Currently at SCU, there is a lack of a coherent system that enables students within the same class to coordinate study sessions. In this project, we create a system that allows students not only to schedule meetings, but also give them the option to reserve a library room in advance if they desire. We noticed that the current class system at SCU, Camino, in addition to keeping track of grades also features a discussion board that is heavily underused.We have come to the conclusion that students prefer using applications that specialize in a certain function, so the separation between grade trackers and group study systems would be for the best. Using this system will probably work best for classes that focus on more difficult material, or for classes that place an emphasis on teamwork and collaboration.

Acknowledgments

Contents

List of Figures

List of Tables

Chapter 1

Introduction

1.1   Problem Statement

Santa Clara University students spend much of their academic career completing coursework material or studying for exams. Students within the same class often meet with one another outside of the classroom, either in person or through social media. Group meetings are great for studying for a class, but students have very busy schedules, so setting up a meeting time and place can be difficult. On the other hand, social media allows for students to contact each other at their own convenience, but it is usually easier to convey information in person.

Students often use social media to organize meetings for their class.The prevalence of smartphones at SCU promotes the usage of social networking apps such as texting, Facebook, or Twitter to contact classroom peers. Access to these social resources may be convenient, but organizing meetings through these methods is inefficient due to the recreational nature of these applications. The library at Santa Clara University currently offers an online room reservation system, but the rooms are limited in both size and number. The primary concern is that the system is based on a first come, first serve basis. If a group of students attempts to reserve a room at the library, there might not be enough rooms for access due to either the limited number of rooms or the time of day. Additionally, if an individual student were to reserve a room in advance, a group of students looking for a room within the same time frame would

be denied a room. Towards the middle of the school quarter, demand for these rooms rises, and finding an available room becomes increasingly more difficult.

Our solution is to create an application dedicated to group collaboration and library reservations. With our application, we hope that students will be able to be more efficient in planning meetings, as well as have alternative options for collaboration. After authenticating his or her status as an SCU student, the student can create an account on the system and contact other students so group study meetings can be established. In addition to enabling the student to schedule meetings, he or she will have the option to set reminders to reserve group rooms early. As an option, the system provides a classroom forum for student communication on the course material. In case a student is unable to attend a group meeting, he or she can use this feature to remotely collaborate with his or her group members. This application will not be limited to only organizing meetings for a library room, but also for non-academic events such as off-campus gatherings or club sessions. By giving students within the same class the ability to easily form meetings and reserve rooms within the same interface, organizing study groups will be greatly simplified for students.

1.2   Project Overview

Our project is the development of a mobile application that will serve as a platform for student collaboration. With it, students will be able to share information through the app, as well as set up meetings. We also hope that we will be able to incorporate a system that will promote usage of the libraryâĂŹs study rooms.

1.3   Background

When this project topic came up, we were interested because it could prove to be a valuable resource to many people. With the ongoing development in technology, we believe that one of the most useful applications of technology is information sharing. This is especially relevant to students, who need to increase their knowledge not only

for classes, but also life after graduation. It is important to point out that many students do collaborate with one another. It is not uncommon for them to exchange knowledge online or set up appointments to study. Our goal with our application is to make this process more efficient for a wider variety of students.

1.4   Research

The research that we have done on knowledge sharing and collaboration will act as support for our project. The sources we found showed that collaboration is a valuable asset to improve learning. For example, the paper by Cheng demonstrated that devices can be used during lecture to promote interactivity and group thinking. While we do not plan to have our app be used in a lecture setting, we were able to see some different ways that collaborative applications can help students learn.

Another source, written by Rossitto and Eklundh, supports our idea that students should have a dedicated study area. They compare students to âĂIJnomadsâĂİ since they often have to roam from place to place when completing schoolwork. In a campus environment, it can be difficult to find a suitable workplace that is consistently available for (group) use. For Santa Clara, the most reliable places are the study rooms in the library. We hope that our app will allow students to schedule group meetings in these rooms earlier.

A third source that we found to be interesting, was âĂIJKnowledge SharingâĂęâĂİ, which is an expanded view of our topic. Our target audience is students at SCU who may have trouble meeting groups due to various circumstances. The application mentioned in this source deals with students from various schools who lack adequate sources of knowledge, such as poor academic institutions. This issue is likely to present itself in many parts of the world, and collaboration applications are useful.

Chapter 2

Requirements

The following requirements describe how the major functions of the system will behave as proposed in the introduction. Functional requirements define actions the system will explicitly perform. Non-functional requirements describe the means by which functional requirements will be achieved. Both functional and non-functional requirements will be categorized as either critical, recommended, or suggested based on the importance of a task. There will be several design constraints that will define the creation of the system.

2.1   Functional Requirements

2.1.1   Critical

- The application must allow students to create and join groups

- The application must provide a forum for discussion

- The application must display a calendar of group meeting dates

2.1.2   Recommended

- The application will allow students the option to reserve a library room

- The application will show all members of a group

2.1.3 Suggested

-

- The application will allow students to directly message group members

2.2 Non-functional Requirements

2.2.1 Critical

- The application will allow concurrent users at the same time

- The application will protect the privacy of the users

- The application will be user friendly and intuitive

2.2.2 Recommended

- The application will have a clean interface for ease of use

- The application can be easily updated or changed if needed

2.2.3 Suggested

-

2.3 Design Constraint

- The system must be able to run on Android mobile phones

Chapter 3

Use Cases

From the client side, the user is assumed to be an SCU student. The goal of what the user wants to accomplish is detailed in a use case.

3.1 Use Case #1

Name: Create a new study group

Goal: To create a new study group for a class

Actors: Student

Pre-conditions:
- User wants to create a group

Post-conditions:
- Group is created

Steps:
1. User selects "Create Group" option
2. User creates a name for the group, and is provided a digital key

Exceptions: n/a

3.2 Use Case #2

Name: Join a study group

Goal: To join an existing study group within a class

Actors: Student

Pre-conditions: • User wants to join a group

Post-conditions: • User successfully joins a group

Steps: 1. User selects âĂIJJoin GroupâĂİ option

      2. User selects the name of the group from the menu

      3. User enters the groupâĂŹs digital key

Exceptions: n/a

3.3   Use Case #3

Name: Invite others to a study group

Goal: To gather other students to the group

Actors: Inviter, Invitee

Pre-conditions: • User seeks to add students to the group

Post-conditions: • New students are successfully added

Steps: 1. User selects âĂIJInviteâĂİ option

      2. User enters the studentâĂŹs email address

      3. Invitee receives a digital key to the group

Exceptions: n/a

3.4   Use Case #4

Name: View/edit calendar

Goal: User will add important events to the calendar

Actors: Student

Pre-conditions: • n/a

Post-conditions: • User will be able to view a calendar of assignments/exams

  • User can set reminders for important events

Steps: 1. User selects âĂIJCalendarâĂİ from navigation

  2. User selects dates and adds events

  3. User chooses whether or not to receive reminders

Exceptions: n/a

3.5   Use Case #5

Name: Create/join discussion on forum

Goal: Users use forum to discuss topics

Actors: Students

Pre-conditions: • n/a

Post-conditions: • User will be able view and respond to discussion

Steps: 1. User chooses a group

  2. User selects the âĂIJForumâĂİ link

  3. User can choose existing discussion or creates their own

Exceptions: n/a

Chapter 4

Activity Diagram

The following figure illustrates the process by how the user will navigate the application. The user will first go through authentication, where he or she will then be able to create or enter a group, and view the calendar. Afterwards, the user may continue using the application or end it.

Figure 4-1: test figure one

Chapter 5

Design and Implementation

Users will be presented with the login screen as shown below in Figure 7.2. Once the user enters the correct login credentials, the home screen will display. The options below will allow the user to create a group, join a group, or view the calendar. Likewise, a sidebar on the left can be accessed by swiping from left to right to enable users to navigate between the home page, group list, and calendar. All subsequent pages can return to the home screen through the userâĂŹs phone back button or through the sidebar.

Chapter 6

Technologies Used

As both a Web application and a hybrid mobile application, this application will be created using several such popular Web technologies. Several tools will be used to make this a reality.

6.1 HTML (Hyper Text Markup Language)

HTML provides the main framework of the application. The functionality and styling of the application is built on top of the HTML file.

6.2 CSS (Cascading Style Sheets)

CSS is used to style HTML elements shown within the application.

6.3 Javascript

JavaScript is used to provide interactive functionality for the sidebar in the application.

6.4   PHP

PHP is a scripting language that provides functionality for the back end of the application.

6.5   MySQL

MySQL is the database of choice that stores information within data tables. This is hosted within the SCU web servers.

6.6   JQuery Mobile

We use this framework to make the application also accessible by the web.

Chapter 7

Architectural Design

To make the user experience as simple and painless as possible, the application will function as a single Web page. The HTML main page will be stylized with CSS from the Bootstrap framework, and page functionality will be manipulated using Javascript. The user will be able to request information from the server in the form of HTTP requests. The server stores information about the groups that have been created and what students are in each group. Figure 9.3 shows the basis of the architecture as shown below.

Chapter 8

Design Rationale

The reason we hope to use these technologies is because they are standard technologies that we have experience with. These technologies are well documented, so there are many resources we can use to ensure our product is working properly. HTML and CSS will allow us to create a site that is easy to navigate and aesthetically pleasing. Bootstrap will also help accomplish this, as it lays out our application in a manner that is accessible on mobile devices. MySql is a database management system that we are familiar with and will be used to store user information.

Many design decisions will be made in order to enhance the usability of the application.

- Side/drawer menu to keep navigation out of the way

- Tabular format for forum to keep the discussions organized

- Multiple pages so that users can focus attention on the different functionalities

- Minimalist/Simple look to limit visual distraction and maintain user interaction

Chapter 9

Testing

9.1 Unit Testing

We tested the application as it was being made to ensure that all sections were working as intended. The functions that we wanted to ensure were working include the login features, the ability to join groups and communicate with groups members, and to access a calendar of events. We set up a number of test accounts and went through the various features.

9.2 Integration Testing

Once we confirmed that all units of the application were working properly, we integrated them into one and tested the application as a whole. We went through a comprehensive test of every unique page within the application to make sure there were no errors.

9.3 User Testing

After the applicationâĂŹs functionality was complete, we had other SCU students test the application. This acted as a stress test for our application by creating many test accounts and groups to see how well they could be handled.

Although students will likely create only a handful of groups with the application, we still created many instances of users and groups to test it.

Chapter 10

Lessons Learned

Over the course of creating this application, our team has learned many tools and skills that will help us in the future in an engineering career.

10.1 Workload Balance

Work was split between working on the front end and the back end of the application. Most of the more intensive work resided with working on the backend, yet we did not give it special attention until the later stages of development. This most likely increased the amount of time it took to implement certain features in the application such as creating groups.

10.2 Proper Research of Technologies

While we had some previous experience with the core web technologies used in this application, we should have properly researched the technologies that were unfamiliar to us so that we could plan our design better. Rather than diving straight into the code, we should have taken extra time to understand our options, specifically for using Phonegap. More research would likely have allowed us to be more efficient with our development.

10.3   Communication

Throughout development, it became clear that communication between each of us was important. It helped us know how much progress each person has made, or when one of us needed help on a specific module or task. This affected us in the early stages of development since we mostly worked individually on our on tasks.

Chapter 11

Conclusion

Making SCU Collab a reality was a great undertaking that presented many challenges along the way. We learned a great deal about what working as a professional programmer would be like. From the satisfaction of creating our initial operating system, frustration at the accidental breaking of modules which took hours to fix, and our arrival at the final end product, we took away many valuable lessons from developing it. The greatest lesson we learned was by working as team on a simple concept, we could make systems that improve the lives of other people.

Appendix A

Appendix

A.1   Risk Analysis

It is important to account for any risks that may happen during the development of this architecture. By establishing a contingency plan for common risks, hindrances within the development process will be minimized. The following risks can seen in Table T-1 below.

Table A.1: Risk Table

Risk	Consequence	Probab
Bugs	Unable to meet requirements. Program does not work properly	0.7
Lack of Technical Ability	Delays. Unable to meet requirements	0.3
Changing Requirements	New features are needed	0.2
Loss of Data	Modules will have to be rebuilt	0.1

A.2 Development Timeline

The development timeline shows a clear view of each team memberâĂŹs responsibilities and roles in this project. Each team memberâĂŹs progress can be traced across the time periods shown below in Table T-2.