

final project proposal

by Kelly Casey

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Project Proposal

Women in STEM Study Buddy
Platform



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Introduction

As one of the few women in my STEM (Science, Technology, Engineering, and Mathematics) program, I've faced the distinct challenges that come with being underrepresented, including feelings of isolation and a lack of peer support. To help address these challenges, I am developing a web application designed specifically for female students in STEM. This platform will encourage collaboration, mentorship, and academic support, enabling users to connect with peers, find study partners, share resources, and build a strong, supportive community. The goal is to reduce isolation, boost confidence, and empower women to excel in a traditionally male-dominated field. By fostering this network, we can enhance academic success and create a more inclusive, empowering environment for women in STEM.

Aims

The aim of this project is to develop a user-friendly platform tailored to female STEM students, where they can:

- **Connect with study partners** by matching with peers who share similar academic subjects and interests, making collaboration on assignments and projects more accessible.
- **Exchange educational resources**, such as lecture notes, tutorials, study guides, and to collaborate on coursework, research, and problem-solving.
- **Build a supportive community** where users can openly discuss the unique challenges faced by women in STEM, share advice, offer encouragement, and celebrate successes, fostering a sense of belonging and empowerment. This platform will provide a space for collaboration, support, and personal growth, helping female students overcome common challenges in their fields and thrive academically.

Objectives

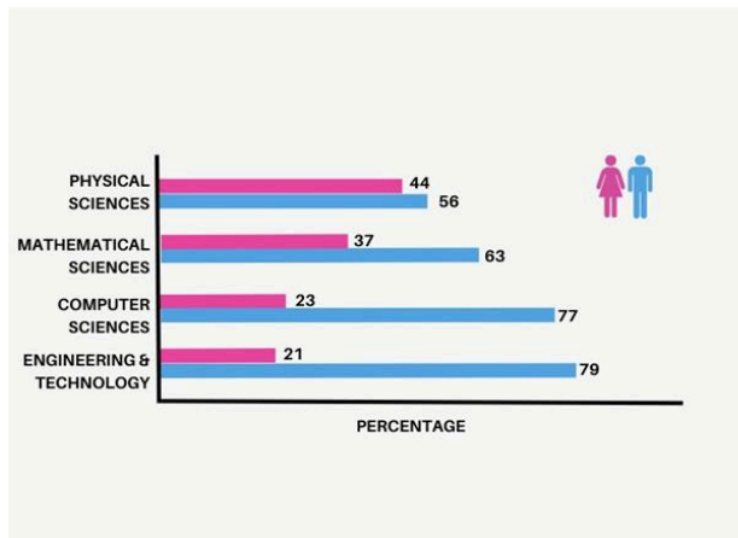
- Design and develop a robust application that features user registration, profile creation, and a matching algorithm to connect users based on their academic fields and interests. This will allow female STEM students to easily find study partners and collaborators who share similar goals and subject areas.

- Incorporate a real-time messaging system that facilitates smooth communication, enabling users to work together, exchange ideas, and offer peer support.
- Test the application extensively to ensure its usability, collecting detailed feedback from female STEM students to fine-tune the interface and improve functionality based on their specific needs.
- After refining the platform, launch it and promote it actively at universities, STEM departments, and women-focused tech groups to build a user base, encouraging participation and community growth.

Background

Research consistently shows that female students in STEM often encounter challenges such as isolation and insufficient peer support [1] [2] [3]. Studies emphasize the positive impact of building networks and communities for underrepresented groups, showing that these initiatives can significantly enhance engagement and confidence in academic fields.

Peer support systems have been proven to improve success rates in traditionally male-dominated field. While platforms like Women Who Code [4] focus on career development, there remains a gap in academic support platforms specifically designed for female STEM students, highlighting the need for a solution that addresses this critical area.



[1]

Literature Review

Several key studies highlight the important role that support systems in the success of women in STEM [5] [6]. Research shows that developing peer networks can significantly improve academic performance [7] [8] [9]. Initiatives like GoldieBlox [10], which promote STEM learning for young girls, demonstrate the long-term benefits of engaging women in STEM early in their education. Building on these efforts, this project shifts the focus to university-level support by creating a dedicated platform for female students in STEM.

While existing solutions often target career development for women in STEM, there are few platforms that provide academic peer support. This gap, combined with the growing emphasis on gender diversity in STEM fields, creates a timely opportunity for the development of this platform.

Problem statement

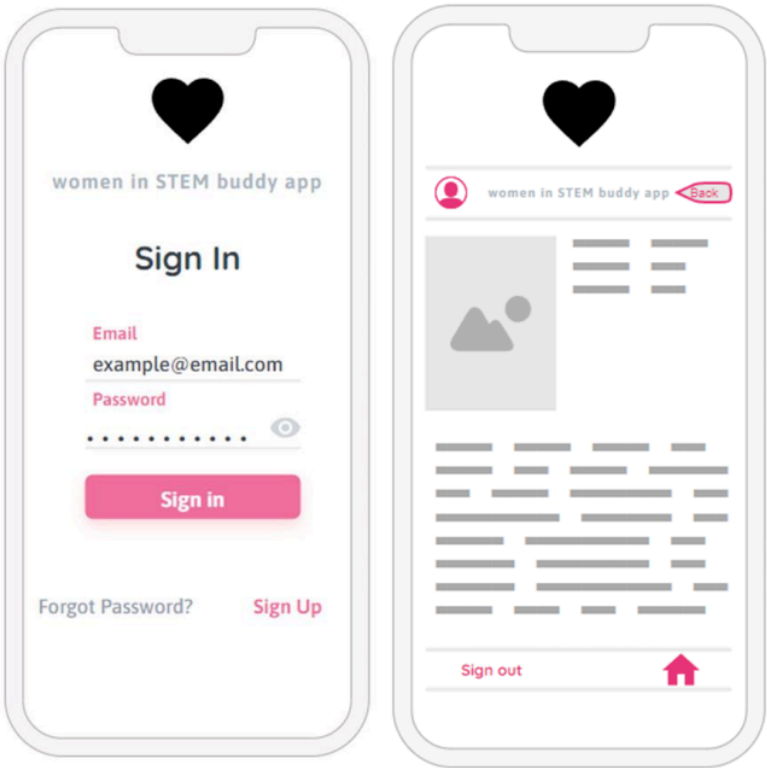
Women in STEM fields frequently experience feelings of isolation due to their underrepresentation, which can lead to significant challenges in their academic journeys. The absence of a strong peer support system often results in lower confidence, lower academic performance, and higher dropout rates from STEM programs.

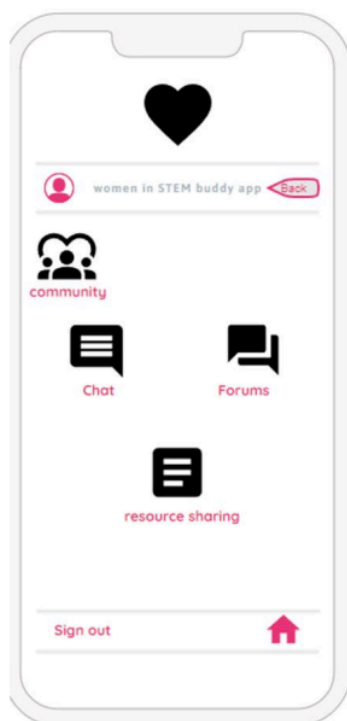
This project aims to combat these issues by developing a platform specifically designed to foster academic collaboration, resource sharing, and community building among female STEM students.

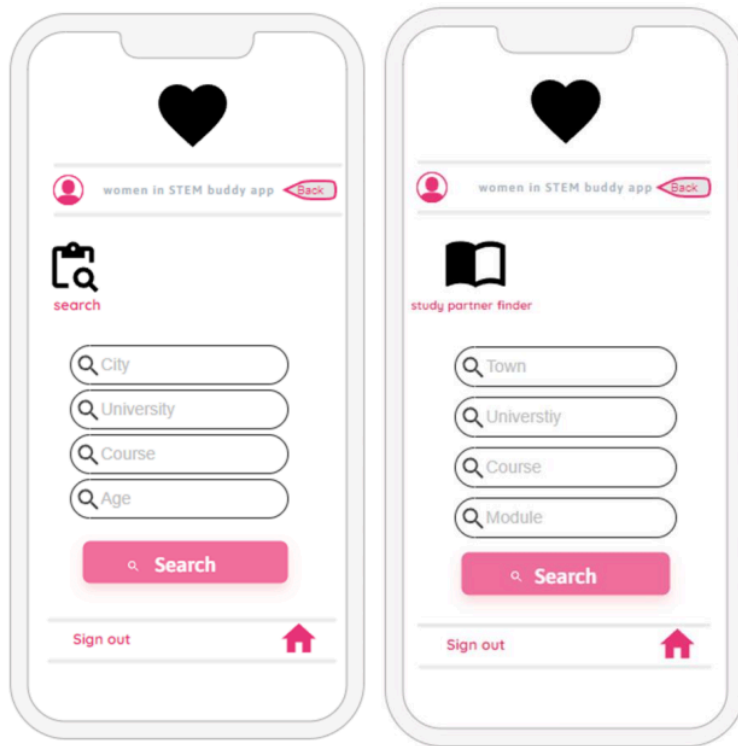
Creating a space where users can connect with like-minded peers, share valuable study materials, and support each other's growth, the platform will help mitigate the isolation that many women in STEM face. Ultimately, it will empower female students to thrive academically and remain engaged in their fields, contributing to greater gender diversity and inclusion in STEM disciplines.

Project design

Wireframe







Frontend development

The frontend of the application will use essential web technologies to create a responsive, intuitive, and visually engaging user interface:

- **HTML (HyperText Markup Language):** HTML will structure the web pages, such as text, images, videos, and interactive elements. It ensures cross-browser compatibility and provides users with a clear and easy-to-navigate layout.
- **CSS (Cascading Style Sheets):** CSS will be used to style the web pages, making it more visually appealing for the user. It allows for layout adjustments, custom colour schemes, and consistent typography, delivering a professional and polished look across different devices.
- **JavaScript:** JavaScript will add interactivity to the application, powering dynamic features such as form validation, interactive menus, and real-time user feedback. These features aim to enhance user engagement and create a smooth user experience.

- **Vue.js (Framework):** Vue.js, a flexible JavaScript framework, will be chosen for frontend development. Its architecture integrates seamlessly with HTML, CSS, and JavaScript, making it ideal for building both simple and complex user interfaces. Vue.js is lightweight, scalable, and efficient, supporting rapid development of responsive UI components.

Tools for Frontend Development

- **NPM (Node Package Manager):** NPM will manage the project's JavaScript dependencies. NPM accelerates the development process by enabling quick and reliable integration of additional features.
- **Webpack:** Webpack will bundle JavaScript and other assets such as images and CSS, improving the website's load time and performance. Which ensures faster page loads and an overall efficient frontend.

Backend development

The backend will handle server-side logic and manage the application's data using the following technologies:

- **Python:** Python will be used for backend development due to its simplicity and versatility. With a vast array of libraries available for web development, Python is well-suited for building robust backend functionality.
- **Flask (Framework):** Flask, a lightweight and flexible framework, will power the backend. Known for its rapid development capabilities, Flask allows the application to be built efficiently. It provides scalability and flexibility, making it a popular choice for all platforms.
- **MySQL (Database):** MySQL will manage user data, ensuring the application can store and retrieve structured information like user profiles, messaging history, and matching algorithms. MySQL is highly reliable and can handle large amounts of data efficiently.

More technologies

- **Socket.IO:** Socket.IO will allow real-time messaging within the application, which will let users communicate instantly with each other.
- **Bootstrap (Styling):** Bootstrap will be used to speed up the frontend development process by providing pre-designed parts that will make a consistent look across all pages
- **Git (Version Control):** Git will manage version control throughout the development process, allowing developers to track changes, manage updates, and collaborate efficiently. Making for a smooth project management.

Deployment

The project will be hosted on GitHub to manage version control and development. GitHub will also be used as the deployment platform, ensuring the project is easily accessible for feedback and further improvements.

Testing

- **Jest (Frontend Testing):** Jest will be used to conduct unit tests on the frontend components, ensuring that each element of the user interface functions correctly.
- **PyTest (Backend Testing):** PyTest will be used to write unit tests for the backend, specifically testing Flask API endpoints and interactions with the database. This ensures that the backend logic is reliable, performs correctly across different scenarios, and handles data accurately.

Development Methodology

The project will adopt an **Agile development methodology**, breaking the work into smaller sprints to ensure continuous progress.

Each sprint will focus on:

- Planning and implementing key features, such as user registration, messaging, and profile creation.
- Ongoing testing, gathering user feedback, and making iterative improvements to ensure the application aligns with user needs and performs effectively.

This approach promotes flexibility and a user-centered development process, allowing the project to adapt to feedback and evolving requirements.

Data collection

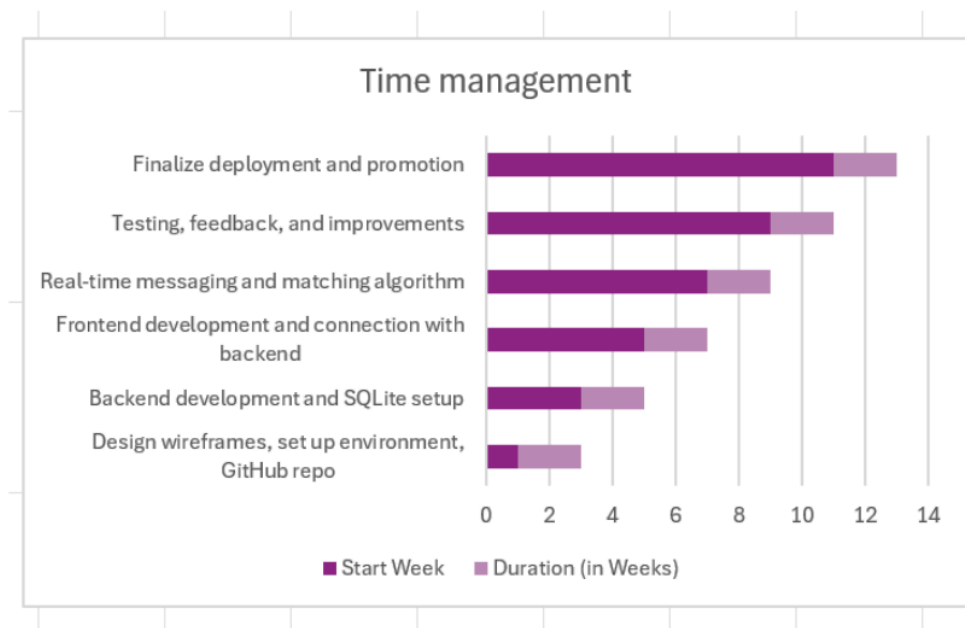
Usability feedback will be gathered through dedicated user testing sessions, focusing on key metrics such as user engagement, retention rates, and overall ease of use. Additionally, surveys and A/B testing will be employed to assess the effectiveness of the matching algorithm and messaging system.

Risk management

- **Technical Complexity:** To mitigate technical challenges, the development will begin with a simplified version of the app, using beginner-friendly yet scalable tools like Flask and SQLite. These technologies allow for ease of development while providing the flexibility to expand as the app grows.
- **Data Privacy:** To ensure compliance with data privacy regulations, including GDPR(General Data Protection Regulation), sensitive user data will be encrypted, and secure authentication methods will be implemented. This will safeguard user information and build trust in the platform's security.

Planning

- **Weeks 1-2:** Design wireframes, set up the development environment, and create a GitHub repository.
- **Weeks 3-4:** Develop the backend using Flask and set up the SQLite database for managing user profiles.
- **Weeks 5-6:** Build the frontend using HTML, CSS, and JavaScript, and connect it with the backend.
- **Weeks 7-8:** Implement the real-time messaging system and matching algorithm.
- **Weeks 9-10:** Conduct testing, collect user feedback, and make improvements to the app.
- **Weeks 11-12:** Finalize deployment and promote the app at universities.



Expected Outcomes

A fully operational web application that allows users to create profiles, connect with study partners, and engage in real-time communication.

Collected feedback and engagement data from early users to guide improvements and enhance the platform.

Opportunities for broader adoption by universities to provide academic support for female STEM students.

Conclusion

This project is more than just an opportunity to develop essential software engineering skills, it's also a venture with significant social impact. By creating the "Women in STEM Study Buddy platform" I aim to contribute to reducing gender disparities in STEM by fostering collaboration, support, and empowerment among female students. Through careful planning, risk management, and a user-centered design approach, I will ensure the app is both functional and sustainable. This initiative not only enhances my skills in software development, project management, and user experience design, but also represents the first step in a larger effort to build a supportive, inclusive community for women in STEM, furthering broader goals of diversity and empowerment.

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GRADEMARK REPORT

FINAL GRADE

GENERAL COMMENTS

84/100

Intro / A&O (400 words)		
Introduction, aim and objectives clearly outlines the project's intent. Good. Existing work is good and can remain in the project's introduction. However a new aim could be created that clearly outlines the project in 15-25 words. Background to the project provides further validation and outlines the clear need for the project with supporting references. Good.	20	18
Background to the Project / Literature Review (400 words)		
Literature provides an overview of the project and problem area, including supporting research and a case study example. Good. Could be extended.	20	14

Project Design (500 words)		
Problem area clearly outlined. Good. Mock-up visuals present a good clear overview of the UI for the intended app. Good. Could be introduced. Required technologies and their purpose is clearly outlines. Good.	30	25
Resources / Planning (200 words)		
Development methodology is selected and justified. Data collection methods outlined. Risk management considerations are documented. Planning schedule is outlined. Good. Focuses on the practical element. Good. Needs to be updated to include research and documentation areas to precede and run in parallel with the practical aspect of the project, which is top priority. Expected Outcomes are also outlined. V. Good.	15	14
Document Presentation		

Good format, structure and presentation. Only minor spelling/grammar error.	15	13
TOTAL	100	84

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