Project Evaluation Report

Project Title: SMART-bridge-to-WEB

School/Department: Design, Creative and Digital Industries/Computer Science and Engineering

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Abstract

An analysis of the SMARTEST website [1] node view was conducted to gather what features should be transferred over to SMART-bridge-to-WEB (SB2W). Then, several prototypes were created from the requirements identified during analysis until a final master prototype was developed. This prototype was used as a reference for the project's implementation, which can be viewed at [2]. The report is concluded by reflecting on our teamwork, how the project went, and on what we will do next with the project.

Introduction

This project aims at developing a web-based application which will target an additional functionality to the already developed knowledge and learning platform SMARTEST [1]. The platform, as it currently stands, enables interactions between students and academics, represents learning content graphically in forms of module structures and learning processes. It has attracted more than 300 registered student users both from University of Westminster (UoW) and various groups of students at our partner university in Tashkent – Westminster International University in Tashkent (WIUT). This is due to it offering a more interactive interface of building learning content in the form of graphs and learning paths [3], which other existing learning platforms such as Blackboard [4] does not. However, for many student users and academics, specifically for those not from STEM disciplines, the representation of learning content in the form of graphs may not be ideal as it requires an understanding of the additional graph structure/concept.

This project will improve and allow SMARTEST to attract more users by tackling the development of a relevant software solution, building extra functionality of a more familiar web-based interface of the SMARTEST learning content. With such a solution the possibility offered to lecturers to create graphical representations of the learning processes will be complemented with a graph-less interface for students who prefer it, leaving the possibility open for them to still access the graphical representation should they desire so. With such extension, SMARTEST will be able to also offer a simple and intuitive interface to academics, that allows the easy navigation and consumption of information. With existing platforms, it is difficult at times for students to access all the information and have a clear overview of the module structures and learning paths, which may serve as an inconvenience at times when revisiting materials for exam revision, for example. The proposed project aims at addressing this issue.

Requirement Gathering

We started the project by analysing SMARTEST first. We wanted to migrate as many features as possible over without using the graphs. The aim was to have all the same information displayed in a different style, so that students that could not learn using the graphs had an alternative method of accessing them. In the end we took each section of a graph view and created an equivalent web view.
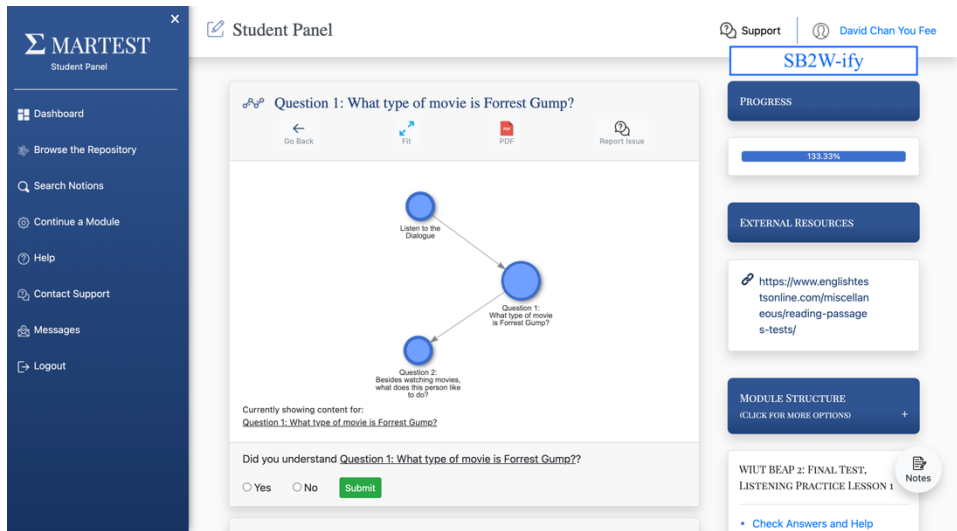
Figure 1 - Deciding on where to put the button linking to SMART-bridge-to-WEB.
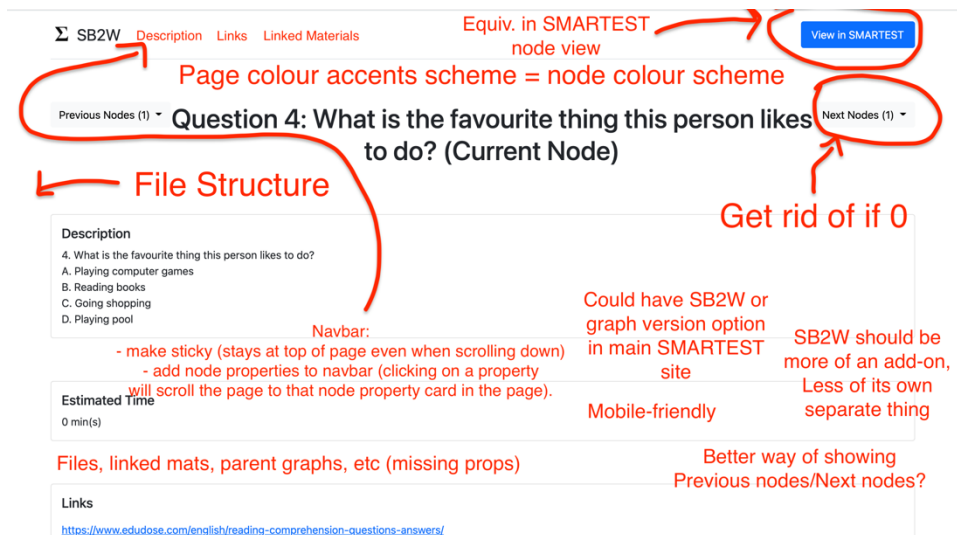

Figure 2 - Notes to improve the first iteration of SB2W, during a group meeting.

The design of the whole page was inspired from other learning platforms like Blackboard and LinkedIn Learning [5]. The best way to represent the graph was a style similar to a file structure that students are most likely, already used to. The design had to be intuitive on a mobile device, as we were aware that many of our student users use their phones when accessing SMARTEST.

We decided that the most important features to convert were the navigation and access to information that the graph provided. This is facilitated by the file structure on the left-hand side and the main panel (containing the graph information) on the right-hand side. We also found the notes, feedback dialogue, share buttons, and SMARTEST link to be fundamental to increasing the usability and efficiency of the new platform.

Navigation and clear access to information for SMARTEST's mobile interface was not as good as it was on desktop. One of the comments given on this noted that important aspects such as a

node's description, hyperlinks and tags were not immediately visible upon loading a page, and that it was required to scroll down to see them. No clear indicators were also given that these could be viewed by scrolling further down the page. These aspects were addressed in the SMART-bridge-to-WEB design.

Methodology

We held weekly Teams [6] meetings online on Thursday evenings, where we each gave updates on our progress throughout the week, sometimes also by giving a small visual demonstration of our work. After we had all given an update, we divided the tasks for the next week amongst ourselves. Meetings also provided opportunities to ask questions or to help each other out with tasks.

To keep track of tasks, we used a project task management tool called Trello [7], which allowed us to add, update or mark task cards as done on a virtual board, which was done at every meeting.
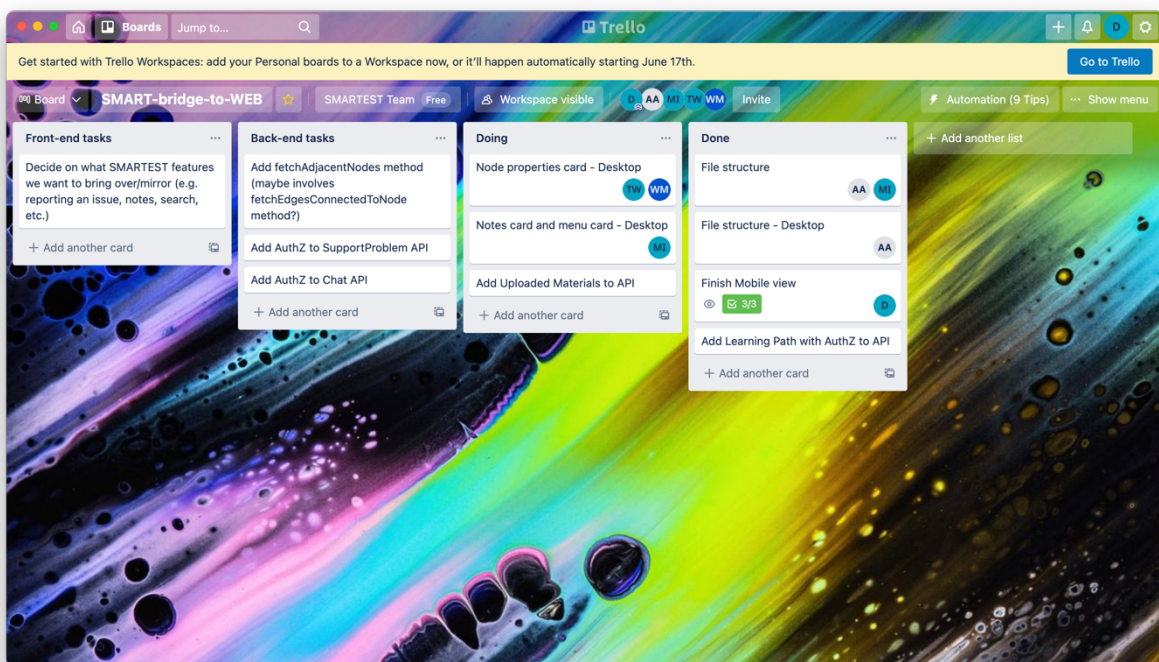

Figure 3 - The Trello board for the project.

When it came to code development, we all shared a similar development environment which we had set up on our own systems. Code was then uploaded to a shared repository on GitHub [8], where we could see each other's code changes, download them, and/or merge them together.
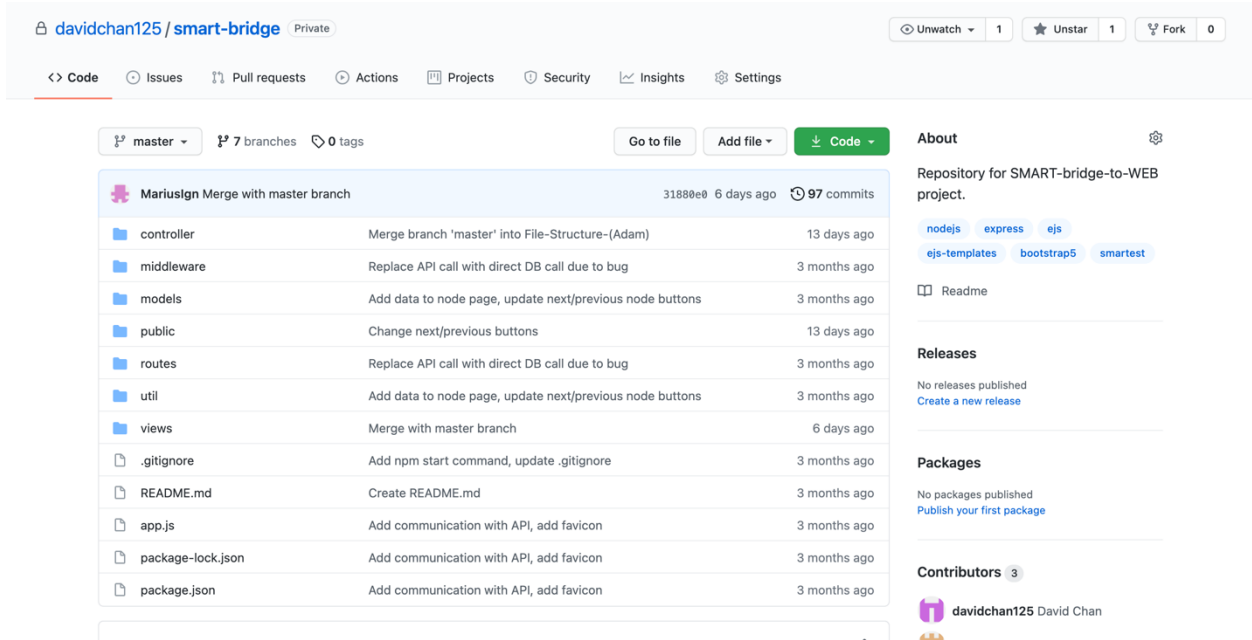
Figure 4 - The GitHub repository page for the project.

Design

To start the design process of our software, each team member created a prototype design of how they imagined the software could look like and how it would function, considering the requirements and target users. All ideas were then presented at a team meeting, where we analysed and discussed our designs, and then decided to incorporate features from each design into one, to create a rough idea of how we all wanted the software to look and function. This idea formed the basis for our first functioning prototype using HTML [9], CSS [10] and JavaScript [11].

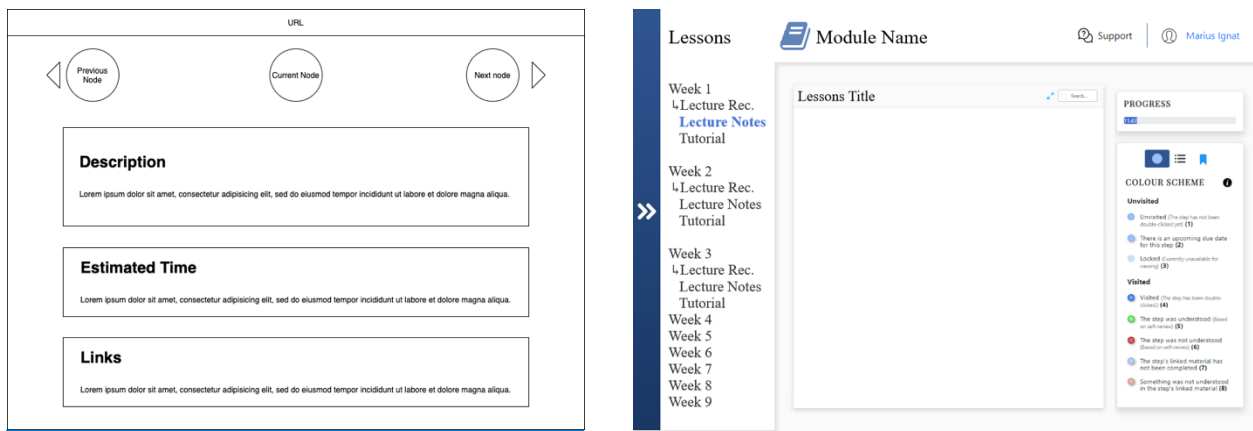First prototype designs (gathering ideas for the design):

Figure 5 – [Left] One of the designs created as a possible candidate for SB2W's user interface [1]. [Right] One of the designs created as a possible candidate for SB2W's user interface [2].
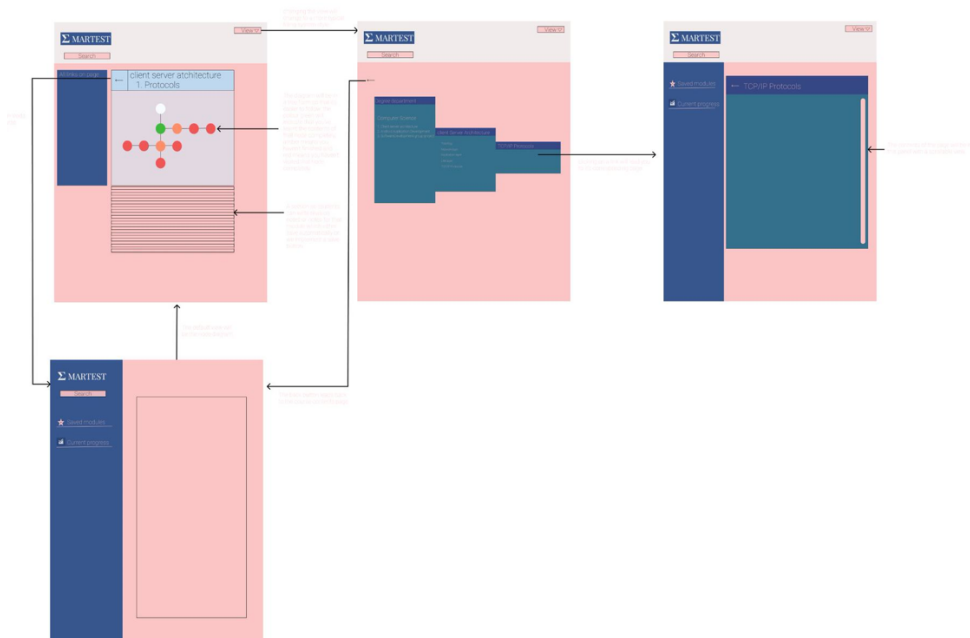
Figure 6 - One of the designs created as a possible candidate for SB2W's user interface [3].
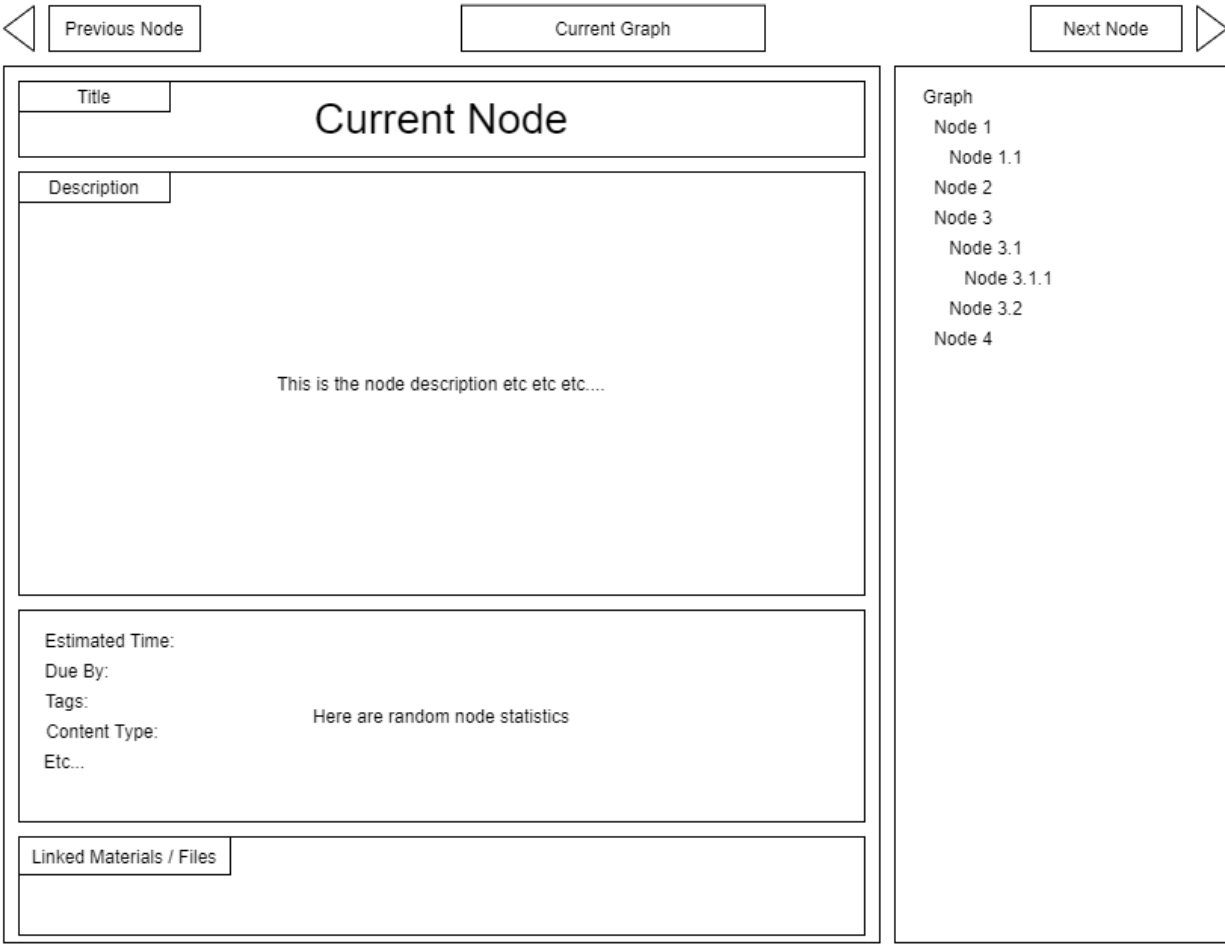
Figure 7 - One of the designs created as a possible candidate for SB2W's user interface [4]

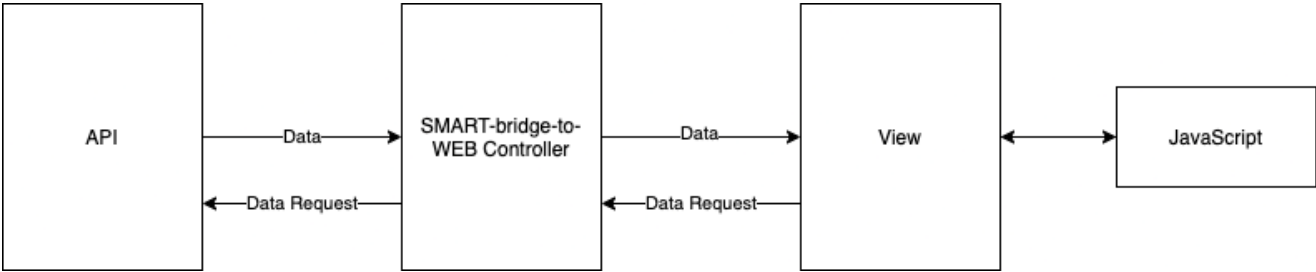A diagram demonstrating how the back-end side of SMART-bridge-to-WEB would work was also produced:

Figure 8 - A diagram of the back-end architecture of SMART-bridge-to-WEB.

With all team members satisfied with the first prototype, we decided to create low-fidelity desktop and mobile wireframe designs in a collaborative design software called Miro [12], which allowed the team to work on the designs at the same time.

Once the wireframes were finished in Miro, we moved to another design tool called Figma [13], where we created high-fidelity designs from the wireframe designs, introducing aspects such as

the colour scheme and a user flow for the website, which can be tested out using Figma's "prototype" feature.
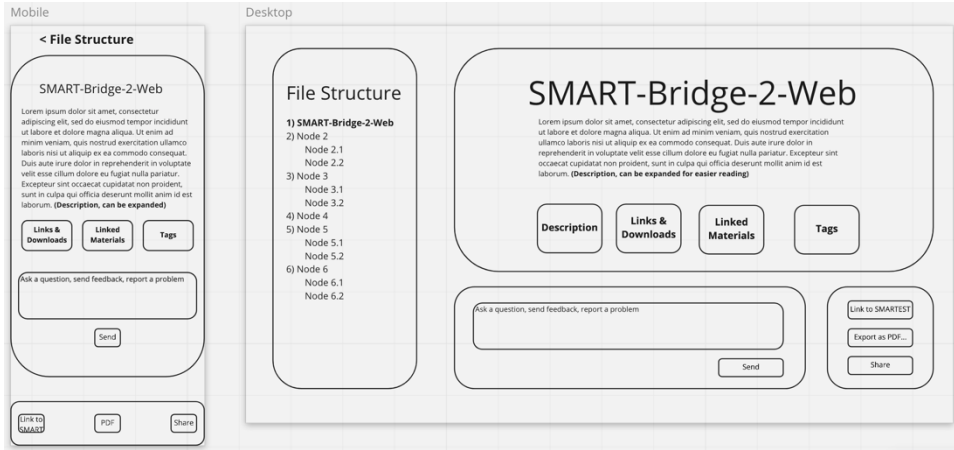
Miro designs:

Figure 9 - The low-fidelity designs created in Miro.
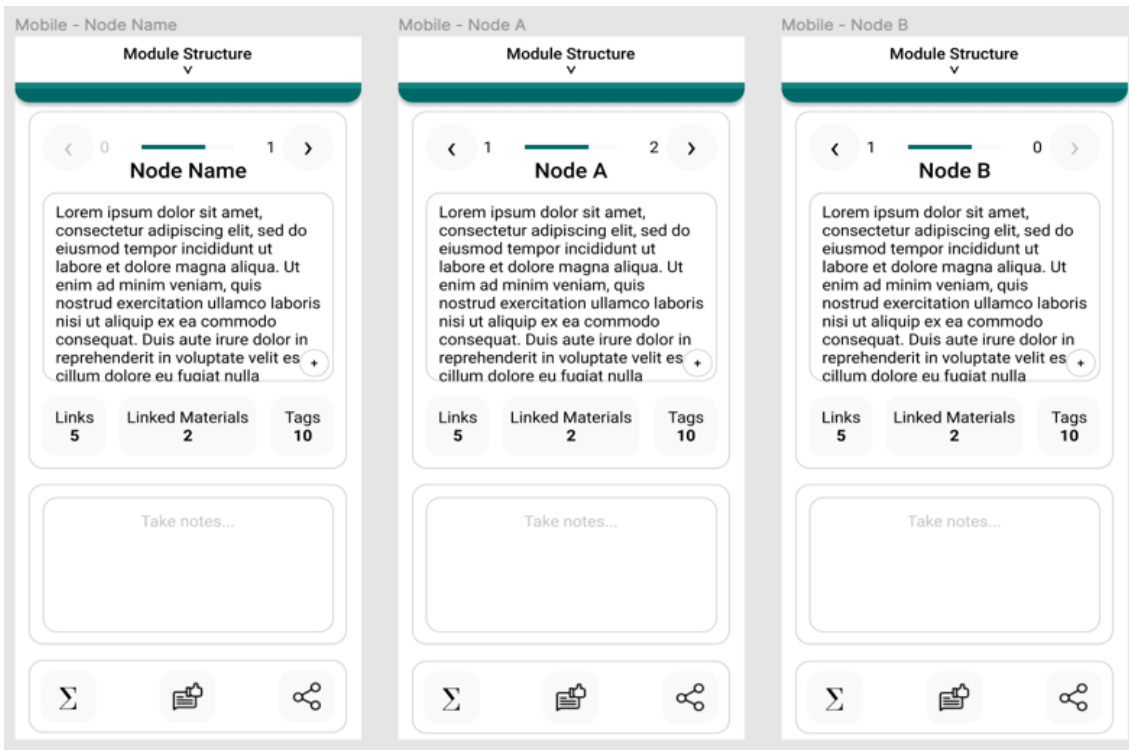
Figma designs:

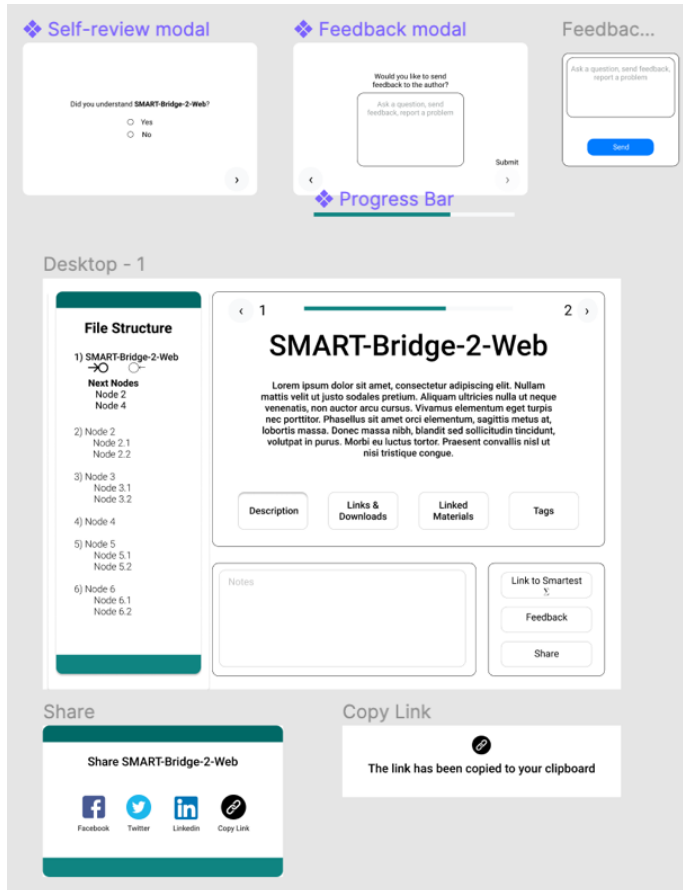*Figure 10 - The high-fidelity mobile designs created in Figma.*

Figure 11 - The high-fidelity desktop designs created in Figma.

During the design process, it was also possible to address issues given on the SMARTEST website's current mobile interface, mentioned in the Requirement Gathering section of this report.

Implementation

The designs made in Miro and Figma served as references for the user-facing side of the website implementation which we built with HTML, CSS, JavaScript and with Bootstrap [14], a front-end open-source toolkit, which helped a lot in allowing us to quickly build a functional version of the website. The back-end side of the website was built with Node.js [15] and the Express framework [16].

As per our meetings, we assigned tasks for implementation among ourselves individually, with some more complex tasks requiring them to be shared between a few members. One example of such is connecting the back-end side of SMART-bridge-to-WEB to the user-facing side. Our workflow was based upon the development environment we created, which involved a local testing environment where we could safely test the versions of SMART-bridge-to-WEB we were each working on, in conjunction with our code in Visual Studio Code [17]. Each time we made changes and tested that they worked, we uploaded to an online GitHub [8] repository, and

when merging another team member's code into our own, we downloaded from the same repository and fixed any merge conflicts (mismatches between one version of the code and another) that may have occurred.

Results

As seen from above, the project was carefully planned through from the start by following different steps to ensure that each aspect of the development process is given its importance, by taking the time and giving the effort to understand the requirements of the project and create multiple prototypes to ensure that the design is well suited with the goal of this project. As a result, we are pleased to say that we have a working prototype developed, which can be accessed through the following link: https://sb2w.herokuapp.com/.

In the future, we will deploy this as a complementary addition to the SMARTEST website [1] (at https://smartestknowledge.org).

Conclusion

Reflecting on what we did well, we consistently had meetings every week and we planned effectively throughout the project, which allowed the implementation process to go very smoothly.

With regards to what we could improve, we could have had a better understanding of each team member's technical skills which would have allowed tasks to have been allocated more effectively and efficiently. We could also have touched base more often in-between meetings to keep everyone more engaged with the project and help boost productivity.

With regards to the project's future, we are on track to completing our prototype by the project's end date. The project's progress can be tracked via the link provided in the Results section above or at [2].

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