VIETNAM NATIONAL UNIVERSITY – HCM

INTERNATIONAL UNIVERSITY

Final Report

Topic: H5P Creation Platform

Department: School of Computer Science and Engineering

Course: Web Application – IT093IU

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1. Project Overview

The goal of this project is to create a web-based platform that simplifies the process of creating and customizing H5P interactive content for university teachers. The platform will allow teachers to upload their own videos or use YouTube links, edit videos, and create H5P content with an intuitive interface. The platform will also provide a preview feature and export H5P content as LTI links for integration with Learning Management Systems (LMS).

2. Target Audience

The primary users of the platform are university teachers who:

- Are not familiar with web-based video creation tools.
- Struggle with the complex UI and long loading times of existing H5P tools.
- Need a simple, intuitive, and free tool to create interactive video content.

3. Core Features

User Authentication

Teachers can create accounts and log in to save and organize their projects.

Video Upload and YouTube Integration

Teachers can upload their own videos or provide YouTube links.

Basic Video Editing

Teachers can trim videos and add captions (for uploaded videos).

H5P Content Creation

Teachers can use the H5P plugin to create interactive content (e.g., quizzes, clickable hotspots).

Templates

Pre-designed H5P templates to simplify the creation process.

Preview Feature

Teachers can preview their H5P content before exporting.

Export as LTI Link

Teachers can export their H5P content as an LTI link for LMS integration.

Multi-Language Support
The platform supports English and Vietnamese.

Feedback Mechanism
Teachers can provide feedback to help improve the platform.

4. Tools and Technologies
Frontend
- React.js(TypeScript, Mobx): For building a responsive and intuitive UI.
- H5P Core Library: For creating interactive content.
- FFmpeg.wasm: For basic video editing (trimming, captions).
- YouTube IFrame API: For embedding and using YouTube videos.
- Material-UI/Chakra UI: For pre-built UI components and a clean design.

Backend
- Node.js with Express: For handling API requests and server logic.
- PostgreSQL: For storing user accounts, project data, and metadata.
- H5P Node.js Library: For integrating H5P functionality.
- YouTube Data API: For validating and extracting YouTube video details.

Authentication
- JSON Web Tokens (JWT): For secure user authentication.
- Bcrypt: For hashing passwords.

Hosting
- Nginx/Apache: As a reverse proxy to serve the application.
- Provided Server: For hosting the platform.

Other Tools
- i18next: For multi-language support (English and Vietnamese).
- FFmpeg: For server-side video processing (if needed).

5. Workflow for Teachers
- Sign up/Log in: Teachers create an account or log in.
- Upload Video or Paste YouTube Link: Teachers choose to upload a video or provide a YouTube link.
- Edit Video: Trim the video or add captions (for uploaded videos).
- Create H5P Content: Use the H5P plugin to add interactivity (e.g., quizzes, hotspots).
- Preview: Test the H5P content to ensure it works as expected.
- Export: Generate an LTI link for use in their LMS.
- Save/Organize: Save the project to their account for future editing or reuse.

6. Implementation Plan

Phase 1: Setup and Basic Structure

- Set up the development environment (React, Node.js, PostgreSQL).
- Create a basic React frontend with a login/signup page.
- Set up a Node.js backend with user authentication (JWT).
- Integrate PostgreSQL to store user data and project metadata.

Phase 2: Core Features

- Add a video upload feature to the frontend.
- Add support for YouTube links using the YouTube IFrame API and YouTube Data API.
- Integrate a basic video editor (trimming, captions) using FFmpeg.wasm for uploaded videos.
- Integrate the H5P plugin to allow teachers to create interactive content.
- Add a preview feature so teachers can test their H5P content.
- Implement an export feature to generate LTI links.

Phase 3: User Experience and Polish

- Add multi-language support (English and Vietnamese) using i18next.
- Create a dashboard where teachers can view, organize, and manage their projects.
- Add templates for common H5P content types to simplify the process.
- Implement a feedback mechanism (e.g., a simple form).

Phase 4: Testing and Deployment

- Test the platform thoroughly with sample users (e.g., university teachers).
- Fix bugs and improve the UI/UX based on feedback.
- Deploy the platform on your server using Nginx/Apache as a reverse proxy.

7. Challenges and Solutions

Challenge: Supporting both uploaded videos and YouTube links.

- Solution: Use FFmpeg.wasm for uploaded videos and the YouTube IFrame API for YouTube links.

Challenge: Ensuring scalability with a large number of users.

- Solution: Use PostgreSQL for the database and implement connection pooling.

Challenge: Simplifying the UI for non-technical teachers.

- Solution: Use templates and a clean, intuitive design with Material-UI/Chakra UI.

8. Future Enhancements

- Cloud Storage: Integrate cloud storage (e.g., AWS S3) for video uploads if the platform scales.
- Analytics: Add analytics to track how teachers and students interact with the content.
- Collaboration: Allow multiple teachers to collaborate on the same project.
- Mobile Support: Make the platform mobile-friendly.

9. Conclusion

This platform will provide university teachers with a simple, intuitive, and free tool to create interactive H5P content. By leveraging modern tools and technologies, the platform will streamline the process of video creation and customization, making it accessible to teachers with varying levels of technical expertise. The project is designed to be scalable, user-friendly, and easy to maintain, ensuring long-term success and adoption.