

# Project Evaluation Report

**Project Title: STAR-GATE**

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

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## Abstract

The STAR-GATE project researches the gateways for efficient online learning for university students. Literature review and background research have been conducted to classify existing online platforms, in addition to finding advantageous online features that accelerate online learning. Data is also gathered through a student survey which will aid in developing a design framework of an online learning platform. Designs have been produced in Miro and Figma and can be viewed within this report. Finally, our thoughts on how the project and teamwork went are given in the conclusion, and references for the project's literature review are specified in the references section.

## Introduction

The project will look, from a student angle, at the presentation of learning material on on-line digital platforms. We are interested in studying those features of the platforms that make students' learning more effective. We will be researching and analysing tools and design that can be used to make learning content more feasible to learn. We will investigate what makes the student user experience as smooth as possible and we will research how the nature of the subject can affect digital representation.

The aim of this project is to investigate students' appreciation of on-line learning and classify/compare available learning platforms, mapping their functionalities to the identified students' expectations and identifying new functionalities not already offered by these platforms. We will study, in particular, BBC Bitesize [1], Blackboard [2], Brilliant [3], edX [4], FutureLearn [5], Khan Academy [6], LinkedIn Learning [7], Shaw Academy [8], SMARTEST [9], SoloLearn [10] and WolframAlpha [11].

Our research hypothesis is that it is unlikely to expect that a single platform will have all features students would like to see. We would like to attempt to classify the platforms, and research other features of the platforms that make students' learning more effective. We envisage, at this stage, that it is important to look at the tools and design features that are used and how effectively these make learning content more feasible to learn. We will also gather data from students through a survey about their requirements. We will pay attention to student user experience and what makes this as smooth as possible. Finally, we will research how the nature of the subject can affect digital representation.

Based on the data culminated from research and student feedback, we aim to put together an interactive visual prototype of the STAR-GATE.

## Literature Review & Background Research

A classification of online platforms was carried out. This resulted in the discovery of many types of online learning platforms and their unique features.

Each type of learning platform targets different types of learners, leading to different responses and effectiveness when learning. The types and characteristics of online platform that were found through research are presented below. [12]

- a. **Video-Based Learning:** Video-Based Learning utilises videos as a primary form of studying. It's very effective and cost-efficient. They serve as a more efficient and effective way to enhance the learning experience. They make learning more engaging.
- b. **One-on-One Online Learning:** This type of platforms helps learners create customisable lessons plans based on their requirements. This form of learning is ideal for people who want to study a specific topic. It delivers a high-quality and personalised interaction between students and teachers. Any possible distraction that students can experience is eliminated. This type of e-learning also allows students and teachers to communicate better.
- c. **Online Group Learning:** It allows learners to learn from the ideas, skill sets, and experience of other students. It also encourages learners for group analysis and collaborative team-building skills.
- d. **Proposal/Bidding Based Online Learning:** This type of learning connects students and tutors. It allows the learner to post their questions and receive bids/proposals from verified tutors. Student can select and hire tutors based on their reviews, price and profile. Payment only comes through after the student is satisfied by the answer/solution of the teacher and can also request a refund after reviewing the request within a time limit.
- e. **eLearning Platform for Teachers:** These platforms are solutions for teachers where they get resources to teach their students efficiently. It enables the teachers to be more confident in what they are delivering in the class. Teachers can monetise their knowledge and resources by making them accessible to other teachers.
- f. **Massive Open Online Courses:** Most of the courses provided by MOOCs platforms are for free. They allow the students to self-paces learning. MOOCs provide flexible courses and deadlines and are open to everyone. They are also available in different languages.

Following extensive study, six distinct learning platforms were identified, with the goal of determining which one would be best for University of Westminster students.

This also assisted in determining which category STAR-GATE belongs to. The closest match was found to be the Massive Open Online Course (MOOC) category. Given that STAR-GATE is a free platform with a flexible course structure and a focus on self-paced learning. [13]

The benefit of STAR-GATE is its flexibility, which allows students to complete the course at their own speed without being pressured by deadlines. Although this wonderful feature might assist them in reducing stress, it can also reduce their results. Because each platform has various advantages and learning styles, it is in the students' best interest to choose the appropriate platform for them.

There are video-learning-based platforms that are best suited for students who learn quicker through listening and watching. Comparatively, MOOC'S are ideal alternative for those who want flexibility, or one-on-one learning, which allows students to complete their course at their own speed with the assistance of a teacher. Each learning platform has its own set of advantages and will have a distinct impact on student's learning process.

As mentioned above, STAR-GATE was found to fit closest into the Massive Open Online Course (MOOC) category, given that it's free, has flexible course structure and focuses on self-paced learning.

Through researching it was also found that each platform displays course content according to a specific style thus interacting with students in various ways. Each way entices and attracts students to learn, resulting in comfortable user experiences. The researched course content styles, and their examples, are displayed below. [14]

- a. **Video-based:** The course is delivered through video content.
  - i. Masterclass [15]
  - ii. SkillShare [16]
  - iii. LinkedIn Learning [17]
- b. **Module-style:** The course is delivered on a step-by-step basis. This means that the user must learn the course content in the order it comes before being able to advance and access the next part of the course content.
  - i. edX [18]
  - ii. Coursera [19]
- c. **Audio-based:** The course is delivered through audio content.
  - i. Language transfer [20]
- d. **Community-driven:** The user learns content through the help of a community which have a specific goal of learning a certain subject.
  - i. Teachable [21]
  - ii. Learnworlds [22]
  - iii. Tandem [23]
- e. **Quiz-based:** The course is delivered through quizzes which tests the user's knowledge.
  - i. Kahoot [24]
  - ii. Quizizz [25]
- f. **Game-based:** The user engages with learning content through playing games.
  - i. Grasshopper [26]
- g. **Article/Interactive:** The course engages with the user through interactive questions where the user must practically solve the questions presented. The user learns the needed knowledge through articles.
  - i. SoloLearn [10]
- h. **Management (LMS):** Courses are delivered through real-time managed content. This means that content about the subject is added at a specific intervals which depends on the creator managing the course.
  - i. Google classroom [27]
  - ii. Blackboard [2]
  - iii. Schoology [28]
  - iv. Moodle [29]

#### v. Future Learn [30]

STAR-GATE satisfies the requirements of a Learning Management System (LMS) since the content of the course is managed by the creator, which may prevent a student from being pushed into a large amount of material at once. Every platform type enhances or detracts from the student experience in their own unique way. Students can choose from a variety of platforms based on the sort of studying they want to do. There are types of learning platforms that are focusing on passive learning (video-based, audio-based, LMS) that emphasise on absorbing knowledge by watching/listening, and active learning platforms (game-based, quiz-based, article/interactive) that allow students to actively participate in the course.

Through investigation of these 11 learning platforms mentioned in the Introduction section of this report, it was discovered that certain features of a platform lead to a smoother user experience. This was determined by conducting research on each targeted platform's functionalities. A report was compiled which observes all the common/unique features of the targeted platform, to help with tasks later throughout the project.

From our research, several features were identified as a necessity: a search bar, bookmarks, a progress showcase, a navbar, and features that improve the user experience, such as icons. Nonetheless, the characteristics shared by these many learning systems (Blackboard, Khan Academy, edX, and others) are designed to make a student's experience more enjoyable and seamless.

#### Survey Results

The gathered feedback of the survey from the 9 participants is summarised below, alongside a conclusion and the decision drawn from the data. There were 30 questions altogether, divided into 3 sections which are as follows:

1. Intro – mostly open-ended questions aimed at collecting information on participants' experiences with e-learning platforms.
2. Main Questions – multiple choice and scale-based questions aimed at collecting participants preferences on various key e-learning platform features.
3. Additional Questions – multiple choice and scale-based questions aimed at collecting participants preferences on various key e-learning platform features.

#### **Introductory section of the survey:**

1. Have you ever taken an online course?
  - 8 out of 9 participants answered yes.
  - 1 out of 9 participants answered no.
2. What device and web browser do you mainly access online courses/websites from? (E.g. Windows laptop, Firefox/iPhone 11, Safari/Samsung Galaxy S20, Google Chrome)
  - 6 out of 9 participants specified a desktop device.
  - 3 out of 9 participants did not specify a device.
  - 2 out of 9 participants use the Safari web browser

- 5 out of 9 participants use the Google Chrome web browser
  - 2 out of 9 participants did not specify a web browser.
3. What platform did you use?
- 1 out of 9 participants did not specify a platform.
  - 1 out of 9 participants used Coursera.
  - 1 out of 9 participants used Microsoft Learn.
  - 1 out of 9 participants used FreeCodeCamp.
  - 1 out of 9 participants used LinkedIn Learning.
  - 1 out of 9 participants used Blackboard.
  - 1 out of 9 participants used Safari.
  - 1 out of 9 participants used Blackboard, together with Google Drive.
  - 1 out of 9 participants used Blackboard, in combination with Microsoft Teams.
4. Why did you choose that platform to learn over other learning platform? What kept you motivated?
- 1 out of 9 participants did not give an answer.
  - 1 out of 9 participants answered that the e-learning platform gave a certificate upon completing a course.
  - 1 out of 9 participants answered that it was the main way of learning about a topic. Motivation was drawn from what they would learn and the certification that would be gained upon completing the course.
  - 1 out of 9 participants answered that the platform was very good at explaining coding.
  - 1 out of 9 participants answered that the platform has a large community and has many free and paid courses.
  - 1 out of 9 participants answered that the platform was the only platform offered for the course they were taking.
  - 1 out of 9 participants answered, “it was the main browser on Mac”.
  - 1 out of 9 participants answered it was for their long-term goal.
  - 1 out of 9 participants answered it was mostly from teachers’ choices. Problem solving as part of studying provided motivation.
5. How did you find the course? Did you enjoy it? Please explain why.
- 2 out of 9 participants did not give a response.
  - 4 out of 9 participants said they enjoyed the online course they took.
  - 2 out of 9 participants gave a mixed response on the enjoyment of online courses.
  - 1 out of 9 participants said they did not enjoy the online course they took.

**Main section of survey:**

6. Which home page is the easiest to navigate? Can you see where to access your profile, the content, the search bar, etc.

- 3 out of 9 participants answered SMARTTEST.
  - 3 out of 9 participants answered Blackboard.
  - 2 out of 9 participants answered SoloLearn.
  - 1 of 9 participants answered WolframAlpha.
7. Which type of content do you learn most effectively with?
- 4 out of 9 participants answered visual-based (e.g. interacting with images, animations, computer graphics).
  - 3 out of 9 participants answered exercise-based (e.g. completing tests, textbook exercises).
  - 1 out of 9 participants answered text-based (e.g. reading textbooks, articles, documentation).
  - 1 out of 9 participants answered video-based (e.g. watching tutorials, online lectures).
8. How important is it to be able to search within the e-learning course you are taking? (e.g. to find keywords, links, tags).
- 4 out of 9 participants gave a 5/5 rating.
  - 3 out of 9 participants gave a 4/5 rating.
  - 2 out of 9 participants gave a 3/5 rating.
9. From the screenshots below, which 'course search' feature seems more user friendly?
- 4 out of 9 participants answered Blackboard.
  - 2 out of 9 participants answered LinkedIn Learning.
  - 1 out of 9 participants answered Shaw Academy.
  - 1 out of 9 participants answered edX.
  - 1 out of 9 participants answered SMARTTEST.
10. How important is an introductory walkthrough for an e-learning platform you are using for the first time?
- 4 out of 9 participants gave a 5/5 rating.
  - 2 out of 9 participants gave a 4/5 rating.
  - 2 out of 9 participants gave a 3/5 rating.
  - 1 out of 9 participants gave a 2/5 rating.
11. Which style of help do you find most useful? You may select more than one option.
- 6 out of 9 participants said an introductory walkthrough of platform features was useful.
  - 5 out of 9 participants said tips that pop up whilst using the platform was useful.
  - 4 out of 9 participants said a dedicated help section (e.g. help articles, FAQs) was useful.
12. If you selected multiple options for the previous question, please indicate the order you value these from the most useful (4) to least useful (1). Mark the options you didn't select as N/A.
- 6 out of 9 participants rated the introductory walkthrough as a 4/4.

- 1 out of 9 participants rated the introductory walkthrough as a 3/4.
  - 2 out of 9 participants rated the introductory walkthrough as N/A.
  - 1 out of 9 participants rated the tips as a 4/4.
  - 3 out of 9 participants rated the tips as a 3/4.
  - 3 out of 9 participants rated the tips as a 2/4.
  - 2 out of 9 participants rated the tips as N/A.
  - 1 out of 9 participants rated a help section as a 4/4.
  - 5 out of 9 participants rated a help section as a 3/4.
  - 1 out of 9 participants rated a help section as a 2/4.
  - 2 out of 9 participants rated a help section as N/A.
  - 1 out of 9 participants rated “Other” as a 3/4.
  - 8 out of 9 participants rated “Other” as N/A.
13. Given a platform has a basic note taking and notes export feature, would you prefer using the platform's note taking feature or take notes using your own method?
- 6 out of 9 participants said they would prefer taking notes using their own method.
  - 3 out of 9 participants said they would prefer taking notes using the platform’s note taking feature.
14. Have you ever used an e-learning platform where you would you like the option to add a note taking functionality?
- 6 out of 9 participants answered no.
  - 3 out of 9 participants answered yes.
15. If yes, what type of notes would you include? If no, just put N/A.
- 7 out of 9 participants answered N/A.
  - 1 out of 9 participants answered quick ones to elaborate on later.
  - 1 out of 9 participants answered either an explanation with more examples or remembering the main explanation in short.
16. How useful are progress bars at motivating you to learn? Please rate on a scale of 1-5.
- 5 out of 9 participants gave a 4/5 rating.
  - 3 out of 9 participants gave a 3/5 rating.
  - 1 out of 9 participants gave a 2/5 rating.
17. From the screenshot below, which progress page seems more user friendly?
- 4 out of 9 participants answered SMARTTEST.
  - 2 out of 9 participants answered FutureLearn.
  - 1 out of 9 participants answered LinkedIn Learning.
  - 1 out of 9 participants answered edX.
  - 1 out of 9 participants answered BBC Bitesize.
18. Which icon style do you prefer?
- 3 out of 9 participants answered SoloLearn’s icon style.
  - 2 out of 9 participants answered Blackboard’s icon style.

- 1 out of 9 participants answered SMARTEST’s icon style.
  - 1 out of 9 participants answered LinkedIn Learning’s icon style.
  - 1 out of 9 participants answered BBC Bitesize’s icon style.
  - 1 out of 9 participants answered WolframAlpha’s icon style.
19. How important are graphics (e.g. images, illustrations, animations) for an e-learning platform?
- 4 out of 9 participants gave a 5/5 rating.
  - 4 out of 9 participants gave a 4/5 rating.
  - 1 out of 9 participants gave a 5/5 rating.
20. Do you prefer learning on mobile or on desktop?
- 7 out of 9 participants answered Desktop/Laptop.
  - 1 out of 9 participants answered Mobile.
  - 1 out of 9 participants answered they like learning on mobile and desktop equally.
21. How important is it to enjoy using an e-learning platform?
- 2 out of 9 participants gave a 5/5 rating.
  - 4 out of 9 participants gave a 4/5 rating.
  - 3 out of 9 participants gave a 3/5 rating.

**Additional survey questions (all participants agreed to take the additional questions):**

22. Which 'course layout' feature is the most user friendly?
- 3 out of 9 participants answered SMARTEST.
  - 2 out of 9 participants answered Brilliant.
  - 1 out of 9 participants answered SoloLearn.
  - 1 out of 9 participants answered WolframAlpha.
  - 1 out of 9 participants answered BBC Bitesize.
  - 1 out of 9 participants answered Blackboard.
23. Please select which colour scheme you find most appealing.
- 4 out of 9 participants answered “Black and white, with red, yellow, blue accents”.
  - 3 out of 9 participants answered “Navy Blue and White”.
  - 1 out of 9 participants answered “White, blue and grey”.
  - 1 out of 9 participants answered “Pink, blue, white, purple, grey (main)”.
24. How useful do you find pop ups whilst you are learning?
- 2 out of 9 participants gave a 4/5 rating.
  - 3 out of 9 participants gave a 3/5 rating.
  - 3 out of 9 participants gave a 2/5 rating.
  - 1 out of 9 participants gave a 1/5 rating.
25. How important is a bookmarking/saving for later feature?
- 4 out of 9 participants gave a 5/5 rating.

- 3 out of 9 participants gave a 4/5 rating.
  - 1 out of 9 participants gave a 3/5 rating.
  - 1 out of 9 participants gave a 1/5 rating.
26. Which bookmarking/saving for later page seems more user friendly?
- 3 out of 9 participants answered SMARTTEST.
  - 3 out of 9 participants answered FutureLearn.
  - 2 out of 9 participants answered Blackboard.
  - 1 out of 9 participants answered LinkedIn Learning.
27. How important are email reminders (e.g. to remind you to meet a daily learning target, to continue a course you had started earlier on in a week)
- 2 out of 9 participants gave a 5/5 rating.
  - 1 out of 9 participants gave a 4/5 rating.
  - 5 out of 9 participants gave a 3/5 rating.
  - 1 out of 9 participants gave a 2/5 rating.
28. How important is a native sharing feature?
- 1 out of 9 participants gave a 5/5 rating.
  - 3 out of 9 participants gave a 4/5 rating.
  - 3 out of 9 participants gave a 3/5 rating.
  - 2 out of 9 participants gave a 2/5 rating.
29. How important is it that feel like you are learning with others? E.g. seeing statistics like "92% of people got this question right" or "516 people taking this course"?
- 2 out of 9 participants gave a 5/5 rating.
  - 3 out of 9 participants gave a 4/5 rating.
  - 2 out of 9 participants gave a 3/5 rating.
  - 2 out of 9 participants gave a 1/5 rating.
30. How is important modern design in an e-learning platform?
- 2 out of 9 participants gave a 5/5 rating.
  - 3 out of 9 participants gave a 4/5 rating.
  - 3 out of 9 participants gave a 3/5 rating.
  - 1 out of 9 participants gave a 1/5 rating.

### Addressing the small number of survey responses

We did not receive as many responses as we had hoped, which we assume was caused by the timing we released the survey as well as difficulties brought on by online working restrictions.

To try and mitigate for these difficulties, we sought help from the Student as Co-creators management, Jennifer and Fatima, who advertised our survey to other project groups. Other methods of survey advertising we tried included contacting societies (the programming society and the Indian society), course leaders (to publish on their Blackboard timelines) and contacting classmates/colleagues.

## Designing the survey and STAR-GATE principles

The key e-learning platform features discovered during the literature review and background research served as the topics for the survey. The survey was created using Google Forms. [31]

Questions were mostly multiple choice or scale-based, so conclusions could easily be drawn from answers. These answers would then be used as references when developing the Miro and Figma designs.

In addition to the survey questions, we also brainstormed amongst ourselves our own set of principles for STAR-GATE which we would implement alongside the survey responses and background research. The principles would act as a base theme for the designs and the research and survey responses would serve as references to standardise the designs to other e-learning platforms and adapt the designs to students' tastes.

## Implementation of design and researched framework

One of our aims was to create a high-fidelity prototype design of an e-learning platform. We have constructed it using knowledge we have gathered from research and feedback from the survey. The prototype itself was created using two online platforms, [Miro \[32\]](#) and [Figma \[33\]](#).

According to their [website](#) "Miro is the online collaborative whiteboarding platform that enables distributed teams to work effectively together, from brainstorming with digital sticky notes to planning and managing agile workflows". The sticky notes and basic shapes provided for designing helped us to gather our thoughts and combine them together into a plan of action and then a low-fidelity prototype. [34]

The designs developed in Miro:

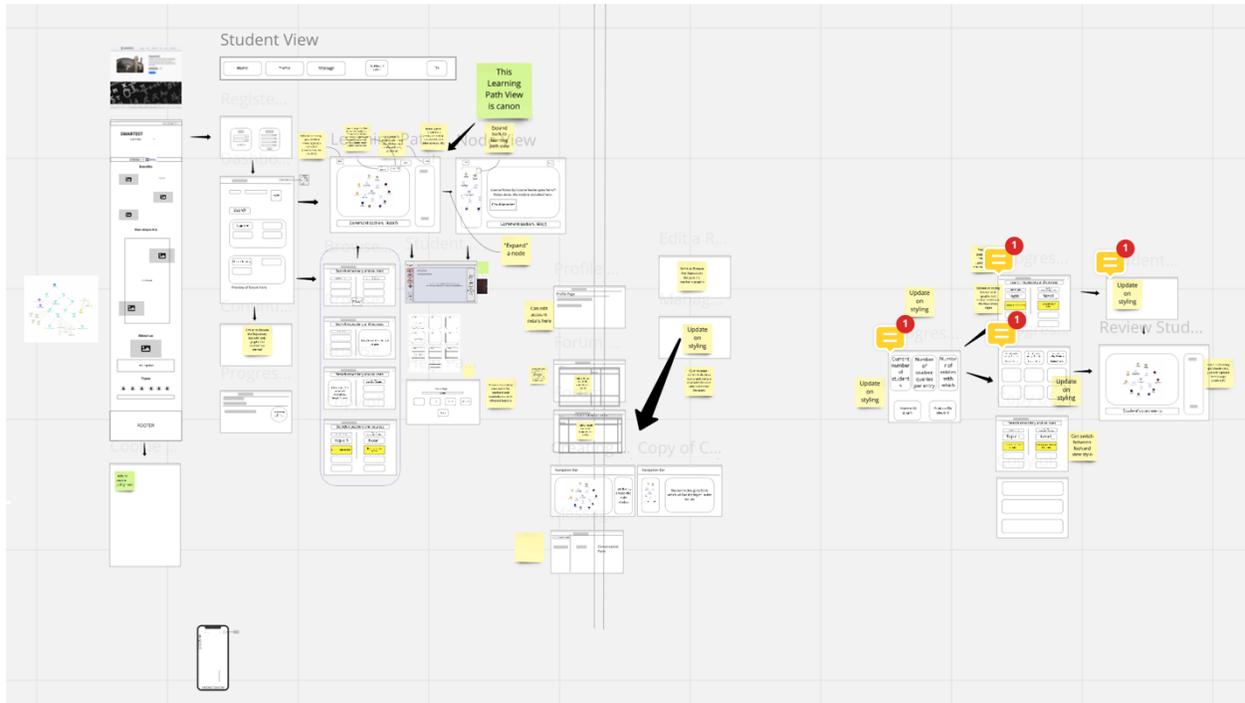


Figure 1 - The low-fidelity designs created in Miro. [Left] Views shared between teachers and student users. [Right] Views exclusive to teachers.

Based on the notes and the low-fidelity prototype from Miro we then moved to a more advanced tool - Figma. Figma is a graphic editor and a prototyping tool made to help website designers in creating prototype designs of their websites. It is possible to create there a functioning design with different pages and animations. It is great for visualizing future websites and their user flows. [33]

The designs developed in Figma:

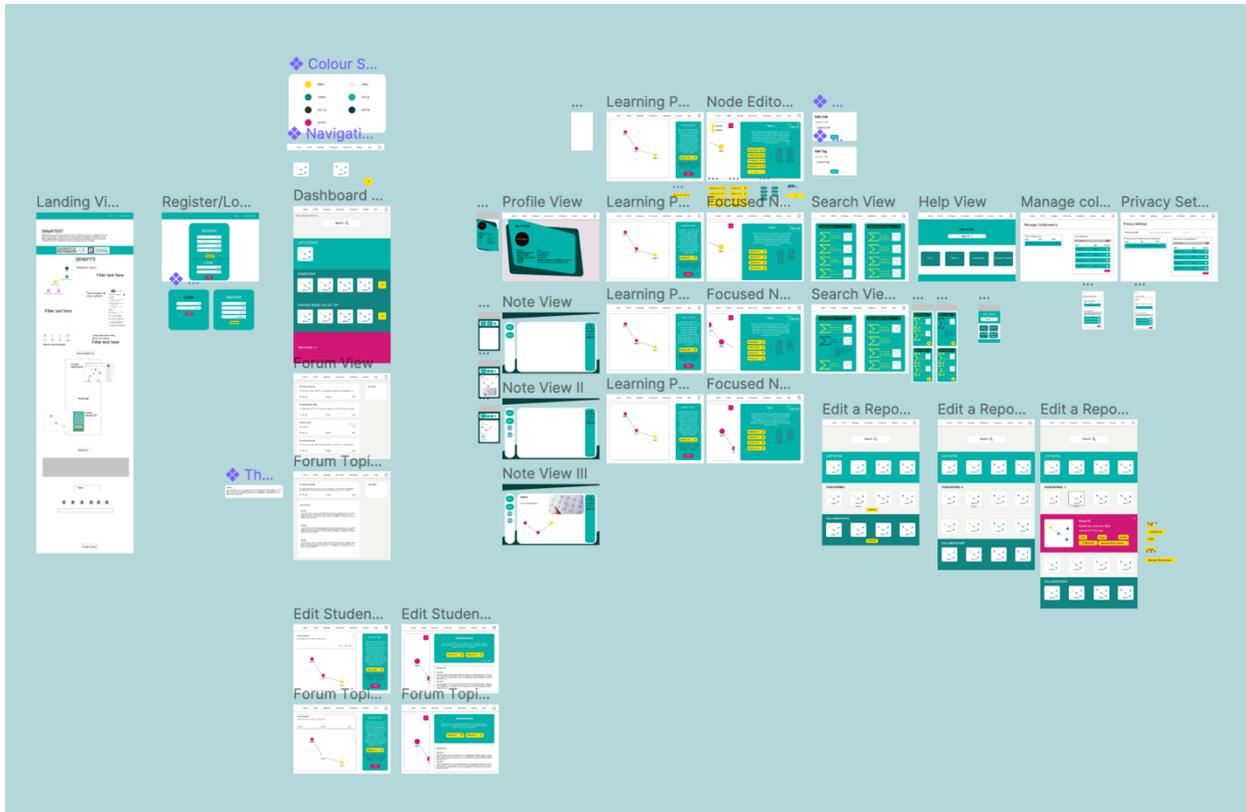


Figure 2 - The high-fidelity designs created in Figma.

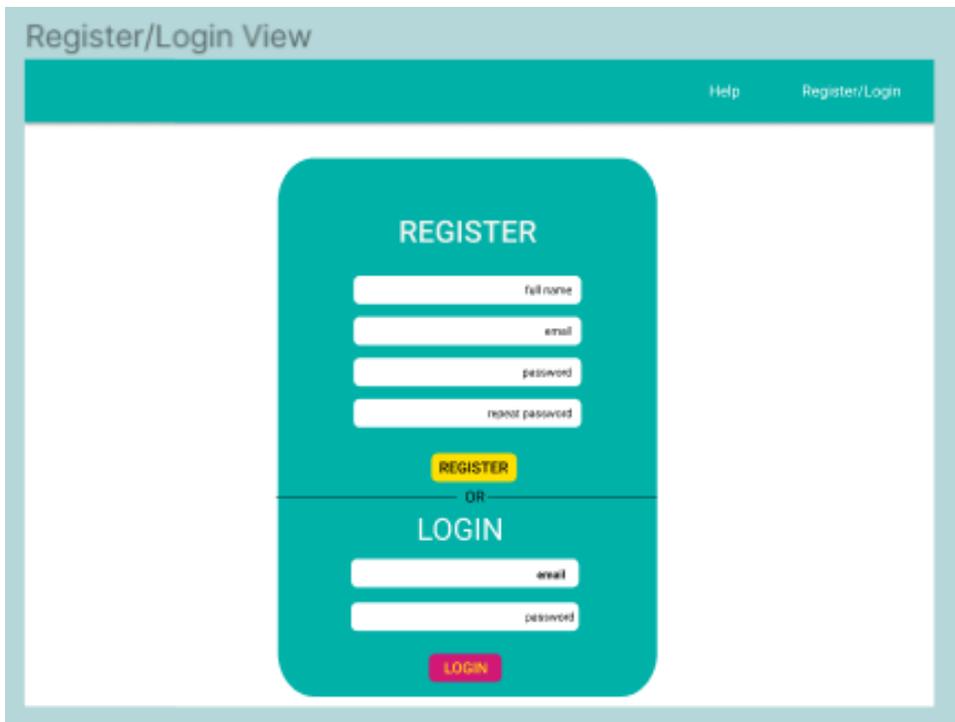


Figure 3 - The account registration and login view designs in Figma.

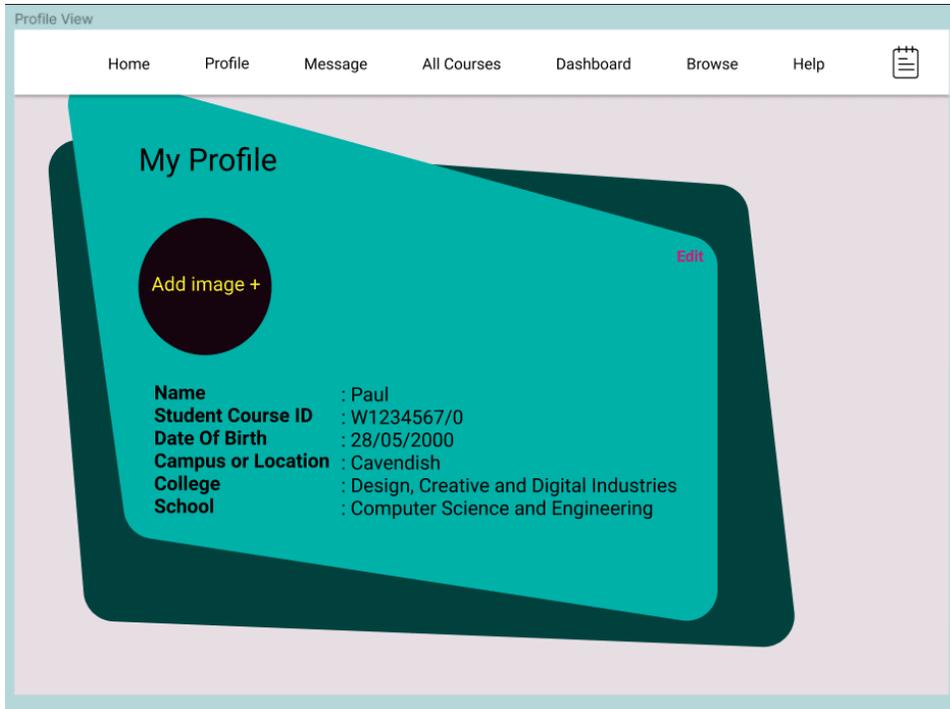


Figure 4 - The account profile view design in Figma.

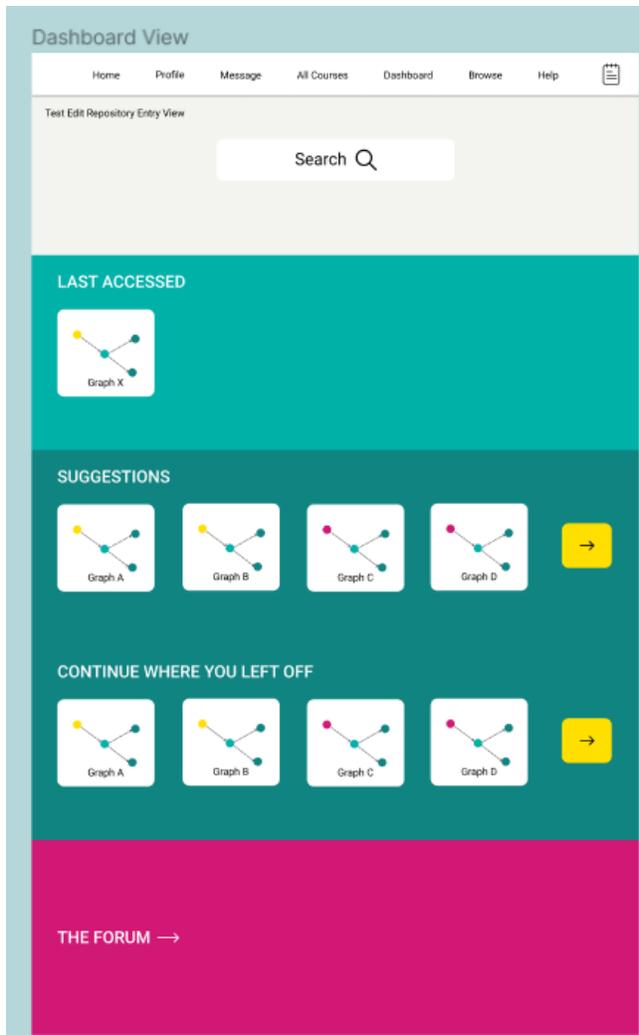


Figure 5 - The dashboard design in Figma.

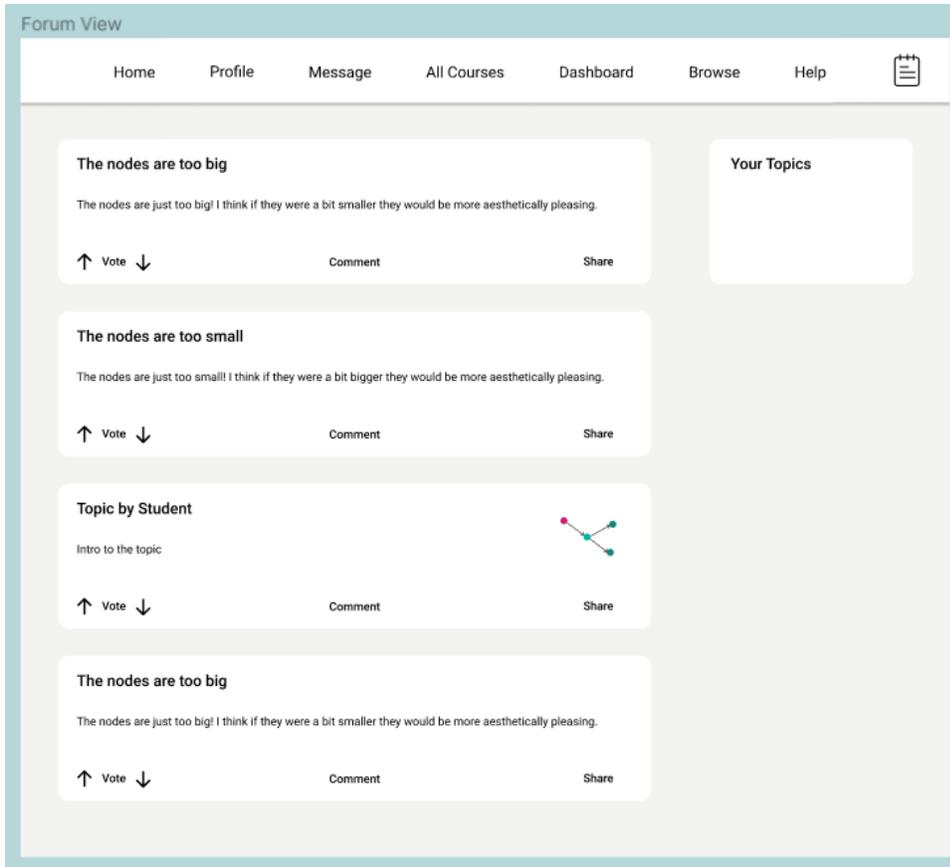


Figure 6 - The forum view design in Figma.

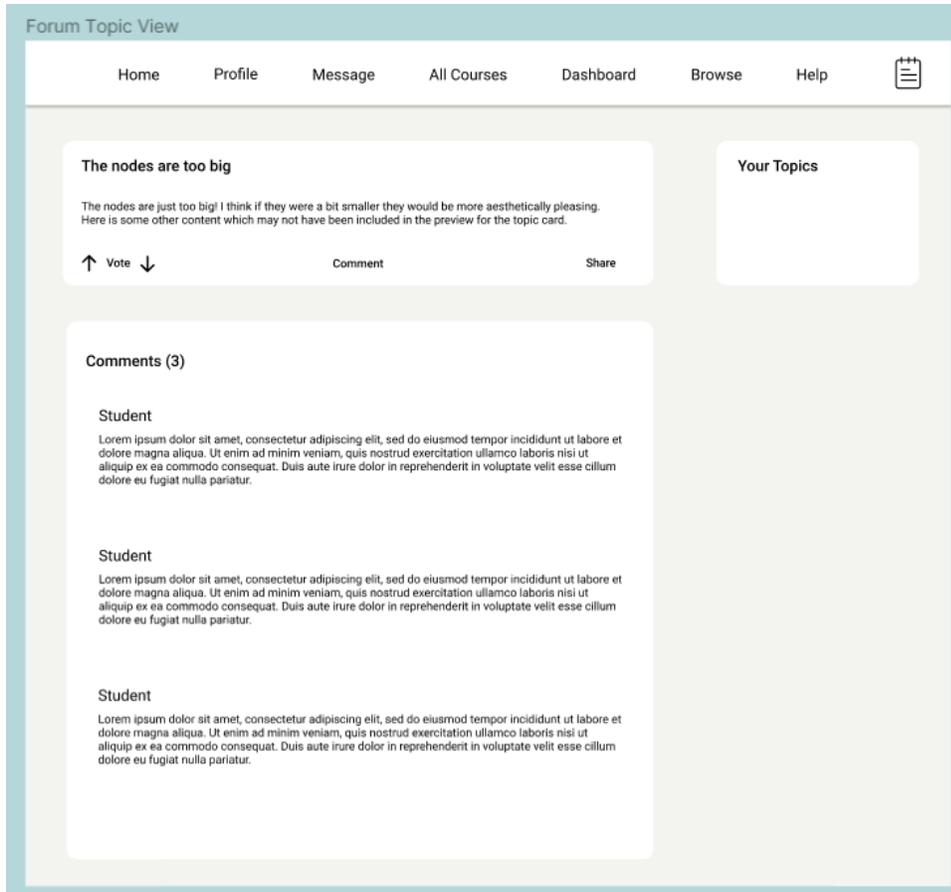


Figure 7 - The forum topic discussion view design in Figma.



Figure 8 – [Top-left] The view design in Figma for when you post a learning path as a discussion topic to the student forum. [Top-right] The view design in Figma for when you post a node as a discussion topic to the student forum. [Bottom-left] The design for a view in Figma that a student would see when viewing a discussion on a learning path within the student forum. [Bottom-right] The design for a view in Figma that a student would see when viewing a discussion on a node within the student forum.

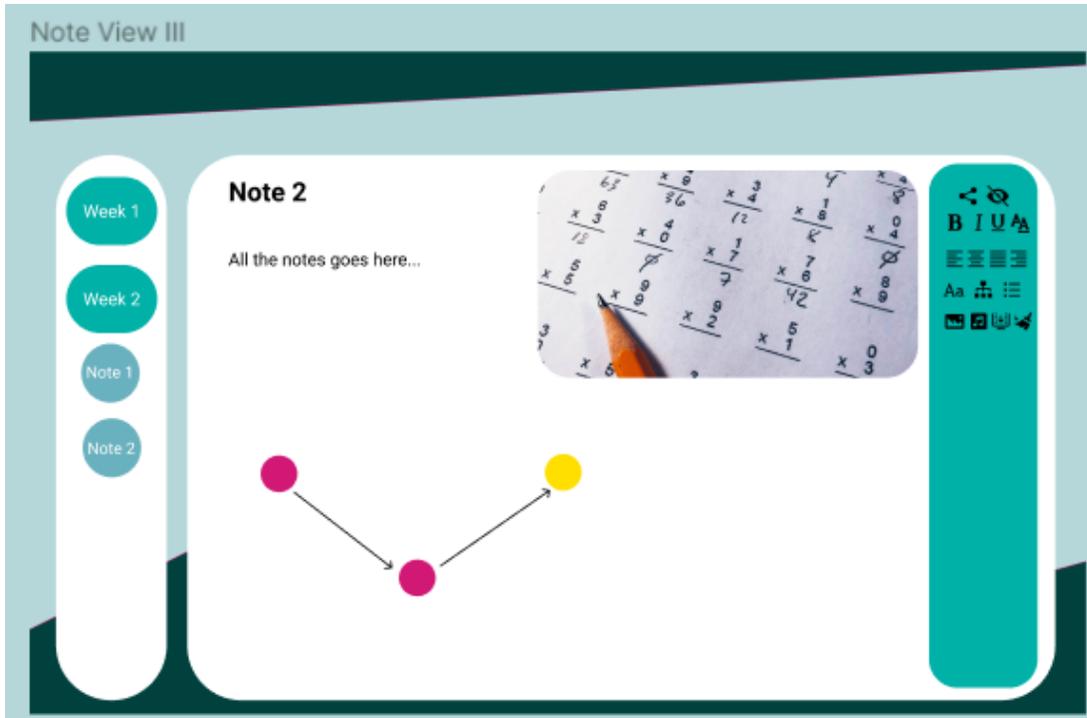


Figure 9 - The note view design in Figma.

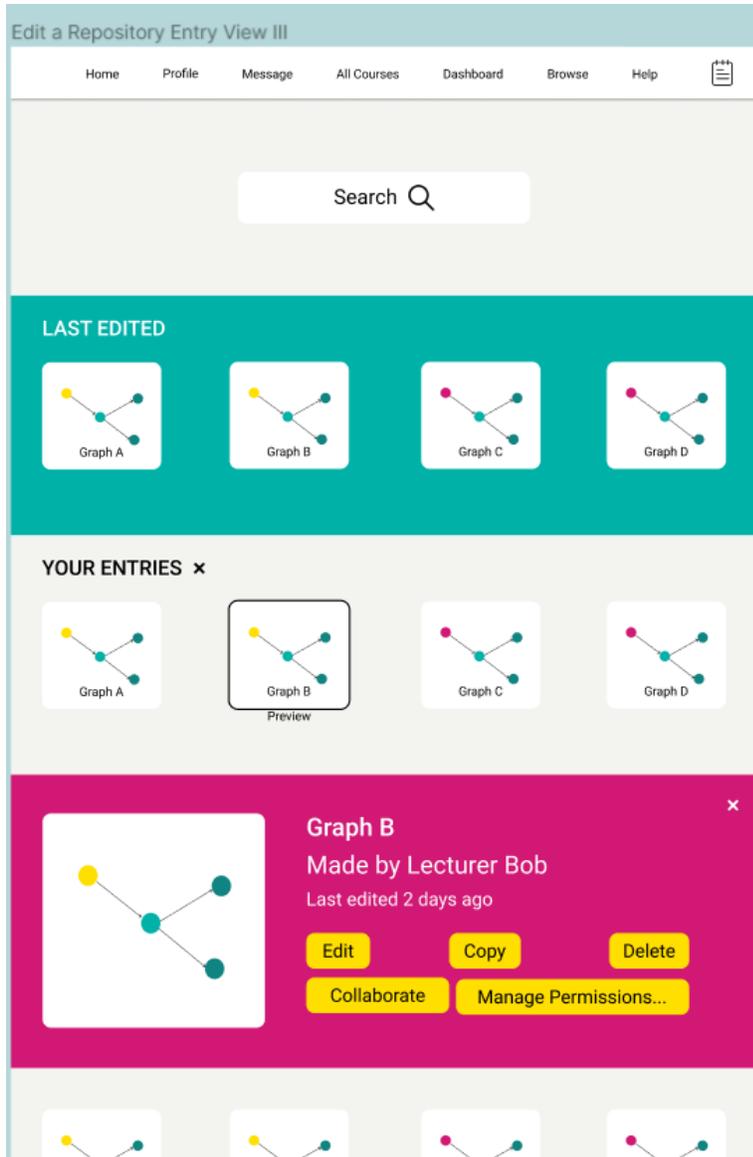


Figure 10 - The Edit a Repository Entry view design for teachers in Figma.

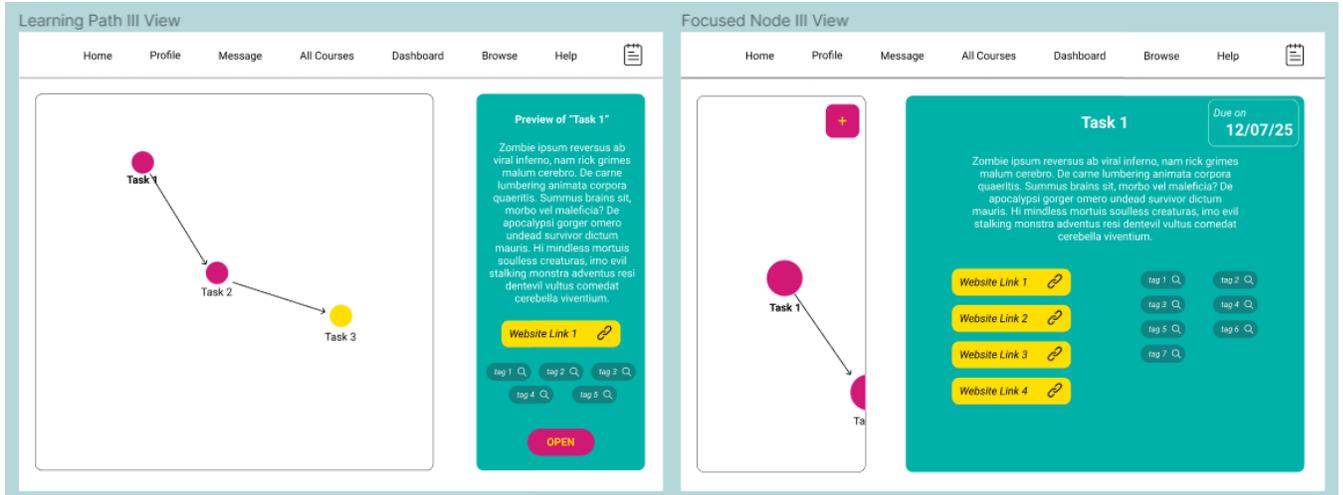


Figure 11 - [Left] The learning path view design. [Right] The view design for when a student focuses on a node.

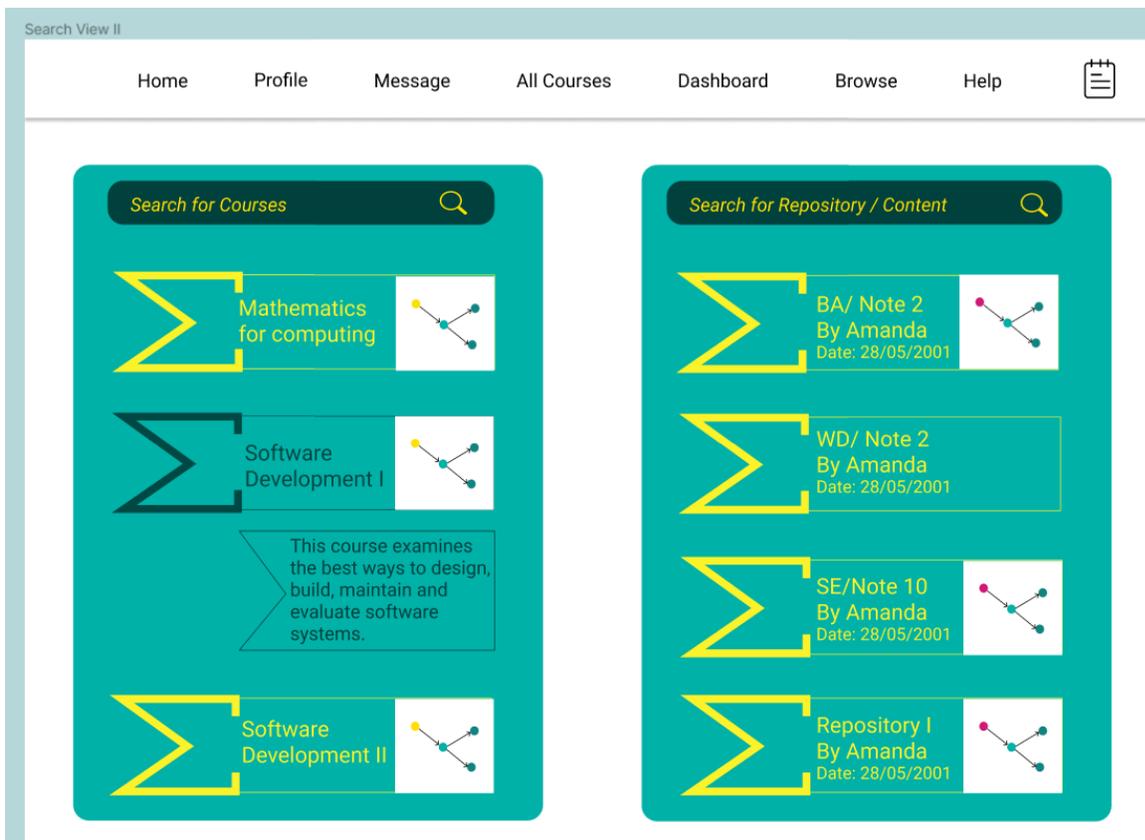


Figure 12 – View designs in Figma. [Left] The list of courses available on STAR-GATE. One course has been highlighted in black, which causes a course description to appear below. [Right] The list of content relevant to the logged in student student. This could involve things like learning paths they are currently taking or notes they have taken. Both lists have a search feature.

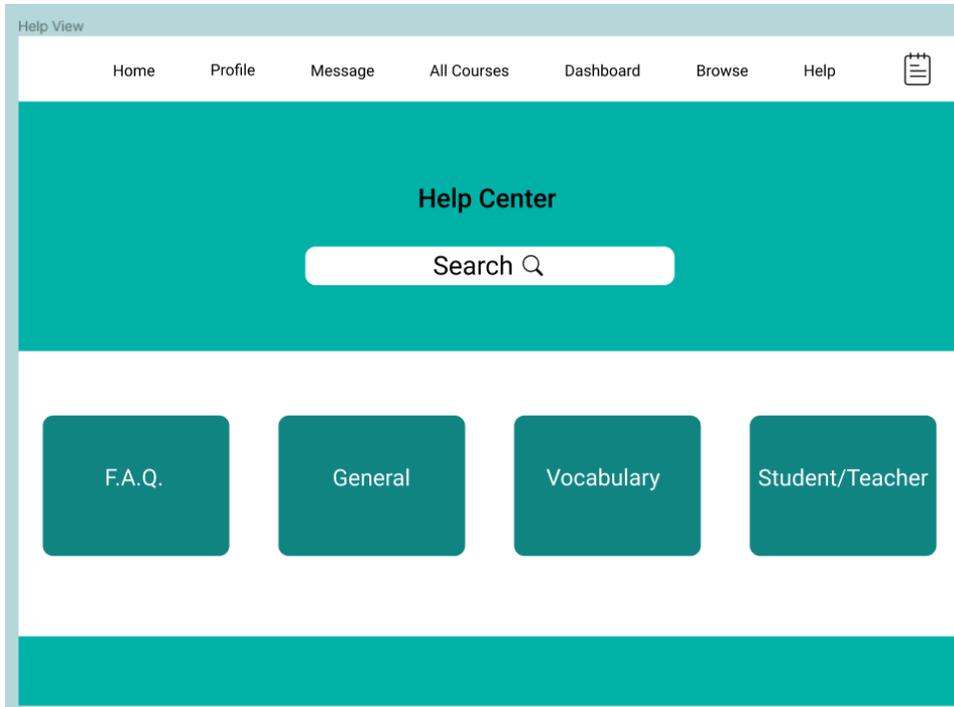


Figure 13 - The STAR-GATE help view design. There are four main categories shown by the row of buttons. Specific help articles can also be filtered with the search bar at the top.

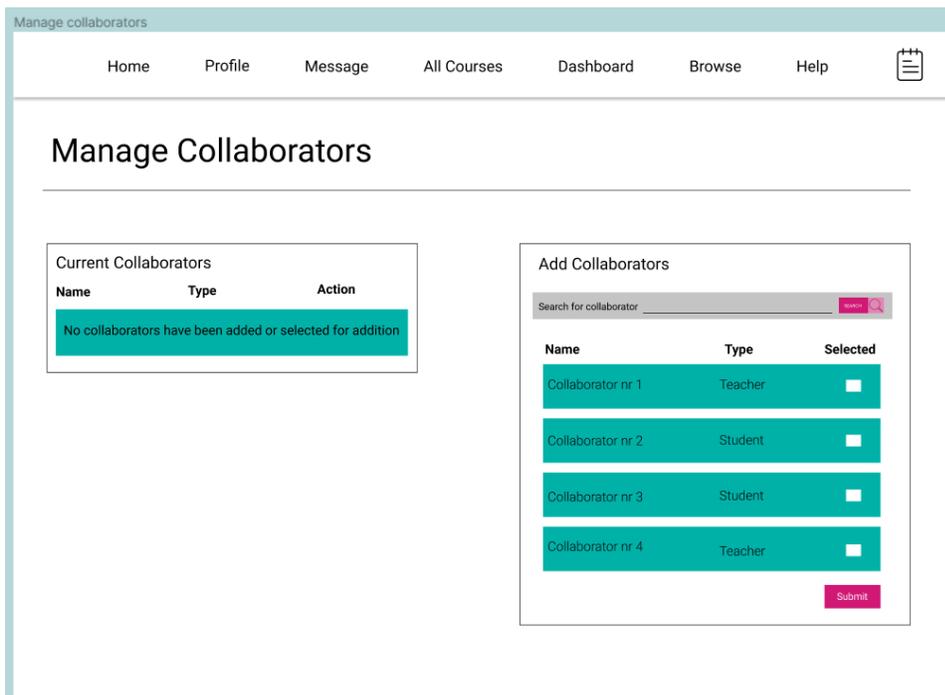


Figure 14 - The Manage Collaborators view design for teachers. This view allows a teacher to manage the collaborators for a learning path they have created.

Privacy Settings

Home Profile Message All Courses Dashboard Browse Help 

## Privacy Settings

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**Who can see my stuff?** Who can see your future repositories? Everyone Edit

People who can currently view your repositories

Name	Type	Action
No collaborators have been added or selected for addition		

Who will see your repositories?

Search for collaborator  Search

Name	Type	Selected
Collaborator nr 1	Teacher	<input type="checkbox"/>
Collaborator nr 2	Student	<input type="checkbox"/>
Collaborator nr 3	Student	<input type="checkbox"/>
Collaborator nr 4	Teacher	<input type="checkbox"/>

Submit

Figure 15 - The Privacy Settings view for teachers. This view allows a teacher to manage the privacy setting for a learning path they have created. The privacy settings can be set to make the learning path accessible/inaccessible to all users or only accessible to specific users.

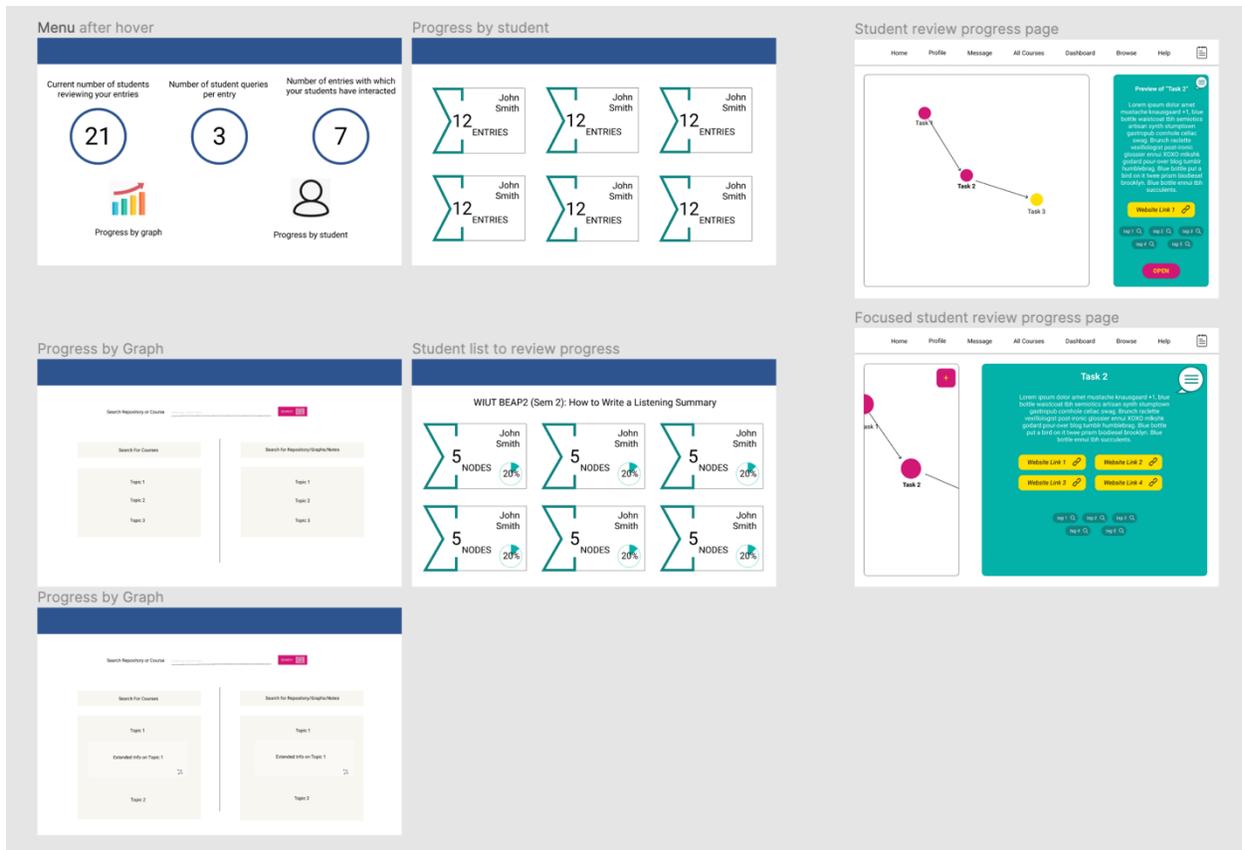


Figure 16 - The Figma progress review designs for teachers. Teachers can see the progress of all the students that are taking their learning paths here.

Plans of action would be realised at our weekly meetings. We divided page views between the team members, and during meetings we have been helping each other with any problems that surfaced during designing. Additionally, every week we have been polishing what we had done in previous weeks to ensure consistency across all pages of the designed website prototype. An example of this is where there was a week where one team member found a way to cleverly integrate the SMARTEST logo (the  $\Sigma$  symbol) [9] into their part of the website design, which led to the rest of the team updating their design parts to integrate the logo as well.

Whilst designing in Figma, we also came up with new ideas which we did not cover in Miro, such as a forum style page, to allow students to discuss educational topics, and made tweaks to the Miro design where necessary to meet principles like a modern design.

## Results

### Prototype Results

The prototype we developed in Figma meant we achieved our goal of creating an interactive visual prototype of STAR-GATE.

It covers both student and teacher perspectives and incorporates information and ideas from the team, the survey and the research. Being implemented in Figma, it is also possible to test out the user flow and easily visualise how different elements of STAR-GATE should behave. [33]

## Conclusion

In conclusion, the project was mostly successful. We have met one of our key project aims of producing an interactive visual prototype for multiple web pages.

In terms of working together as a team, we were mostly successful, as each team member succeeded in bringing something to the project, whether it was interesting tools to look at or try out, help with organising the project or just new ideas, we also had weeks where we worked together very well, bouncing ideas off each other, coming up with new ideas together and producing a lot during meetings. In terms of aspects to improve, we could have been more punctual by finishing on time with team meetings, which was often due to being engrossed in project discussion.

Doing background research of literature review, we found it did not contribute massively to the overall project prototype, but it gave us a better overall understanding of the sources we could refer to when it came to designing the website interface.

Regarding the survey, we found the current circumstances made it difficult to gather feedback from students, however we are still pleased with the responses we got, nonetheless. For the future, we could implement the design towards a real, functioning website, and as a follow-up project, gather feedback on this more effectively.

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