Senior Project: ForumSphere.com

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Abstract

We live in the Age of Information & Technology where social media has become an integral part of our society. Social media platforms such as Facebook help bring people and ideas together in one place. However, currently there is no centralized hub on the internet that is geared towards individual college campuses. Our goal is to create an environment that promotes structured and productive discussion between students, alumni, and staff. A platform like ours is needed to bring a campus closer if the community is willing and able to help one another.

There are other platforms that focus on social media as a place for communities to grow and help one another. Good examples include Reddit.com and Piazza.com. Reddit however has a much larger scope in terms of the audience that they reach and Piazza is solely focused on bringing a single classroom together for discussions and problem solving.

Our platform aims to build an online community for college campuses, starting with Cal Poly. We believe in the power of crowdsourcing and if we get this platform in the hands of most Cal Poly's students and staff it will blossom into a thriving organic community that is focused on getting students the answers they need while providing a sense of belonging to everyone. Since our project is heavily focused on making an environment that promotes user interaction we spent a large portion of our time on iterative user-testing to insure that our website is intuitive and fun to use.

Contents

1 Background

We implemented this application using a serverless architecture - meaning we used Amazon Web Services to host a majority of our resources, and we integrated them into our web application without having to provision or use servers.

1.1 Amazon Web Services

The focus of our application was the mission and the algorithms that make it work. As such, we didn't want to handle the backend maintenance with servers and APIs. We decided to let Amazon Web Services handle these parts, specifically the services geared towards web applications.
These services include:

- RDS: provisions and hosts a MySQL database so that we can easily set up and use it.
- Api Gateway: allows us to easily make an API and make custom functions on Lambda.
- Lambda: hosts functions on the cloud and allows them to be triggered by outside events.
- S3: a cloud file system for hosting files, videos, etc.
- Cognito: user authentication on the cloud that securely stores user passwords and data.

These services provide an easy way to maintain code and servers on the cloud. They don't provide code, just the means to host applications on the cloud easily and that is how we utilize them.

1.2 Frameworks and Code

This application was developed using the framework of Angular 5, which provides an easy way of coding HTML and CSS without dealing with JavaScript. The primary language used is TypeScript, which replaces JavaScript on the frontend. In the backend, we are coding in Python 3.6, which is integrated using API Gateway hosted by AWS.

2 Application

2.1 Overview

The purpose of the site is so users can ask questions and get answers to questions in an academic setting. The goal of the site is so users can be productive with their studying and not be distracted by the normal clutter of social media sites that are out there today. This section will demonstrate the user flow for the site.

2.2 Register / Login

The first step to using this application is registering the user with the system and then logging in. The system needs to validate an email address for security reasons.

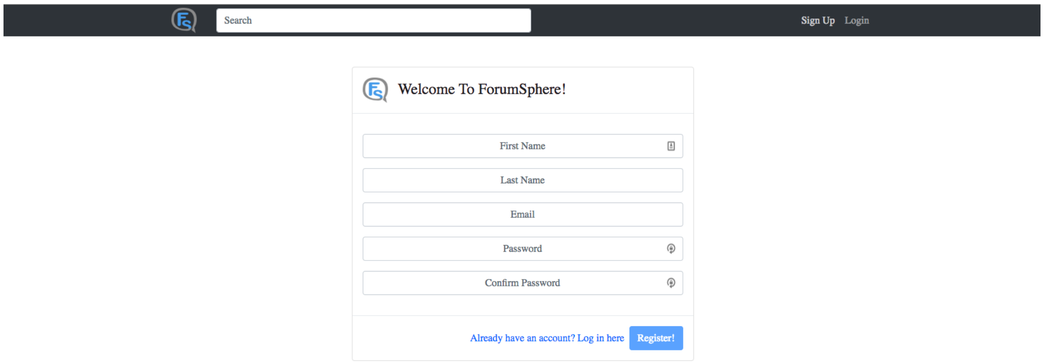
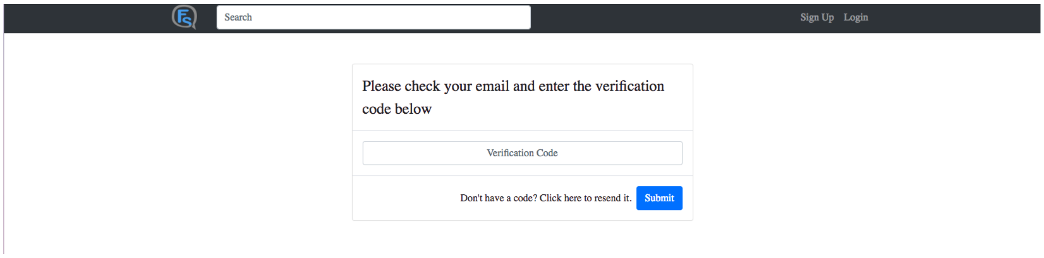


Figure 1: Register screen

After registering a new user, an email will be sent to verify the email. The user has to input the 4 digit code into the box and hit enter to verify. The reason this is done is so passwords can be reset. Passwords are fully encrypted and can only be reset through an email flow.



Please check your email and enter the verification code below

Figure 2: Verification page

Once the user verifies, they will be taken to the login screen where they enter their email and password.

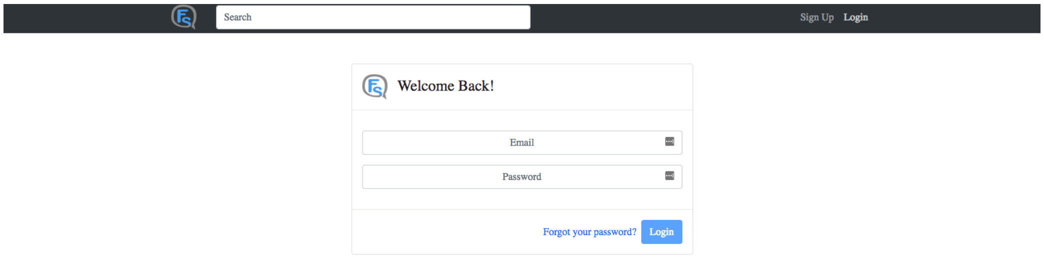


Figure 3: Login Screen

Now that the user has logged in, the site's main functionality becomes available for use. The main components of the site are:

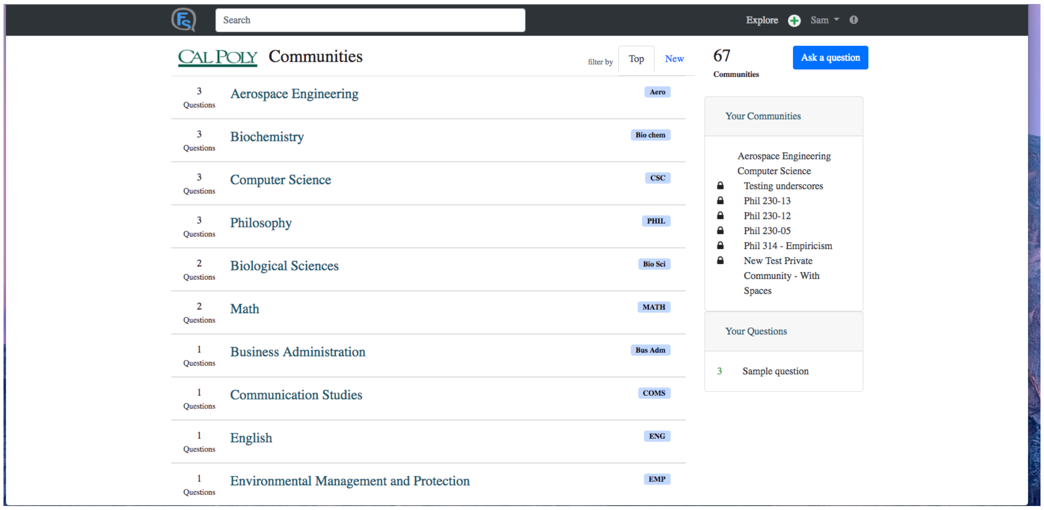
- Communities
- Questions
- Profiles
- Influence

All of the site's general functionality is available for use without logging in, except there are limitations. These will be covered in each of their respective sections.

2.3 Communities

Communities are the cornerstone of the application. They are a way to organize questions so that users can more easily find questions that they can answer. Each question asked must be tagged with at least one Community, but are not limited to the amount of Communities they can be tagged in.

Communities can be either public or private. However, 200 Influence is needed when creating a Community. Influence will be discussed in detail later.



Communities

3 Questions	Aerospace Engineering	Aero
3 Questions	Biochemistry	Bio chem
3 Questions	Computer Science	CSC
3 Questions	Philosophy	PHIL
2 Questions	Biological Sciences	Bio Sci
2 Questions	Math	MATH
1 Questions	Business Administration	Bus Adm
1 Questions	Communication Studies	COMS
1 Questions	English	ENG
1 Questions	Environmental Management and Protection	EMP

67 Communities

Your Communities

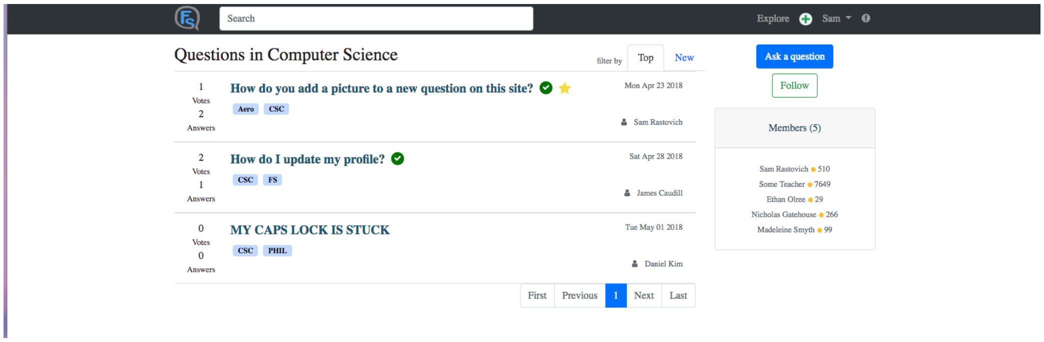
Aerospace Engineering
Computer Science
🔒 Testing underscores
🔒 Phil 230-13
🔒 Phil 230-12
🔒 Phil 230-05
🔒 Phil 314 - Empiricism
🔒 New Test Private Community - With Spaces

Your Questions

3 Sample question

Figure 4: The home page of ForumSphere.com

The home page of the site lists all available communities to the user. If a user is logged in, all the available private communities to them are also listed. Otherwise, only the public ones are listed. If a Community is clicked, the user is navigated to the Community home screen, which shows all questions tagged with that Community and all other relevant information.



Questions in Computer Science

1 Votes 2 Answers	How do you add a picture to a new question on this site? ✓ ★	Aero CSC	Mon Apr 23 2018 Sam Rastovich
2 Votes 1 Answers	How do I update my profile? ✓	CSC FS	Sat Apr 28 2018 James Caudill
0 Votes 0 Answers	MY CAPS LOCK IS STUCK	CSC PHIL	Tue May 01 2018 Daniel Kim

Members (5)

Sam Rastovich	510
Some Teacher	7649
Ethan Olree	29
Nicholas Gatehouse	266
Madeleine Smyth	99

Figure 5: The Computer Science Community

Each Community page will show the users that follow that Community as well. Users have the option to follow Communities, allowing them to have easier access to the Community later. This feature is not available if the user is not logged in.

In order to create a Community, the user must be logged in. The user must click the plus sign in the upper right hand corner.

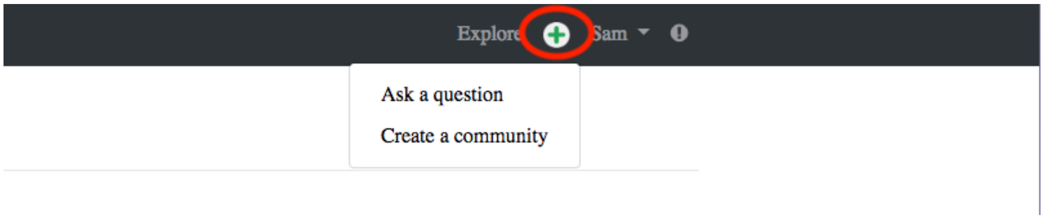
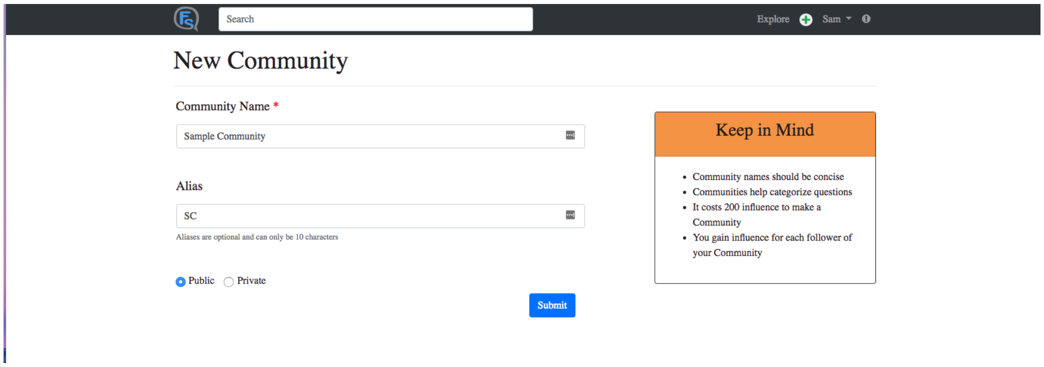


Figure 6: Demonstrating the create button

In order to create a Community a name is required, and the user must be logged in. There is an option for an alias, which can shorten the name when tagging it in a question. An example of a Community called "Sample Community" with the alias "SC" is shown below.



New Community

Community Name *

Sample Community

Alias

SC

Aliases are optional and can only be 10 characters

● Public ○ Private

Submit

Keep in Mind

- Community names should be concise
- Communities help categorize questions
- It costs 200 influence to make a Community
- You gain influence for each follower of your Community

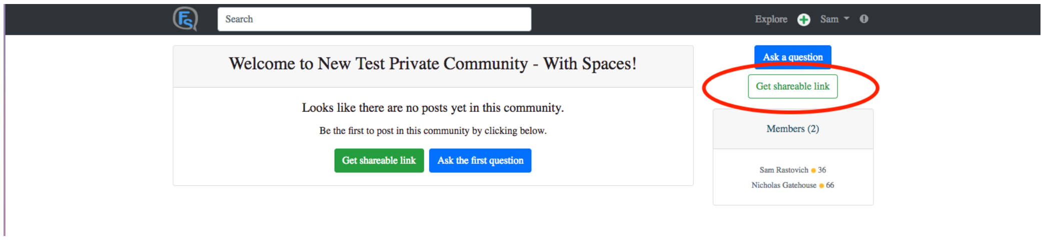
Figure 7: Public Community 'Sample Community' with alias 'SC'

After hitting 'Submit', the Community will appear on the home screen and be available for use by all users.

2.3.1 Private Communities

If the Community created is private, the creator must allows access for other users to use it. This is done via a sharable link, which can be found on the

Community home page.

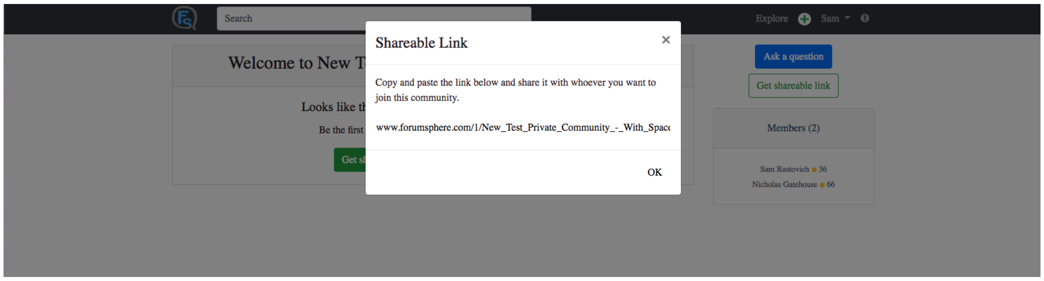


Welcome to New Test Private Community - With Spaces!

Looks like there are no posts yet in this community.

Be the first to post in this community by clicking below.

Figure 8: Home page of private Community



Shareable Link

Copy and paste the link below and share it with whoever you want to join this community.

www.forumsphere.com/1/New_Test_Private_Community_-_With_Spac

Figure 9: The shareable link for a private Community

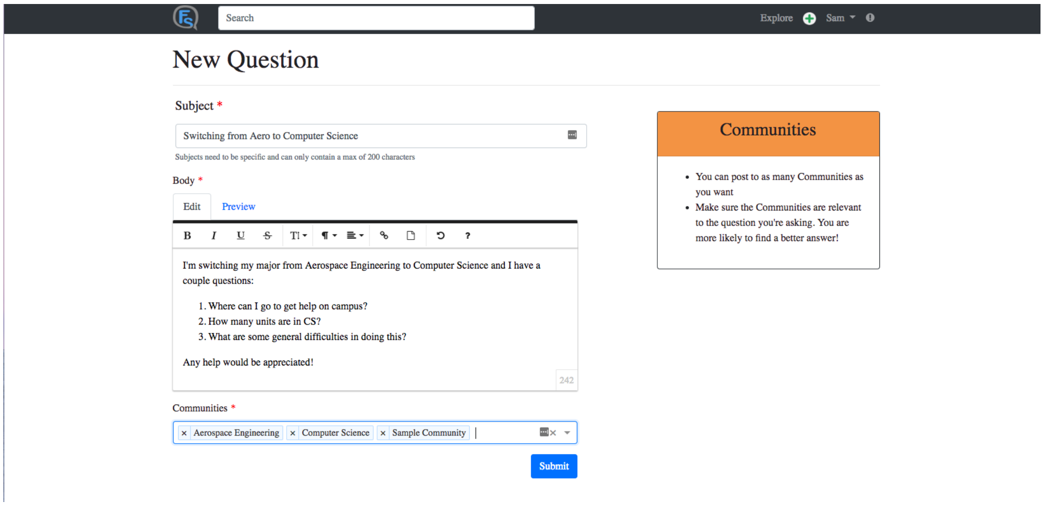
The creator just has to copy and paste the shareable link for other users to join. When another user clicks on the link, they will be added to the Community and it will allow them to post questions in it. Questions inside private Communities are only visible to the users that are members of that Community.

2.4 Questions

Questions are the main purpose of ForumSphere.com. They provide a way for a user to ask a question, and get constructive answers and feedback on it. Questions must be tagged with at least 1 Community.

In order to ask a question, the user must be logged in. There must be a subject and a body of the question, and the subject can not be longer than 200 characters. Subjects are meant to be a general summary of the question, and not the actual question. This is so users can get a one line description of your problem when searching for it.

An example question from a student switching majors from Aerospace Engineering to Computer Science is shown below.



New Question

Subject *

Switching from Aero to Computer Science

Subjects need to be specific and can only contain a max of 200 characters

Body *

I'm switching my major from Aerospace Engineering to Computer Science and I have a couple questions:

1. Where can I go to get help on campus?
2. How many units are in CS?
3. What are some general difficulties in doing this?

Any help would be appreciated!

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Communities *

× Aerospace Engineering × Computer Science × Sample Community

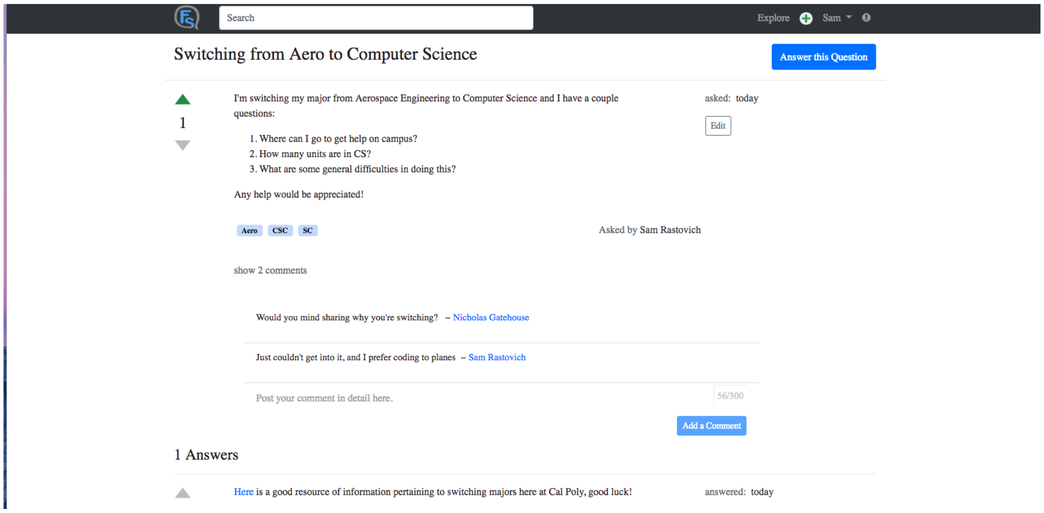
Communities

- You can post to as many Communities as you want
- Make sure the Communities are relevant to the question you're asking. You are more likely to find a better answer!

Figure 10: New question posting to Aerospace Engineering, Computer Science, and Sample Community

After asking the question, it becomes available for other users to interact with it. Other users can:

- Respond
- Ask clarifying questions
- Vote on their favorite answers and questions



Switching from Aero to Computer Science

I'm switching my major from Aerospace Engineering to Computer Science and I have a couple questions:

1. Where can I go to get help on campus?
2. How many units are in CS?
3. What are some general difficulties in doing this?

Any help would be appreciated!

Asked by Sam Rastovich

Would you mind sharing why you're switching? – Nicholas Gatehouse

Just couldn't get into it, and I prefer coding to planes – Sam Rastovich

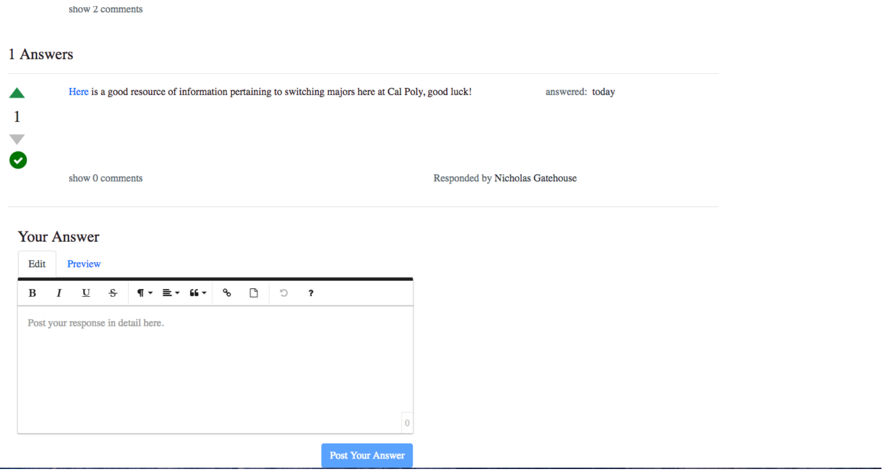
Post your comment in detail here.

1 Answers

Here is a good resource of information pertaining to switching majors here at Cal Poly, good luck!

Figure 11: The question page: showing clarifying questions, and the body of the question visible to all users

The creator of the question can now see responses to the question, and mark one of them as the answer, which shows to all users that the creator marked it as answered. This is symbolized by a green check mark. An example of a response by another user to the question is shown below.



1 Answers

Here is a good resource of information pertaining to switching majors here at Cal Poly, good luck!

Responded by Nicholas Gatehouse

Your Answer

Post your response in detail here.

Figure 12: A response marked as the answer by the asker of the question.

If a professor or other staff member of the school votes up on a question or answer, it is marked with a gold star, putting more weight on the question or answer.

2.5 Profiles

In order to get to the user's profile, click on the name in the upper right hand corner and click 'Profile'.

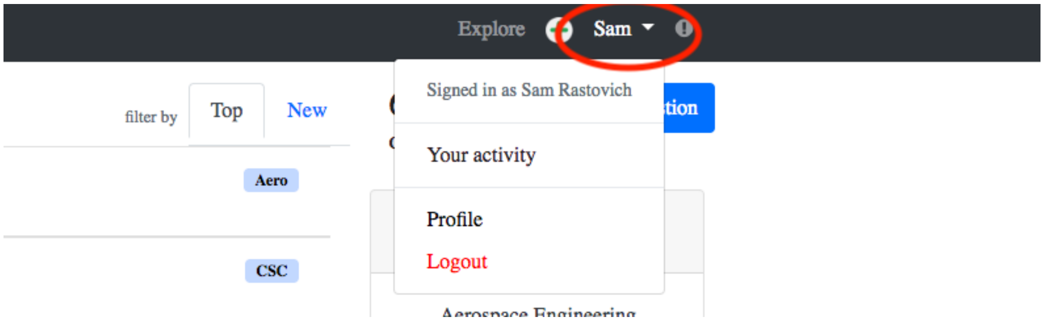
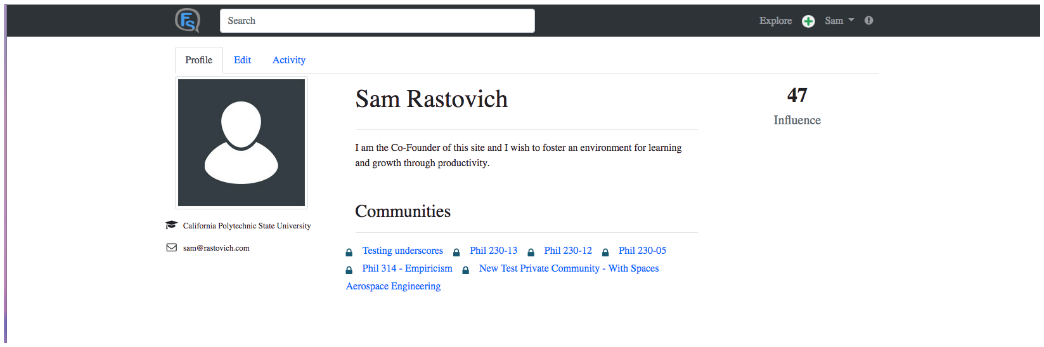


Figure 13: Profile navigation

The user's profile page has a variety of information:

- Their name
- List of Communities they are a member of
- The school they go to
- Their email (only if the user allows it to be public)
- Their Influence



Sam Rastovich

I am the Co-Founder of this site and I wish to foster an environment for learning and growth through productivity.

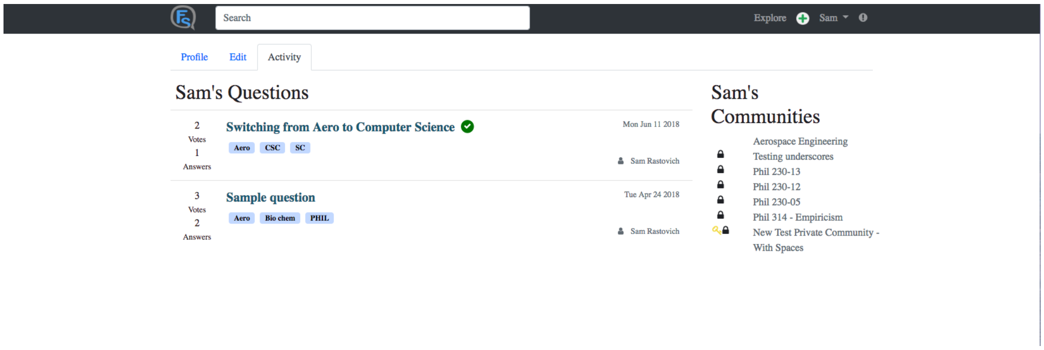
California Polytechnic State University

sam@rastovich.com

Testing underscores · Phil 230-13 · Phil 230-12 · Phil 230-05 · Phil 314 - Empiricism · New Test Private Community - With Spaces · Aerospace Engineering

Figure 14: Profile page

Also on the profile page is the user's activity. This page shows all of the user's questions, responses, and comments, so that they can more easily navigate to those posts and receive updates.



Sam's Questions

2 Votes 1 Answers — **Switching from Aero to Computer Science** ✓ — Aero CSC SC — Mon Jun 11 2018 — Sam Rastovich

3 Votes 2 Answers — **Sample question** — Aero Bio chem PHIL — Tue Apr 24 2018 — Sam Rastovich

Sam's Communities

- Aerospace Engineering
- 🔒 Testing underscores
- 🔒 Phil 230-13
- 🔒 Phil 230-12
- 🔒 Phil 230-05
- 🔒 Phil 314 - Empiricism
- 🔑🔒 New Test Private Community - With Spaces

Figure 15: User activity page

The activity page shows the Communities and the questions associated with the user.

2.6 Influence

Every user on our application has an amount of Influence. These points determine how much weight they have on the communities and questions. This is implemented so that a productive environment is maintained on the site.

2.6.1 Influence points are earned by:

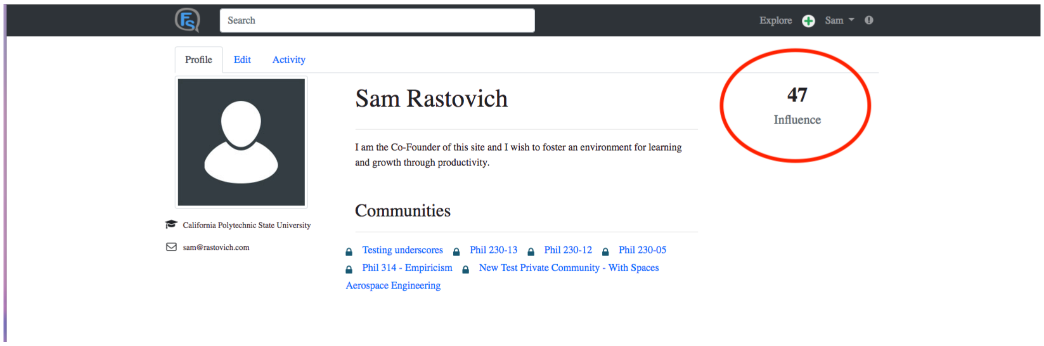
- Asking questions (+10)
- Receiving upvotes on a question or answer (+3)
- Answering questions (+5)
- Gaining followers on a community (+4)

2.6.2 Influence points are lost by:

- Receiving downvotes on a question or answer (-1)
- Receiving a flag on a question or answer (-10)
- Starting a community (-200)

- Losing followers on a community (-4)

The amount of Influence a user has is their metric to how active and reliable they are on the site. Other users can use this information to determine the validity of their answers, creating a more productive environment online. Every user starts with 201 Influence, and a user cannot drop below 1 Influence.



Sam Rastovich

I am the Co-Founder of this site and I wish to foster an environment for learning and growth through productivity.

Communities

Testing underscores Phil 230-13 Phil 230-12 Phil 230-05 Phil 314 - Empiricism New Test Private Community - With Spaces Aerospace Engineering

California Polytechnic State University

sam@rastovich.com

Figure 16: Highlighting the user's Influence on the profile page

2.7 Tickets

ForumSphere.com has a ticketing system for user feedback. The user just has to click on the exclamation icon in the upper right hand corner and submit feedback. The user must be logged in to use this feature.

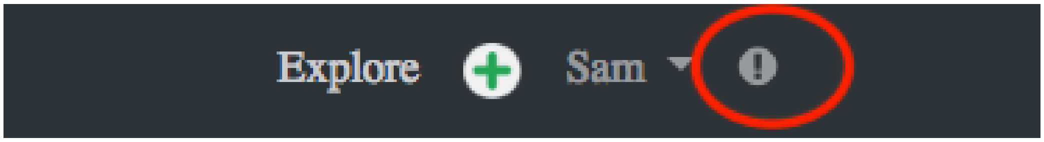
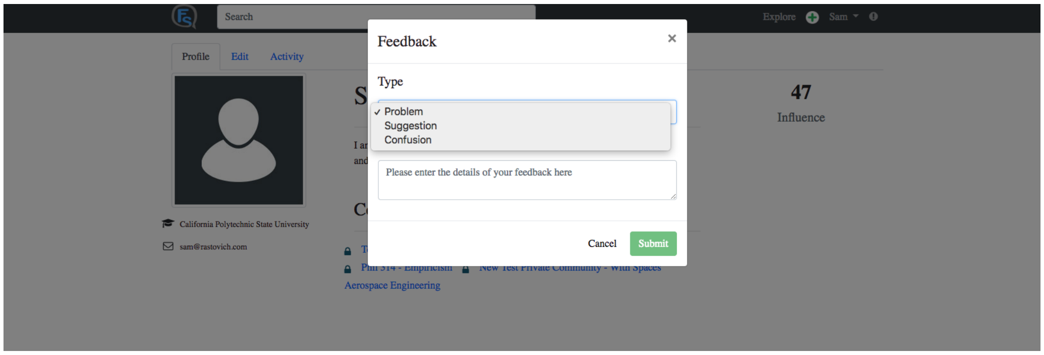


Figure 17: Ticket icon



Type

✓ Problem
Suggestion
Confusion

Please enter the details of your feedback here

Figure 18: Ticket window

3 Design

We wanted to design this site so that it could accomplish 3 main things:

- Community based learning
- Productive and social user activity
- Scalability

3.1 Community based learning

Other forum-based sites focus most of their attention towards the posts that are made rather than the communities that organize them. When a user thinks about ForumSphere.com, we want them to think first about communities and then questions; not vice versa. We achieved this by putting communities at the front of the homepage, and by making navigation community-based. Our hope is that this will incite more inter-community interaction which in turn will bring the campus community closer together.

3.2 Productive and social user activity

Productivity was always at the forefront of our minds when designing ForumSphere.com. The biggest problem in social media sites today is the clutter of unnecessary information that floods users' feeds. We decided to tackle this problem using a minimalist design — the questions can't have very long threads, and the most relevant information is shown at the top of the page. This information is then sorted by our Influence metric which should indicate reliability of the information.

Our aim with Influence was to create an artificial metric in which users can tangibly see the reliability of a specific user. Much more forethought is needed into how to properly socially engineer such a metric to get the results that we are seeking. For now the arbitrary assignment of points shall suffice for our first iteration of this project.

3.3 Scalability

Finally, our site needs to be scalable. This is difficult to achieve when you don't have much money or resources, which is why we decided to go with Amazon Web Services (AWS). They provide a year of free services that include everything we needed for this project. AWS also provides the means of scaling upwards easily. AWS also provides a service for delivering and caching content globally, which is pivotal for a website that needs to gain traction like ours.

4 Implementation

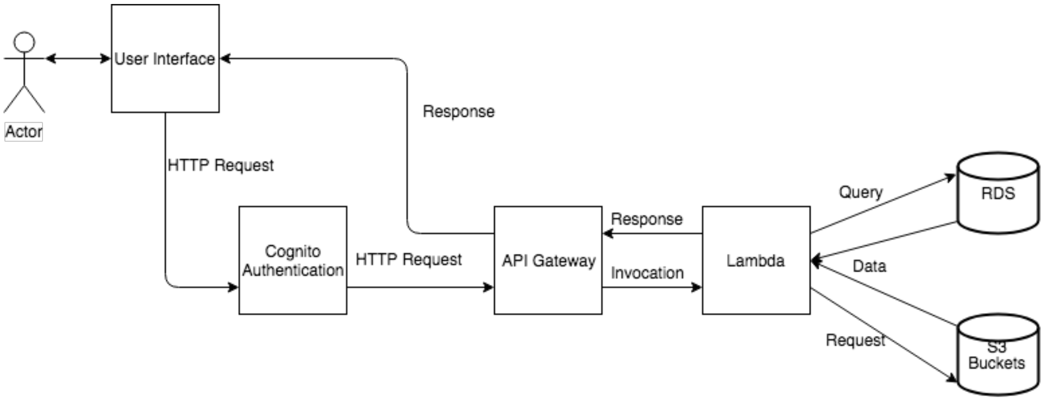


Figure 19: Diagram of the Applications Flow

4.1 Front End Breakdown

- **Overview**: The front end of our website is the User Interface which we went over extensively in the Application section. Refer to that section for a more in depth look.
- **Framework:** Angular 5
- **Code:** HTML 5 & Bootstrap 4
- **Build:** Webpack

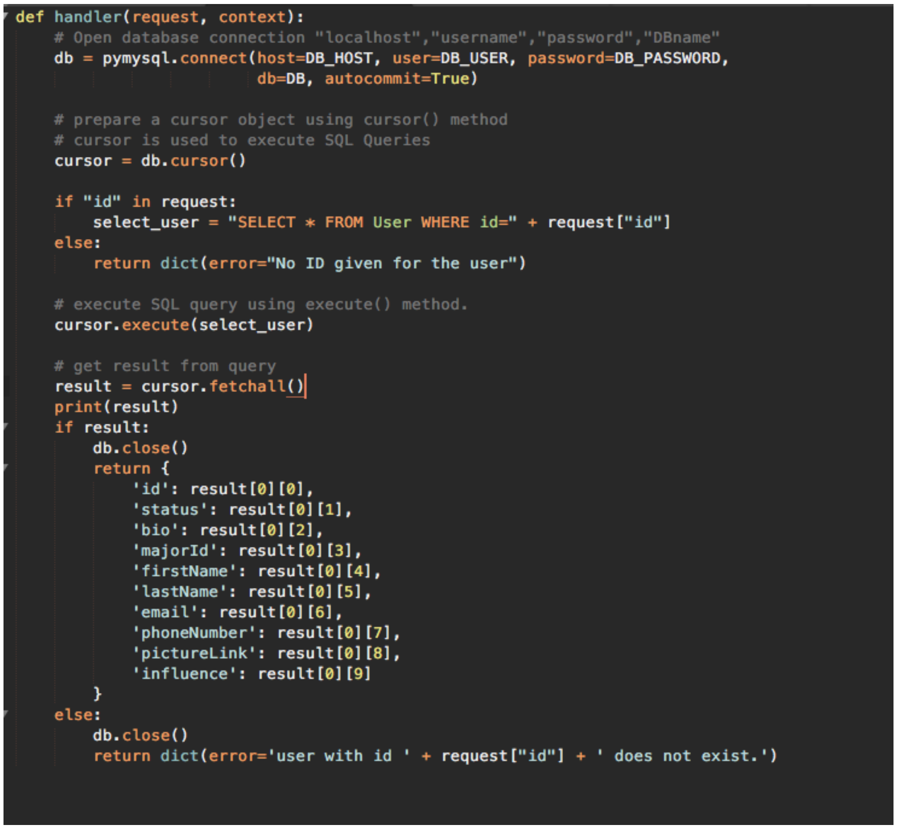
4.2 Back End Breakdown

- **Overview:** The back end of our website is everything the user cannot see. This includes mostly data storage and manipulation. Below is a more in depth look at each of the pieces.
- **Cognito:** handles new user registration and current user authentication. This way we don't have direct access to user passwords as well as providing security via encryption
- **AWS API Gateway:** is used to activate the AWS Lambda Functions from the frontend via REST service requests.
- **AWS Lambda Functions:** are used to access, modify, and insert information into the database and S3 Buckets. This is where the majority of the code was written. As an example, below are two of the lambda functions that we created.
- **RDS:** MySQL Relational Database is used to store information about the users and their content.
- **AWS S3 Buckets:** are used to store questions, answers, and comments. We did this because the body of text we used was in html (so users can format) and it was simpler to store it here than in a database.

4.3 Lambda Function Code Examples

1. API Call User/Get

- Functionality: This function simply queries the database for a userId and returns information associated with that ID

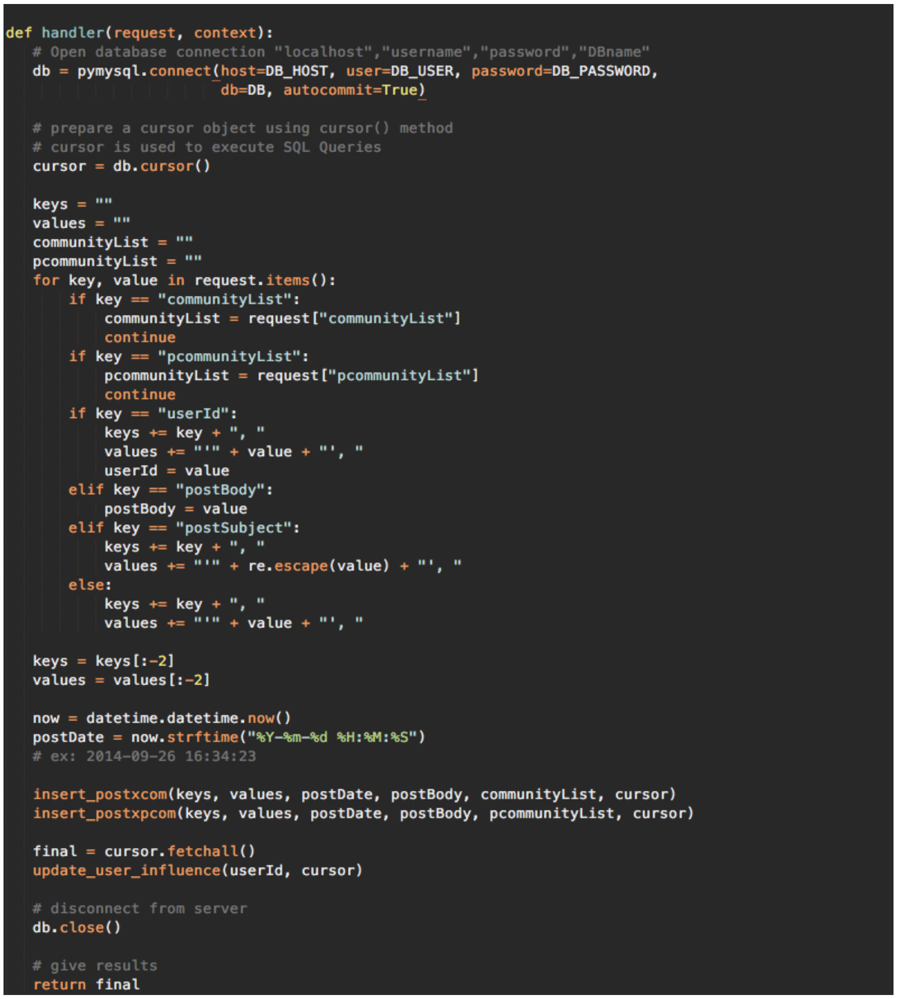


```
def handler(request, context):
    # Open database connection "localhost","username","password","DBname"
    db = pymysql.connect(host=DB_HOST, user=DB_USER, password=DB_PASSWORD,
                         db=DB, autocommit=True)

    # prepare a cursor object using cursor() method
    # cursor is used to execute SQL Queries
    cursor = db.cursor()

    if "id" in request:
        select_user = "SELECT * FROM User WHERE id=" + request["id"]
    else:
        return dict(error="No ID given for the user")

    # execute SQL query using execute() method.
    cursor.execute(select_user)

    # get result from query
    result = cursor.fetchall()
    print(result)
    if result:
        db.close()
        return {
            'id': result[0][0],
            'status': result[0][1],
            'bio': result[0][2],
            'majorId': result[0][3],
            'firstName': result[0][4],
            'lastName': result[0][5],
            'email': result[0][6],
            'phoneNumber': result[0][7],
            'pictureLink': result[0][8],
            'influence': result[0][9]
        }
    else:
        db.close()
        return dict(error='user with id ' + request["id"] + ' does not exist.')
```

Figure 20: User/Get

2. API Call Post/Post

- Functionality: This function creates a Question that is posed by a user and is added to the appropriate communities. If it is added to a private community a new instance of the question is made. A question sent to multiple public communities however is the same instance of the question. It's also worth noting that we add the postBody to an S3 Bucket as opposed to the database since the body is in HTML and MySQL Databases don't hold HTML well. At the end of the function if all goes well the user is then awarded 10 influence points for posting a question to promote activity on the site.



```python
def handler(request, context):
    # Open database connection "localhost","username","password","DBname"
    db = pymysql.connect(host=DB_HOST, user=DB_USER, password=DB_PASSWORD,
                         db=DB, autocommit=True)

    # prepare a cursor object using cursor() method
    # cursor is used to execute SQL Queries
    cursor = db.cursor()

    keys = ""
    values = ""
    communityList = ""
    pcommunityList = ""
    for key, value in request.items():
        if key == "communityList":
            communityList = request["communityList"]
            continue
        if key == "pcommunityList":
            pcommunityList = request["pcommunityList"]
            continue
        if key == "userId":
            keys += key + ", "
            values += "'" + value + "', "
            userId = value
        elif key == "postBody":
            postBody = value
        elif key == "postSubject":
            keys += key + ", "
            values += "'" + re.escape(value) + "', "
        else:
            keys += key + ", "
            values += "'" + value + "', "

    keys = keys[:-2]
    values = values[:-2]

    now = datetime.datetime.now()
    postDate = now.strftime("%Y-%m-%d %H:%M:%S")
    # ex: 2014-09-26 16:34:23

    insert_postxcom(keys, values, postDate, postBody, communityList, cursor)
    insert_postxpcom(keys, values, postDate, postBody, pcommunityList, cursor)

    final = cursor.fetchall()
    update_user_influence(userId, cursor)

    # disconnect from server
    db.close()

    # give results
    return final
```

Figure 21: Post/Post

5 Analysis/Verification

Since this application is user-driven, we focused our research on the UI to make sure it was usable and that users would find it helpful. In order to do this, we ran 10 user tests on the UI, and then we tested the site for 5 weeks with 63 students in 4 different classes.

5.1 User Tests - UI

We had 10 different students run through user tests of the site, keeping note of how much they struggled with finding specific pages and commenting on the overall usefulness of the site. We tested with 5 users with the first iteration of the site, and then we fixed the issues and re-tested with another 5 users. The rubric for the user testing can be found in Appendix A.

5.1.1 First Iteration:

After running through the tests with the first 5 users, we narrowed down the problems of the site into basic groups:

- Users had trouble navigating to their profile (average 30+ seconds)
- Users had trouble asking questions (average 45+ seconds)
- Users had trouble creating communities (average 45+ seconds)
- Users didn't like the overall color-scheme
- Some basic functionalities broke (registering a new user, marking questions as answered)

We noticed that during testing, a majority of the time, their mouse lived in the lower half of the screen, and we wanted them to mostly live at the top where the navigation bar is.

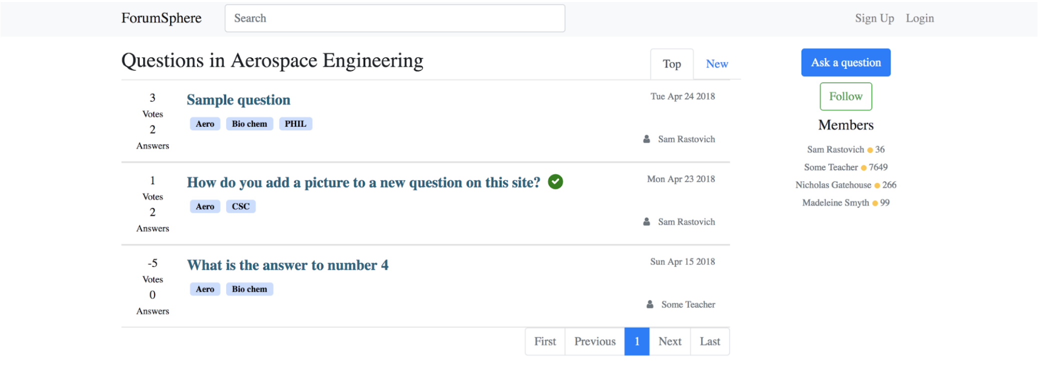
We also asked our users follow-up questions (Appendix A), and the general results are as follows:

- 100% of users said they would find this application useful and they would use it.
- The majority of students said they would use it for questions on exams mostly; they would use it for studying mostly.
- Users found that the navigation was frustrating, and they wouldn't want to use it if it wasn't more polished.
- A majority of users said they would like to see some kind of direct-messaging system so they could communicate easier when on the site.

5.1.2 Solutions

We found that one of the biggest issues was the navigation bar at the top of the screen. Originally the color was a light grey, and it was almost never used by any of the users. A simple fix we applied to this was by darkening the navigation bar to black, making it stand out more for users. This helped improve navigation tremendously, and made it so users' mouses lived at the top of the screen for a longer period of time.

We changed the overall color-scheme to be more dark. At first, the fonts were light, and the colors were minimally colored. We decided to make buttons darker and more colorful, the fonts changed from light blue to a dark black, and we added colors to names and other various details of the profile.



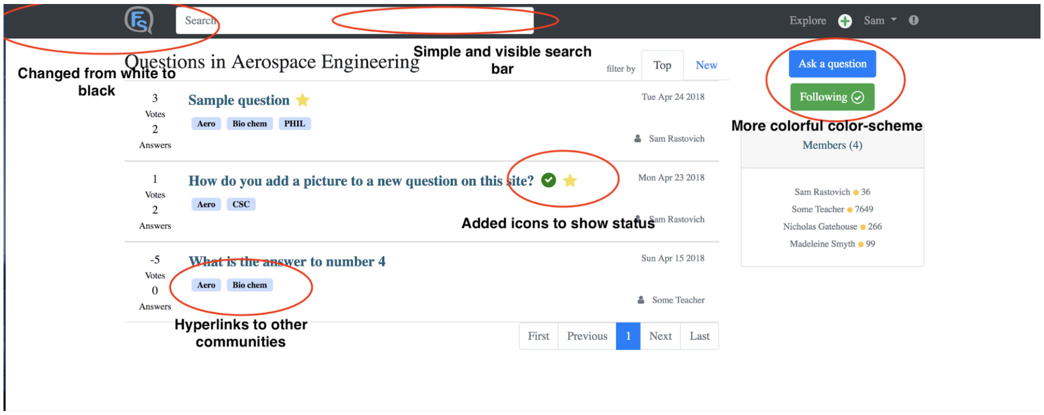
Questions in Aerospace Engineering

3 Votes 2 Answers	Sample question ✓ Aero Bio chem PHIL	Tue Apr 24 2018 Sam Rastovich
1 Votes 2 Answers	How do you add a picture to a new question on this site? ✓ Aero CSC	Mon Apr 23 2018 Sam Rastovich
-5 Votes 0 Answers	What is the answer to number 4 Aero Bio chem	Sun Apr 15 2018 Some Teacher

Members

Sam Rastovich ● 36
Some Teacher ● 7649
Nicholas Gatehouse ● 266
Madeleine Smyth ● 99

Figure 22: First iteration Community page.



Changed from white to black

Simple and visible search bar

More colorful color-scheme

Added icons to show status

Hyperlinks to other communities

Questions in Aerospace Engineering

3 Votes 2 Answers	Sample question ★ Aero Bio chem PHIL	Tue Apr 24 2018 Sam Rastovich
1 Votes 2 Answers	How do you add a picture to a new question on this site? ✓ ★ Aero CSC	Mon Apr 23 2018 Sam Rastovich
-5 Votes 0 Answers	What is the answer to number 4 Aero Bio chem	Sun Apr 15 2018 Some Teacher

Members (4)

Sam Rastovich ● 36
Some Teacher ● 7649
Nicholas Gatehouse ● 266
Madeleine Smyth ● 99

Figure 23: Second iteration Community page.

5.1.3 Second Iteration:

After running through the tests with the second 5 users we found significant improvements. Overall, the user tests decreased in length by 5 minutes or more. Users found navigation a lot easier.

- Asking a user to ask a question no longer had any significant problems.
- Creating communities no longer had significant problems.
- Users liked the color-scheme, however, they still asked to see more colors.
- No functionalities broke or malfunctioned.
- Users still had trouble navigating to their profile, but the time decreased on average by about 10 seconds.

In terms of UI, the tests went really well, and there was significant improvement. However, we also wanted to test how users would interact with the site. A Philosophy professor at Cal Poly offered up 4 of their sections of classes to beta test our site. We decided to measure their activity using our Influence metric.

- Total users: 63
- Users who had Influence over 210: 17
- Users who had 230 or over: 3

With this metric, 27% of our test users were active (at least one question asked) and involved on the site. 5% of the users were highly active (2+ questions).

We determined that this was a successful beta test, seeing that there was only 63 students, and 27% of the users found it useful enough to use more than once. Comparatively if we applied this percentage to the amount of Cal Poly students attending in Fall 2016 which was 21,306, this would roughly be 5,800 active users.

This application was designed so that there could be a more productive environment online for students to share ideas and learn. After analyzing the questions and answers posted by the active users, we determined that the questions were productive and constructive, which we were happy with. We concluded that this was a successful test of our site.

6 Related Work

6.1 Intro

Creating an online community is no easy task but there are a few major websites that have tackled this problem with a great deal of success. The first that comes to mind is Reddit; a forum based website that is divided up into focused communities. The second is Piazza; a question and answer fueled forum that is moderated by a teacher. The third and final website we will discuss is Stack Overflow; a structured programming specific question and answer forum that implements a reward system.

6.2 Reddit

Reddit is a website where users can anonymously create posts and interact with other users posts. The core functionality of Reddit consists of moderated communities, posts, comments, and a voting system that leads to gaining or losing Karma. Karma is used to measure the positive contribution users are making to Reddit as a whole whether it is by posting content people like or making comments people like.

Community based forums are the core of what our project is so this within itself makes Reddit largely similar to ForumSphere. Unlike Reddit there will be no moderators for the public communities and users cannot be anonymous. These two design decisions together will hopefully promote people to moderate themselves since their real names are tied to what they say.

Currently our reward system of what we call Influence is largely similar to Karma. Users are given points for making posts, responding to posts, getting upvotes, and having your answers be selected as “the answer” by a question asker. This influence is weighted based on whether a teacher likes the answer or not as well. In the future we plan on implementing a more complex reward system that has a tier system and statistics to go along with it.

The last thing that sets us apart from Reddit is that there will be no direct messaging on our platform. We plan on replacing a direct messaging feature with contact sharing. Instead of having a friends list, people will share contact information with the people they like which will purportedly lead to more personal connections outside of the online community.

6.3 Piazza

Piazza is a structured classroom oriented forum where students ask questions and their classmates collectively create an answer along with the teacher of the course. The environment Piazza creates for its users promotes collaboration between peers, decreases the workload teachers receive from repeated questions, and gives students a reliable source of help. Overall, it increases the accessibility to the teacher and other students specifically when a student needs help. As an additional feature Piazza allows companies to connect with students that use the website.

Since our aim is to help students collaborate and succeed academically we found Piazza's forum structure as a great inspiration. We will be pulling a few things from their structure like providing feedback to students that a teacher thinks a question or answer is good. What makes us different is that communities will not be limited to QA style posts and we won't have a moderator for a community unless it is private. Furthermore, all students answers will be individual without the option to be anonymous. We also will not be allowing companies to advertise and contact students about job opportunities.

6.4 StackOverflow

Stack Overflow is a website that most all programmers are familiar with and some would describe it as indispensable. It is a website that acts as a reliable source for any and all questions pertaining to programming. Stackoverflow has created a reputation system that provides an incentive for asking good questions and providing thoughtful answers. we wish to reproduce this incentive system with what we will call influence. The difference however will come from how our users will gain their influence and what they can do with it.

For now users obtain influence through using the site and receiving upvotes on the content they create. As for what they can do with their influence; our first thought is that it will cost influence in order to create new communities. Our hope is that this will prevent nonsensical communities from cropping up from users who aren't that involved on the site in the first place. As of right now influence can be used to indicate how reliable someones answer may be or whether this person contributes often to the website.

7 Future Work

7.1 Notifications

We plan on continuing our work on this project because we believe it could become an invaluable tool for Cal Poly students and staff. In order for it to become usable and enjoyable there will be several new iterations. Our game plan for now is over the summer to implement Notifications so our users know when there has been activity that needs their attention. This is extremely important for users to be able to more easily interact with one another in a timely manner. Here is the lay out for how we see the Notifications feature working.

- Notify users when a question is posted in a community they follow.
- Notify users when someone answers a question they posted.
- Notify users when someone likes their question/answer.
- Notify users when someone comments on their question/answer.
- Notify users when their answer is selected as "the answer" by a question asker.

7.2 Profile Pictures, Contact Sharing

We wish to spruce up the project to make it more visually appealing and more interactive. To accomplish this we aim to add Profile Pictures so users can personalize their profile. We also plan to add Contact Sharing, a feature that will allow users (with click of a button) to share their contact information (either phone number or email) with another user. We hope this will encourage users to have more interactions outside of our application and in turn create a more cohesive and connected college community. This also makes up for the fact that we will not have direct messaging on our platform

7.3 Influence

Another huge change we would love to make is a well researched and complex influence point feedback system. Our hope is to socially engineer a system that encourages users to give honest and accurate answers to relevant questions pertaining to the university and student life. We envision this to be a tier system with statistics provided as to why users are within that tier. This in turn will allow other users to see the reliability and activeness of the user they are getting an answer from.

7.4 Student or Staff Verification

One other feature we may want to add if the project gains traction would be to link up with the Campus ITS and setup a verification process in which users would use their Cal Poly login (or any other campus) to verify that they should be a part of this schools community. This will further the reliability of user answers and questions that we hope to resonate throughout the application.

7.5 Reporting System

We would like to put in a reporting system in which users can flag content that they deem to be inappropriate. This would help to follow the trend of the communities keeping themselves accountable for the content that they put onto the site. How we see this working technically would be as follows.

- 1 report would subtract 10 points of Influence from the user whose content is reported.

- Users who are reporting would be required to give a reason as to why they are reporting the content.
- After 3 reports (arbitrary) the content would be removed and a notification would be sent to that user as to why their content was removed along with a community behavior policy that we would draft.

8 Conclusion

This platform is a tool for the students at Cal Poly to use to their advantage. We hope that it will have a positive impact on their lives by creating a safe place online for them to get the relevant information they need pertaining to their school provided by their peers. If everything goes perfectly it will bring a sense of belonging to the students who otherwise haven't found it yet. The only way for this website to work is if people see the value in the website that we do.

Overall we had a lot of fun working on this project, and we will continue to work on this by marketing it to new and existing students, administration, and faculty. Each of us put in a considerable amount of work to get this site to where it is today. We learned how to work as a team to turn a vision into a tangible product, and we were able to see the use of our product on a larger scale. It was very rewarding and we each grew tremendously as programmers and business professionals. We hope that by continuing to work on ForumSphere.com we will provide a platform for students to grow just like we did.

9 Appendix

9.1 Appendix A - User Testing Questions

Read out loud:

"Before starting, you are under no obligation to do this test, and at any time you feel uncomfortable, uneasy, or would like to stop for any reason, please say so and we will stop the test. Are you comfortable with us doing a screen and video recording during the test? It is only for feedback and the results will only be used to help modify the site for better usability.

This test is an evaluation of the website. Please think out loud especially when voicing what you like, dislike, or if you become confused. Feel free to ask questions however we may not be able to answer some until the end of the test. Thank you!"

9.1.1 User Test

1. Go to www.dev.forumsphere.com
2. Create an account
3. Edit your Profile by adding a bio and a phone number
4. Ask a Question in at least 2 Communities (except the Math Community)
5. At this time one of us will respond to their question
6. Vote on the most recent Question in the Math Community
7. Respond to the most recent Question in the Aerospace Engineering Community
8. Sign up for the Private community with this hyperlink www.dev.forumsphere.com/1/BIO310/509f6930-b4ee-4526-9a0c-40e9e8a580dd
9. localhost:4200/1/BIO310/509f6930-b4ee-4526-9a0c-40e9e8a580dd
10. One person has asked a Question in this Community, Navigate to their profile.
11. Now edit the first Question you created at the start of this test.
12. Mark your Question as answered by one of the Responses.
13. Create your own community either private or public.
14. Follow 2 Communities of your choosing

15. Find the page that shows the Communities you followed and the Questions you've asked
16. Submit Feedback to the site.
17. Logout

9.1.2 Follow up

1. General thoughts on the layout of the site (colors, general feedback)
2. Is this a product you would find helpful?
3. If so, how would you use it?
4. Was there anything you found particularly frustrating? If so, what?
5. Are there any features that are not currently there that you would like to see?

9.2 Appendix B - API Documentation

<https://docs.google.com/document/d/1I_ABdS9L_IgKAS_cogv3o99HDlq4BQIy0NghjMG20SM/edit?usp=sharing>

9.3 Appendix C - SQL Diagram and Schema

<https://docs.google.com/document/d/1RNQTy4_xb6Ev3cVcVf9bxoCHUrqwPsTkYYdQOTWstlg/edit?usp=sharing>