

# Student Social Network

**Kelvin Chua Foo Long**

BSc Computer Science 2019/20

University of Birmingham

Supervised By

Dr. Rachid Anane

## **Abstract**

This project is concerned with the analysis, design and implementation of a student social network. The system developed is a web application and consists of two components, a social network and a structured forum. The main objective of the project involved viewing the literature and functionalities of existing systems, analysing their strengths and weaknesses and implementing a system that will satisfy the requirements of both systems. The process that was chosen for implementing the system was both an incremental and iterative process. This was the ideal choice so that the project could be broken up into several components and goals, which would lead to an incremental completion of the system.

*Keywords* – social network, structured forum, formal and informal learning

## **Acknowledgements**

I would like to thank my parents for their overwhelming support and encouragement during my studies. I would also like to thank my project supervisor Dr. Rachid Anane for his incredible insight and feedback, which has allowed me to think critically and write with better clarity; as well as for telling me that knowledge is power, and we should share it with everyone. Last but not least, I would like to thank all my good friends for sticking by me, believing in me and helping me find the necessary strength and willpower to push forward and never give up.

## Table of Contents

1	Introduction .....	1
2	Application Domain .....	1
2.1	Secondary Research .....	1
2.2	Primary Research.....	3
3	Requirements Analysis.....	5
3.1	Personal Thoughts.....	5
3.2	User Requirements.....	5
3.3	System Requirements.....	6
3.4	Risk Analysis.....	7
3.5	Project Management.....	7
4	Technological Background .....	7
4.1	Development Methodologies .....	7
4.2	Relevant Technologies .....	8
5	Design .....	10
5.1	Overall Software Architecture .....	10
5.2	Design of Components and Relationships.....	11
5.3	UML Diagrams .....	11
5.4	Description of GUI.....	11
6	Implementation .....	12
6.1	Commitment to Technology .....	12
6.2	Description of Functionality .....	12
6.3	Testing Strategies .....	15
7	System Description .....	16
7.1	Description of System Interface .....	16
7.2	Functionality and Features of the System.....	16
8	Critical Evaluation.....	17
8.1	Evaluation of Process.....	17
8.2	Evaluation of Product.....	18
9	Conclusion.....	20

10	References .....	21
11	Appendix A: User Requirements Survey Analysis.....	23
12	Appendix B: User Requirements .....	30
13	Appendix C: UML Diagrams.....	32
14	Appendix D: System Requirements.....	36
15	Appendix E: Norman's Design Principles.....	38
16	Appendix F: Risk Assessment Table.....	39
17	Appendix G: Black Box Testing Results.....	40
18	Appendix H: Screenshots of the System.....	41
19	Appendix I: User Evaluation Survey Questions .....	44
20	Appendix J: User Evaluation Survey Analysis.....	46

## 1 Introduction

The invention of social networks has allowed people to utilise it in a number of different and useful ways. These include keeping in touch with their friends and family, keeping up to date with the latest news and happenings as well as creating and sharing content with the world. Social networks are an integral part of our everyday lives and they have transformed the way we communicate and share information with each other. With that being said, the majority of people nowadays are using the Internet to share their knowledge with each another on certain topics or areas of interest. Platforms such as forums and discussion boards allow people to do this. However, social networks could also be used for formal and informal learning. A study done by Whitty and Anane found that social networks are the ideal platforms for fostering knowledge creation and sharing (Whitty and Anane, 2014). The study also mentioned that there is a growing interest in social networks as platforms for mediating learning, where features such as forums can be integrated into the social network for formal and informal exchange of ideas. This was the main motivation behind this project.

The aim of this project is to develop and build a student social network with an integrated collaborative learning tool, in this case it would be a structured discussion forum. The social network will enable students to use a conventional social network as well as access a structured forum, where it will be able to offer a platform for formal and informal learning and exchange of ideas. Furthermore, the social network aims at addressing weaknesses present in current social networks and providing a more focused and less distracting experience.

## 2 Application Domain

The potential of social networks being used as an educational tool has been discussed amongst a number of academia and it turns out that social networks could be the optimal platform for harnessing and sharing knowledge between academia. The conclusion was drawn based on the fact that a key and important advantage of social networks is that it allows seamless communication, collaboration and interaction between people.

The following section is split into two sections, primary and secondary research. The primary research includes a user survey and requirements research whereas the secondary research includes research on existing systems.

### 2.1 Secondary Research

There have been attempts at creating and developing a social network specifically aimed at students to increase its potential and value. In the following section three systems are introduced and their functionalities are analysed and discussed.

## Facebook

Facebook is arguably the most widely used social network today. Its endless list of useful features is what attracts people to use Facebook, and there have been attempts to integrate educational learning with Facebook. A study done by Gonzalez-Ramirez et al. found that in conclusion Facebook could be used as a voluntary tool in teaching as opposed to a compulsory tool, and that almost 73% of the students who participated in the study made a positive assessment about the use of social networks as a teaching and learning tool (Gonzalez-Ramirez et al., 2015).

## Unii

Unii is a student-only social network that was introduced by founder Marco Nandone in 2013. This social network was developed specifically for students and was created because Marco found there was a gap in the market for a platform to be used in higher education (Lomas, 2013). He had done research across a sample of 30 universities and found out that students were annoyed that they had to use large and popular social networks such as Facebook to carry out daily activities and needs that are specific to the student community, such as finding housemates.

Aside from the conventional social network features such as posting and messaging, other features of the website include finding accommodation, buying and selling books as well as finding jobs (Lomas, 2013) . However, according to an article by TechCrunch, both the website and company behind the social network no longer exist, leading to the conclusion that the website wasn't that successful, and the company had to close all its operations (Lomas, 2013).

## Campus Society

Campus Society is a university social network founded by a person called Rashid in 2016, and its aim is to provide students with a platform where they could share and post content without having to worry about their parents or future employers potentially seeing their profile and posts (Campus Society, n.d.). The social network requires a verified student email to register for the network. At first glance, this social network looks like an identical copy to Instagram, another popular social network for mobile users. All of the features of Campus Society are identical to Instagram, and it includes conventional social network features such as posting and sharing media, a news feed as well as a messaging system (Campus Society, n.d.). The only major difference between Campus Society and Instagram is that all of its user base is students, whereas for Instagram it is people from all age groups.

## Comparison Chart

The following table showcases a comparison of features between Unii, Campus Society and Facebook.

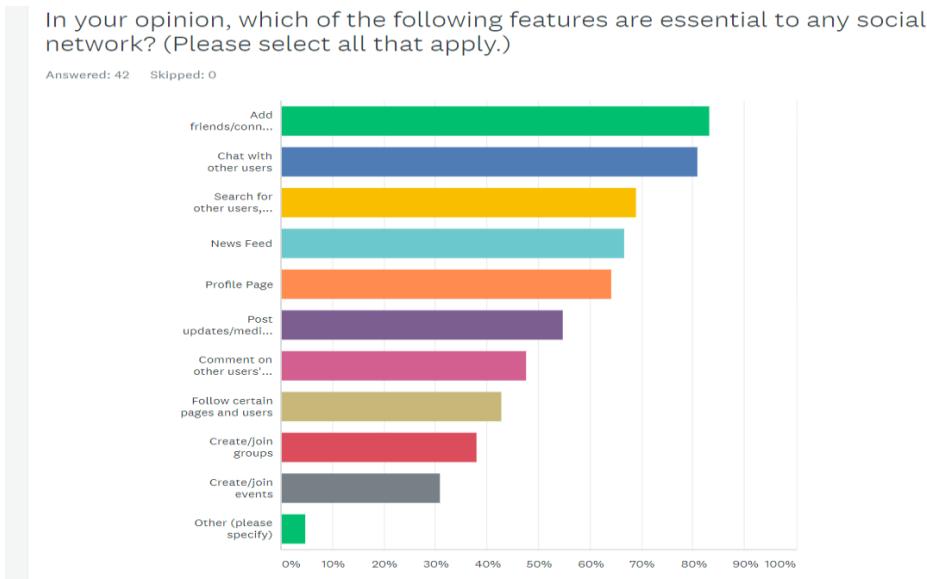
**Table 1: Existing Systems Comparison**

Features	Unii	Campus Society	Facebook
Profile	✓	✓	✓
Media sharing	✓	✓	✓
Finding accommodation	✓		✓
Finding jobs	✓		✓
Polls	✓		✓
Search function	✓	✓	✓
Notifications	✓	✓	✓
Instant messaging/messaging other users	✓	✓	✓
Friend requests/following users	✓	✓	✓
Follow specific threads		✓	✓
Need university email	✓	✓	
Groups for specific degrees/accommodation			✓
Student exclusive	✓	✓	

## 2.2 Primary Research

### User Involvement

Involving users in the design process is important, as this gives a better understanding of the user's goals, which would lead to a more usable and effective system. As part of establishing requirements for the system, a survey was distributed online to students at university and this was done to find out what features the users wanted in a social network as well as finding out their opinions and views on what makes a good social network. The survey was done using an online survey creator called SurveyMonkey. The following illustration shows one of the questions in the survey that was distributed and the results of that particular question.



**Figure 1: Example Survey Question**

The rest of the survey questions and analysis will be presented in **Appendix A**. The survey has assisted in establishing the user and system requirements for the system.

## Requirements Research

Research into which features should be implemented was also done. This is so that during the establishing requirements phase, analysis from both the user feedback and research could be taken into consideration, leading to a more complete set of requirements.

A feature that would be useful in a student social network is the integration of structured discussion forums. Forums are an ideal place for formal and informal learning, since users are constantly interacting and discussing relevant ideas or topics with each other. Forums could be seen as an example of a “community of practice”, where it consists of people that constantly engage with each other in a process of collaborative learning in a shared domain (Trayner and Trayner, 2015). Whether a forum is structured or unstructured could impact the effectiveness of the forum itself. A study done by Moanes Tibi found that computer science students who participated in structured forums responded more positively as opposed to those who participated in unstructured ones. In particular, structured forums are more effective for the acquisition of knowledge in terms of the know-how (ability to do something) and the know-why (knowledge about cause and effect) (Tibi, 2018). The main differences between an unstructured and structured forum is that unstructured forums do not include planned discussion nor does it provide rules for interaction and collaboration among participants, whereas a structured forum provides well-designed, organised and planned discussion set by the instructor with specific topics and goals (Tibi, 2018). A study done by Borges et al. also found that almost 40% of students said that discussion forums are an important resource for educational social networks (Borges et al., 2017).

### 3 Requirements Analysis

This chapter includes details on the user requirements and system requirements of the system as well as personal thoughts on the implementation of the system.

#### 3.1 Personal Thoughts

There are multiple reasons why I chose not to include certain features, such as groups, on the social network. Firstly, I feel like when users join the social network, they are immediately part of a community, a community of students and lecturers who are willing to discuss with each other and share their knowledge and insights on certain topics. In other words, joining the social network immediately gives the users a sense of inclusivity, therefore groups would be redundant. Secondly, from the user requirements survey, less than 40% of the respondents said that groups would be essential, which tells me that groups are not important to the users.

Another feature I didn't include is the "like" feature, where users are able to like posts and comments. The main reason I didn't include likes is because it has a profound effect on the mental health of teenagers. A study done by Sherman et al. found that likes trigger the brain's reward system, therefore giving this addicting habit of having to have more likes on a post. If the post does not get as many likes as the person wanted, then this could lead to anxiety and depression. Another reason for not including likes is biasness. The study also found that if a post has a large amount of likes, no matter the content, it is more likely to be liked by people (Sherman et al., 2016).

#### 3.2 User Requirements

The system interacts with a variety of different users, and these users can be separated into different user groups. The system offers a set of features and capabilities that are shared amongst all user groups. The groups of users that is intended to interact with the system are split into three main categories. These include the students, lecturers and administrators. The following section describes some examples of the functional requirements for the various user groups. Additionally, use-case diagrams will be included to present the different user groups.

##### User Requirements for Students

The student user group has most of the main user requirements since they are the main users of the system. Examples of these requirements include being able to create and delete posts, being able to create and delete comments, being able to view and access all pages of the social network etc. A full list of the user requirements for students can be found in **Appendix B**.

##### User Requirements for Lecturers

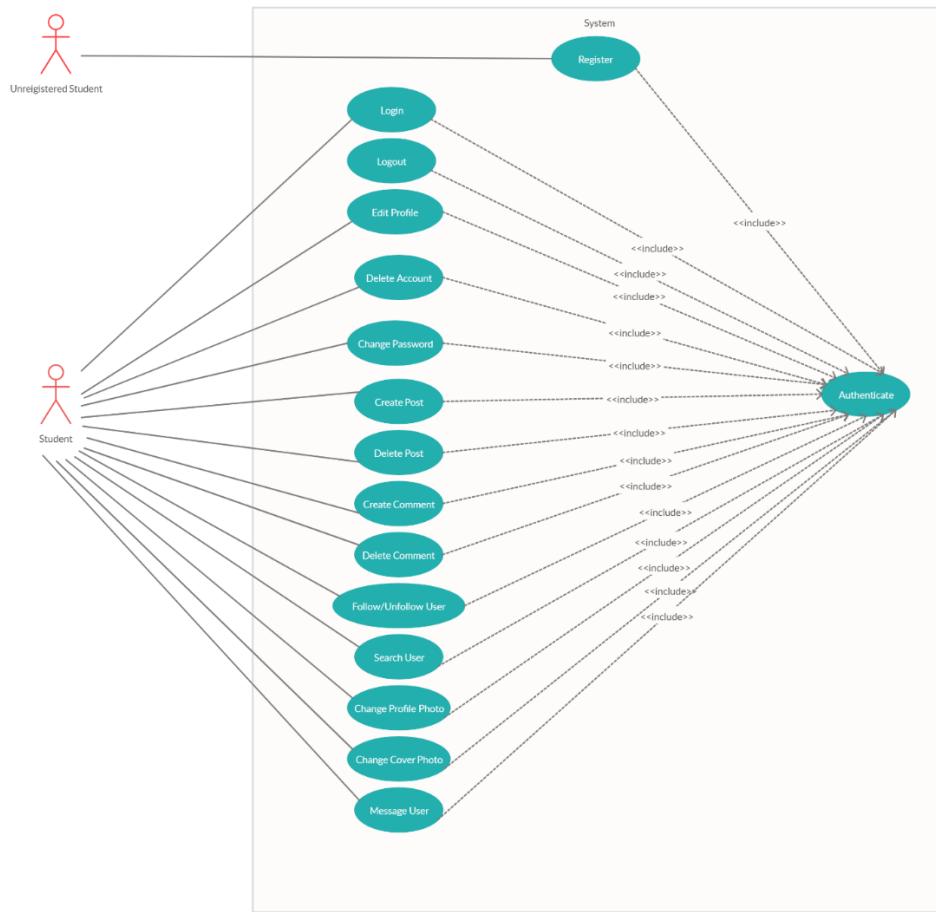
The lecturer user group inherits all of the user requirements for students with the addition of two requirements, which are they must be able create forums and delete forum comments. A full list of the user requirements for lecturers can be found in **Appendix B**.

## User Requirements for Administrators

The administrator user group mainly has administrative requirements. These include being able to view all the users of the system, being able to edit the details of all users, being able to view all the posts and forums etc. A full list of the user requirements for administrators can be found in **Appendix B**.

## Use Case Diagram

The following figure presents the use case for the **Student** user group. Use case diagrams for the other user groups can be found in **Appendix C**.



**Figure 2: Student Use Case Diagram**

### 3.3 System Requirements

This section showcases some examples of the functional and non-functional requirements for the system.

#### Functional Requirements

Functional requirements are critical functionalities that the system should support. Examples of these requirements include being able to present all posts and forums, being able to store user

details, being able to create user accounts etc. A full list of the functional requirements can be found in **Appendix D**.

### Non-Functional Requirements

Non-functional requirements are optional functionalities that do not have an effect on the core functionalities of the system. Although not required, these functionalities will ensure a smooth, reliable and secure operation of the system. Examples of these requirements include being able to navigate the user across all interfaces, being resistant to attacks, providing data integrity, data privacy and data confidentiality etc. A full list of the non-functional requirements can be found in **Appendix D**.

### 3.4 Risk Analysis

Risk analysis is vital to any software development project as it helps in being prepared for any potential problems that may arise in the future. During risk analysis, a potential risk and its risk level is identified, and then a solution to that risk is developed. Included in **Appendix F** is a risk assessment table for the current project.

### 3.5 Project Management

Project scheduling is very important as it assists in the organisation and management of resources and ensures that the project is completed within a defined time period. The Gantt chart displayed below illustrates the schedule for this project. The first week started on September 30<sup>th</sup>, 2019.

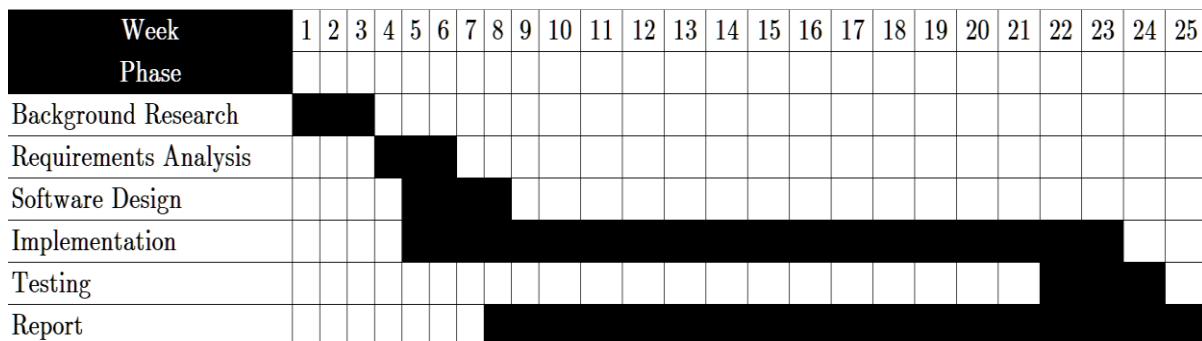


Figure 3: Gantt Chart

## 4 Technological Background

This chapter includes research and presentation of relevant technologies that can be utilised for web development. Furthermore, it includes the different development methodologies that are available and the rationale for choosing a specific methodology.

### 4.1 Development Methodologies

Choosing the right development methodology is essential to the development of any software. This section explores and compares the various methodologies available that would be ideal for developing the current application.

## Waterfall Model

The waterfall model was the first Process Model to be introduced. The model follows a linear-sequential life cycle and is very simple to understand and use. It consists of six phases, which are **Requirements Analysis, System Design, Implementation, Testing, Deployment and Maintenance** (Tutorialspoint, n.d.). Each phase must be completed before the next phase can begin and there is no overlapping of phases. The main advantage of the waterfall model is that it is easy to manage due to the rigidity of the model (Tutorialspoint, n.d.). The main disadvantage of the waterfall model is that it doesn't allow much reflection and revision. This means that once a project is in the testing stage, it is very difficult to go back and change something that was not well-documented or thought upon (Tutorialspoint, n.d.). This makes it a poor model for long and huge projects.

## Incremental and Iterative Development

The incremental and iterative development process is a cyclical development process that is a combination of both the iterative design and incremental models for development (Tutorialspoint, n.d.). This development process was created to address the weaknesses of the waterfall model. The iterative part of the process means that project is broken down into sections. The main idea behind iterative design is to produce a new version of the software at the end of each iteration (Tutorialspoint, n.d.). The incremental part of the process means that the project is divided into various builds. Each subsequent release of the module adds function to the previous release. This process continues until the complete system is ready. This makes this development process suitable for large and long projects (Tutorialspoint, n.d.).

## 4.2 Relevant Technologies

The following section explores and compares various technologies and languages that would be ideal for developing the current application.

### Bootstrap Framework

Bootstrap is a front-end web development framework developed by former Twitter employees Mark Otto and Jacob Thornton. It is considered to be one of the most popular frameworks available for web development (Ouellette, 2017). The framework consists of reusable code written in Hypertext Markup Language (HTML), Cascading Style Sheets (CSS) and JavaScript. This allows developers to quickly build responsive and mobile-first applications on the web. The main focus of Bootstrap is stability and speed.

### ReactJS

ReactJS is a JavaScript library used for creating user interfaces. It was developed by Facebook and is the main library used by Facebook for its website and mobile applications. The library is component-based, allowing users to compose them to make complex user interfaces (Facebook Inc.,

2020). Although the library has a lot of useful functionalities, it is not beginner friendly, as the JavaScript syntax required to build the user interfaces is difficult to understand.

## PHP

PHP (PHP: Hypertext Preprocessor) is a popular open-source server-side scripting language that is suited for web development and allows web applications to interact with databases. PHP is embedded into HTML and is used to manage and execute the back-end processes of the application (The PHP Group, n.d.). PHP is an optimal language to learn for newcomers to web development as it is easy to learn and has a lot of features.

## Java

Java is a programming language introduced by Sun Microsystems in 1995. Today it is one of the most highly used languages for back-end development. It uses an object-oriented model and is used to develop complete applications for various platforms and the Internet.

## MySQL

MySQL is the most popular open-source Relational SQL Database Management System (RDBMS). MySQL works well with PHP because of its web development capabilities (The PHP Group, n.d.). PHP offers various functions to access and manipulate the data from the MySQL database. The language used to interact with the data is called Structured Query Language (SQL), hence the name MySQL. MySQL is ACID (**atomicity, consistency, isolation, durability**) compliant, which guarantees validity in the event of errors.

## PostgreSQL

PostgreSQL is an open-source object-relational database system that extends the SQL language. It is considered to be the most advanced open-source database system with over 30 years of active development. What makes PostgreSQL stand out is that it allows users to integrate custom functions written in other languages and it is the first database management system to implement multi-version concurrency control (MVCC) (PostgreSQL, n.d.). PostgreSQL is ACID compliant, which guarantees validity in the event of errors. However, it is not beginner-friendly, as the initial setting up process takes quite some time to do.

## XAMPP

XAMPP is an open-source cross-platform web server package that consists of an Apache HTTP Server, a MariaDB database that runs on MySQL and interpreters for scripts written in PHP and Perl (Apache Friends, n.d.). It is considered to be the most popular PHP development environment, which is ideal for developing the current application. XAMPP allows developers to test and deploy their web applications on a local server. The package also allows developers to transition from a local test server to a live server. XAMPP is beginner-friendly with its intuitive GUI interface.

## WampServer

WampServer is a Windows web development environment that includes Apache2, PHP and MySQL. It is similar to XAMPP in the sense that it allows developers to develop applications and test them on a local development environment. The main advantage of WampServer is that it can be used as a production server as it has an advanced security system (Bourdon, n.d.).

## 5 Design

This chapter provides a description of the overall software architecture, a detailed description of the components and relationships of the system as well as the choices that had to be made during the development of the project.

### 5.1 Overall Software Architecture

The most common software architecture for designing applications is called the Layered (N-Tier) Architecture. It is also called multi-tier architecture because the software is engineered to have the processing, data management and presentation functions separated logically and physically (Stackify, 2017). This is done so that resources do not have to be shared between the services and functions, which leads to the services and functions being delivered at top capacity. A typical N-tier architecture would involve dividing an application into three tiers. These would be the **Presentation Tier**, **Logic Tier** and the **Data Tier**. The following figure illustrates the responsibilities of each tier.

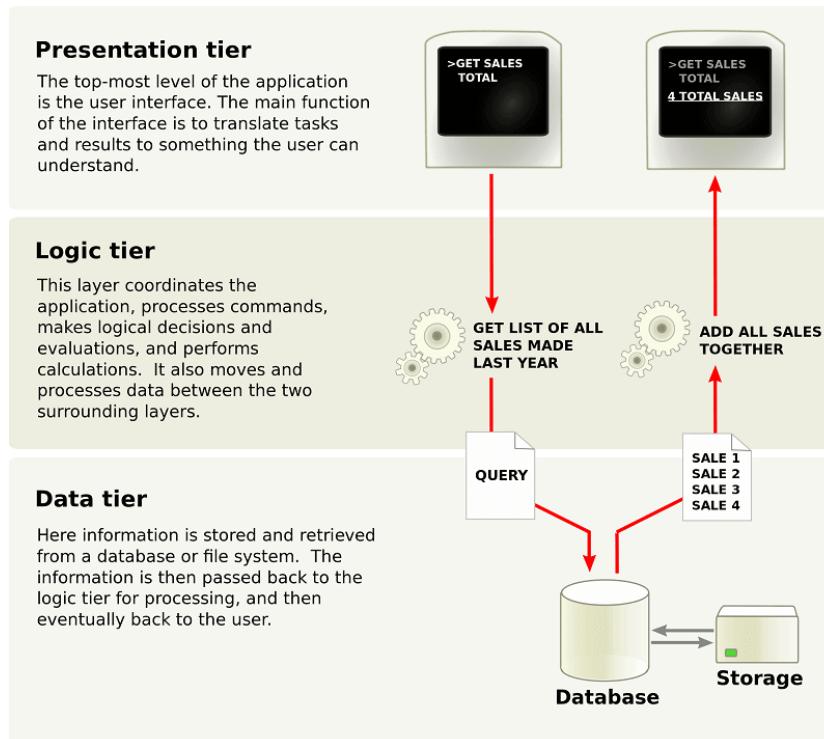
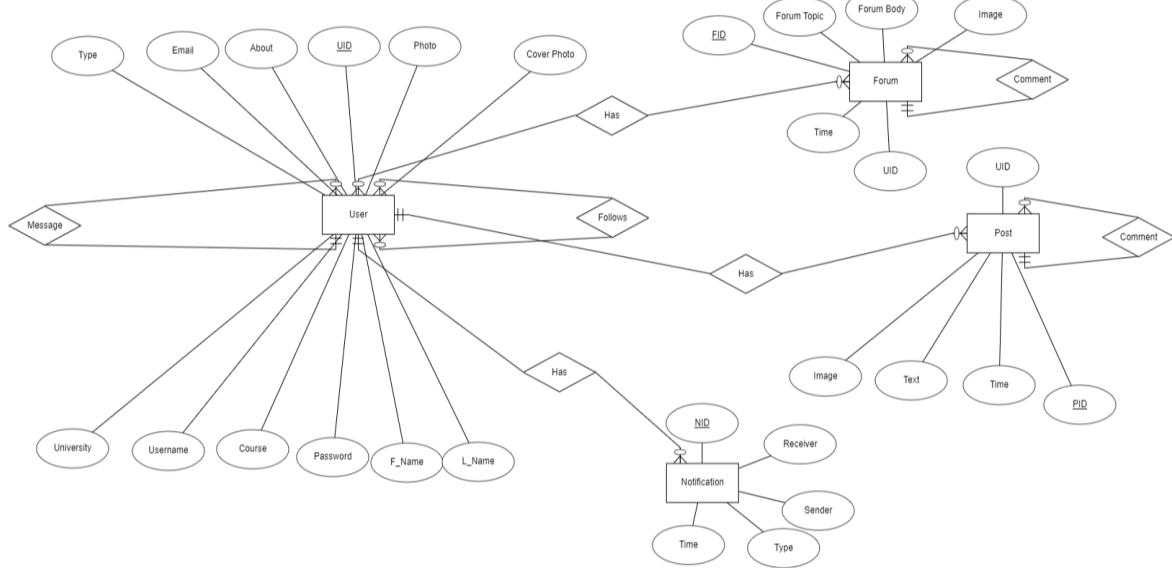


Figure 4: N-Tier Architecture

## 5.2 Design of Components and Relationships

The following entity-relationship diagram shows the relationships of the entities present in the database.



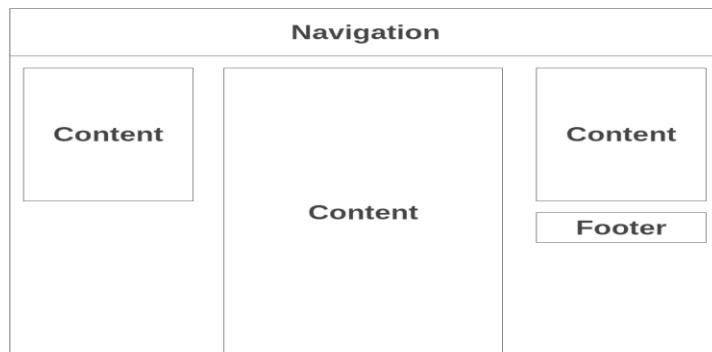
**Figure 5: Entity Relationship Diagram**

## 5.3 UML Diagrams

A couple of UML diagrams were created to further visualise the design of the system. A class diagram of the system as well as a sequence diagram for the **Edit Profile** use case was created. These diagrams can be found in **Appendix C**.

## 5.4 Description of GUI

The interface of the system is vital to any software since it will be the medium of communication and interaction with the user. The user interface was designed to be simple and easy to use, utilising the features of the Bootstrap Framework. The design of the interface was inspired by modern user interface designs present on other social networks such as Facebook and Twitter, which implements a continuous feed of content. The figure below shows the different elements of a page on the website.



**Figure 6: Page Elements**

## 6 Implementation

This chapter is concerned with the implementation stage of the presented system. The commitment to the technologies that were used to develop the system is discussed. Furthermore, code segments and example cases are presented to describe the functionalities of the system. Finally, testing strategies that were used to test the system and its results are presented.

### 6.1 Commitment to Technology

A selection of available frameworks, programming languages and database packages were presented in **Section 4.2**. In this section the technologies that were used in the development of the system and why they were chosen is presented.

For the current system the **Bootstrap Framework** was chosen as the preferred web development framework because of the advantages and features it provides as summarised in **Section 4.2**.

For the back end of the system, **PHP** was chosen as the preferred back end scripting language for its ease-of-use and security capabilities, as well as its compatibility with SQL queries and databases.

**MySQL** was chosen as the preferred RDBMS to store and manipulate the data of the system. MySQL was chosen because of the features and capabilities it provides as summarised in **Section 4.2**.

**XAMPP** was chose as the preferred web development environment to develop the system on. XAMPP was chosen because of the features and capabilities it provides as summarised in **Section 4.2**.

Finally, **Visual Studio Code** was chosen as the preferred integrated development environment (IDE) for developing the system.

### 6.2 Description of Functionality

This section provides in-depth information and code segments of a selected section of the implemented system. The section of the system that is going to be presented is the structured forum. The structured forum was chosen because it is implemented with most of the important features of the system, mainly posting, commenting, retrieving and presenting data from the database as well as deleting comments.

The following section presents a HTML code segment from the structured forum's PHP file. A PHP file allows HTML and PHP code to be implemented together. This allows the HTML code to call a function called `get_forum_posts()` written in PHP, which is called using PHP tags. The function will get all the relevant information of a specific forum and display it based on the forum ID.

```
<?php echo get_forum_posts();?>
```

The following section presents a CSS code segment from the CSS file that is included in the structured forum's PHP file. The CSS describes the style of the HTML code and how it should be displayed, in other words it is what styles the page to look as it is. In this code snippet the CSS is setting the background colour of the page to dark blue and setting the font to 'Roboto'.

```
body {
    background-color: rgb(11, 37, 85);
    font-family: 'Roboto', sans-serif;
}
```

The following section shows the JavaScript code for the structured forum's PHP file. JavaScript defines how a page and its elements behave. In this code snippet the JavaScript makes any text area automatically expand.

```
.on('input.autoExpand', 'textarea.autoExpand', function() {
    var minRows = this.getAttribute('data-min-rows')|0, rows;
    this.rows = minRows;
    rows = Math.ceil((this.scrollHeight - this.baseScrollHeight) /
16);
    this.rows = minRows + rows;
});
```

The following section shows segments of the `get_forum_post()` function written in PHP. This function executes the following SQL query to get all the relevant information for that forum from the database.

```
$forumposts = DB::query('SELECT *
FROM forum_post, user
WHERE user.UID = forum_post.UID
AND forum_post.id = :PID', array(':PID' => $PID));
```

After doing this, it loops through the array getting all the variables using a **foreach** loop.

```
foreach($forumposts as $f) {
    $profile_photo = $f['profile_photo'];
    $f_name = $f['f_name'];
    $l_name = $f['l_name'];
```

Finally, the variables are outputted onto the page using PHP's echo function. The following code shows an example.

```
echo'<img src= "'.$profile_photo.'" class="img-circle" height="50px"
width="50px" style="vertical-align:middle; float:left; margin-right:
1rem"> '
```

The following section shows the code segment for posting comments. The structure of the function is the same as posting posts and forums. The function executes when it gets a **POST** request with the name “**forum\_comment**” from the page, this is in the form of a button called “**forum\_comment**” . When the user clicks the button, it initiates the **POST** request and the function executes. The function retrieves the contents of the comment, an image if given and the forum ID. Then it executes an SQL query inserting the comment into the database. The following code shows an example of this.

```
if (isset($_POST['forum_comment'])) {
    $commentbody = htmlspecialchars($_POST['commentbody']);
    $postID = $_GET['forumID'];
    $userLoggedIn = Login::isloggedIn();
    if((strlen($commentbody) > 0 && strlen($commentbody) < 1024) &&
    $_FILES['post_image']['size'] == 0){
        DB::query('INSERT INTO forum_comment VALUES(\'\', :UID, :postID,
        :commentbody, :commentimage, NOW())', array(':UID'=> $UID, ':postID' =>
        $postID, ':commentbody' => $commentbody, ':commentimage' => null));}}
```

The following section shows the code segment for deleting comments. This is executed when it gets a **POST** request with the name “**deletecomment**”. The function executes an SQL query which deletes the comment from the forum. The following code shows this happening.

```
if (DB::query('SELECT id FROM forum_comment WHERE id=:commentid AND
    forum_ID=:forumID', array(':commentid'=> $commentid, ':forumID'=>
    $_GET['forumID']))) {
    DB::query('DELETE FROM forum_comment WHERE id=:commentid AND
    forum_ID=:forumID', array(':commentid'=> $commentid, ':forumID'=>
    $_GET['forumID']));
}
```

The following section shows code segments for creating an account. This is executed when the user clicks the **sign-up** button on the sign-up page. The following code segments show examples of regular expression checking as well as password hashing and salting.

```
preg_match('/[a-zA-Z0-9_]+@bham.ac.uk/', $email)
```

```
password_hash($password, PASSWORD_BCRYPT)
```

The following code segment shows how the system verifies the password of the user.

```
password_verify($password, DB::query('SELECT password FROM user WHERE
username = :username', array(':username' => $username))[0]['password']))
```

The following code segment shows how the system creates a login cookie for the user.

```
$token = bin2hex(openssl_random_pseudo_bytes(64, $cstrong));
DB::query('INSERT INTO login_token VALUES (\'\', :token, :user_id)',
array(':token' => sha1($token), ':user_id' => $user_id));
```

### 6.3 Testing Strategies

This section describes the testing methods that were used during and after the development of the system. Testing ensured the system was robust, secure and efficient.

#### Unit Testing

Unit testing is a software testing method where individual components/units of a system are tested. The purpose of this testing method is to validate and verify that each unit of the system performs as expected (Software Testing Fundamentals, 2011). Unit testing was performed throughout the development process to ensure that the system is robust, secure and reliable. Furthermore, unit testing was performed to eliminate any errors or unexpected behaviour from the system.

#### Integration Testing

Integration testing is a software testing method where components/units are combined together and tested as a group. This is done after unit testing and its aim is to expose faults in the interaction between integrated units (Software Testing Fundamentals, 2011). Integration testing was performed on the current system to ensure that the units smoothly communicated and interacted with each other.

#### System Testing

System testing is a software testing method where the whole system is tested. This is done after integration testing and its aim is to verify that the system meets the specified system requirements (Software Testing Fundamentals, 2011). The current system was tested for its reliability and robustness, with the system being tested under irregular circumstances as well as using various techniques to “break” into the system.

#### Acceptance Testing

Acceptance testing is a software testing method where the system is tested for acceptability. This is done after integration testing and its aim is to evaluate the system and assess if it is acceptable for delivery to the users (Software Testing Fundamentals, 2011). Black box testing was chosen as the preferred testing method for this stage of testing. The procedures that were used to test the current system and its results is presented in **Appendix G**.

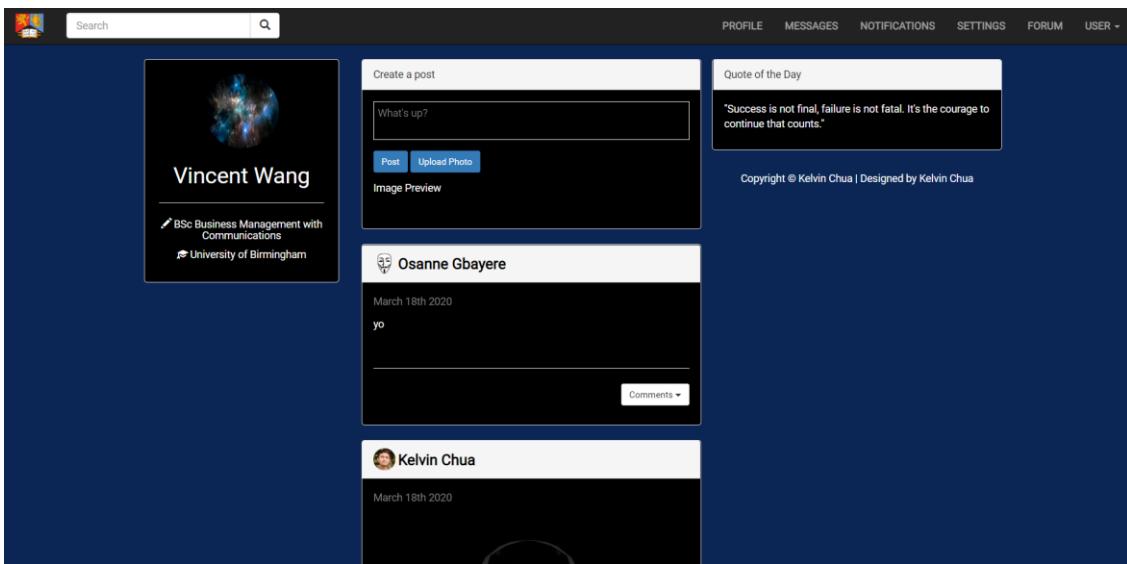
## 7 System Description

This chapter provides a detailed description of the system by providing screenshots and explanations of the figures presented. It includes a description of the system interface as well as descriptions of the functionalities of the system and the features that it incorporates.

### 7.1 Description of System Interface

The following figure illustrates the design of the user interface. The interface includes:

- A navigation bar at the top, with the links to the various pages on the right and the logo and search bar on the left. The logo acts as a link to go back to the home page.
- The body of the interface, which will change depending on which page the user visits.
- The footer, which is located below the quote section.



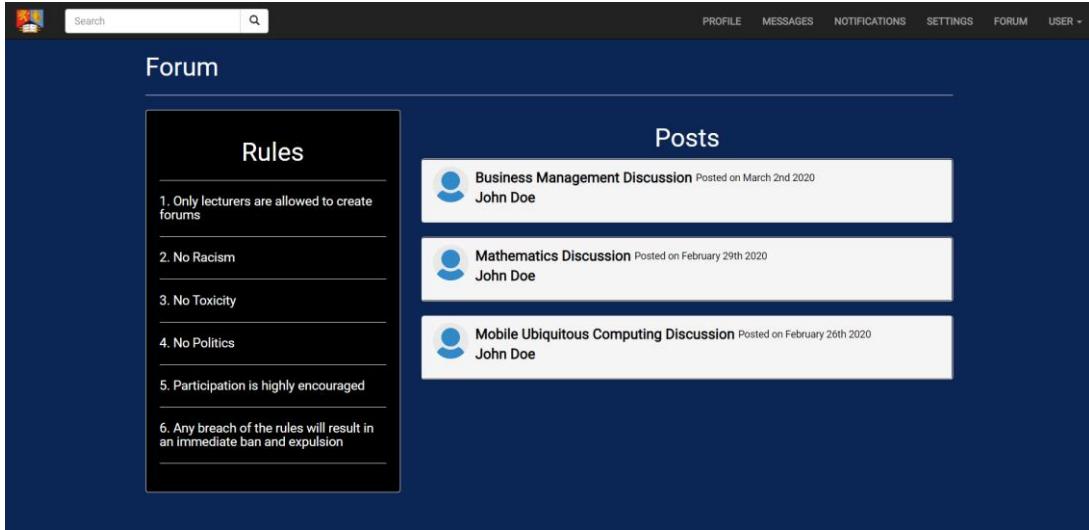
**Figure 7: Home Page**

### 7.2 Functionality and Features of the System

This section showcases the functionality and features of the system. The features that are presented do not represent the complete set of features of the system, only a fraction of it. This section will be focusing on the perspective of a student using the structured forum. The rest of the features can be found in **Appendix H**.

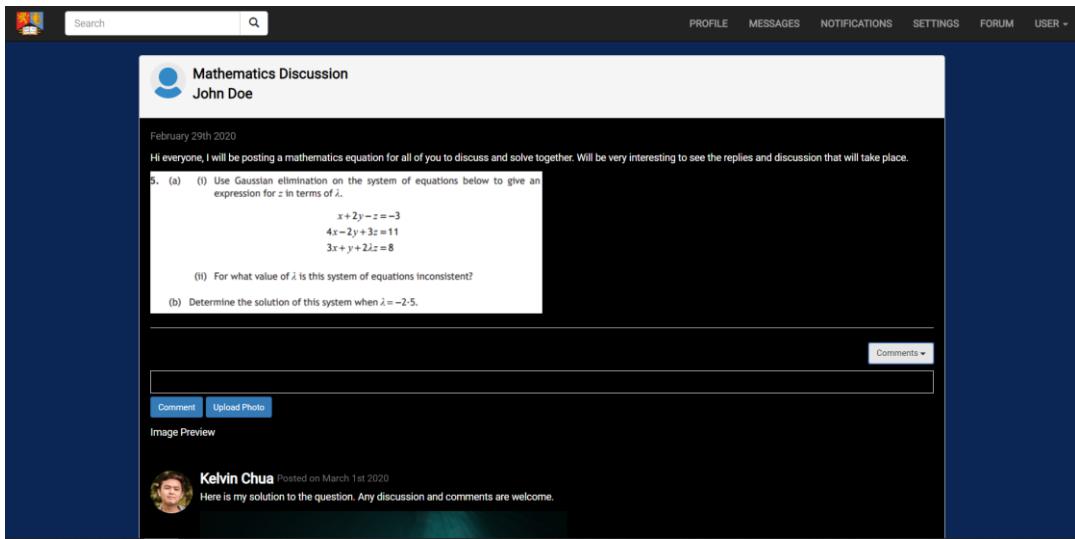
#### Registered Student Perspective

**Figure 8** showcases the main discussion forum page of the social network. Here the student can see a list of active discussion forums posted by lecturers as well as the rules of the forum. If the user logged in was a lecturer, he/she will be able to see a section that allows him/her to post a forum above the list of forums.



**Figure 8:** Student Main Discussion Forum Page

**Figure 9** showcases the forum post page of the social network. This page appears when a user clicks on one of the discussion forums listed on the main forum page. The page includes details of the forum, the ability to comment as well as a list of the comments made on that forum.



**Figure 9:** Student Discussion Forum Post Page

## 8 Critical Evaluation

This chapter presents the evaluation of the development process used, the system itself as well as the whole project in general.

### 8.1 Evaluation of Process

For the development of the current system, an incremental and iterative process was used. Reasons for choosing this process is due to the advantages it offers, as described in **Section 4.1**. In the end, this development process was the ideal choice for developing the current system because it allowed

the system to be revised and refactored as much as needed, which led to a more polished and reliable system. Additionally, the flexibility of the development process allowed for critical deadlines to be met.

## 8.2 Evaluation of Product

The completed system was tested against the requirements specified in the requirements analysis phase. An evaluation of this will be presented. Additionally, a comparison of the current system with existing systems will be presented, alongside an HCI evaluation as well as results for user evaluation.

### Conformance to Specifications

The system developed aimed to provide users the ability to use a social network with a structured discussion forum. When comparing the system to the requirements specified in the requirements analysis phase, the system met 90% of the requirements, which is adequate. The only requirements it didn't meet were deleting post comments and forums, which are features that are not necessarily important to the overall functionality of the system but would have been ideal for a better user experience.

### Comparison with Existing Systems

The current social network was compared against existing social networks such as Facebook and Campus Society. A summary of the comparison is presented in the following table.

**Table 2: Systems Comparison**

Features	Unii	Campus Society	Facebook	Student Social Network
Profile	✓	✓	✓	✓
Media sharing	✓	✓	✓	✓
Finding accommodation	✓		✓	
Finding jobs	✓		✓	
Polls	✓		✓	
Search function	✓	✓	✓	✓
Notifications	✓	✓	✓	✓
Instant messaging/messaging other users	✓	✓	✓	✓

Friend requests/following users	✓	✓	✓	✓
Follow specific threads		✓	✓	
Need university email	✓	✓		✓
Groups for specific degrees/accommodation	✓		✓	
Student exclusive	✓	✓		✓
Structured Discussion Forum				✓

A quick look at the comparison shows that the system achieved its goal in providing a social network with the most important features. The social network also achieved its goal of implementing a structured discussion forum, a feature that the other platforms do not have.

### HCI Evaluation

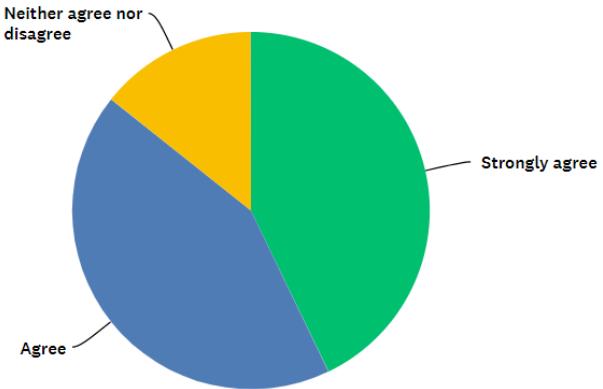
As illustrated in **Section 7.1**, the user interface is made up of various components and elements, such as the navigation bar at the top and the main body. The user interface of the system is consistent and easy to use. The interface design followed a modern and minimalist design to ensure easy navigation and a better user experience.

Additionally, the system used familiar icons and elements so that the user can easily recognise the functions of the system. All of this was possible because the design of the system followed Norman's Design Principles, which is described and explained in **Appendix E**. Overall, the user interface achieves its goal of providing the user with an interface that is easy to use and convenient.

### User Evaluation

For an effective evaluation of the system, the system was given to users of the target audience and they were given the opportunity to test and evaluate the system. A questionnaire was then sent out to them after they have finished testing and evaluating the system. The questions and results from the questionnaire can be found in **Appendix I & J**.

Overall, the system was well-received by the users. The majority of users rated the functionalities and aesthetics of the website positively. Arguably the most important data retrieved from the questionnaire is that almost all of the users agreed that the structured discussion forum could be used as a collaborative learning tool, which indicates that the structured forum is positively received by students and has potential to be used for formal and informal learning. The following chart illustrates the results from that particular question.



**Figure 10: User Evaluation Survey Result**

However, a number of testers reported some problems and annoyances with the system. One example is that after signing up for the social network, they were expecting the system to take them back to the login screen, but instead the system just stays on the sign-up page.

## 9 Conclusion

The aim of this project was to develop a functional social network that would provide an integrated collaborative learning tool in the form of a structured discussion forum. The project aimed to prove that social networks could be used as an educational platform for formal and informal learning. Additionally, the project examined existing systems and analysed their strength and weaknesses in order to provide a social network which addresses weaknesses in existing systems.

The developed system managed to satisfy most of the requirements set at the requirements analysis phase. The aim of providing features that were both from a social network as well as a structured discussion forum was achieved and the results of the evaluation with users and existing systems provided crucial information for the effectiveness of the system. The system also has its limitations, as pointed out by the testers in the user evaluation questionnaire. In order to fulfil this, further functionalities and features would have needed to be implemented. The potential of the social network is immense as a vast set of features and functionalities could have been implemented if not for the time limitations. For example, a feature that could be implemented is a recommendation system, whereby the system recommends users forums to participate in based on their areas of interests.

In conclusion, the project has successfully implemented a social network with an integrated structured discussion forum. With the addition of some useful functionalities such as the recommendation system as well as addressing the limitations pointed out by the testers, the social network will be able to compete with existing systems and it can evolve into a fully viable commercial product.

## 10 References

Apache Friends (n.d.) *About the XAMPP project*. Available at: <https://www.apachefriends.org/about.html> (Accessed: 20 February 2020).

Borges, G.H.A., de Souza Bermejo, P.H., de Almeida, E.L., et al. (2017) "Social Network for Education: What Are the Resources Desired by Students?" In Kō, A. and Francesconi, E. (eds.). *Electronic Government and the Information Systems Perspective*. Lecture Notes in Computer Science Cham, 2017. Springer International Publishing. pp. 263–277. doi:10.1007/978-3-319-64248-2\_19.

Bourdon, R. (n.d.) *WampServer*. Available at: <http://www.wampserver.com/en/> (Accessed: 11 March 2020).

Campus Society (n.d.) *About Us - Campus Society | The social network for university students*. Available at: <https://www.campussociety.com/about/> (Accessed: 2 November 2019).

Facebook Inc. (2020) *React – A JavaScript library for building user interfaces*. Available at: <https://reactjs.org/> (Accessed: 18 March 2020).

Gonzalez-Ramirez, R., Gasco, J.L. and Taverner, J.L. (2015) Strengths and Weaknesses of Facebook in teaching. *The International Journal of Information and Learning Technology*, 32: 65–78. doi:10.1108/IJILT-09-2014-0021.

Lomas, N. (2013) *Unii, A Student-Only Social Network, Signs Up 100,000+ Users In Six Months In The U.K.* Available at: <http://social.techcrunch.com/2013/11/01/unii/> (Accessed: 2 November 2019).

Ouellette, A. (2017) *What is Bootstrap: A Beginners Guide*. Available at: <https://careerfoundry.com/en/blog/web-development/what-is-bootstrap-a-beginners-guide/> (Accessed: 19 February 2020).

PostgreSQL (n.d.) *PostgreSQL: About*. Available at: <https://www.postgresql.org/about/> (Accessed: 11 March 2020).

Sherman, L.E., Payton, A.A., Hernandez, L.M., et al. (2016) The Power of the Like in Adolescence: Effects of Peer Influence on Neural and Behavioral Responses to Social Media. *Psychological Science*, 27 (7): 1027–1035. doi:10.1177/0956797616645673.

Software Testing Fundamentals (2011) Acceptance Testing. *Software Testing Fundamentals*. Available at: <http://softwaretestingfundamentals.com/acceptance-testing/> (Accessed: 10 April 2020).

Software Testing Fundamentals (2011) Integration Testing. *Software Testing Fundamentals*. Available at: <http://softwaretestingfundamentals.com/integration-testing/> (Accessed: 10 April 2020).

Software Testing Fundamentals (2011) System Testing. *Software Testing Fundamentals*. Available at: <http://softwaretestingfundamentals.com/system-testing/> (Accessed: 10 April 2020).

Software Testing Fundamentals (2011) Unit Testing. *Software Testing Fundamentals*. Available at: <http://softwaretestingfundamentals.com/unit-testing/> (Accessed: 10 April 2020).

Stackify (2017) *What is N-Tier Architecture? Examples, Tutorials & More*. Available at: <https://stackify.com/n-tier-architecture/> (Accessed: 13 March 2020).

The PHP Group (n.d.) *PHP: What is PHP? - Manual*. Available at: <https://www.php.net/manual/en/intro-whatis.php> (Accessed: 20 February 2020).

Tibi, M.H. (2018) Computer Science Students' Attitudes Towards the Use of Structured and Unstructured Discussion Forums in Fully Online Courses. *Online Learning*, 22 (1). doi:10.24059/olj.v22i1.995.

Trayner, E. and Trayner, B. (2015) *Introduction to communities of practice / Wenger-Trayner*. Available at: <https://wenger-trayner.com/introduction-to-communities-of-practice/> (Accessed: 11 March 2020).

Tutorialspoint (n.d.) *SDLC - Iterative Model - Tutorialspoint*. Available at: [https://www.tutorialspoint.com/sdlc/sdlc\\_iterative\\_model.htm](https://www.tutorialspoint.com/sdlc/sdlc_iterative_model.htm) (Accessed: 11 March 2020a).

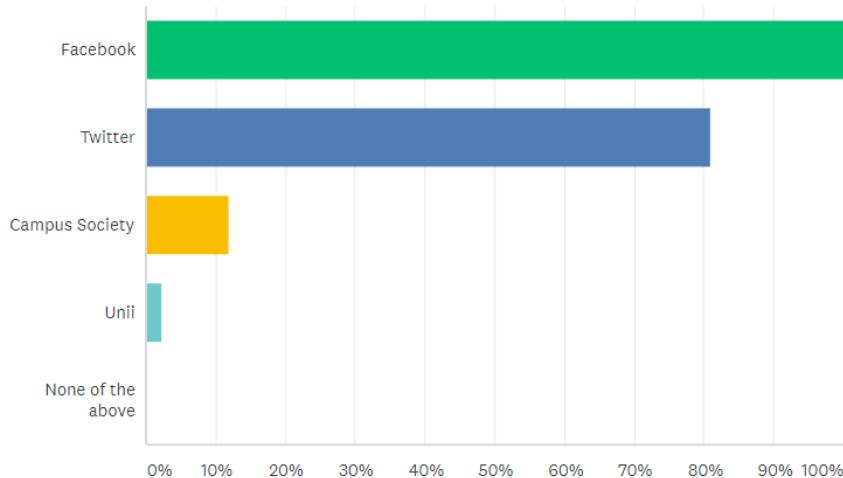
Tutorialspoint (n.d.) *SDLC - Waterfall Model - Tutorialspoint*. Available at: [https://www.tutorialspoint.com/sdlc/sdlc\\_waterfall\\_model.htm](https://www.tutorialspoint.com/sdlc/sdlc_waterfall_model.htm) (Accessed: 11 March 2020b).

Whitty, C. and Anane, R. (2014) "Social Network Enhancement for Non-formal Learning." In *2014 47th Hawaii International Conference on System Sciences*. Waikoloa, HI, January 2014. IEEE. pp. 1645–1654. doi:10.1109/HICSS.2014.210.

## 11 Appendix A: User Requirements Survey Analysis

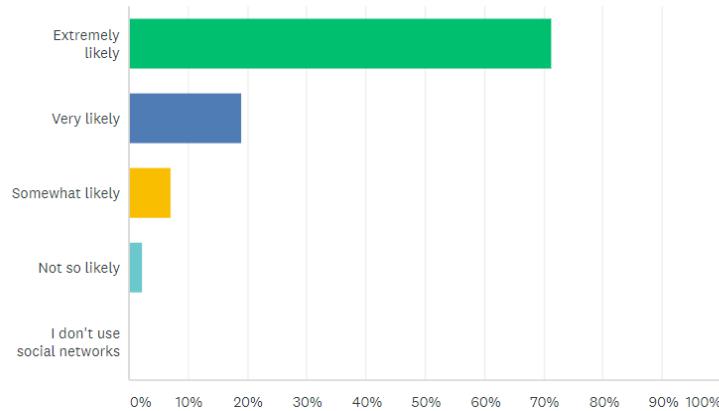
Are you aware or have used any of the following social networks? (Please select all that apply.)

Answered: 42 Skipped: 0



In a typical day, how likely are you to use social networking websites?

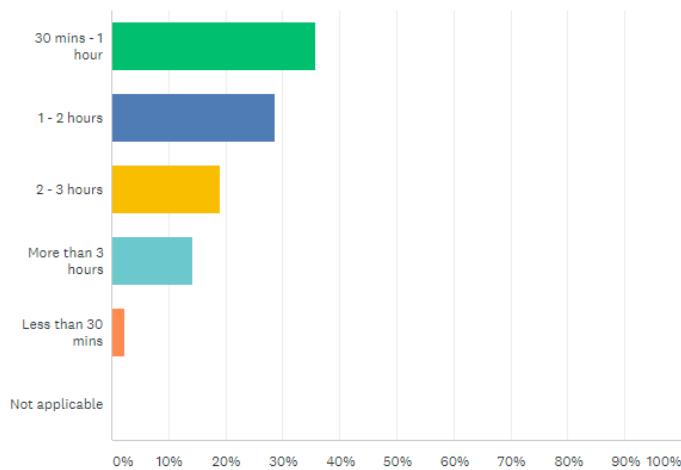
Answered: 42 Skipped: 0



ANSWER CHOICES	▼	RESPONSES	▼
▼ Extremely likely		71.43%	30
▼ Very likely		19.05%	8
▼ Somewhat likely		7.14%	3
▼ Not so likely		2.38%	1
▼ I don't use social networks		0.00%	0
<b>TOTAL</b>		<b>42</b>	

In a typical day, about how much time do you spend using social networking websites?

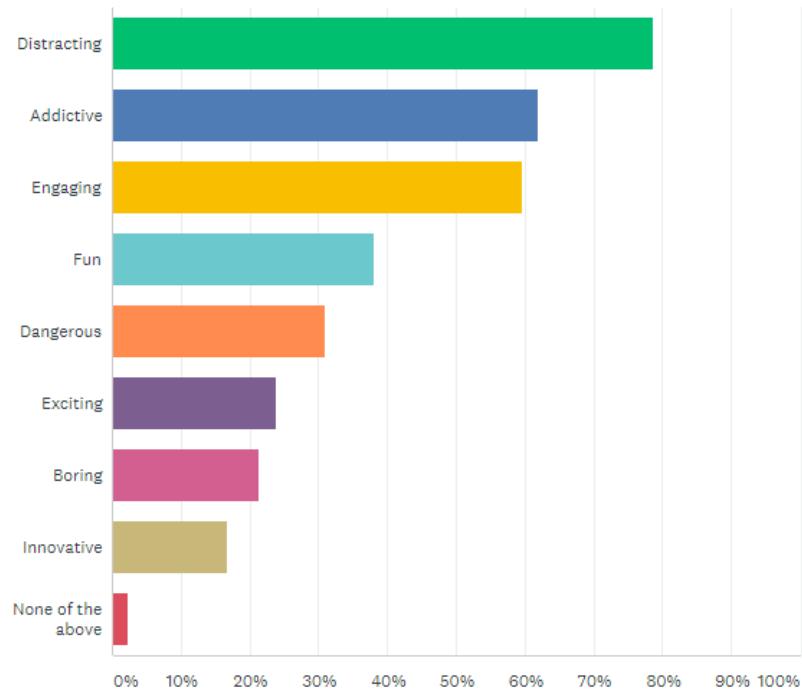
Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES
30 mins - 1 hour	15
1 - 2 hours	12
2 - 3 hours	8
More than 3 hours	6
Less than 30 mins	1
Not applicable	0
<b>TOTAL</b>	<b>42</b>

In your opinion, which of the following words describes social networks? (Select all that apply)

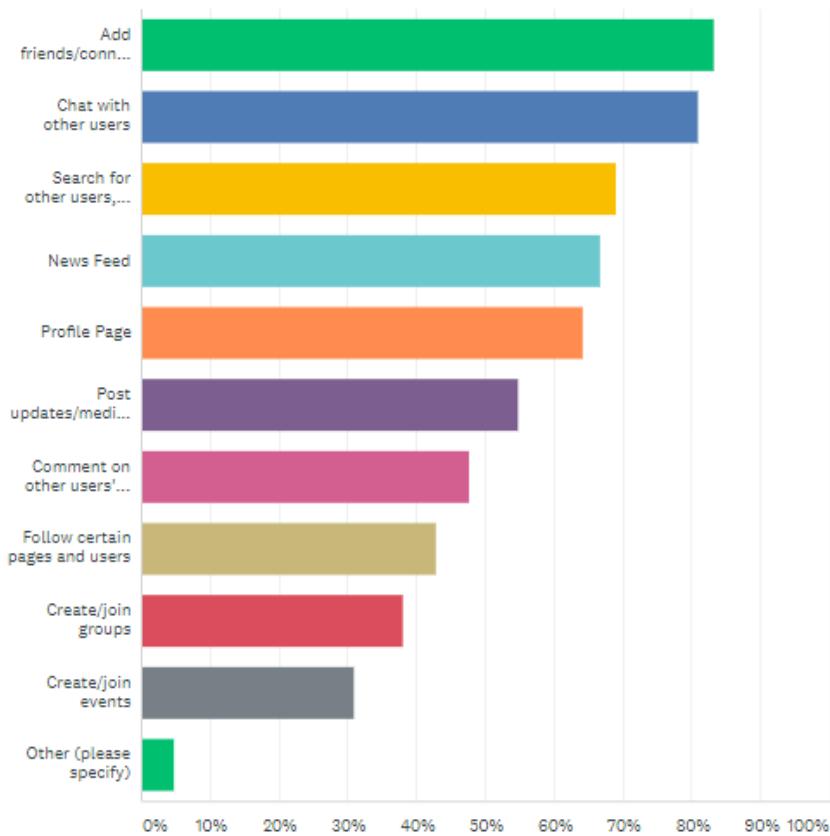
Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES
▼ Distracting	78.57% 33
▼ Addictive	61.90% 26
▼ Engaging	59.52% 25
▼ Fun	38.10% 16
▼ Dangerous	30.95% 13
▼ Exciting	23.81% 10
▼ Boring	21.43% 9
▼ Innovative	16.67% 7
▼ None of the above	2.38% 1

In your opinion, which of the following features are essential to any social network? (Please select all that apply.)

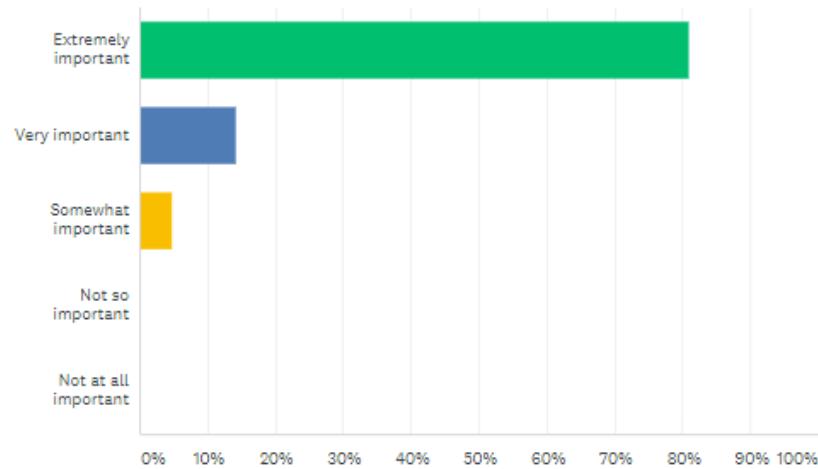
Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES
▼ Add friends/connections	83.33% 36
▼ Chat with other users	80.95% 34
▼ Search for other users, pages, groups etc.	69.05% 29
▼ News Feed	66.67% 28
▼ Profile Page	64.29% 27
▼ Post updates/media on your feed	54.76% 23
▼ Comment on other users' posts	47.62% 20
▼ Follow certain pages and users	42.86% 18
▼ Create/join groups	38.10% 16
▼ Create/join events	30.95% 13
▼ Other (please specify)	Responses 4.76% 2

### In your opinion, how important is the privacy and security of your data?

Answered: 42 Skipped: 0



ANSWER CHOICES	RESPONSES
Extremely important	34
Very important	6
Somewhat important	2
Not so important	0
Not at all important	0
<b>TOTAL</b>	<b>42</b>

## In your opinion, what weaknesses are present in existing social networks?

Answered: 32 Skipped: 10

RESPONSES (32) WORD CLOUD TAGS (0) 🔒 Sentiments: OFF 

Apply to selected ▾ Filter by tag ▾ Search responses  ?

Showing 32 responses

Most social media platforms nowadays are trying to integrate everything together and simply become cluttered (for example 'stories' which was a Snapchat feature and now it's in both Facebook and Instagram). Also, most of them are now having sponsored posts and adds which is annoying.  
11/17/2019 7:25 PM View respondent's answers Add tags ▾

Currently the privacy of users  
11/14/2019 1:07 PM View respondent's answers Add tags ▾

Too easy to find people and be found  
11/14/2019 12:10 PM View respondent's answers Add tags ▾

News feed bloating by showing things your friends have commented on/reacted to. Too many ads. Lots of fake news/propaganda.  
11/14/2019 11:43 AM View respondent's answers Add tags ▾

## Aside from common and existing features, what other features would you want in a social network?

Answered: 19 Skipped: 23

**RESPONSES (19)** WORD CLOUD TAGS (0) Sentiments: OFF

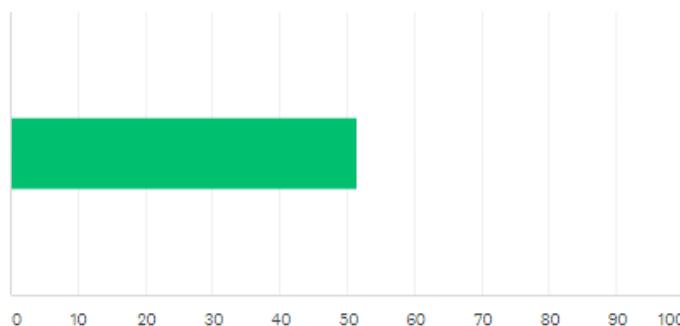
Apply to selected ▾ Filter by tag ▾ Search responses ?

Showing 19 responses

- Features encouraging people to make friends with people they'd otherwise be unaware of. Maybe if it was a public platform like Twitter, detecting who talks to who a lot and then encouraging them to 'wave' at each other like on Messenger.  
11/11/2019 11:23 PM View respondent's answers Add tags
- Private areas where you select particular friends who can view your activity on the social media platform. For example people usually follow or add people they know of but do not know as a friend or personally, therefore some of the activity you may be posting or sharing ; you may not want them to see.  
11/11/2019 10:56 PM View respondent's answers Add tags
- Feature that help verify people (from above weakness)  
11/11/2019 10:42 PM View respondent's answers Add tags
- More control over privacy and the things that show up on my feed  
11/11/2019 10:40 PM View respondent's answers Add tags

## How interested are you in a university social network?

Answered: 39 Skipped: 3



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
Responses	62	2,011	39
Total Respondents: 39			

## 12 Appendix B: User Requirements

### User Requirements for Students

- [UR1] – Students must be able to login/logout from the system.
- [UR2] – Students must be able to update their personal details.
- [UR3] – Students must be able to view their personal details.
- [UR4] – Students must be able to create an account.
- [UR5] – Student must be able to delete their account.
- [UR6] - Students must be able to change their password or retrieve a forgotten password.
- [UR7] – Students must be able to view and access the navigation bar at the top of all pages.
- [UR8] – Students must be able to view and access all pages of the social network.
- [UR9] – Students must be able create a post.
- [UR10] – Students must be able to view their posts.
- [UR11] – Student must be able to delete posts.
- [UR12] – Students must be able to comment on posts.
- [UR13] – Students must be able to delete comments.
- [UR14] – Students must be able to search other users.
- [UR15] – Students must be able to follow/unfollow other users.
- [UR16] – Students must be able to view posts from people they are following.
- [UR17] – Students must be able to change their profile picture and cover photo on the profile page.
- [UR18] – Students must be able to delete their profile picture or cover photo.
- [UR19] – Students must be able to view the profile pages of other users.
- [UR20] – Students must be able to view their timetable.
- [UR21] – Students must be able to message other users.
- [UR22] – Students must be able to receive notifications.
- [UR23] – Students must be able to contribute to forums.

### User Requirements for Lecturers

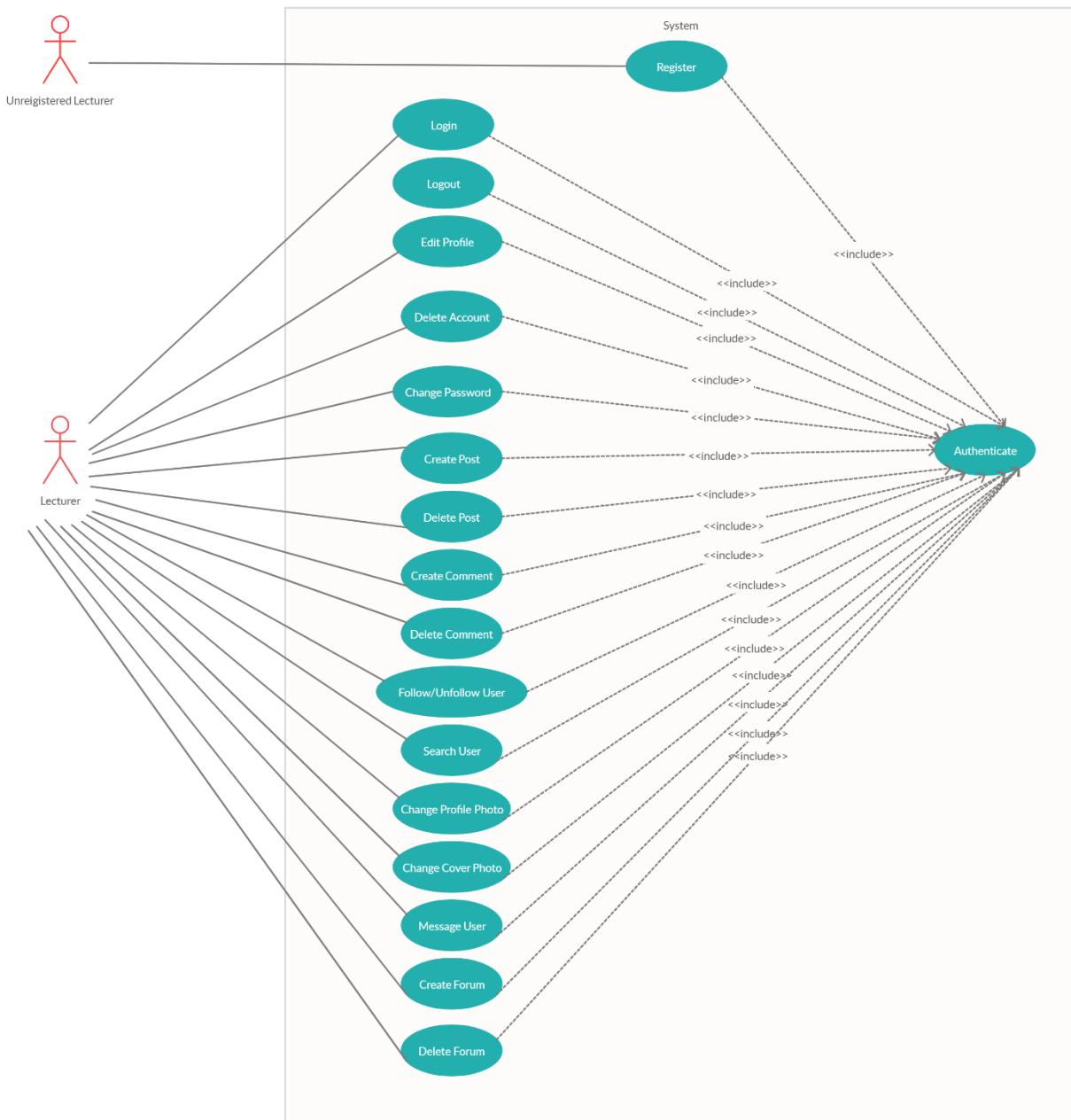
- [UR1] – Lecturers must be able to create a forum.
- [UR2] – Lecturers must be able to delete forum comments.

### User Requirements for Administrators

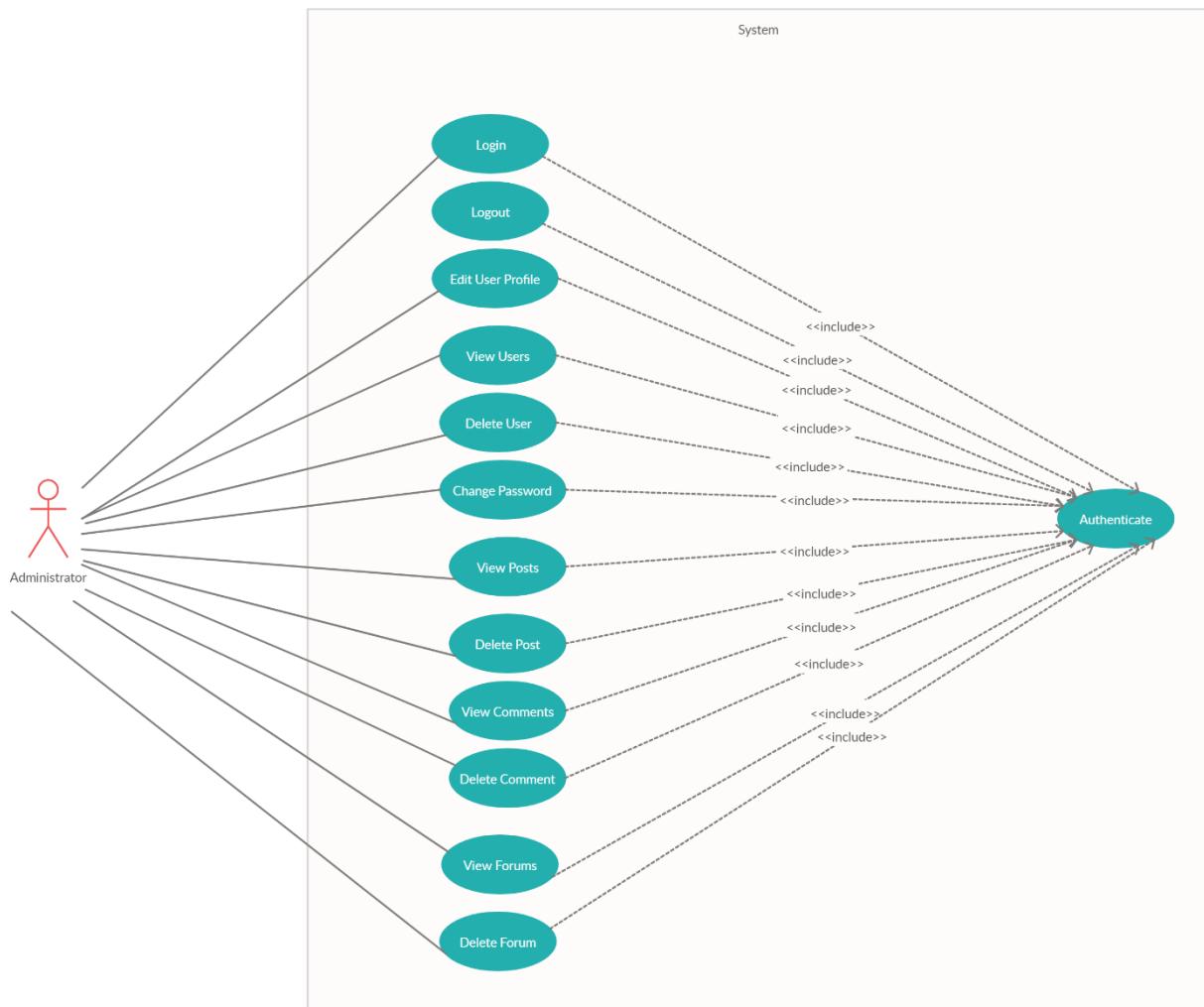
- [UR1] – Administrators must be able to view all the users of the system.
- [UR2] – Administrators must be able to edit the details of all users.
- [UR3] - Administrators must be able to view all the posts and forums in the system.
- [UR4] – Administrators must be able to view all comments in the system.
- [UR5] – Administrators must be able to delete comments from the system.

- **[UR6]** – Administrators must be able to delete posts and forums from the system.
- **[UR7]** – Administrators must be able to add users to the system.
- **[UR8]** – Administrators must be able to delete users from the system.

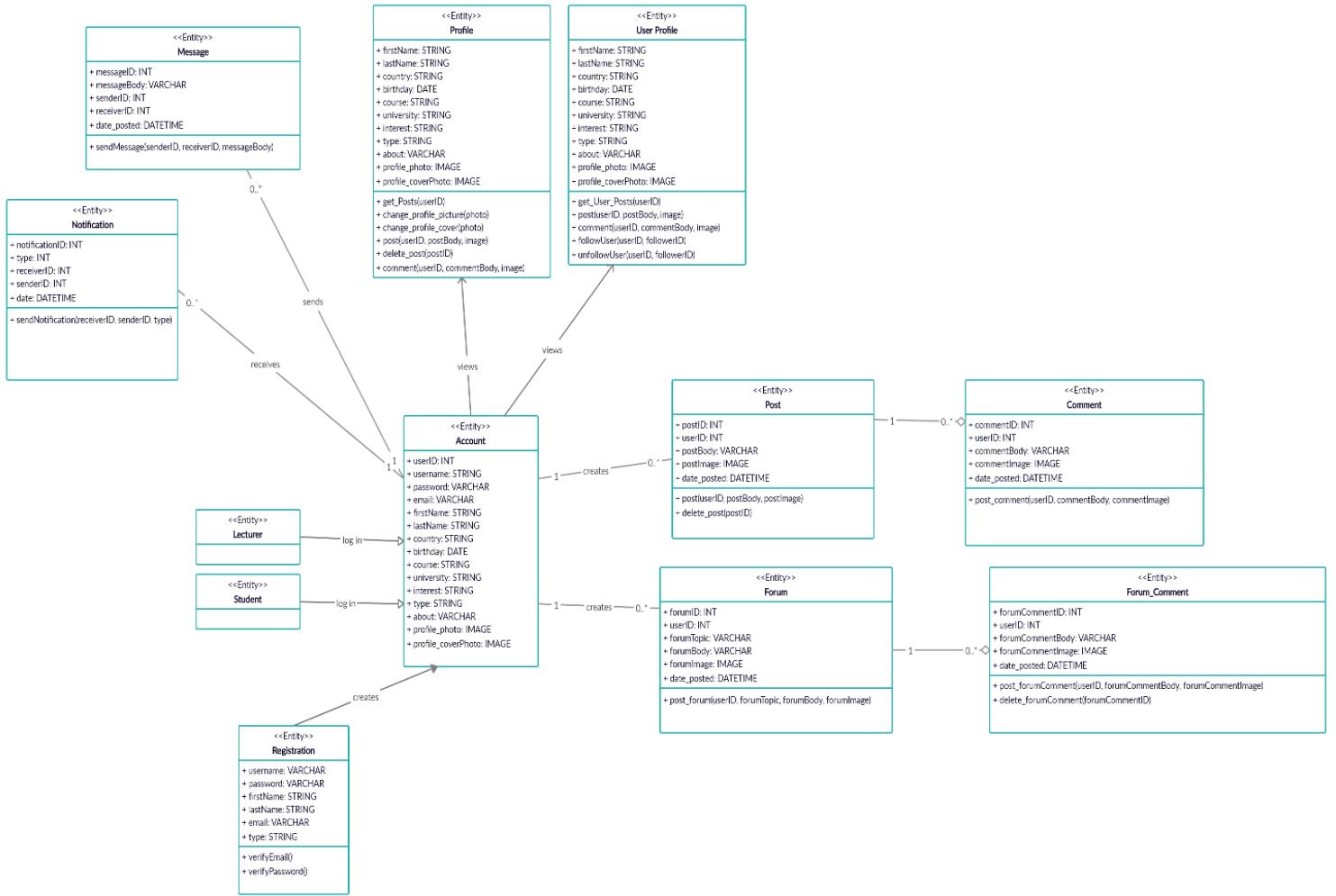
### 13 Appendix C: UML Diagrams



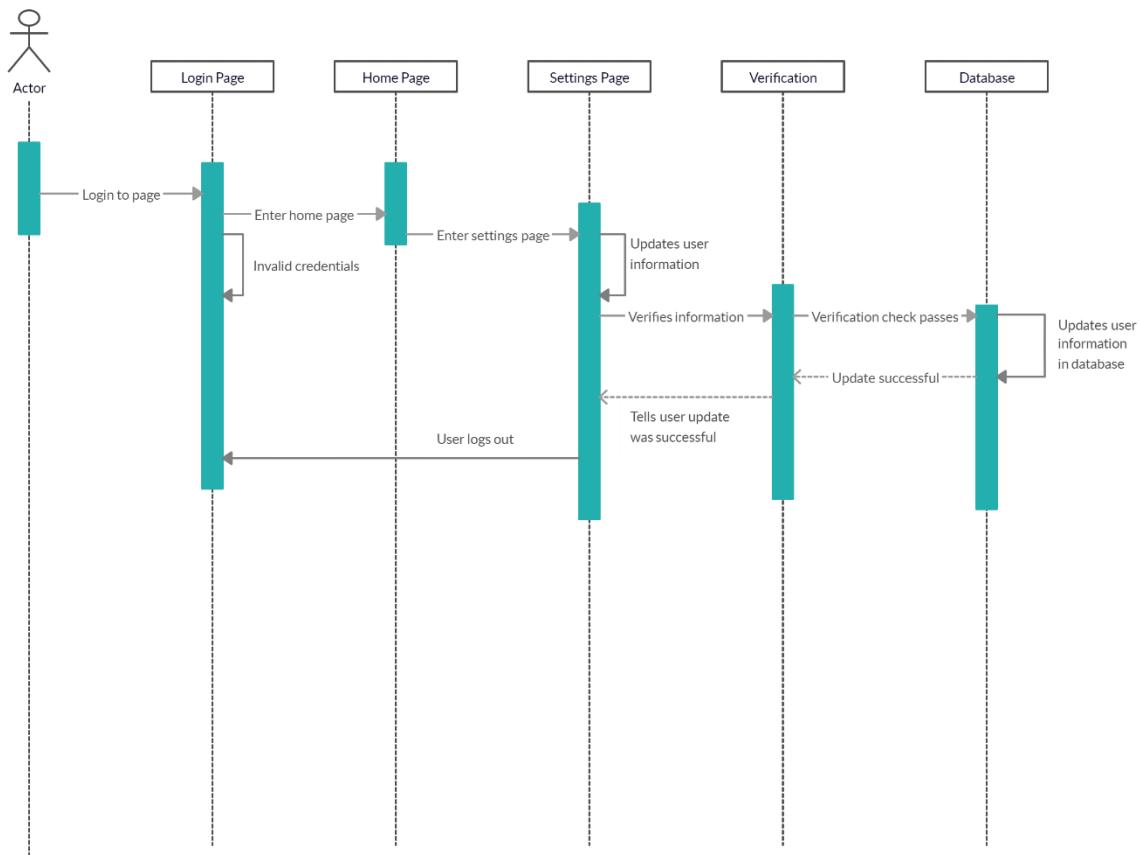
Lecturer Use Case Diagram



**Administrator Use Case Diagram**



## Class Diagram



Edit Profile Sequence Diagram

## 14 Appendix D: System Requirements

### Functional Requirements

- [FR1] – The system should be able to authenticate and verify a user given a username and password.
- [FR2] – The system should be able to create a user account through registration and specify a username, password and type of account.
- [FR3] – The system should be able to delete a user account.
- [FR4] – The system should be able to login/logout a user.
- [FR5] – The system should be able to store user details.
- [FR6] – The system should be able to search for users.
- [FR7] – The system should be able to provide access to user details.
- [FR8] – The system should be able to update user details.
- [FR9] – The system should be able to present all posts and forums.
- [FR10] – The system should be able to send, store and present notifications.
- [FR11] – The system should be able to send, receive, store and present messages.
- [FR12] – The system should be able to create posts and forums.
- [FR13] – The system should be able to delete posts and forums.
- [FR14] – The system should be able to update profile pictures and cover photos.
- [FR15] – The system should be able to delete profile pictures and cover photos.
- [FR16] – The system should be able to create comments.
- [FR17] – The system should be able to present comments.
- [FR18] – The system should be able to delete comments.
- [FR19] – The system should be able to change and update the user's password.
- [FR20] – The system should be able to send a forgotten password to the user.

### Non-Functional Requirements

#### Implementation Requirements

- [IR1] – The application must conform with Norman's Design Principles. This includes **visibility, feedback, constraints, mapping, consistency and affordance**. Details of each principle can be found in **Appendix E**.
- [IR2] – The application must be designed using the Unified Modelling Language.

#### Performance Requirements

- [PR1] – System response time must be within an acceptable range, ideally 3-5 seconds.
- [PR2] – System must be able to handle interaction with multiple users without losing response time.
- [PR3] – The database package must be able to handle a large volume of data.

### Navigation Requirements

- [NR1] – The system must be able to navigate the user across all interfaces.
- [NR2] – The system must give indicative information for the current location of the user.
- [NR3] – The system interface should take into consideration the page length and width, and adjust its layout based on the width of the page.

### Security Requirements

- [SR1] – The system should provide data integrity.
- [SR2] – The system should provide data privacy.
- [SR3] – The system should provide data confidentiality.
- [SR4] – The system should be resistant to attacks that aim to exploit the system.

### Maintainability Requirements

- [MR1] – The system should be easy to maintain.
- [MR2] – The system should be maintained during off-peak hours, such as in the early morning, to avoid disruption to users.
- [MR3] - The system should be able to be maintained within a reasonable amount of time.
- [MR4] – The system should be able to adapt to a new environment or to changes in the existing environment.

### Reliability Requirements

- [RR1] – The system should be reliable during peak hours.
- [RR2] – The system should be able to recover in the event of errors or failures.
- [RR3] – The system should be loosely-coupled, therefore if one part of the system breaks it won't affect the entire system.
- [RR4] – Probability of data corruption or data loss should be minimal.

## 15 Appendix E: Norman's Design Principles

**Visibility:** The functions on the website need to be visible to the user. For example, the navigation bar on the website should be visible to the user at all times so they can navigate between pages. Another example is the **hamburger** icon, which indicates that there is a drop-down menu with more options.

**Feedback:** Every action needs a reaction. When a user presses a button or does something on the website there needs to be some kind of indication. For example, when a user loads a new page, there needs to be an indication that the page is loading, like a spinning wheel or a progress bar. Most modern web browsers such as Google Chrome does this well, as a spinning circle will appear as soon as a page is being loaded or an operation is being executed. This indication will tell the user that their action caused something.

**Constraints:** Constraints are the limits to an interaction or an interface. A physical example of this is the screen size of the device the user is using. The screen size tells the user the physical boundaries of the interface. Another example is a single continuous page with an image peeking onto the page, this signals that the user has to scroll down to reveal the image, and thus the rest of the page.

**Mapping:** Mapping refers to the relationship between the controls and effects. Nearly all elements and artifacts must have some kind of mapping between its controls and effects, this to acknowledge that the controls have affected/changed something. A good example of mapping is a vertical scroll bar, it tells you where you are on a page, and as you drag it down, the page moves down with the scroll bar at the same rate.

**Consistency:** Consistency concerns with designing interfaces that have similar operations and uses similar elements to achieve similar tasks. For example, a consistent operation is using the same input action to input text into a textbox, where a left click onto the textbox is needed to trigger the typing cursor, and then the user can type in their desired text. Another example is design consistency, this could be such that every page has the same background, same navigation bar on the top, same elements etc.

**Affordance:** Affordance is the relationship between what something looks like and how it is used. This means that when a user sees something, such as an element on a website, they need to know how to use it. The element needs to give a clue as to how to interact with it. For example, a button on the website invites pushing/clicking by the way it is physically constrained in a bordered box.

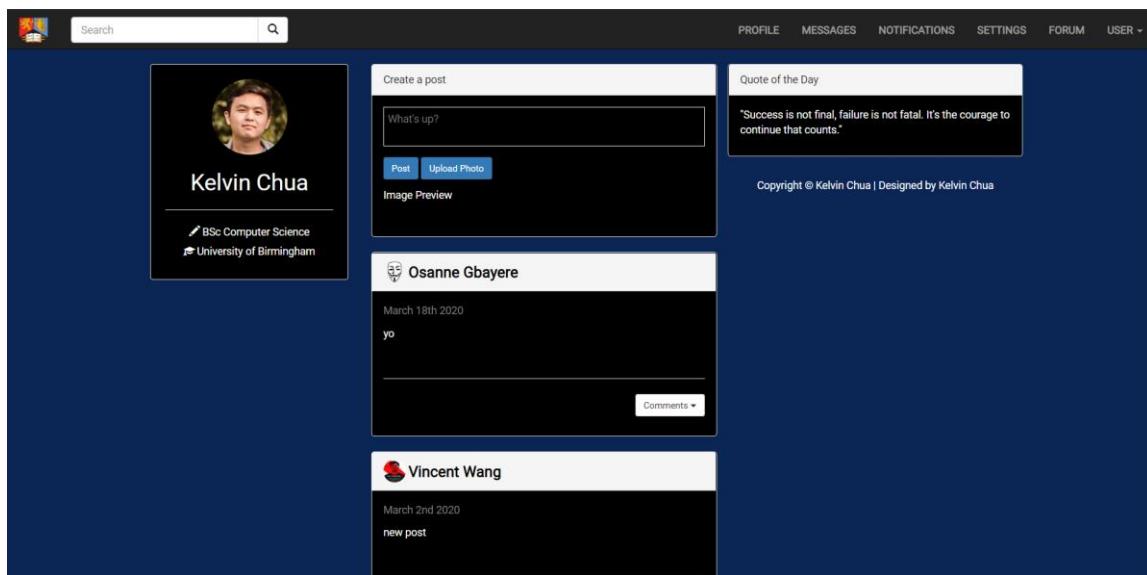
## 16 Appendix F: Risk Assessment Table

Risk	Risk Level	Solution
Project schedule will exceed the deadline	Low	Develop a plan each week to stay organised and committed to doing work
Hard drive will malfunction/crash	Low	Back-up everything to the cloud to ensure the safety and security any data/progress
Internet will malfunction, hindering the ability to test the application	Low	Make sure another device such as a smartphone has data so the laptop could connect to it via hotspot
Frameworks/languages used to develop the application aren't easy to learn, therefore delaying the development phase	Medium	Make sure there are multiple frameworks/languages available for developing the system, in the event that one of them is hard to learn other options could be tried out
Requirements for the system are inadequately defined	Medium	Make sure the requirements are defined very early on, so that it could be refined and amended as development progresses
A feature turns out to be harder to implement than initially thought	Medium	Make sure that the most important features of the system are implemented first, then if there is time focus on implementing that specific feature
Critical user evaluation of the system can't be achieved	High	Make sure a functional and presentable version of the system is completed at least a couple of weeks before the deadline to allow time for user evaluation

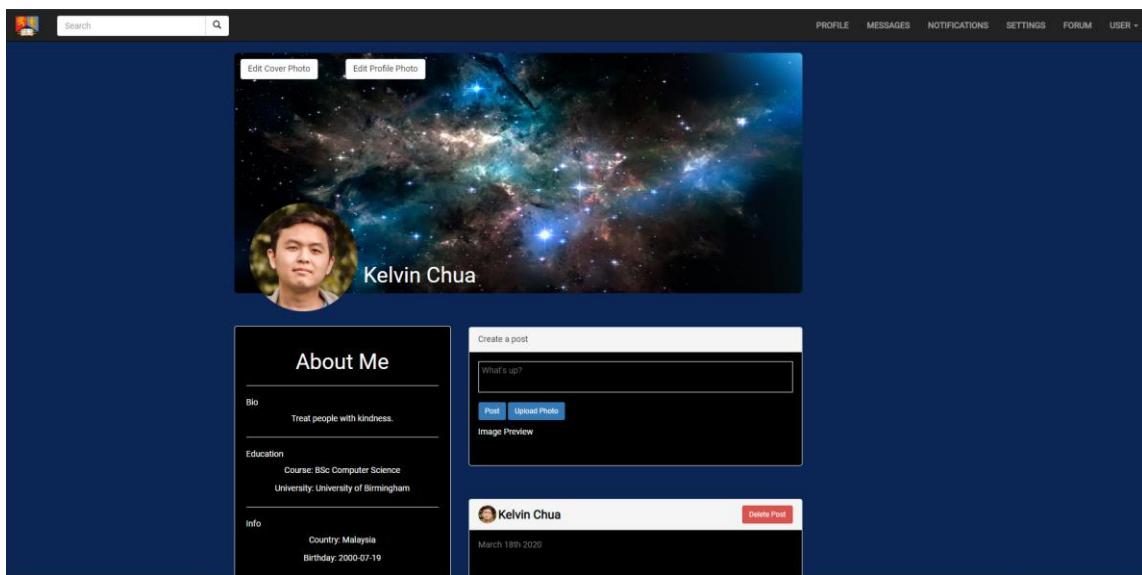
## 17 Appendix G: Black Box Testing Results

#	Test Name	Input Function	Expected Output	Actual Output	Observation
1	Posting Updates/Posts	Clicking the “Post” button	System should display the post just posted	System displays post just posted	Pass
2	Posting Comments	Clicking the “Comment” button	System should display the comment just posted	System displays comment just posted	Pass
3	Following Users	Clicking the “Follow” button on a user’s profile page	System should display posts from that user on the home page	System displays posts from that user on the home page	Pass
4	Searching Users/Forums	Clicking the search button on the search bar	System should transfer user to the results page, showing results relating to the search	System transfers user to the results page, showing results relating to the search	Pass
5	Messaging other users	Clicking the “Send” button	System should display the message the user just sent, as well as the messages between the user and the receiver in chronological order	System displays the message the user just sent, as well as the messages between the user and the receiver in chronological order	Pass
6	Viewing Forums	Clicking the “Forum” link on the navigation bar	System should transfer user to the main Forum page	System transfers user to the main Forum page	Pass
7	Editing User Information	Clicking the “Update Profile” button	System should update the user’s info and display it on their profile page	System updates the user’s info and display it on their profile page	Pass

## 18 Appendix H: Screenshots of the System



Student Home Page



Student Profile Page

The screenshot shows the 'Messages' section of the Student Social Network. At the top, there's a search bar and a navigation bar with links for PROFILE, MESSAGES, NOTIFICATIONS, SETTINGS, FORUM, and USER. On the left, a sidebar lists user profiles: Vincent Wang, John Doe, Osanne Gbayere, pathahahaha leo, and Feilue Lin. The main area shows a conversation with Vincent Wang. The messages are:

- John Doe: hey kelvin
- Vincent Wang: how are you
- Osanne Gbayere: i'm fine, how about you
- Vincent Wang: fine as well
- pathahahaha leo: how's school and stuff
- Vincent Wang: school's fine, going well
- Feilue Lin: that's good, going fine for me as well

A text input field at the bottom says 'Type a message...' and a 'Send' button is visible.

Student Messages Page

The screenshot shows the 'Notifications' section of the Student Social Network. At the top, there's a search bar and a navigation bar with links for PROFILE, MESSAGES, NOTIFICATIONS, SETTINGS, FORUM, and USER. The main area displays a single notification from Vincent Wang:

Vincent Wang just posted! March 2nd 2020

Student Notifications Page

The screenshot shows the 'Settings' page of a student social network. At the top, there's a navigation bar with links for PROFILE, MESSAGES, NOTIFICATIONS, SETTINGS, FORUM, and USER. Below the navigation is a sidebar with options: Edit Profile (selected), Change Password, and Delete Account. The main area is titled 'Edit Profile' and contains fields for Username (kelvinst), Email (kfcb50@student.bham.ac.uk), First Name (Kelvin), Last Name (Chua), Country (Malaysia), Birthday (07/19/2000), Course (BSc Computer Science), University (University of Birmingham), About (Treat people with kindness.), and Interests (Web Development, Software Engineering, Mobile Application Development, Mathematics). A 'UPDATE PROFILE' button is at the bottom.

## Student Settings Page

The screenshot shows the 'Results' page of a search function. The top navigation bar is identical to the Settings page. The main content area is titled 'Results' and features a search interface with tabs for 'Users' (selected) and 'Forums'. Below the tabs, a search result card displays a user icon and the name 'John Doe'.

## Search Results Page

## 19 Appendix I: User Evaluation Survey Questions

1. How would you describe yourself in terms of computing experience?
  - Novice
  - Intermediate
  - Expert
  
2. For each of the options below, select the rating that best describes your experience with the Student Social Network in terms of functionality.

Function	Rating				
	Very Bad	Bad	Average	Good	Very Good
Registration					
Posting updates/media					
Following other users					
Accessing your profile page					
Messaging other users					
Searching for other users					
Accessing other users' profile page					
Accessing the discussion forum					
Updating your details					
Commenting on posts and forums					

3. Overall, how would you compare your experience using the Student Social Network as opposed to other social networks such as Facebook?

- Much worse
- Worse
- About the same
- Better
- Much better

4. How visually appealing is the website?

- Not at all appealing
- Not so appealing
- Somewhat appealing
- Very appealing
- Extremely appealing

5. Do you feel you are part of a community when using the social network?

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

6. In your opinion, does the discussion forum have the potential to be used as a collaborative learning tool?

- Strongly disagree
- Disagree
- Neither agree nor disagree
- Agree
- Strongly agree

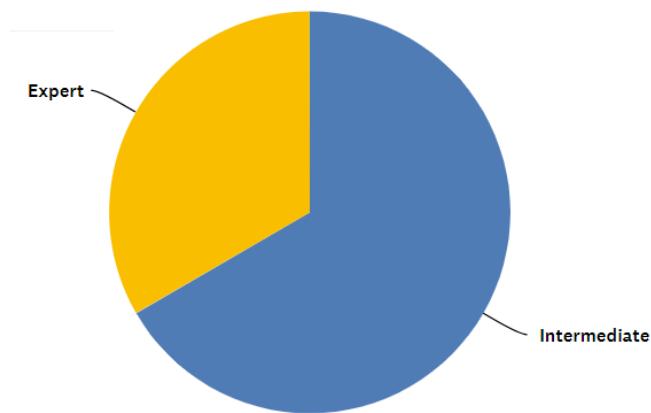
7. In your opinion, what are the most positive aspects of the social network?

8. In your opinion, what are the most negative aspects of the social network?

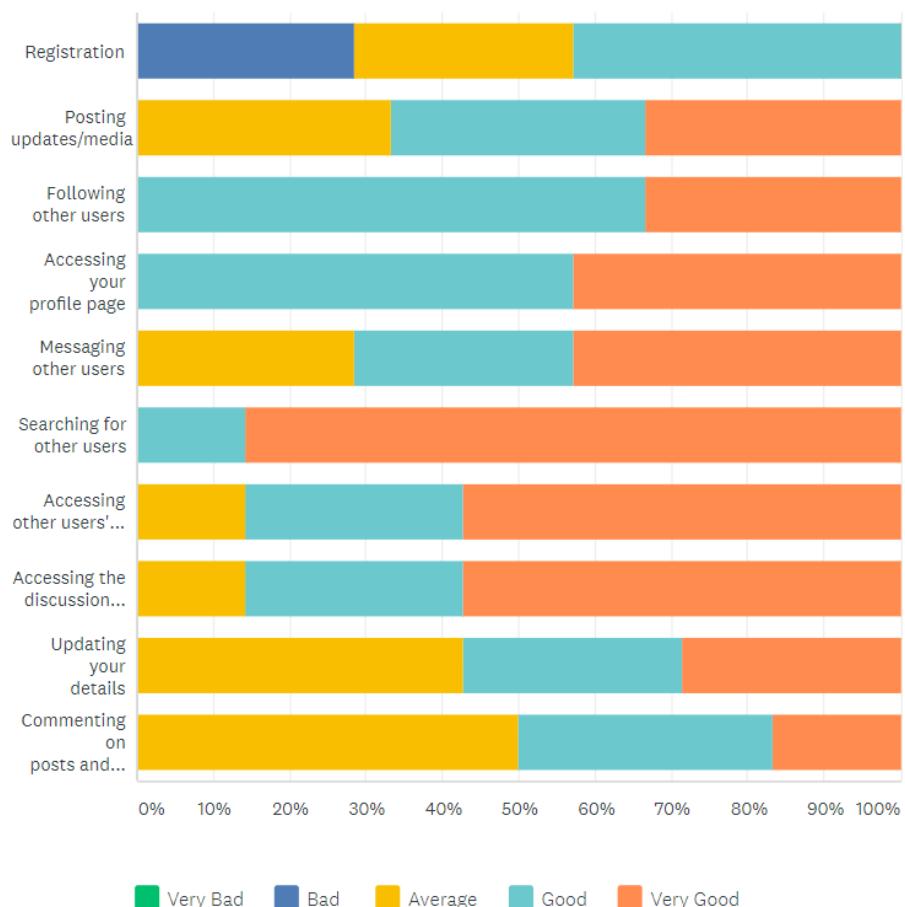
9. What improvements would you make to the overall design and functionality of the website?

## 20 Appendix J: User Evaluation Survey Analysis

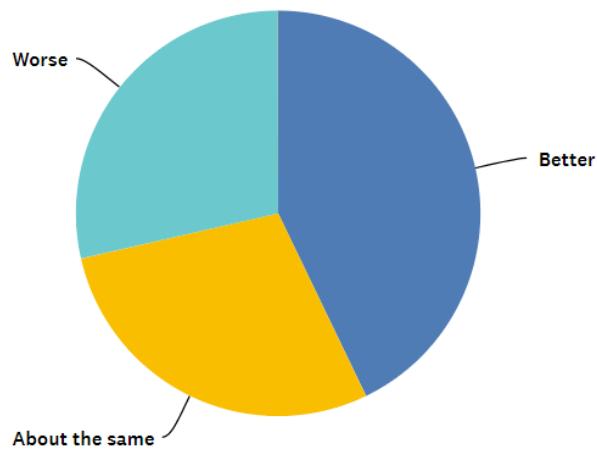
- How would you describe yourself in terms of computing experience?



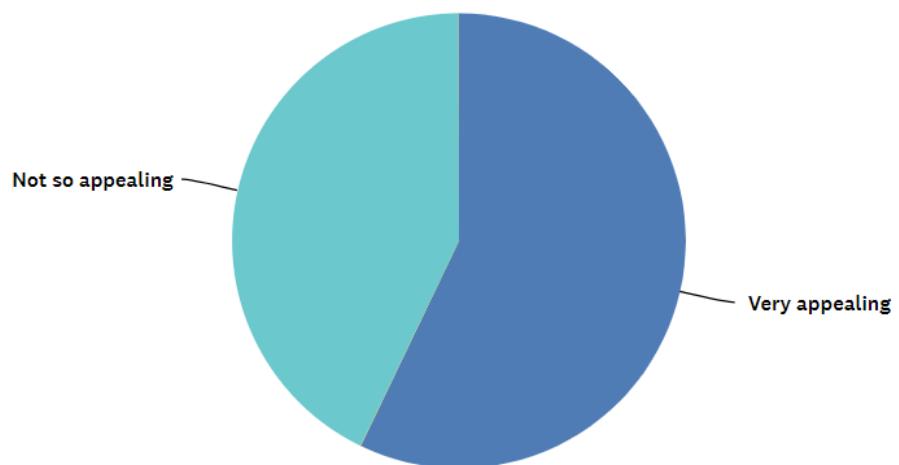
- For each of the options below, select the rating that best describes your experience with the Student Social Network in terms of functionality.



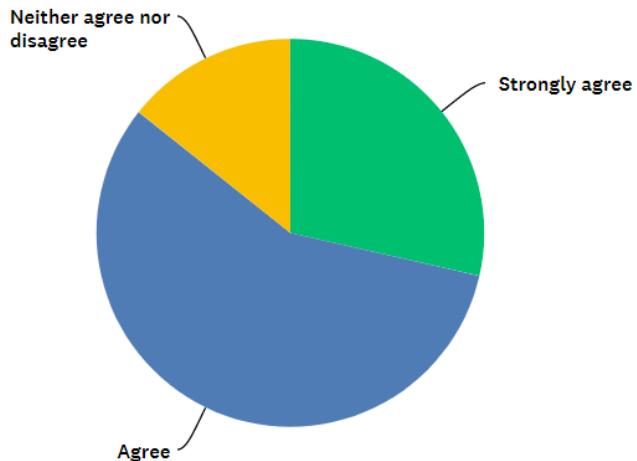
3. Overall, how would you compare your experience using the Student Social Network as opposed to other social networks such as Facebook?



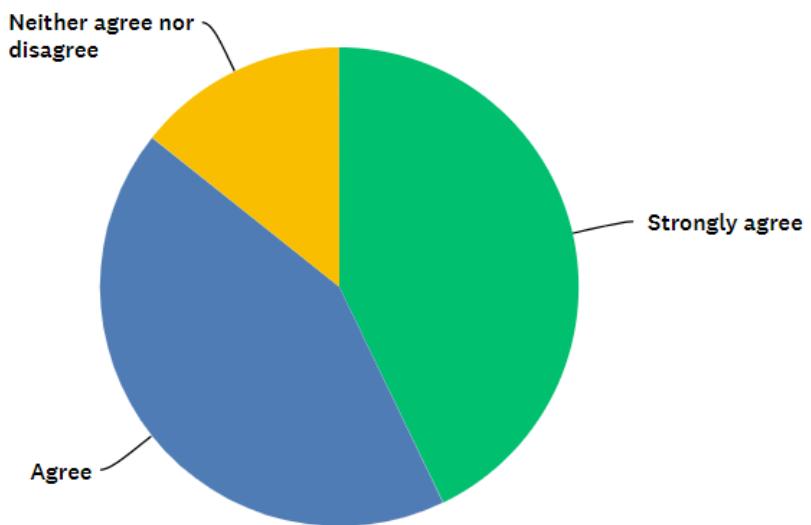
4. How visually appealing is the website?



5. Do you feel you are part of a community when using the social network?



6. In your opinion, does the discussion forum have the potential to be used as a collaborative learning tool?



7. In your opinion, what are the most positive aspects of the social network?

1. outlook 2. easy to start using

3/18/2020 10:44 PM

[View respondent's answers](#)

Add tags ▾

---

In terms of functionality, it does what most social network suppose to do.

3/18/2020 9:03 PM

[View respondent's answers](#)

Add tags ▾

The social network places a focus on using it for academic purposes and can be used to engage in academic and intellectual discussions, without other irrelevant content distracting the user.

3/18/2020 6:10 PM

[View respondent's answers](#)

Add tags ▾

It provides a better alternative to Canvas, which doesn't provide a centralised notification system for all subjects

3/18/2020 4:28 PM

[View respondent's answers](#)

Add tags ▾

8. In your opinion, what are the most negative aspects of the social network?

1. no jumping back to login screen after successfully signed up 2. the list of users in messages are not in order of recently chat with 3. messages need to be seen after refreshing the webpage each time

3/18/2020 10:44 PM

[View respondent's answers](#)

Add tags ▾

---

Few things can be improved, such as the UX design on components and colours.

3/18/2020 9:03 PM

[View respondent's answers](#)

Add tags ▾

The news feed at the home page does not show the new posts I have made.

3/18/2020 6:10 PM

[View respondent's answers](#)

Add tags ▾

Comments to posts are hidden by default and need to be selected before being revealed. This affects the social aspect of the network. Editing my profile picture requires clicking an update button before changes are made which can be confusing as the "edit profile" dialogue must be reopened in order to select the button.

3/18/2020 4:28 PM

[View respondent's answers](#)

Add tags ▾

9. What improvements would you make to the overall design and functionality of the website?

At registration I would make sure that if some of the details are incorrect (like password < 6 characters) then only the incorrect fields get cleared instead of all details. I would also make the profile features shown on the home page link to stuff. Like when I click on the picture then it takes me to my profile, I would like it if I could also click on the name to go to the profile.

3/19/2020 7:05 PM

[View respondent's answers](#)

Add tags ▾

---

Add clearer descriptions or notifications as to what is happening on screen

3/19/2020 4:46 PM

[View respondent's answers](#)

Add tags ▾

All functions are very good. Maybe you can change the colour schemes, the dark blue and black are too dark, the light part it too light, my eyes feel hurt after browsing for a long time.

3/18/2020 10:47 PM

[View respondent's answers](#)

Add tags ▾

1. able to see the user's own posts at homepage? 2. why is the user with lecturer permission able to delete comments that in the forum posted by anyone? 3. interests are not shown when observing others? 4. inputs of users' settings are too free? or the way of showing it