

PROJECT REPORT

WEB SITE FOR “KNOWLEDGE_TREE”



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GAM/IT/2023/P/0042

ICT Project

HNDIT 1052

KNOWLEDGE_TREE

By

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GAM/IT/2023/P/0042

THE REPORT

Submitted in partial fulfillment of the requirements

Of

HIGHER NATIONAL DIPLOMA IN INFORMATION TECHNOLOGY

2023

Advanced Technological Institute,

Naiwala,

Sri Lanka.

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OF
INFORMATION TECHNOLOGY
IT SPECIALIZATION PROJECT REPORT HEADER SHEET
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ABSTRACT

The "Knowledge Tree" project aims to develop an advanced Learning Management System (LMS) tailored to meet the evolving educational needs of students and instructors. It addresses critical challenges in existing systems, such as limited access, lack of customization, and inadequate interaction tools. The platform provides free access to high-quality educational materials, including downloadable course notes, video tutorials, and interactive exercises. Designed for scalability and security, the LMS ensures robust data protection and a seamless user experience across devices. Through features like discussion forums, progress tracking, and dynamic learning paths, the project fosters an engaging and inclusive learning environment. Built with Wix and integrating tools like YouTube and W3Schools, the system demonstrates innovation in content delivery and administrative efficiency. Future enhancements will include AI-driven personalization, mobile app integration, and gamification, positioning "Knowledge Tree" as a transformative tool for modern education.

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Chapter 1

INTRODUCTION

1.1 Client Details

Client Name : Shahama Faris
Position : General Manager
Company Name : Alite Uni

Company Overview

Aliate Uni is a prestigious educational institution specializing in Information and Communication Technology (ICT). Established on **November 4, 2003**, the university has significantly expanded its reach and influence in the field of ICT education. With a student base exceeding **2,000**, Aliate Uni is committed to fostering future professionals in technology-driven industries.

Known for its academic excellence** and **innovative approaches, Aliate Uni has established a strong global presence. Its dedication to high standards of education and research has made it a leader in preparing students for the rapidly evolving ICT landscape.

Branch Network

Aliate Uni operates across key global regions to ensure accessibility and quality:

1. **Asia:** Focused on booming technology and education markets, providing students access to advanced ICT programs.
2. **Europe:** Maintaining globally recognized academic standards and providing a strong foundation in ICT education.
3. **America:** Offering comprehensive training designed to equip students with practical skills for diverse ICT careers

1.2 Problems in Existing Methods

The current systems at Aliate Uni face several challenges in managing and delivering educational content effectively. Knowledge Tree, with its free and globally accessible resources, aims to address these issues and provide solutions tailored to students' needs. Key problems include

1. **Limited Free and Open Access**

Existing platforms lack the ability to provide students worldwide with free and open access to high-quality educational materials. Knowledge Tree eliminates this barrier by offering completely free resources to all users, making education accessible to everyone.

2. **Lack of Customization Options**

Current systems do not allow for personalization based on individual learning preferences or course requirements. Knowledge Tree solves this by integrating features that enable customization, such as tailored learning paths and adjustable content delivery, meeting diverse student needs.

3. **Inadequate Security and Accessibility**

Many existing platforms struggle with providing secure and reliable access for users across the globe. Knowledge Tree addresses this by ensuring robust security measures and an intuitive user interface that supports a seamless experience for global students.

4. **Limited Student-Instructor Interaction**

The absence of interactive tools like discussion forums, real-time Q&A sessions, and progress tracking limits engagement and collaboration between students and instructors. Knowledge Tree introduces these features to foster a more dynamic and participatory learning environment.

1.3 Aim of the Project

The primary aim of this project is to develop a **user-friendly Learning Management System (LMS)** that will significantly enhance the student learning experience by providing seamless, centralized access to essential academic resources and services. This system will empower students to take full control of their learning journey, fostering a more flexible and interactive educational environment.

1. **Download Course Notes:** The system will provide students with easy and efficient access to a variety of study materials, including lecture notes, presentations, and other relevant course resources. These materials will be available for direct download, enabling students to review content offline at their convenience. This feature will support independent study, allowing students to prepare for exams or assignments without needing to be online at all times.
2. **Watch Recorded Lessons:** In addition to course notes, the LMS will integrate **video streaming capabilities**. This will allow students to watch recorded lectures, tutorials, and educational videos on-demand. The feature ensures that students can learn at their own pace, revisiting complex or missed topics. It also provides flexibility for those unable to attend live classes, allowing them to stay current with the course material and review content as needed.
3. **Free Access to Course Fees:** One of the key objectives of this project is to **remove financial barriers to education**. The LMS will offer all courses **at no cost**, ensuring that every student, regardless of their financial background, can access high-quality educational resources. This will make education more inclusive, promoting equal opportunities for students to engage with and benefit from the learning content.

1.4 Objectives

1. **Develop a Reliable and Scalable LMS:** The system will be designed to accommodate a large number of users, including students, instructors, and administrators, ensuring that it can handle increased demand over time. It will be built with scalability in mind, allowing for future expansion in terms of user base and functionality.
2. **Enhance Student Engagement:** The LMS will include features such as **discussion forums, quizzes, assignments, and interactive learning materials** that encourage active participation and engagement. These features will foster a dynamic learning environment, where students can collaborate, ask questions, share ideas, and track their progress in real-time.
3. **Simplify Administrative Processes:** By integrating tools for **course management, student progress tracking, and report generation**, the LMS will streamline administrative tasks, reducing the manual workload for instructors and administrators. This will allow them to focus on more strategic academic activities, improving overall operational efficiency within the institution.
4. **Ensure Data Security and Privacy:** Protecting sensitive information is a top priority. The LMS will be developed with robust **data security protocols** to safeguard student and institutional data. This includes measures for **user authentication, encrypted transactions, and secure data storage**, ensuring that students and faculty can trust the platform with their personal and academic information.
5. **Facilitate Seamless Integration of Learning Resources:** The system will allow easy integration of various learning materials, including lecture notes, recorded videos, assignments, and quizzes, into a centralized platform. This will make it easier for students to access and navigate their academic content, contributing to a more organized and efficient learning experience.
6. **Promote Accessibility and Inclusivity:** By offering **free access to all courses**, the LMS will ensure that students from diverse economic backgrounds have equal access to educational resources. This will remove financial barriers to education, allowing more students to benefit from the learning opportunities provided by Aliate Uni.

1.5 Scope

The scope of this project is carefully defined to ensure clarity, focus, and feasibility in the development and implementation of the Learning Management System (LMS). This section outlines the specific features and functionalities that will be included in the system, as well as the aspects that will be excluded to maintain a clear project focus.

In Scope:

1. **Access to Course Materials:** The LMS will provide students with access to essential course resources, including downloadable lecture notes, presentations, and supplementary materials. These resources will be available for students to download and study offline, providing flexibility in their learning.
2. **Video Streaming for Lessons:** The platform will incorporate video streaming functionality to allow students to watch recorded lessons and tutorials. This will enable students to learn at their own pace, review lectures, and stay up-to-date with course content, even if they miss live sessions.
3. **Interactive Learning Features:** The LMS will include interactive features such as **discussion boards, quizzes, and assignments** to engage students actively in their learning. These features will encourage peer interaction, self-assessment, and collaboration, enhancing the overall learning experience.
4. **Free Access to Courses:** All courses offered through the LMS will be **completely free**, ensuring that no financial barriers exist for students. Every learner will have equal access to all the educational content, promoting inclusivity and widening opportunities for those who might not otherwise afford paid courses.
5. **Admin and Faculty Management Tools:** The system will include features for **course management, student progress tracking, and report generation**, enabling instructors and administrators to efficiently manage academic activities, monitor student performance, and generate necessary reports.

Out of Scope:

1. **Offline Learning Materials:** The LMS will not support face-to-face teaching or offline learning modules. All learning materials will be made available online, and any offline activities or workshops will be managed separately.
2. **Advanced AI Features:** Although future development may include **artificial intelligence** to recommend personalized learning paths or content, such features will not be part of the initial project scope unless specifically identified for future integration.
3. **Offline Payment Processing:** As the LMS is completely free, no payment processing system, online or offline, will be included in the platform.
4. **In-depth Analytics and Reporting:** Advanced analytics features, such as detailed learning behavior analysis or predictive performance reports, will not be included in the initial phase of the project. These can be considered for future development after the system is successfully implemented.

1.6 Significance

1. **Improved Access to Learning Resources:**

The LMS will provide students with centralized and easily accessible academic resources. By offering downloadable lecture notes, video tutorials, and interactive learning materials, the system will enhance the learning experience and ensure that students can access materials anytime, anywhere. This is particularly important in a fast-paced academic environment where students need flexibility and convenience to study effectively.

2. **Encouragement of Active Learning:**

Through features such as discussion forums, quizzes, and assignments, the LMS will foster a more interactive and engaging learning environment. By encouraging participation and collaboration, students will have the opportunity to deepen their understanding, exchange ideas with peers and instructors, and receive immediate feedback on their progress. This active learning approach will help students retain information better and improve overall academic performance.

3. **Cost-free Education for All Students:**

One of the key benefits of this project is the free access to all courses. The absence of fees ensures that financial constraints will not hinder any student from accessing quality educational content. This aligns with the institution's mission to provide equitable opportunities for all students, promoting inclusivity and supporting the goal of making education more accessible.

4. **Streamlined Administrative Processes:**

The LMS will reduce the administrative burden on faculty and staff by automating many tasks related to course management, student progress tracking, and report generation. This will allow academic staff to focus more on teaching and strategic decision-making while ensuring that the institution's operations run smoothly and efficiently.

5. Enhanced Security and Privacy:

With the integration of secure authentication systems, data encryption, and privacy protection measures, the LMS will ensure that student and institutional data are protected. By maintaining high standards of data security, the system will help build trust among users and safeguard sensitive information, which is essential in today's digital learning environment.

6. Long-term Sustainability and Scalability:

The system is being designed with scalability in mind, ensuring that it can accommodate a growing user base and additional functionalities as the institution's needs evolve. This long-term vision for the LMS will allow Aliate Uni to adapt to future educational trends and technologies, maintaining its position at the forefront of academic innovation.

7. Alignment with Modern Educational Needs

The project reflects the institution's commitment to staying current with technological advancements in the education sector. By adopting a digital platform for managing academic content, Aliate Uni will be able to meet the expectations of today's students who are accustomed to accessing online resources and engaging with technology in their learning processes.

Chapter 2

2.1 Review of the Existing System

The current educational management systems at Aliate Uni, though functional, exhibit limitations that impact the overall user experience.

These limitations include:

1. Lack of Free Access

Existing platforms impose financial barriers, restricting accessibility to high-quality educational resources for students.

2. Limited Customization:

Systems lack personalization features, preventing tailored learning paths for diverse student needs.

3. Outdated Communication Tools:

Current systems fail to support interactive tools like real-time Q&A, collaborative forums, and progress tracking.

4. Accessibility Issues:

Students face challenges with secure, global access to materials, reducing efficiency and reliability in learning.

2.2 Data Collection Methods

1. Surveys and Questionnaires

Conducted surveys targeting students, instructors, and administrators.

Questions focused on current system limitations, user requirements, and desired features.

2. Reference Materials

Course Videos from YouTube: Relevant tutorials and educational videos were reviewed to identify content delivery methods that improve student engagement and accessibility.

Exercises and Tutorials from W3Schools: Standardized exercises and programming tutorials from W3Schools were analyzed as a model for providing structured and interactive learning resources.

3. Focus Group Discussions

Conducted small group discussions with selected students and faculty members.

Participants provided feedback on desired features, challenges faced with existing systems, and suggestions for improvement.

4. Secondary Research

Reviewed existing LMS solutions such as Moodle, Blackboard, Canvas, and Google Classroom to identify best practices and limitations.

5. Observations

Observed current usage patterns and challenges faced by students while accessing course content.

2.3 Functional Requirements

1. User Registration and Authentication

Secure login for students, instructors, and administrators.

Role-based access to ensure data security.

2. Course Management

Uploading and managing course notes, videos, quizzes, and assignments.

Integration of course videos from YouTube for on-demand viewing.

Reference and tutorial exercises sourced from W3Schools for practical learning.

3. Content Delivery

Downloadable lecture notes and on-demand streaming of recorded lessons.

4. Interactive Learning Tools

Discussion forums for peer-to-peer and student-teacher interaction.

Progress tracking for quizzes and assignments.

5. Administration Tools

Course progress monitoring.

User activity reports for instructors and administrators.

6. Security and Privacy

Data encryption for user information.

Secure user authentication to prevent unauthorized access.

7. Customization and Scalability

Allow integration of third-party tools like Google Drive, Zoom, and external content (e.g., YouTube videos and W3Schools).

Scalable architecture to support increasing user demand.

Chapter 3

3.1 Design Description

1. **User-Centric Design:**

Intuitive navigation ensures students, instructors, and administrators can easily find resources and tools.

2. **Modularity:**

Features such as video streaming, course notes, and discussion forums are implemented as independent modules.

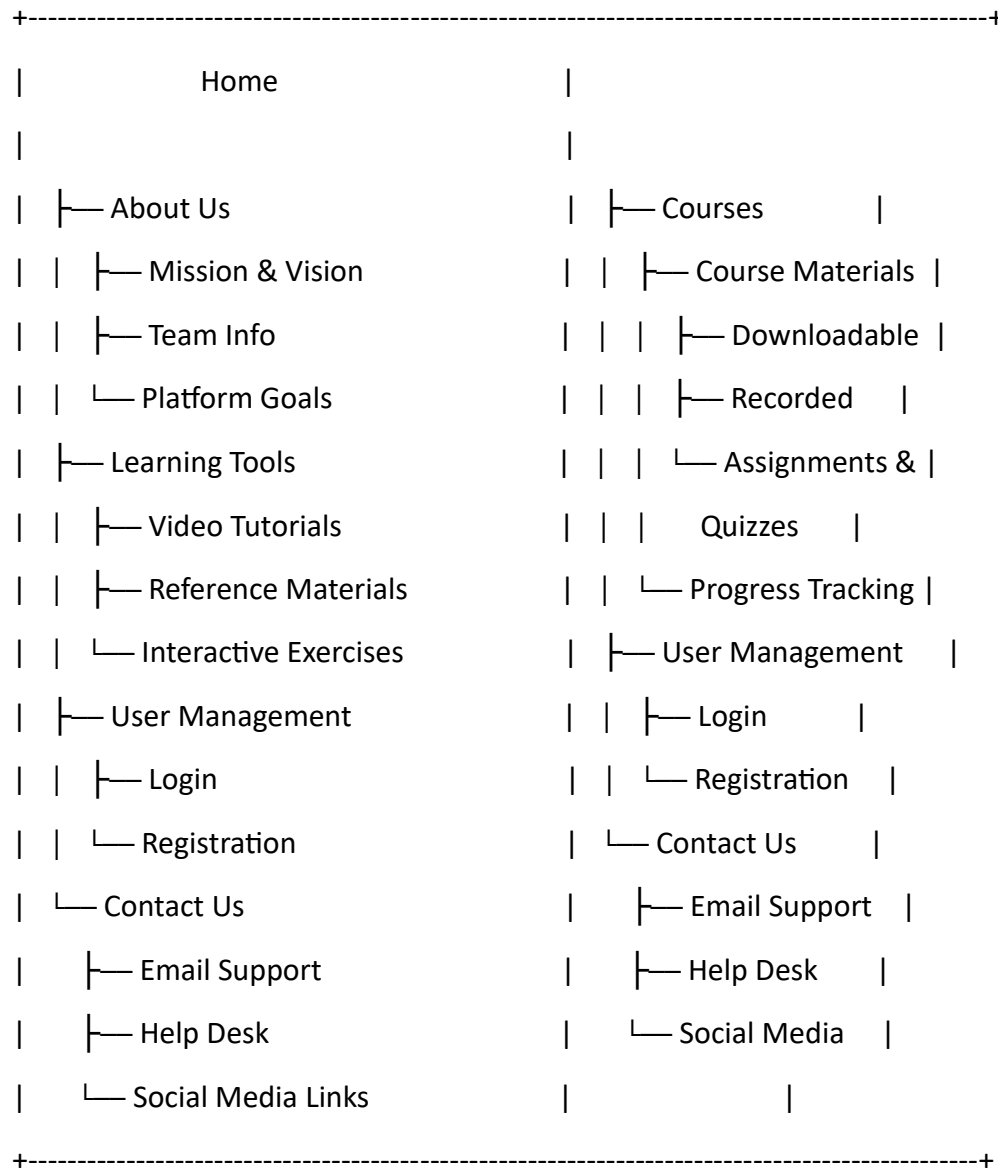
3. **Third-Party Integration:**

Tools like YouTube (video content) and W3Schools (interactive exercises) are embedded for advanced learning opportunities.

4. **Responsive Interface:**

The platform adapts to various devices, ensuring accessibility across desktop, tablet, and mobile screens.

3.2 Site Map



Explanation:

- **Home:** Main entry point with navigation links.
- **Learning Tools:** Focuses on integrating external resources like YouTube and W3Schools.
- **Courses:** Provides core content such as notes, videos, and quizzes.
- **User Management:** Handles user registration and secure login.

3.3 Fully Advanced Wireframes

3.3.1 Login Page Wireframe

- Elements:
 - Logo and Title at the top
 - Username and Password input fields
 - "Remember Me" checkbox
 - Buttons for "Login" and "Register"
 - Footer with "Forgot Password?" link
-

3.3.2 Dashboard Wireframe

- Elements:
 - Sidebar Navigation: Links to Courses, Videos, Forums, Progress, and Profile
 - Main Content Area: Course resources, notes, and videos
 - Top Navigation Bar: Notifications, Search, and User Profile
-

3.3.3 Course Page Wireframe

- Elements:
 - Course Title and Overview
 - Tabs: Notes (Downloadable), Videos (YouTube), and Exercises (W3Schools)
 - "Mark as Complete" buttons
-

3.3.4 Discussion Forum Wireframe

- Elements:
 - Forum Header with Topic Categories
 - Threaded Discussions with posts and replies
 - Search and Filter Options for discussion topics
-

3.3.5 Progress Tracking Page Wireframe

- Elements:
 - Progress Bar for course completion
 - Grades and Deadlines for Assignments
 - Notifications for pending tasks
-

3.3.6 Dashboard Page


- Elements:
 - Sidebar Navigation (Courses, Videos, Forums, Progress)
 - Main Content Area: Displays course resources (notes, videos, exercises).
 - Top Bar: Notifications and user profile.

Purpose: Serves as the central hub for accessing all LMS functionalities.

3.4 Figma Design

3.4.1 Home Page





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Chapters


Chapter 01

Lesson 01	Note 1	Download	01
Lesson 02	Note 1.1	Download	02
Lesson 03	Note 1.2	Download	03

Chapter 02

Lesson 01	Note 2	Download	04
Lesson 02	Note 2.1	Download	05
Lesson 03	Note 2.2	Download	06

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Chapter 4

4.1 Selected Tools and Their Features

1.Wix Dev Mode

- **Used for:** Customizing website functionality and integrating advanced features.
- **Key Features:**
 - **Corvid by Wix:** Adds JavaScript to create custom workflows, animations, and database interactions.
 - **Dynamic Pages:** Enables personalized content for users.
 - **APIs:** Integrates third-party tools like YouTube for embedding content.

2.Wix Members and Light box

- **Used for:** Managing user authentication with login and sign-up forms.
- **Key Features:**
 - Pre-built light boxes for easy creation of login/sign-up modals.
 - Role-based access control for different user types (students, instructors, admins).
 - Member dashboard for personalized user interactions.

3.YouTube API

- **Used for:** Embedding and managing video content.
- **Key Features:**
 - Interactive player controls.
 - Customizable video size and playback settings.

4. W3Schools Tutorials

- **Used for:** Providing interactive exercises and tutorials.
- **Key Features:**
 - "Try It Yourself" editor for hands-on learning.
 - Clear explanations and structured examples.

5. Wix Hosting

- **Used for:** Hosting the Knowledge Tree LMS platform.

4.2 Main Steps Followed

1. Enabling Wix Dev Mode

- Activated Wix's **Dev Mode** to unlock custom coding capabilities and advanced customization.
- Set up a database for storing user data, course materials, and progress tracking using **Wix Data Collections**.

2. Designing Pages

- Created static and dynamic pages for content like **Course Materials**, **Videos**, and **Assignments**.
- Implemented **dynamic pages** to display personalized course content for logged-in users.

3. Integrating User Authentication

- Used **Wix Members** and **Light boxes** for login and sign-up forms.
- Configured user roles to restrict access to certain pages based on the logged-in user type (student, instructor, or admin).

4. Embedding Content

- Integrated YouTube videos using **Wix HTML Elements** and **YouTube API** for dynamic and responsive video embedding.
- Added external links to W3Schools tutorials for interactive learning.

5. Custom Interactivity with Wix Code

- Added JavaScript-based custom code via Wix Dev Mode to enable features like **progress tracking** and **form validation**.

6. Testing and Optimization

- Tested functionality using Wix's built-in debugging tools.
- Ensured the site is responsive on desktop, tablet, and mobile devices.

7. Publishing the Website

- Deployed the website using Wix's hosting service, ensuring SSL encryption and fast load speeds.

4.3 Software Technologies Used

1. Frontend Technology: Wix Drag-and-Drop Editor

- **Purpose:** Designing and structuring the visual layout of the website.
- **Features:**
 - Intuitive drag-and-drop interface to place elements like text, images, buttons, and videos.
 - Pre-designed templates and customizable themes for professional layouts.
 - Responsive design ensures compatibility with desktop, tablet, and mobile devices.

2. Backend Technology: Wix Dev Mode

- **Purpose:** Customizing and extending website functionality.
- **Features:**
 - Built-in JavaScript editor for coding dynamic behaviors.
 - API integrations for third-party tools like YouTube and W3Schools.
 - Event-driven programming to manage user interactions and automate workflows.

3. Database: Wix Data

- **Purpose:** Storing and managing data for users, courses, and progress tracking.
- **Features:**
 - **Data Collections:** Organizes data into tables for easy access and manipulation.
 - **Dynamic Connections:** Links data to website elements like dynamic pages and repeaters.
 - Built-in security for managing permissions and restricting data access based on user roles.

4.4 Sample Code with Explanation

Below is the sign-up and login functionality implemented using HTML, JavaScript, and Wix backend code

Frontend Code

The following code creates the sign-up and login UI and integrates JavaScript functions for communication with the Wix backend

```
<!DOCTYPE html>

<html lang="en">

<head>

  <meta charset="UTF-8">

  <meta name="viewport" content="width=device-width, initial-scale=1.0">

  <title>Sign Up and Login</title>

  <style>

    /* Add your CSS styles here */

  </style>

</head>

<body>

  <div class="form-container">

    <!-- Sign-Up Form -->

    <div id="signupForm">

      <h2>Sign Up</h2>

      <input type="text" id="firstName" placeholder="First Name" required>

      <input type="text" id="lastName" placeholder="Last Name" required>

      <input type="email" id="signupEmail" placeholder="Email" required>

      <input type="password" id="signupPassword" placeholder="Password" required>

      <button onclick="signup()">Sign Up</button>

      <p>Already have an account? <a onclick="toggleForms()">Log In</a></p>

    </div>

  </div>

</body>

</html>
```

```

</div>

<!-- Login Form -->
<div id="loginForm" class="hidden">
  <h2>Log In</h2>
  <input type="email" id="loginEmail" placeholder="Email" required>
  <input type="password" id="loginPassword" placeholder="Password" required>
  <button onclick="login()">Log In</button>
  <p>Don't have an account? <a onclick="toggleForms()">Sign Up</a></p>
</div>

</div>

<script>
function toggleForms() {
  document.getElementById('signupForm').classList.toggle('hidden');
  document.getElementById('loginForm').classList.toggle('hidden');
}

async function signup() {
  const data = {
    firstName: document.getElementById("firstName").value,
    lastName: document.getElementById("lastName").value,
    email: document.getElementById("signupEmail").value,
    password: document.getElementById("signupPassword").value,
  };
  try {
    const response = await fetch("https://your-wix-site.com/_functions/signup", {
      method: "POST",
      headers: { "Content-Type": "application/json" },
      body: JSON.stringify(data),
    });
  }
}

```

```
        alert((await response.json()).message || "Signup successful!");
    } catch {
        alert("Error during sign up.");
    }
}

async function login() {
    const data = {
        email: document.getElementById("loginEmail").value,
        password: document.getElementById("loginPassword").value,
    };
    try {
        const response = await fetch("https://your-wix-site.com/_functions/login", {
            method: "POST",
            headers: { "Content-Type": "application/json" },
            body: JSON.stringify(data),
        });
        alert((await response.json()).message || "Login successful!");
    } catch {
        alert("Error during login.");
    }
}

</script>
</body></html>
```

Backend Code

Wix backend functions handle user sign-up and login securely

```
import wixData from 'wix-data';
import { ok, badRequest } from 'wix-http-functions';
import bcrypt from 'bcryptjs'; // For password encryption

// SIGN-UP FUNCTION
export async function signup(request) {
  try {
    const { firstName, lastName, email, password } = await request.body.json();

    if (!firstName || !lastName || !email || !password) {
      return badRequest({ body: { message: "All fields are required!" } });
    }

    const existingUser = await wixData.query("Users").eq("email", email).find();
    if (existingUser.items.length > 0) {
      return badRequest({ body: { message: "Email already exists. Please log in." } });
    }

    const hashedPassword = await bcrypt.hash(password, 10);

    await wixData.insert("Users", { firstName, lastName, email, password: hashedPassword });

    return ok({ body: { message: "Signup successful!" } });
  } catch (error) {
    return badRequest({ body: { message: "Error during signup.", error } });
  }
}
```

```
}
```

```
// LOGIN FUNCTION
```

```
export async function login(request) {
```

```
  try {
```

```
    const { email, password } = await request.body.json();
```

```
    if (!email || !password) {
```

```
      return badRequest({ body: { message: "Email and password are required!" } });
```

```
    }
```

```
    const user = (await wixData.query("Users").eq("email", email).find()).items[0];
```

```
    if (!user) {
```

```
      return badRequest({ body: { message: "User not found." } });
```

```
    }
```

```
    if (await bcrypt.compare(password, user.password)) {
```

```
      return ok({ body: { message: "Login successful!" } });
```

```
    } else {
```

```
      return badRequest({ body: { message: "Invalid password." } });
```

```
    }
```

```
  } catch (error) {
```

```
    return badRequest({ body: { message: "Error during login.", error } });
```

```
  }
```

```
}
```


Explanation

1. Frontend Code

- **HTML and CSS:** Creates responsive forms for user interaction.
- **JavaScript:** Fetches data from the backend API for sign-up and login.

2. Backend Code

- **Wix Data:** Handles user data storage and retrieval.
- **bcrypt:** Encrypts passwords for secure authentication.
- **API Endpoints:** signup and login handle data validation, storage, and user verification.

Chapter 5

5.1 Functional Testing

1. Link Verification

- Internal and external links tested to ensure proper navigation without errors.
- Tools like Screaming Frog were used to validate link health.

2. Form Functionality

- Sign-up, login, and other input forms tested for correct data validation and processing.
- Handled API integrations for real-time responses and error prompts.

3. Navigation and Buttons

- Menus, dropdowns, and buttons tested to ensure they trigger appropriate actions.
- Tested dynamic actions like light boxes for login and modal transitions.

4. Media Testing

- Images, videos (YouTube integration), and audio were tested for responsiveness, playback, and loading performance.

5.2 Design and Layout Testing

1. Responsive Design Testing

- Used Browser Stack to test across multiple device resolutions (desktop, tablet, mobile).
- Ensured that the layout adjusted gracefully on various screen sizes.

2. Cross-Browser Testing

- Verified appearance and functionality across browsers:
 - Chrome (latest version)
 - Firefox
 - Safari (macOS and iOS)
 - Microsoft Edge

3. Alignment Consistency

- Checked that all visual elements, including buttons, headings, and images, aligned with the design prototype (Figma).

4. Color and Typography

- Verified adherence to the defined color scheme (contrast ratios for accessibility) and font usage.

5.3 Usability Testing

1. User Journey Testing

- Test users completed specific tasks (e.g., signing up, accessing a course, and submitting assignments).
- Gathered feedback on navigation flow, intuitiveness, and speed.

2. Accessibility Testing

- Used tools like **WAVE** and **Lighthouse** to ensure WCAG (Web Content Accessibility Guidelines) compliance.
- Verified keyboard navigation and screen-reader compatibility.

3. Broken Link Analysis

- Automated tools (e.g., **Dead Link Checker**) identified and fixed any broken links.

4. Error Handling

- Tested custom error pages (e.g., 404 and 500 pages) for user guidance and redirection options.

5.4 Performance Testing

1. Load Testing

- Used GTmetrix and Google Page Speed Insights to measure load times and optimize page speed.

2. Stress Testing

- Simulated heavy user traffic to evaluate system stability and response under load.

3. Caching and Optimization

- Ensured proper caching of images, scripts, and styles for faster load times.

Chapter 6

Discussion

6.1 Achievement of Objectives

1. User-Friendly Interface:

- A clean, responsive design was implemented using Wix drag-and-drop editor, ensuring accessibility on all devices.

2. Centralized Learning Resources:

- Integrated features like downloadable notes, YouTube video tutorials, and W3Schools exercises allowed seamless content delivery.

3. Scalability and Customization:

- Dynamic pages and Wix Data Collections supported personalized content for students.

4. Secure Login System:

- User authentication was secured using Wix Members and backend JavaScript code, achieving robust data protection.

6.2Lessons Learned

1.Importance of User Feedback:

- Testing with real users highlighted navigation and usability improvements.

2.Time Management:

- Balancing design and functionality development taught the value of iterative testing.

3.Wix Dev Mode Features:

- Explored advanced JavaScript coding and API integration, significantly enhancing site functionality.

6.3Future Development

1. **AI-Driven Features:**

- Incorporate AI for personalized learning paths and content recommendations.

2. **Mobile App Integration:**

- Extend the platform to mobile apps for better accessibility.

3. **Enhanced Analytics:**

- Add advanced tracking for student progress and activity.

4. **Gamification:**

- Introduce features like badges and rewards to boost student engagement.

References

1. W3Schools - Learn web development languages and interactive exercises

<https://www.w3schools.com>

2. YouTube - Video tutorials and educational resources

<https://www.youtube.com>

3. GTmetrix - Website performance analysis and optimization tools

<https://gtmetrix.com>

4. Google Page Speed Insights - Page performance and loading speed optimization

<https://pagespeed.web.dev>

5. Wix - Website development and hosting platform

<https://www.wix.com>

6. Lighthouse (Google) - Accessibility and performance testing tools

<https://developer.chrome.com/docs/lighthouse>

7. Dead Link Checker - Automated broken link identification tool

<https://www.deadlinkchecker.com>

8. Browser Stack - Cross-browser testing and compatibility tools

<https://www.browserstack.com>