interface prototypes.

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