

Part A – Analysis

1. Introduction

The purpose of this document is to analyse the needs of GibJohn Tutoring and propose a digital solution that addresses their requirements. This includes exploring existing platforms, identifying functional & non-functional requirements, and ensuring legal, regulatory, and professional compliance.

Client: GibJohn Tutoring provides face to face tutoring and learning resources.

Objectives: Create a digital platform that supports interactive resources, wider learning, & progress monitoring.

2. Analysis of existing solutions

Strengths:

Khan Academy >> strong variety of content and assessments

Duolingo >> effective gamification

Weaknesses:

- Limited accessibility options. (Duolingo does not support those with visual impairments 100% effectively)
- Lack of deep personalisation. (Khan & Duolingo - All personalised content is standardised, and custom personalisation is not permitted)

Opportunities:

- Introduce personalisation (potentially AI-driven).
- Accessibility-first design.
- Gamified rewards tied to learning progress.

Justification: A new solution is needed to combine the strengths of existing platforms with accessibility, compliance, and tailored learning for GibJohn's audience.

3. Emerging Technologies

AI: Adaptive quizzes, automated marking.

IoT: Smart classrooms linking to the platform.

AR/VR: Virtual lab experiments and immersive subject exploration.

Cloud computing: Scalable, cost-effective hosting.

Integration: Cloud included immediately; AI, IoT & AR/VR reserved for later iterations

5. Business Context

Overview: Tutoring company expanding digitally

Goals: Wider: access, improved engagement

Audience: Learners (school-aged), tutors, guardians.

Constraints: Time, compliance with GDPR/Equality Act, phased implementation

6. Requirements analysis

Functional Requirements

- Learner registration & login
- Tutor uploads and resource sharing
- Progress tracking dashboards
- Reward system for achievements.

Non-Functional Requirements

- Secure (password hashing, HTTPS).
- Accessible (WCAG 2.1).
- Reliable (99.9% uptime)
- Usable (simple navigation, responsive)

KPIs

- <5s page load time
- 99.9% uptime
- 80% weekly active learner usage
- 90% satisfaction in UAT.

User Acceptance Criteria (UACs):

- **UAC-1:** Learner can create an account with valid details.
- **UAC-2:** Learner can log in securely with email and password.
- **UAC-3:** Tutor can upload resources and learners can access them.
- **UAC-4:** Learner dashboard shows progress (%) for each subject.
- **UAC-5:** Progress updates automatically after a quiz is submitted.
- **UAC-6:** Reward badge appears when a learner meets criteria (e.g., score ≥ 80 three times).
- **UAC-7:** The system works on mobile and desktop, with all functions available via keyboard navigation.
- **UAC-8:** Page load time is under 5 seconds (assessed in staging).

MoSCoW

- **Must have:** Login, progress tracking, content delivery.
- **Should have:** Rewards and accessibility features.
- **Could have:** AI-driven personalisation.
- **Won't have:** VR integration at launch.

7. Problem Decomposition

Modules:

- Authentication (validated register, validated login, functional sessions, and database)
- Resource Management (static assets, caching, image/media optimisation)
- Progress tracking (lessons correct answers wrong answers, unanswered)
- Reward System (wallpapers, banners)
- Admin Dashboard (max clearance access)

System Architecture:

Frontend (html, CSS) >> Backend (Flask) >> Database>> (SQLite)

Hosting: Heroku

Security: Encrypted logins, HTTPS, role-based access.

Emerging Tech: AI for adaptive learning, cloud for scalability.

Justification: Secure, scalable, industry-standard technologies aligned to GibJohn's needs.

System Flow Diagram

[Start: Home/Login]

|

v

[Register] -----> [Login]

|

|

v

v

[Learner Dashboard] <---- [Tutor Dashboard]

| |
v v

[View Content/Take Quiz] [Upload Resources/Create Assignment]

| |
v v

[Progress Tracking] [View Learner Progress]

|
v

[Rewards System]

|
v

[Logout]

8. Legal & Regulatory Compliance

Law/Standard	Requirement	How addressed
GDPR	Protect learner data	Encryption, consent, anonymisation
Equality Act 2010	Accessibility	WCAG2.1 compliance, screen reader support
Consumer Rights Act	Transparent, fair terms	Clear T&Cs, opt-out options
Copyright/IP law	Respect ownership	Licensed resources, attribution
WC3 standards	Accessible web design	Semantic HTML, ARIA roles

9. Professional & Ethical Standards

Aligned with BCS Code of Conduct:

- **Public interest:** Accessibility-first design.
 - **Integrity:** Transparent handling of learner data.
 - **Competence:** Secure, reliable development practices.
 - **Privacy:** GDPR-compliant data storage.
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10. Justification of Design Choices

HTML: Using **HTML5 semantic landmarks** (<header>, <nav>, <main>, <footer>) ensures the site is screen-reader friendly and meets **WCAG 2.1** accessibility standards. This reduces reliance on JavaScript for structure, improving page load performance and helping achieve the KPI of **<5s load times**.

CSS: Using **CSS Grid and Flexbox** provides responsive layouts that adapt across phones, tablets, and desktops. A consistent design system (tokenised colours, rem-based typography) maintains readability and ensures **WCAG contrast ratios** for accessibility.

JavaScript (tiny): Only a small amount of JavaScript is used for **form validation** and **small interactions** (such as showing error messages or toggling UI elements). Core functionality still works without JavaScript, which makes the prototype more reliable and accessible on older devices.

Flask: Flask with **Blueprints** (auth/resources/progress), **Jinja2 templates**, **Flask-Login** for authentication, **SQLAlchemy ORM**, and **CSRF protection** provides a secure and testable backend. Using Python also keeps the door open for future integration with **AI features** such as adaptive learning.

Heroku: Chosen as a simple, cloud-based hosting option because it provides:

- **Automatic HTTPS** → secure logins and data transfer.
- **Easy GitHub deployment** → fast updates and version control.
- **Scalability** → can handle more users if GibJohn grows.
- **Monitoring/logs** → helps track uptime and fix errors quickly.

This makes Heroku a safe, reliable platform that meets the client's needs without complex setup.

11. Risk Assessment

Risk	Impact	Likelihood	Mitigation
Data Breach	High	Medium	Encryption, (2FA potentially)
Missed Deadlines	Medium	High	Agile sprint, weekly reviews
System Downtime	High Impact	Low	Cloud redundancy

Low learner uptake	Medium	Medium	Gamification, user testing
Copyright Infringement	High	Medium	Used licenced materials only