

Version 0.1

Prepared by Group 7

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Revision History

Name	Date	Reason For Changes	Version
Group 7	2025/1/26	Initial Draft	0.1

1. Introduction

1.1 Document Purpose

This document details the requirements for developing the AI-Powered Tutor for Online Learning. The intended audience includes stakeholders, investors, and the development team.

1.2 Product Scope

The AI-Powered Tutor aims to enhance online learning by providing:

- **Personalized Learning Paths** dynamically adapted based on user performance.
- **Detailed Feedback** on tests and exams, identifying improvement areas.
- **Career Preparation Tools** like mock interview simulations.
- **Multilingual Support** for diverse learners.
- **Integrated Workspace** for note-taking, coding, and brainstorming

1.3 Definitions, Acronyms and Abbreviations

AI : Artificial Intelligence

UI/ UX : User interface and user experience

1.4 References

- IEEE 29148 guidelines
- Group 7_Project Proposal
- Group 7_UI/UX_Assignment
- Online learning Platform([Coursera](#), [Udemi](#))

1.5 Document Overview

This document includes the product's objectives, perspective, Functions, constraints, requirements, and verification methods.

2. Product Overview

2.1 Product Perspective

This product is a new, standalone system designed to address shortcomings in current online learning platforms by offering personalized and dynamic learning

2.2 Product Functions

The project focuses on creating an advanced platform tailored to support learning, skill enhancement, and career preparation through innovative and inclusive features. It will include personalized dashboards that enable users to monitor their progress, set goals, and evaluate their performance in a dynamic and user-friendly manner. To support continuous improvement, the platform will offer detailed test feedback accompanied by actionable insights to help users identify and address areas for growth. Career-focused modules, such as mock interviews and resume-building tools, will provide hands-on preparation for real-world job opportunities. The platform will also integrate multilingual support, ensuring accessibility for users from diverse linguistic backgrounds. Additionally, a collaborative workspace will facilitate teamwork, group projects, and peer-to-peer learning, fostering an interactive and cooperative environment for users.

The functions will be explained in more detail in section 3.

2.3 Product Constraints

- Must be accessible on web browsers and mobile apps.
- Feedbacks and suggestions/recommendations must be up-to-date .
- Ensure compliance with GDPR for data security.

2.4 User Characteristics

1.Primary Users

a. University and highschool Students (e.g., "Zeke")

- **Frequency of Use:** High (daily or weekly use).
- **Functions Used:**
 - Personalized learning paths.
 - Test feedback.
 - Multilingual support for better content comprehension.
 - Career preparation tools (e.g., mock interviews).

2. Working Professionals

- **Frequency of Use:** Moderate (weekly or bi-weekly).
- **Functions Used:**
 - Career-focused tools like mock interviews and skill assessments.
 - Multilingual support for accessing diverse content.
 - Workspace for managing career learning materials.

3. Educators

- **Frequency of Use:** Low to moderate (monthly or as-needed basis).
- **Functions Used:**
 - Monitoring student progress.
 - Reviewing test feedback and improvement trends.
 - Suggesting custom learning resources.

4. Administrators

- **Frequency of Use:** Low (as-needed basis).
- **Functions Used:**
 - Managing user accounts and privileges.
 - Overseeing system performance and maintenance.
 - Generating compliance and performance reports.

2.5 Assumptions and Dependencies

- Reliable internet is required.
 - AI modules depend on third-party APIs
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3. Requirements

3.1 External Interfaces

This subsection defines all the inputs into and outputs requirements of the software system. Each interface defined may include the following content:

- Name of item
- Source of input or destination of output
- Valid range, accuracy, and/or tolerance
- Units of measure
- Timing
- Relationships to other inputs/outputs
- Screen formats/organization
- Window formats/organization
- Data formats
- Command formats
- End messages

3.1.1 User interfaces

1. Dashboard interface
 - User progress, personalized insights(feedbacks, course recommendations), learning goals and pathways,
 - Carrier tools and workspace

3.1.2 Hardware interfaces

1. Supported devices
 - a. Desktops, laptops, mobile phone, tablets
2. Nature of Data and Control Interactions:
 - a. Data Inputs :
 - i. User interactions,
 - ii. audio input
 - b. Data Output:
 - i. Info on Dashboard

3.1.3 Software interfaces

1. Third-Party APIs(Natural Language Processing, Language Translation APIs, Learning Management Systems)
2. Databases (User Profiles, Content Library)
3. Communication Protocols

3.2 Functional

This section specifies the core functionalities of the AI-Powered Tutor. Each function addresses user needs and ensures system usability, adaptability, and productivity.

3.2.1 Personalized Learning Paths

- The system creates dynamic, tailored study plans based on user performance and learning goals.
- Tracks user progress and adjusts content accordingly to ensure continuous improvement.
- Includes recommendations for supplementary learning resources.

3.2.2 Test Feedback

- Provides detailed feedback on quizzes, tests, and exams.
- Identifies specific areas of improvement with at least 90% accuracy.
- Suggests follow-up actions or materials to address weaknesses.

3.2.3 Career Preparation Tools

- Offers mock interview simulations with AI-generated feedback on performance.
- Includes career-focused learning modules tailored to specific industries or roles.

3.2.4 Multilingual Support

- Supports subtitles and feedback in multiple languages to cater to a diverse user base.
- Enables seamless switching between languages during content delivery.

3.2.5 Collaborative Workspace

- Provides a built-in platform for note-taking, coding, and brainstorming.
- Supports cloud storage integration to save and access materials across devices.

3.3 Quality of Service

3.3.1 Performance

- **Response Time:** Key functions (e.g., learning path generation) must respond in under **2 seconds**, with up to **3 seconds** during high-load periods.
- **Real-Time Systems:** Latency for interactive features (e.g., mock interviews) must be under **100ms**.

3.3.2 Security

- **Data Protection:** Encrypt data using **AES-256** at rest and **TLS 1.3** during transmission.

- **Authentication:** Implement **role-based access control (RBAC)** and **multi-factor authentication (MFA)** for administrators.
- **Compliance:** Ensure **GDPR** and **ISO/IEC 27001** alignment.

3.3.3 Reliability

- **Uptime:** Ensure **99.9%** uptime over a 30-day period.
- **Fault Tolerance:** Use redundancy mechanisms to prevent system failures.
- **Error Handling:** Provide informative error messages and recovery options.

3.3.4 Availability

- **Continuous Access:** Guarantee availability with scheduled maintenance during off-peak hours.
- **Recovery:** Implement **checkpoint and restart** mechanisms for data preservation and quick recovery.

3.4 Compliance

- **Regulations:** Comply with **GDPR** for privacy and **WCAG 2.1** for accessibility.
- **Audit Logs:** Maintain secure logs of key actions for **1 year**, accessible only to administrators.
- **Reporting:** Generate reports in standard formats (e.g., PDF, CSV) with consistent data naming conventions.

3.5 Design and Implementation

3.5.1 Installation

- Fully cloud-based with no local installation required.
- Accessible via web browsers or lightweight apps.

3.5.2 Distribution

- Web-based platform with cloud updates for instant access to new features.

3.5.3 Maintainability

- Cloud architecture simplifies maintenance and upgrades.
- Includes developer documentation and automated testing.

3.5.4 Reusability

- Core components (e.g., AI modules) designed for reuse.

3.5.5 Portability

- Accessible across devices via browsers, with data synchronized in the cloud.

3.5.6 Cost

- Development: \$150,000.
- Maintenance: \$30,000/year.

3.5.7 Deadline

- Delivered in 6 months using Agile methodology.

3.5.8 Proof of Concept

- Cloud-hosted prototype ready by the end of Sprint 3.
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4. Verification

Testing Phases:

1. Unit Testing: Test individual modules like dashboards and AI engines.
2. Integration Testing: Ensure seamless interaction between components.
3. System Testing: Validate performance, scalability, and reliability.
4. User Acceptance Testing: Engage users to confirm usability and effectiveness.

Verification Process:

- Map test cases to all requirements in Section 3.
- Use automated tools for performance/security tests and manual testing for UI/UX validation.
- Gather feedback iteratively during sprints.

Success Criteria:

- Critical functions meet performance and security thresholds.
 - Achieve at least 90% user satisfaction in UAT.
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5. Appendixes

5.1 References:

1. Group 7 Project ProposalGroup7_ProjectProposal.
2. Group 7 UI/UX AssignmentGroup7UIUX_assignment.

5.2 Glossary:

- **AI:** Artificial Intelligence.
 - **RBAC:** Role-Based Access Control.
 - **UAT:** User Acceptance Testing.
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