Requirements Analysis - Group 5

Project Description:

The project will be a quiz-based learning platform that makes it possible for the user to answer trivia questions of different subjects.

Aims & Objectives:

Aims:

·      Develop an interactive quiz-based learning platform that allows users to answer trivia questions on various subjects with a gamified experience.

·      Ensure a user-friendly interface with attracting colours for ease of use.

·      A system for tracking progress and user performance.

Objectives:

·      Implement a Database (e.g. SQLite, MySQL) to store the questions.

·      A backend will be developed using Python framework (e.g. Django) for quiz logic and user interaction.

·      A frontend interface using web framework (CSS, HTML, JavaScript).

·      A system of scoring that provides feedback.

·      A subject and age selection feature.

·      Add a countdown timer to enhance the challenge.

·      Testing to ensure a smooth experience.

·      User authentication.

Description of Key Literature & Background Reading

We are developing our project to capitalise on the efficiency and retention of memory tests. As proven in the research study Test-Enhanced Learning [1] students retain much more information in the long term from taking a test (i.e. with similar information to what they will be tested on) in comparison to just standalone studying of material (i.e. reading through passages). This is one of the reasons that we are adding the flashcard feature to the project; since the user can write a specific term or phrase on a flashcard and test themselves using our software.

It is also essential that the front-end development (User Interface and User Experience) is as destressing and easy to use as possible. The reason for this being that an overcomplication in terms of the user trying to figure out what is going on or what they are looking at will negatively impact how much they are able to learn. This is proven in Cognitive Load Theory [2], as “groups with the highest learning outcomes reported lowest cognitive load.” Therefore we must ensure the user is not overwhelmed during their experience due to our interfaces.

Leading on from the point I have just made, we are going above the level of just having nicely spaced buttons with labels to satisfy “ease of use”; we are making the project visually appealing and aesthetic. This is due to research carried out in Determinants of the Apparent Usability [3]. The experiment conducted confirms that for improved usability the software must look usable and engaging.

Development and Implementation Summary:

When thinking about the project as a whole I believe we can section it into three  main topics: frontend, backend and the database. The frontend will handle all of the user interactions and form an easy-to-use UI that provides all of the key features the app needs. Most of the frontend is planned to be completed in HTML and CSS however there will be some animations and functions done in JavaScript.The database is an essential part of our app because it is what is going to be storing our quizzes and important user login details so that users are able to store and save quizzes and also create their own. We will be using MySQL to construct the required databases. Finally, the backend is also an integral part of our project as this is what is going to handle the calls from the frontend to the database and link everything together. We have chosen python to handle the backend for our app and have had some initial thoughts about using flask or django to handle the python interaction with both the database and frontend.Additonally, we plan to integrate our website to a functioning mobile app after completing the initial development and in order to do this we have proposed to use ionic for easy integration and application of mobile frameworks.

Data Sources

First of all we will be using user profiles which are going to be generated by the user and the passwords hashed out. This will be once the users have agreed to terms and conditions therefore giving us permission.

Another source of data will be the flashcard sets created by the users which we will maintain in our database. This includes any information about the flashcards (i.e. when a student tests themselves: how many are correct etc.)

Similar to the last source, we will also have the pre-made flashcard sets generated by either us or multiple credible sources in their respective domains.

Finally, we have the data that our APIs use which will be generated by the API itself and we will be using the API’s legally (paid).

Testing & Evaluation

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Ethical Considerations

We have read the University’s ethical guidelines and will follow them. While most of the data contained within the final app will be user-generated, ensuring that any external data (for example, anything AI generated or the actual neural network data used for that AI) is only used with permission will be necessary.

Data security:

Given that users will have individual accounts on the website, it will be important to ensure that data is stored securely (e.g the users’ personal information or authentication data). To this end, the database for the project will be created on the University’s Linux farm.

Testing participants:

In accordance with the University’s guidelines, we will use only appropriate testing participants for the project. To ensure the testers’ privacy, only absolutely necessary information about their contributions will be stored, and it will be fully anonymised and stored securely on the University filestore.

Ensuring appropriate content:

As the app is intended to be a tool for studying, it is likely that the end users would be children and young people. While we cannot have children testing the app, it is still important that any content produced on the app does not contain any inappropriate material given the intended use case.

BCS Project Criteria

Practical & Analytical Skills:

The practical skills that we are using, that have been taught to us throughout the course so far, are the tools we are using for the development of the software as a whole. These are included, but not limited to: CSS, HTML, JavaScript, Python, SQL. These are majority of the languages that we are using in order to develop the software from both the front and back ends. In terms of analytical skills we will be modelling the database used for our system using schema (i.e. a table for users and another for flashcards etc.) We will also be agile testing our system thoroughly to ensure that it functions as proposed and that large issues do not just crop up immediately towards the end of development.

Innovation/Creativity:

AI based flashcards, text-to-speech, multi-language support.

Synthesis:

By reviewing literature such as Cognitive Load Theory [1] inspired us to create software heavily linked to this research and other research we carried out (see Key Literature & Background Reading section.)

Real Need in Wider Context:

There is always a need for education, no matter the time nor the situation. Our project provides a necessary assistant to those in education. Everyone at one point or another is short on time or just wants to get a task out of the way, therefore the efficiency and effectiveness of our project is where we excel. Our project can be accessed by everyone with internet and is in multiple languages providing the inclusion aspect needed by our users.

Self-management:

We are going to be using the methodology of agile testing to ensure that all of our processes that we develop will not be faulty or nurture any new bugs for if we were to piece together different parts of the project together towards the end of development.

Self Evaluation:

We will constantly be assessing how each stage of development, whether it be the log in system and corresponding database, have worked. How fluid our processes work together. If anyone has anything they think they could improve or tweak during development. We will also continue to brainstorm for areas of development during our bi-weekly meetings.

UI/UX Mock-up

A blue board with white writing on it

AI-generated content may be incorrect.A screenshot of a quizzion

AI-generated content may be incorrect.

A screenshot of a quiz

AI-generated content may be incorrect.A screenshot of a cell phone

AI-generated content may be incorrect.

Project, Risk & Contingency Plans

A table with text on it

AI-generated content may be incorrect.

We have created a spreadsheet as seen above to give guidance on how we plan to spend our time over the course of the semester allowing appropriate time for handling submissions, testing and the actual development of the app. Each of the 5 members have individual tasks to work on each week and we will monitor progress via group meetings twice a week. We are anticipating challenges and roadblocks and are only using the spreadsheet as a rough estimate and all weeks are subject to change based on current progress at the time. The bulk of the project will be completed as a web-based application however we plan to integrate our software into an app using ionic frameworks. As we can see from the spreadsheet for the main development of the app we have sectioned it into three sections: frontend development, backend development and database development. Each of these categories have been divided amongst us based on experience and an expected time frame respectively. After completion of initial development we plan to come together for the app integration and final testing of the app. It should be noted that testing will be a continuous process throughout development of the app from the very first day as we plan to use numerous testing methods and technologies and the “final testing” noted in the spreadsheet will only consist of last minute refining and validation.

References

[1] Roediger & Karpicke (2006). Test Enhanced Learning. Psychological Science. 1-2.

[2] Sweller, Ayres & Kalyuga (2011). Cognitive Load Theory, Learning Sciences. 6.

[3] Kuroso & Kashimura (1995). Determinants of the Apparent Usability.