DEVELOPMENT OF AN ANDROID APPLICATION:

UNICONNECT

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This Report Presented in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Computer Science and Engineering.

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APPROVAL

This Project titled "**Development of an Android Application: UniConnect**", submitted by Md. Waliullah, Md. Amteaz Bulbul and Ariful Islam to the Department of Computer Science and Engineering, Daffodil International University, has been accepted as satisfactory for the partial fulfillment of the requirements for the degree of B.Sc. in Computer Science and Engineering and approved as to its style and contents. The presentation has been held on 06th May 2018.

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DECLARATION

We hereby declare that; this project has been done by us under the supervision of **Anup Majumder, Lecturer, Department of CSE** Daffodil InternationalUniversity. We also declare that neither this project nor any part of this project has been submitted elsewhere for award of any degree or diploma.

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ACKNOWLEDGEMENT

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We want to thank our honorable **Supervisor Mr. Anup Majumder, Lecturer,** Department of Computer Science & Engineering, Daffodil International University. Deep knowledge and keen interest of our supervisor in the field of "Android Application Development" to carry out this project. His endless patience, encouragement, expert advice and above all his friendly behavior towards us have made it possible to complete this project.

We would like to express our heartiest gratitude to**Dr. Syed Akhter Hossain, Professor and Head**, Department of CSE, for his kind help to finish our project and also to other faculty member and the staff of CSE department of Daffodil International University.

Next, we must thank and acknowledge our university, Daffodil International University. We also want to thank our beloved classmates and other students of the university who took part in research purpose for our project and appreciated our work.

Lastly, we want to thank our beloved families, who were always by our side and kept faith on us. Without our family support, we could never be here, we cordially thank them for this. We also thank our friends for their support and help to us.

ABSTRACT

This project is based on teacher and student communication system. This project aims to create an easy, faster and smooth communication systems between the teachers and the students. This project also offers some opportunities that will helps both the teachers and the students on their educational purpose. So, for the better communication system we developed our project that will help the users a lot. This project will boost the confidence of the students in studying, communicating and so on. Mostly students are not willing to waste their valuable times, or a large number of students just feel shy or some introvert to talk to their respective teachers. But our project will bring a smart solution for them.Our projects recreate the whole system online but it will help the users offline too. It will save time and students mustn't have to worry about their communication problems. This system is implemented and supervised by the experts and satisfying by the students and teachers. XML, JAVA, Node.js are used to develop the system. This system is tasted by over 5 teachers and 100 students, and 80% of them found the system useful.

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CHAPTER 1

Introduction

1.1 Introduction

The most important thing in this world is communication. From the very beginning of life on earth communication has taken place. It started with various types of sounds and signs and day by day various languages have originated to make it easier. Now with the development of science and technology long distance communication has become smoother and faster. We use different types of communication systems and tools like phone, fax, email, messaging, social media and so on.

In university a student must communicate with the teachers. From study to career plan a teacher can help students a lot. Sometimes students need to go to the teachers when they face some problems in study. Sometimes they have to ask some little question about some subject. Teachers have counseling hour to solve student's problems or answer their queries. But sometimes teachers are not in their desk in counseling hour for various reasons. Teacher may have an important meeting or a seminar or may take a leave on that day when a student comes to the teacher's desk. So, the student has to call the teacher but may be the teacher is so busy that he/she is not expecting phone calls. Then the student leaves a message and waits for the reply.

As most of the university students and the teachers nowadays are using smartphone (mostly Android). This problem can be solved by an Android app. Android app can be the medium of communication between teachers and students in a University.In this project, we are offering a platform only for teachers and students which bring them at a point to make their communication easier.

1.2 Motivation

The motivation to work in this project is actually our real-life experience. As a student we face many difficulties in our study. We also need guidance to build a good career. Teachers can help students a lot to continue their study life and to build career. So, communication with teachers is very much important for a student. But the problem is

to get teachers when they are free as they have a lot of work to do. Though, teachers have counseling hour for students but they may not be available for some important work like meeting, seminar or some personal issues. Sometimes teachers don't receive anonymous phone calls or cannot receive the call for some reason. Then the student communicates with the teacher through messaging. This situation motivates us to make an android app to communicate with the teachers. Using the app students can ask questions to the teachers, make an appointment or see when the teacher is in his/her desk.

1.3 Objective

The main objective of this project is to build a platform where student and teacher can communicate with each other. A platform where Teachers can

- Make their work schedule / Class routine
- Add reminder
- Contact with student
- Create groups of students
- Make Announcement
- Create Notifications
- Answer to students' questions
- Give appointment

And Students can

- Make class routine
- Ask question to teacher
- Request for appointment
- See when his/her expected teacher is available
- Join in a group

1.4 Expected Outcome

The outcome of this project is very simple but important. Some points are mentioned below

- ➢ Using this app, teachers can schedule their classes and other important works. It will remind them of their works to be done. Students will also schedule their classes using the app.
- ➢ Communication with teachers will be easier for students. They can ask questions any time they want. Getting some time with teacher is lot easier by requesting for an appointment. Students will also be able to see when teacher is free in his/her counseling hour and pay a visit.
- ➢ Creating groups teachers will be able to contact with a group of students. Using notification teacher will let students know about their upcoming quizzes, assignments or presentations. Teacher will announce sudden issues using Announcement facility. Teacher can contact with a single student also by messaging.

1.5 Report Layout

We developed an application which name is **"UniConnect".** We make sure that the project complete in time. Respect to our workflow we design our project report.

In chapter 2 named Background discuss about the Introduction, Related Works, Comparative Studies, Scope of the Problem, Challenges.

In Chapter 3 named Requirement Specification we discuss about the Business Process Modeling, Requirement Collection and Analysis, Use Case Modeling and Descriptions, Logical Data Model, Design Requirements.

In chapter 4 named Design Specification we discuss about the Front-end Design, Back-end Design, Interaction Design and UX and Implementation Requirements.
In chapter 5 named Implementation and Testing we discuss about the Implementation of Database, Implementation of Front-end Design, Testing Implementation, Test Results and Reports.

In chapter 6 named Discussion and Conclusion we discuss about the Future Scope, Discussion and Conclusion of the whole project.

CHAPTER 2

Background

2.1 Introduction

Communication between teacher and student is very much important in teaching process. As teachers are the best guide of the students, students have to communicate with teachers. Not only about study but also a good career and future plan students have many questions in their mind. Students face problems everyday while they are study or do some work related to study or their career. To know the answers of their questions or to find the solutions of their problems students go to their teachers first. This is why communicating with teachers is so important. On the other hand, teacher may need to contact a student or a group of students or some reason. A medium or media that is fully dedicated for teachers and students can help both teachers and students to communicate with each other.

2.2 Related Works

There are some applications available related to this project but no one is totally similar. Some of the applications that are similar are mentioned below.

To tell about related works which name come first is Google Classroom. It is only available for teachers and students of an educational institute that has provided Google apps for Education account. Teachers can create classroom here and students join in the classroom using classroom code. Teacher can post Announcement for selected students or for all students. Teacher also can give individual Assignments in classroom.

Another app that is very similar is Buzz Mob. It is a communicating app among teachers, students and parents. Joining school or classroom a user can send or receive message, share photos, videos or other files. It sends important notifications about

assignments, event dates or general updates. BuzzMob.com account is needed for a school or classroom to use this service.

There is a school messaging app that is named Remind. It provides real time messaging to the users. Remind also allows users to add reminder. Using Remind it is possible to send text messages to any phone.

There are other apps to help teacher organize classes, manage student information like attendance, grade etc. Teacher Kit, Teacher App & Grade Book are this kind of app. There are also some class scheduler apps available in Play Store like My Class Schedule: Timetable, Teacher Schedule, Class Schedule etc.

2.3 Comparative Studies

There are a lot of communication system [1] currently available now. By using them both teachers and students become beneficial. Every educational institute specially the universities have their own strategy to communicate with their teachers and students. As the world is going faster so there is always a hunger to communicate faster and effectively. But still now in the age of internet, we are still looking for a platform that make us comfortable to communicate.

So that we wish to offer such a communication system that will help us a lot. Using one communication platform is more comfortable than using three or four communication platforms. As internet reach everywhere, we can easily interact with everyone anytime, anywhere they live. In this competitive world we will say that, our system will keep people together and save their valuable time too.

2.4 Scope of the Problem

As we said, teachers and students face some difficulties to communicate with each other. Our current communication system isn't as fast as the demand is going. So, we can discuss some problems here;

- ➤ Using various numbers of platform may not be suitable for every student or teacher.
- ➤ There is some manual system to communicate, but this is fully online based.

➤ Sometimes students face to share some information face to face with their respected teachers.

According to these problems, our application offers solutions that will help both the teachers and students no doubt. We will look after this from two perspectives; one with the students and another with the teachers.

For students, helps
1. To get communicate faster
2. To select study plan with friends
3. Easy option to make a question to the teacher
4. Get alarming before every task
5. Stay up to date

For teachers, helps
1. To inform students easily
2. Reduce the work pressure
3. Smart way of communication

2.5 Challenges

Every work has some challenges. As communication is our main purpose so we have to face several challenges too.
1. As it's an android based mobile application, so if a student doesn't have an android phone then this app will not help him.
2. After getting notification's if a user doesn't check his phone for full information then the main motto of this app will be failed.

CHAPTER 3

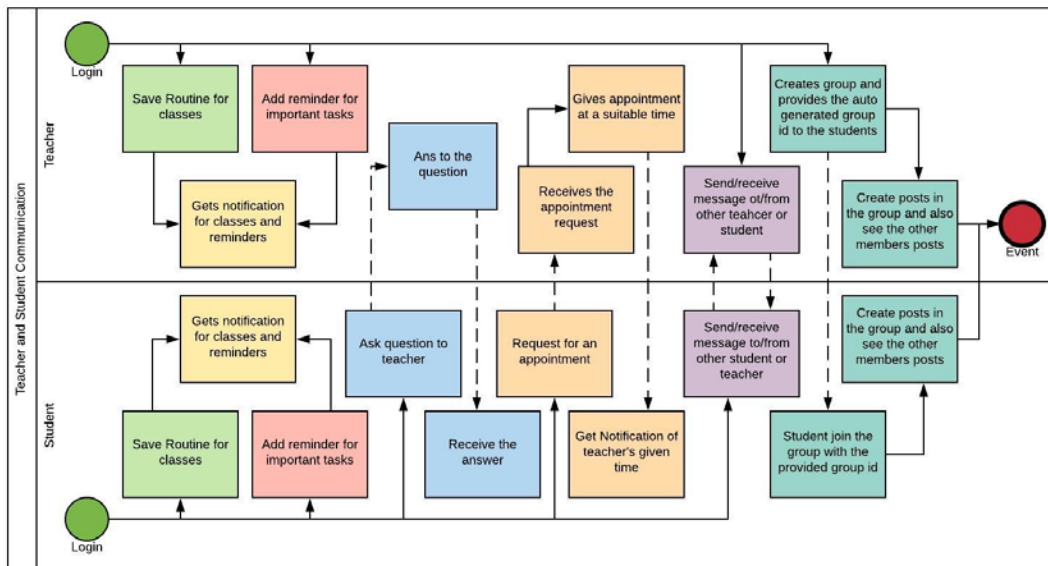# Requirement Specification

3.1 Business Process Modeling

Figure 3.1: Business Process Modeling ofUniConnect.

3.2 Requirement Collection and Analysis

When we are working on a project, a delivery time of the project has already given. That's why project works must be planned and executed to deliver timely with the solutions that are both relevant and realistic to the project problem.

Our project is an online based teacher and student communication system. so, the process of collection requirements must incorporate and address all the realities. It's because to identify the requirements at all levels and perceptions [2].

Software Requirements:

➢ Students
➢ Log in system for the teachers
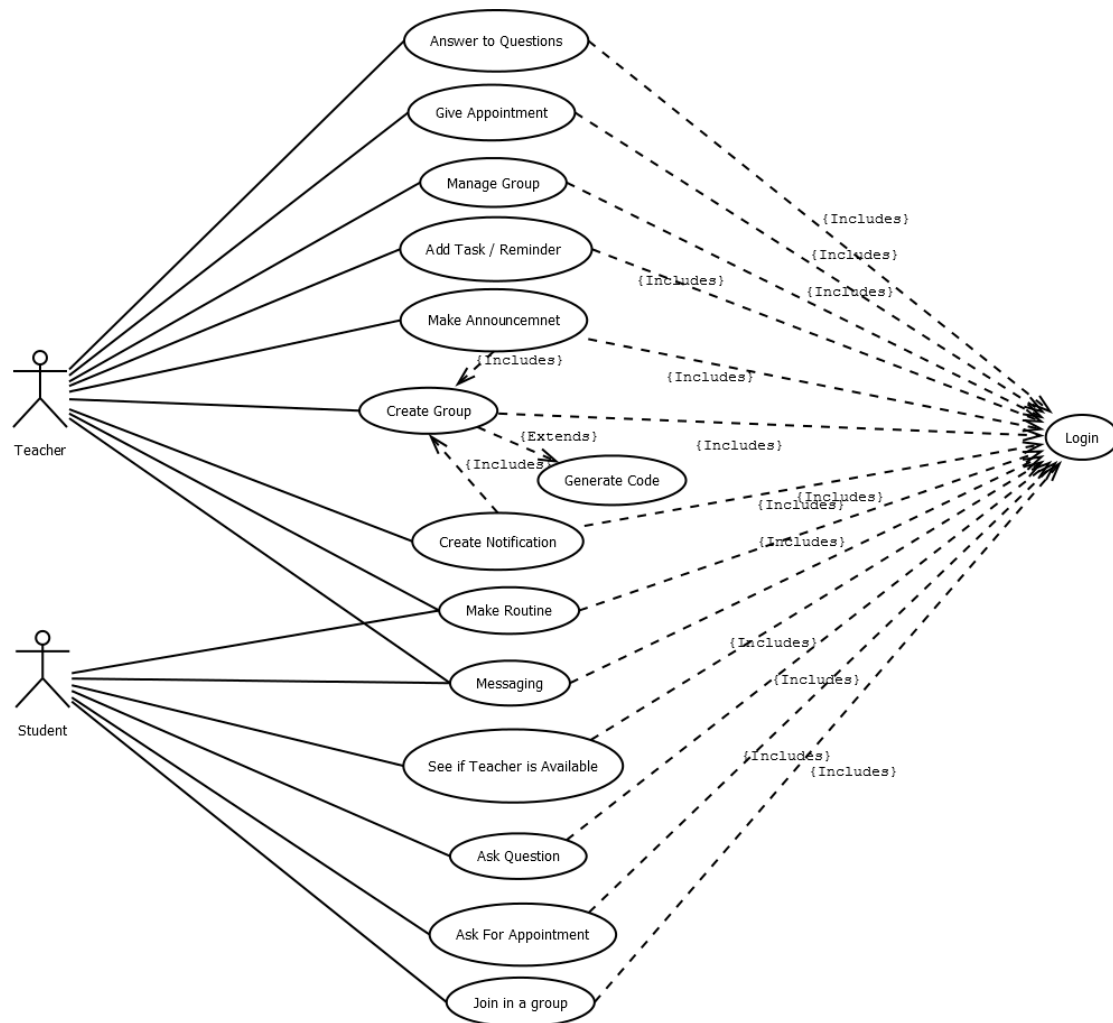➢ Log in system for the students
➢ Timeconvenience
➢ Easily accessible

Hardware and Software Requirements for our system:

Whenever you purchase a software or a hardware for your computer, you should first make sure your computer supports the system requirements. These are the necessary specifications your computer must have in order to use the software and hardware to be used efficiently; all computer software needs certain hardware components or other software resources to be present on a computer.

In development stage the system requires for all tools and platforms describe to advance the new system like.

- ➢ XML
- ➢ JAVA
- ➢ Node.js
- ➢ Android Studio 3.0.1

3.3 Use Case Modeling and Description

Figure 3.2: Use Case Modeling of UniConnect**.**

Use Case 1: Login

Primary Actor: Teacher, Student

Precondition: Must have varsity Email and get password from the varsity

Main Success Scenario:

1. Actor puts Email ID in the Email section

2. Actor put Password in the password section

3. Actor presses the Login button

Exception Scenario:

1. (a) Email ID must be valid varsity provided email ID

2. (a) Password is wrong

    (b) Password is empty

Use Case 2: Make Routine

Primary Actor: Teacher, Student

Precondition: Actor has logged in

Main Success Scenario:

1. Actor selects semester, day and time slot
2. Actor selects course code
3. Actor sets the classroom

Exception Scenario:

1. (a) Classroom cannot be empty

Use Case 3: Add task / reminder

Primary Actor: Teacher, Student

Precondition: Actor has logged in

Main Success Scenario:

1. Actor puts Title
2. Actor puts Location
3. Selects date form calendar
4. Selects Start time and End time or All day long

Exception Scenario:

1. (a) Title cannot be empty
3. (a) Date must be selected
4. (a) Start time and End time or All day long must be selected

Use Case 4: Messaging

Primary Actor: Teacher, Student

Precondition: Actor has logged in

Main Success Scenario:

1. Actor searches expected person with ID or Name or go to Previous massages
2. Actor writes message and send the message

Exception Scenario:

2. (a) Message must contain characters other than Space and New line.

Use Case 5: Create Group

Primary Actor: Teacher

Precondition: Teacher has logged in

Main Success Scenario:

      1. Teacher types the title of the group and creates the group

Exception Scenario:

      1. (a) Group name cannot be empty

Use case 9: Generate Group Code

Primary Actor: System

Precondition: Teacher has created a group

Main Success Scenario:

      1. System generates a unique code for the group

Exception Scenario:

Use Case 6: Make Announcement

Primary Actor: Teacher

Precondition: Teacher has logged in and has created a group

Main Success Scenario:

      1. Teacher selects group(s)

      2. Teacher types announcement and posts

Exception Scenario:

      1. (a) Teacher must select at least one group

      2. (a) The announcement must contain characters other than space and
newline.

Use Case 7: Create Notification

Primary Actor: Teacher

Precondition: Teacher has logged in

Main Success Scenario:

      1. Teacher types the title

      2. Teacher selects date from the calendar

3. Teacher selects the time from the clock

Exception Scenario:

1. (a) Notification title is empty

2. (a) Date is not selected

Use Case 8: Ask Question

Primary Actor: Student

Precondition: Student has logged in

Main Success Scenario:

1. Student selects teachers by ID or name

2. Students types and sends question

Exception Scenario:

1. (a) ID is not valid

(b) Name is not found

2. (a) The question is empty

Use case 9: See If Teacher is Available

Primary Actor: Student, System

Precondition: Student has logged in

Main Success Scenario:

1. Student searches Teacher by ID or Name

2. System shows the counseling hours when teacher is available

Exception Scenario:

1. (a) Teacher ID is not valid

(b) Name is not found

Use case 9: Ask for Appointment

Primary Actor: Student

Precondition: Student has logged in

Main Success Scenario:

1. Search Teacher by ID or Name

2. Type subject for the appointment

3. Give some description and send

Exception Scenario:

1. (a) ID is not valid

(b) Name is not found

2. (a) Subject is empty

3. (a) Description is empty

(b) Description is very large

Use case 9: Join in a Group

Primary Actor: Student, System

Precondition: Student has logged in

Main Success Scenario:

1. Student inputs the group code given by the Teacher

2. System searches the group by the code and add the student to that group

Exception Scenario:

1. (a) Group code is invalid

2. (a) Permission has been denied

Use case 9: Answer to Question

Primary Actor: Teacher

Precondition: Teacher has logged in

Main Success Scenario:

1. Teacher writes the answer and send

Exception Scenario:

1. (a) Answer is empty

Use case 9: Give Appointment

Primary Actor: Teacher

Precondition: Teacher has logged in

Main Success Scenario:

1. System will show free times

2. Teacher selects time and send

Exception Scenario:

2. (a) Time is not selected

Use Case 10: Manage Group

Primary Actor: Teacher

Precondition: Teacher has logged in

Main Success Scenario:

1. Teacher adds student in a group by ID

2. Teacher selects students and remove from group

Exception Scenario:

1. (a) ID is not found

3.4 Logical Data Model
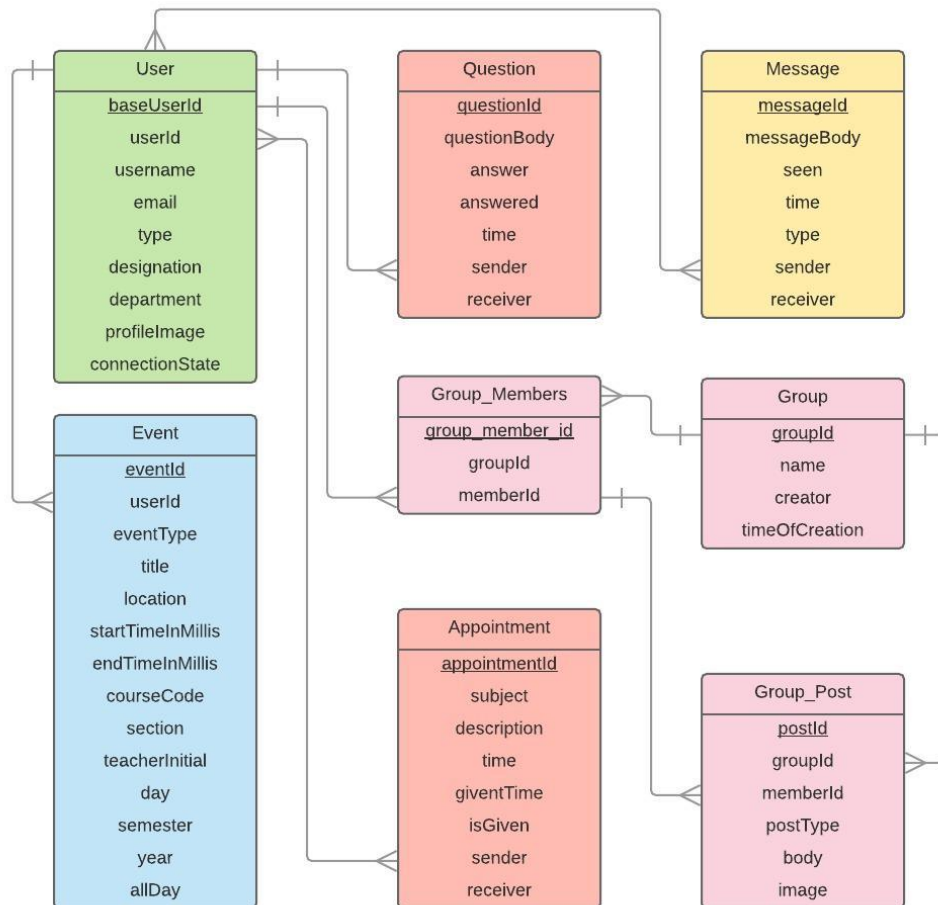
Figure 3.3: Logical Data Model of UniConnect.

3.5 Design Requirements

When we design a software or system, we consider some requirements to make the project efficient. The following requirements are almost mandatory to do.

Ensure the system Facile and Flexible: This system will be designed in such a way that the users feel comfortable, facile and flexible to use it.

Make the system Balanced: This system must be suitable in the whole system and future maintenance.

Proficiency: The most important thing of a software is its proficiency. The system must be capable to run and work with a minimal level of hardware resource available with a good use of time.

CHAPTER 4
Design Specification

4.1 Front-end Design

The front end usually designed by two parts. The web design and front-end web development.In present time, it has been cleared that there is a difference between Photoshop designed and HTML, CSS design. It has become more significant when people start working with JavaScript and jQuery.

Everything that we can see is a combination of HTML, CSS and JavaScript. These include things like fonts, drop-down menus, buttons, transitions, sliders, contact forms etc.
We use XML for our application design [4].

4.2 Back-end Design

The backend usually designed of three parts: a server. An application and a database. If you book a room in a hotel, you usually open the hotel website and interact with the frontend. Once you have input the data that needed, the application stores it in a database [3] that was created on a server.

So, in our back-end system, we create the database to store data that the server gets through users. We basically used JAVA & Node.js for our application development.

4.3 Interaction Design and UX

Interaction Design is most important part with User Experience (UX) design. An

application fruition depends on User satisfaction. How an application is more

attractive to user is depends on interaction and Design part. In our application we

used useful model of Interactive design.
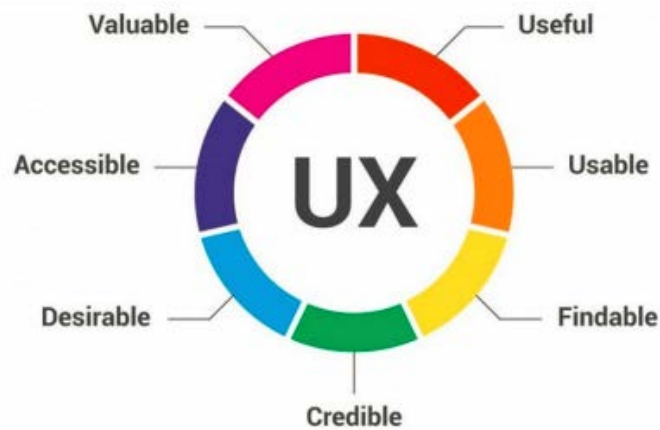
Figure 4.1: UX

4.4 Implementation Requirements

The implementations Requirements was given us a very good idea. The main task of this part is to make all the things easier, user friendly. The list of implementation requirements is given bellow;

- Easier to create
- Easier to manage
- Easier to analyses
- Easier to interact
- Dynamic pages
- User-friendly

CHAPTER 5

Implementation and Testing

5.1 Implementation of Database

We are using Firebase as the database for this project. As Firebase stores all the data as JSON tree format, the whole database of our project is stored as JSON. The whole database is a JSON object and the entities of the database is the children of the object. The entities have their own child JSON objects which are the instances of individual entity. These JSON objects have unique ids. In these objects the attributes are stored as key value pairs. There are also JSON arrays for multi-valued attributes. Firebase is easily traceable but there is some problem too. As this is a non-SQL database, the queries are not like regular SQL queries. There is no concept of Primary Key or Foreign Key. But this can be obtained by the design of the JSON tree. As this is a new concept in database, this seemed a little confusing but this can be a great way to store data in a large scale in near future [5][6].
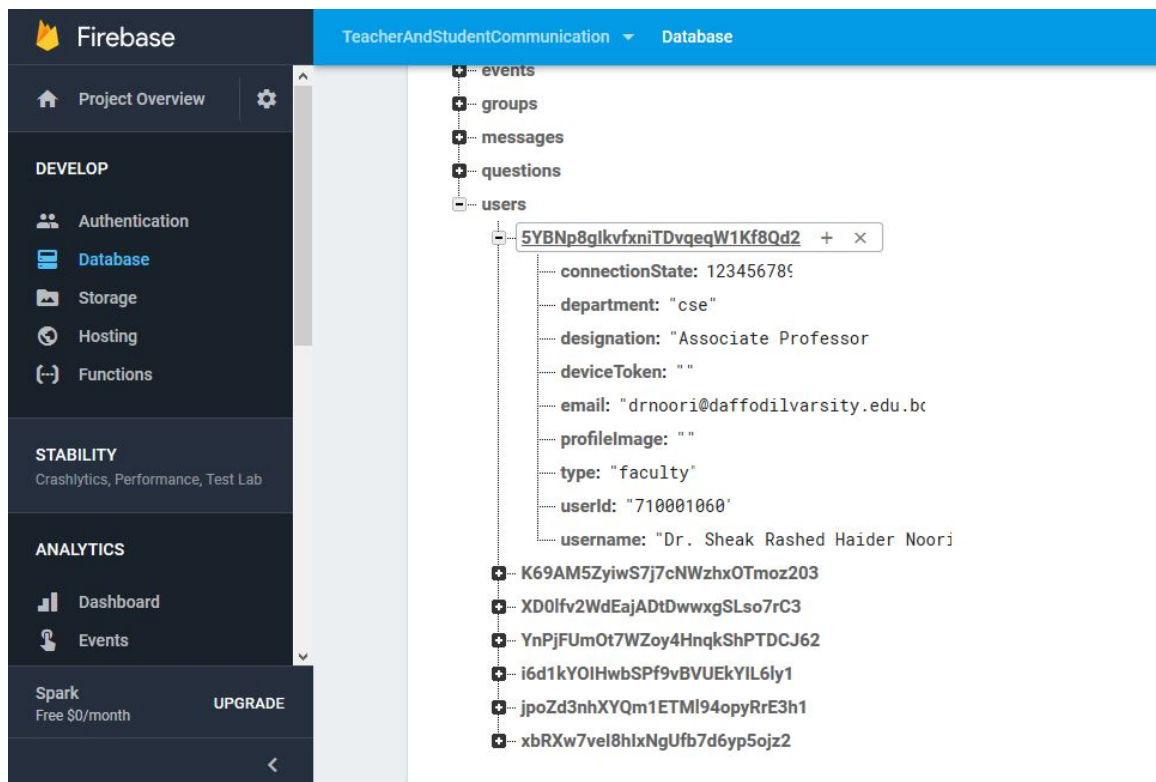
Figure 5.1: Database Implementation Model

In Figure 5.1, we show the implementation of data in the database.

5.2 Implementation of Front-end Design
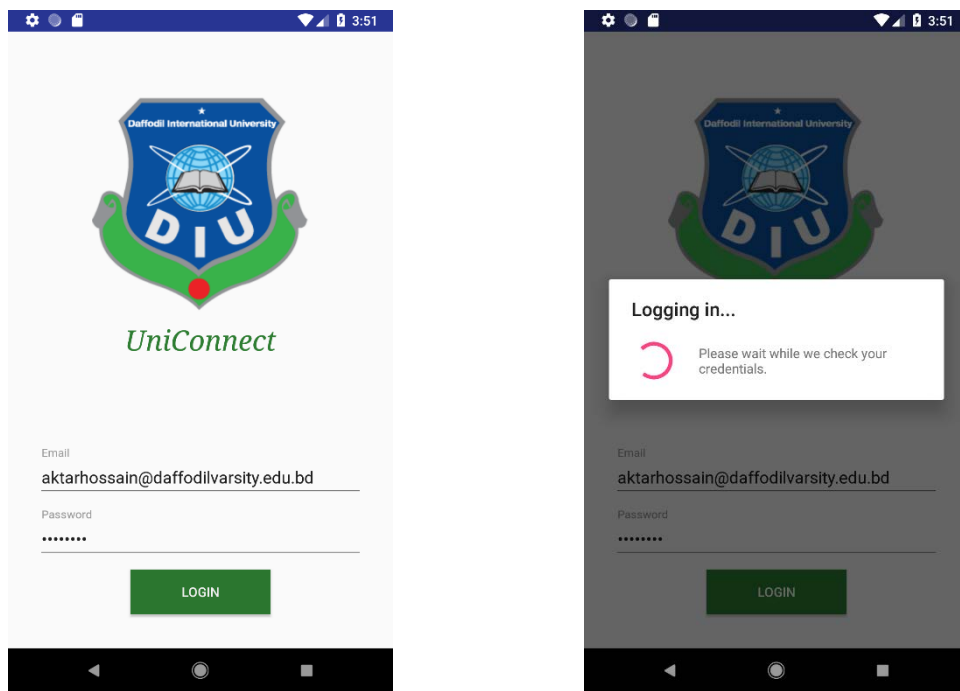
Figure 5.2: User login of "UniConnect".

In Figure 5.2, a user needs to be log in to get access in the app as well as for using.
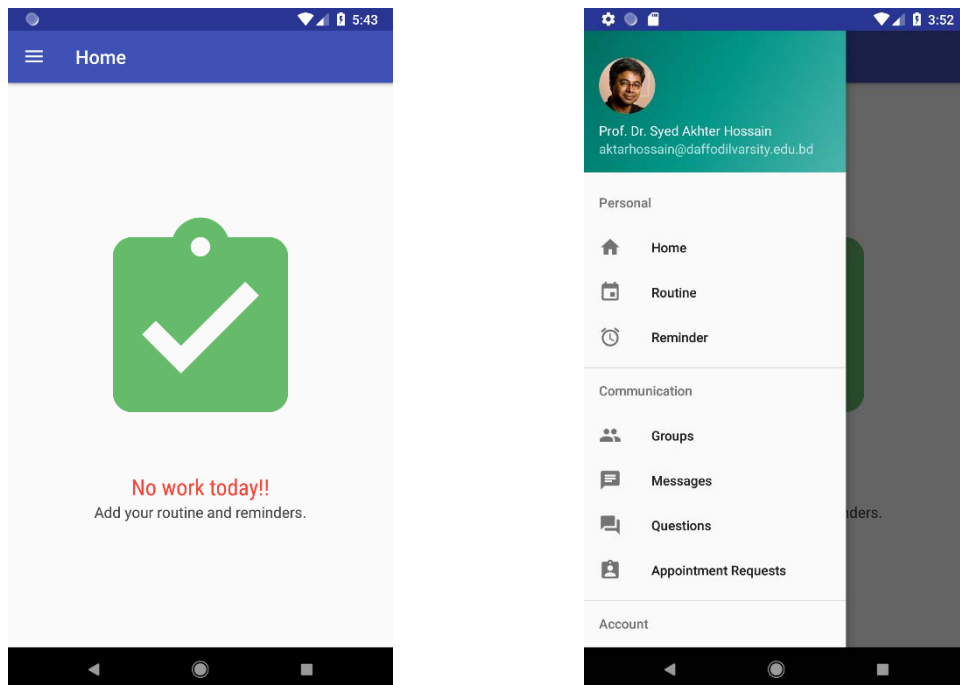
Figure 5.3: Home and Navigation bar.

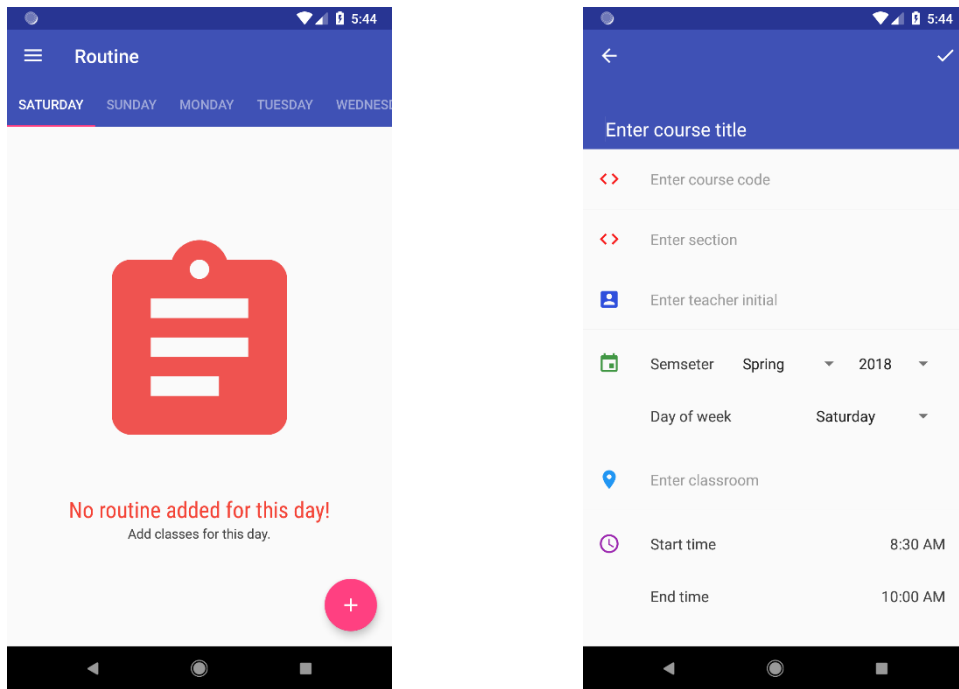In Figure 5.3, This is the Home page and Navigation bar of UniConnect.

Figure 5.4: Empty routine view and Add Routine Activity.

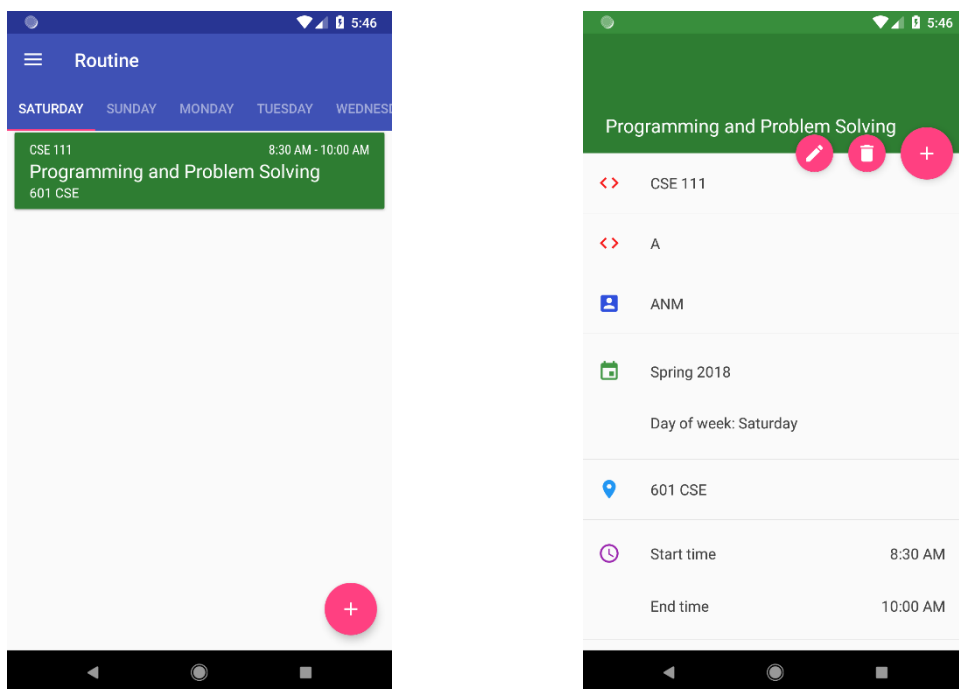In Figure 5.4, a user can add his or her daily routine.

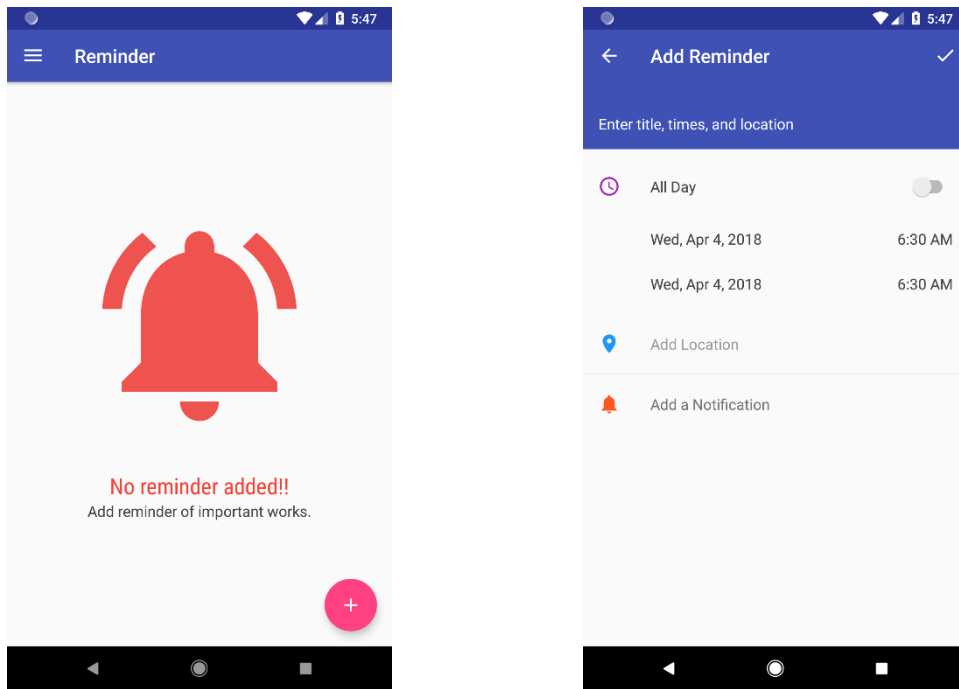Figure 5.5: Routine view and editing option

In Figure 5.5, user can view and edit his or her routine.

Figure 5.6: Reminder empty view and Add Reminder Activity.

In Figure 5.6, user can add reminder.
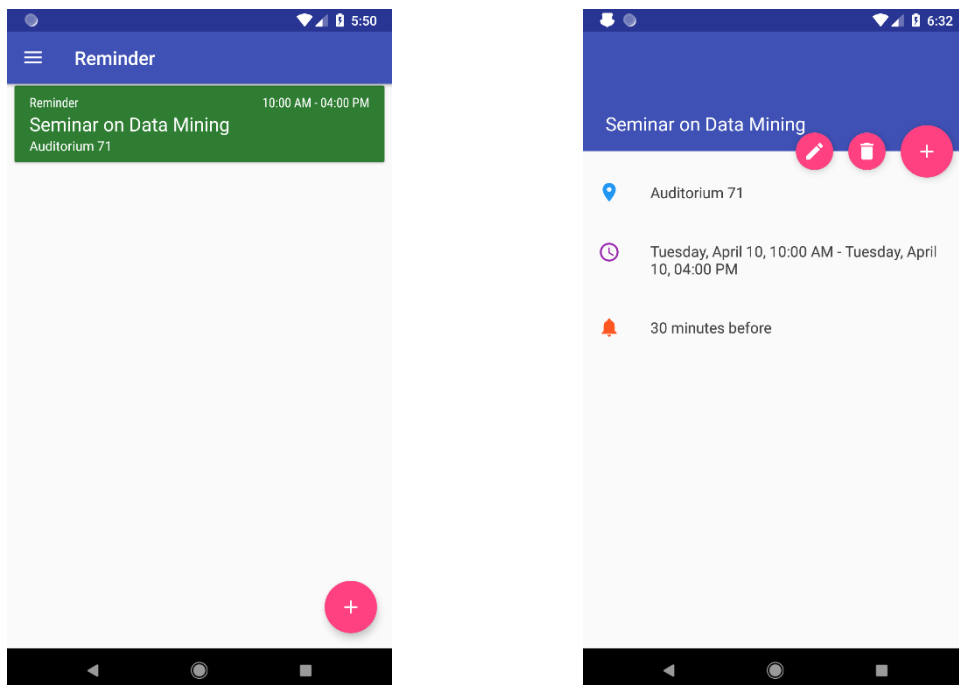
Figure 5.7: Reminder list and Details of a single reminder.

In Figure 5.7, user can view and edit his or her reminder.
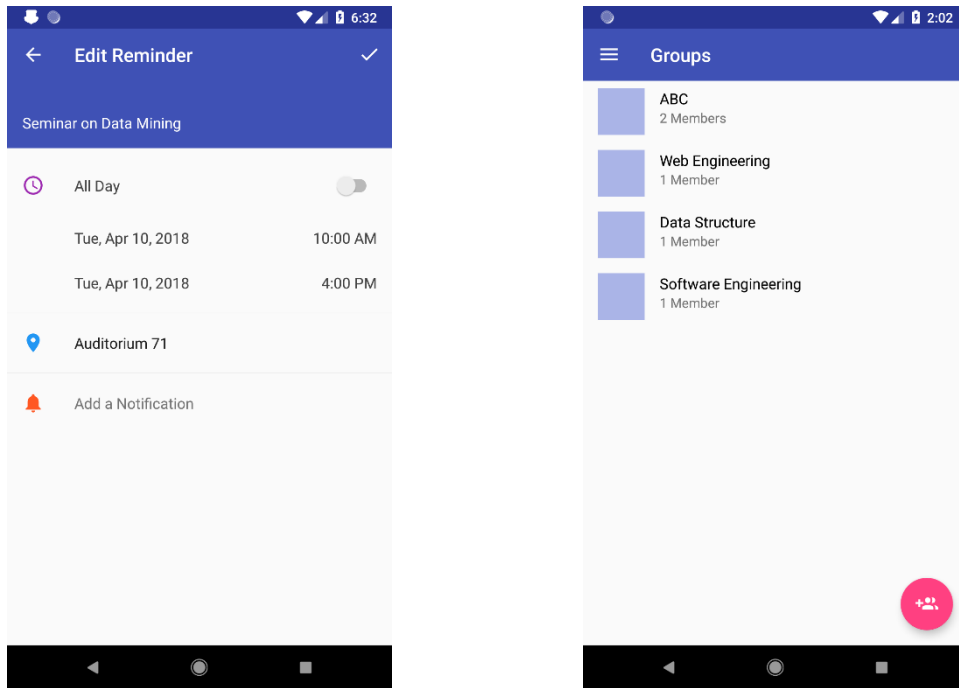
Figure 5.8: Edit Reminder activity and Groups Activity.

In Figure 5.8, User can view his or her groups.
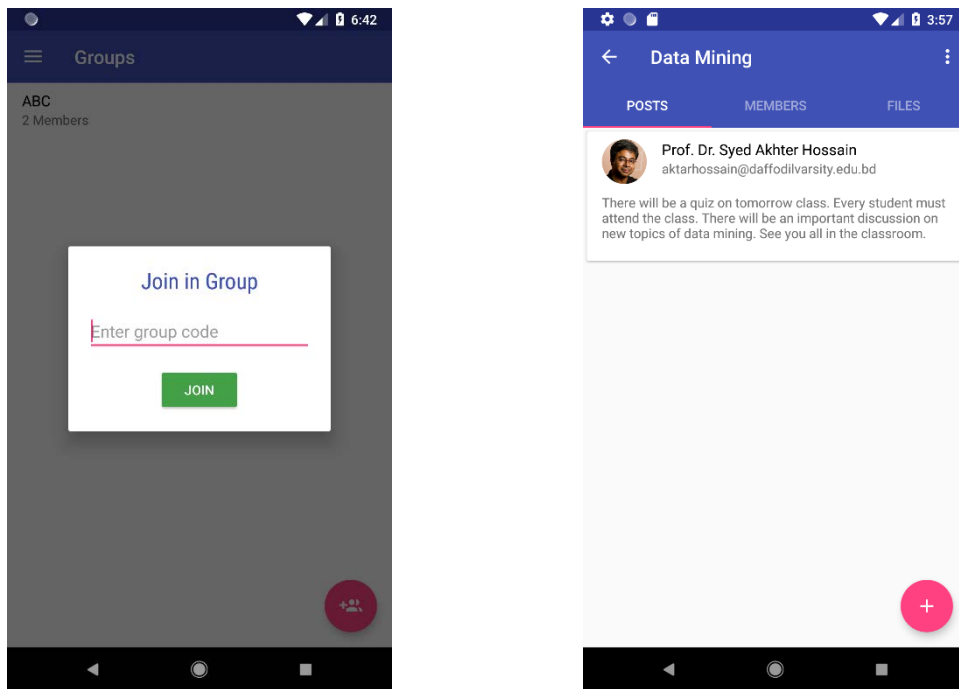
Figure 5.9: Join in a Group using code and Group post view.

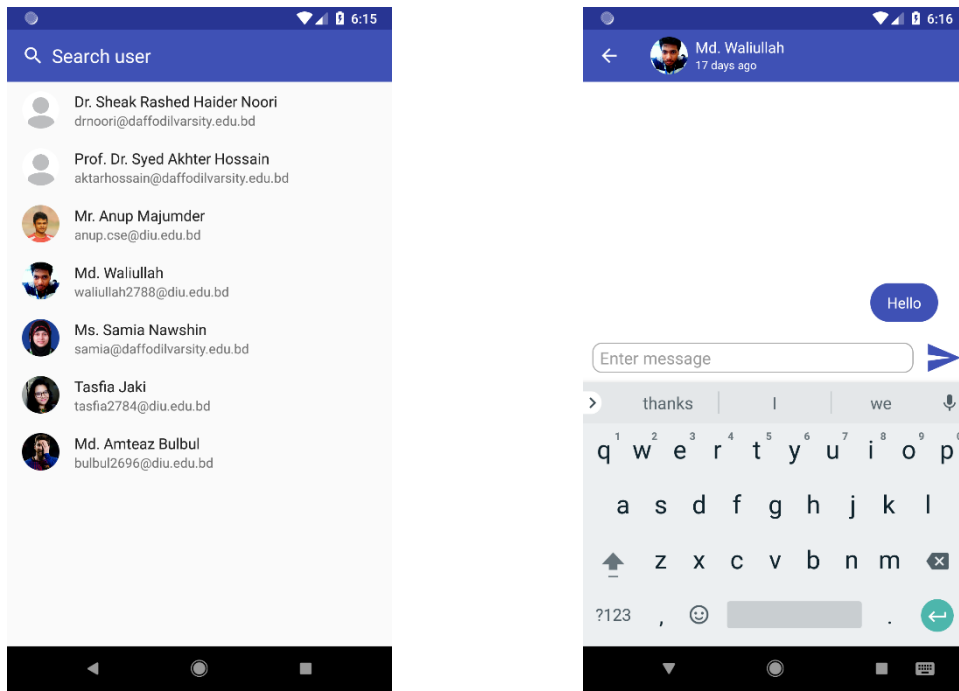In Figure 5.9, user can join a group and view the groups.

Figure 5.10: Users list for message and message activity.

In Figure 5.10, user can view active members and can send text.

Figure 5.11: Message activity of to send message to a user.

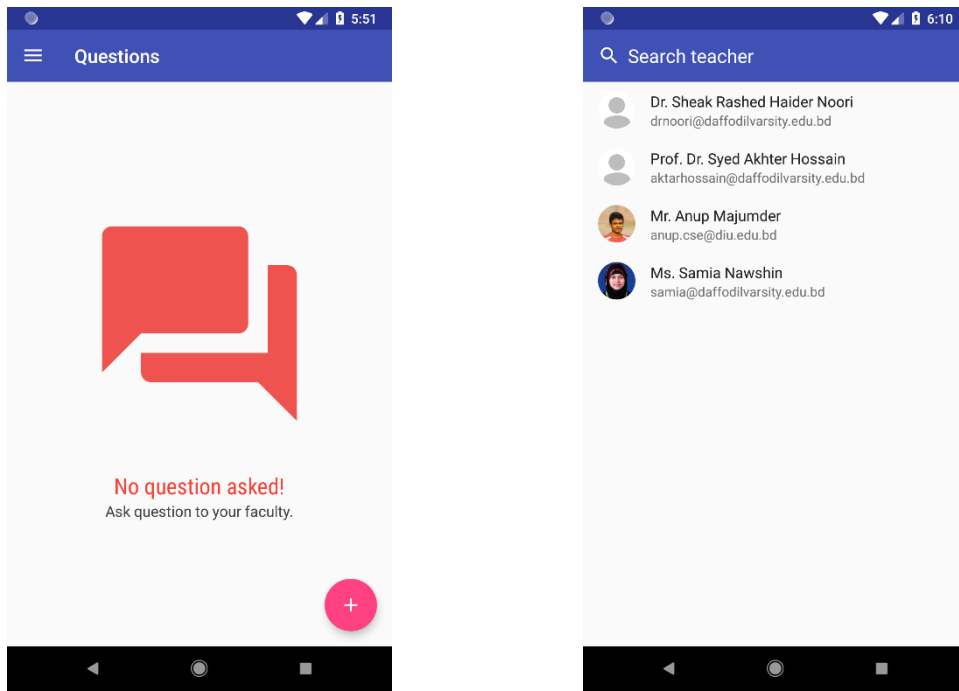In Figure 5.11, user messaging with one of a member.

Figure 5.12: Empty questions list and teachers list to ask question.

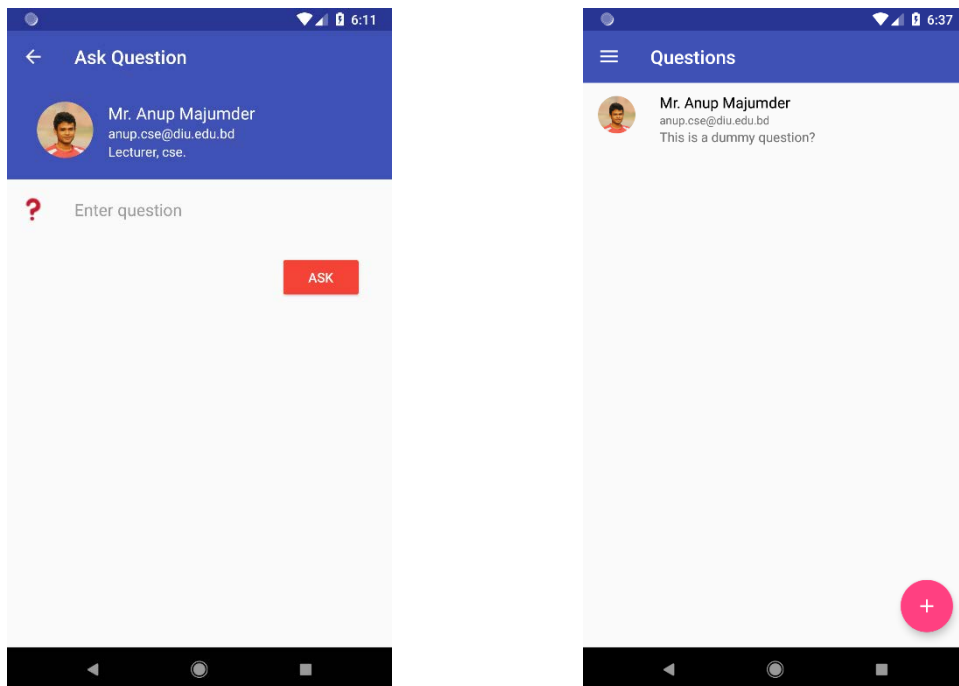In Figure 5.12, user can view teacher list to ask questions.

Figure 5.13: Ask question activity and question list.

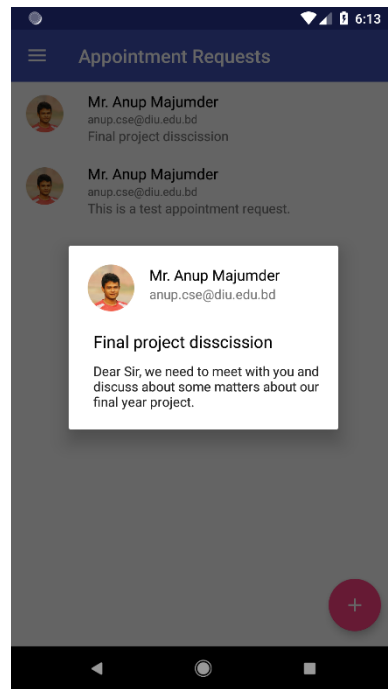In Figure 5.13, user views question process and completed questions.
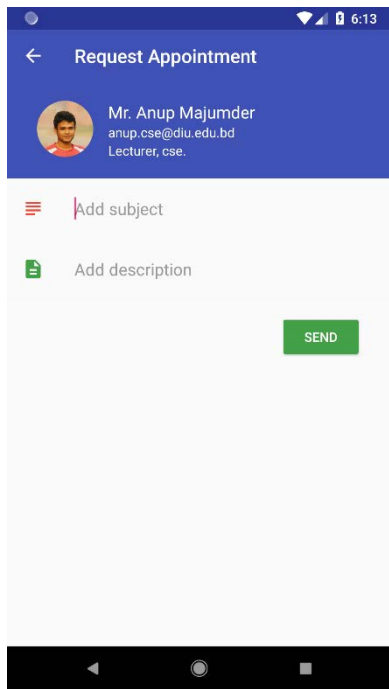
Figure 5.14: Appointment request activity and Account details view.

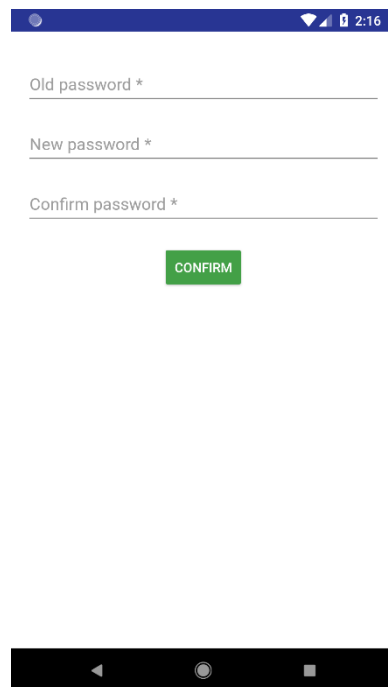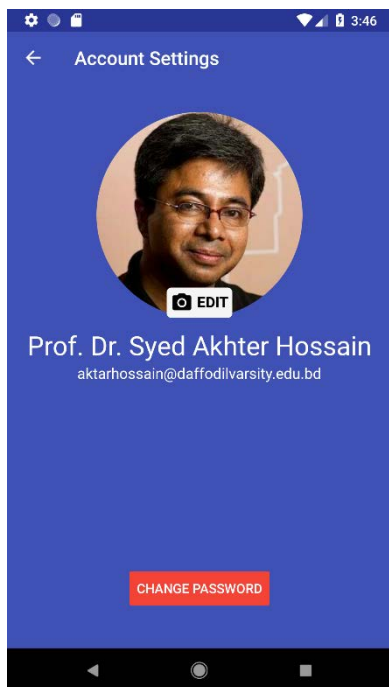In Figure 5.14, User can get the appointment procedure.

Figure 5.15: Account settings activity and change password activity.

In Figure 5.15, users accounts settings in where he or she can change profile photo and password.

5.3 Implementation of Interactions

Interactions are the common thing in today's communication system. It happens because of easy and fast communication. When the users are on a certain page but have to do others thing which is on other activity then interaction helps us. It should be done such a way that attracts the users.

5.4 Testing Implementation

5.4.1   Testing

Testing is an essential part of any system developing project. The main goal of testing is validating the contribution, authenticity, reliability and quality of the application. This project is to implement an android based application that related to student & teacher communication system.

5.4.2   Unit Test

Every part of a software is tasted to make sure that the its design is exactly completed. This make us ensure that each part of the application run as per the requirement.

5.4.3   Unit Test Case

Unit test case can be divided into two parts. Database handler and interface handler. We use some basic function in our application that's are add information data, edit data and delete data. Database handler will check these three functions. And now our database handler test cases will be like this.

➢ Every user can add new data information successfully or not
➢ Every user can edit his or her data information successfully or not.
➢ Every user can delete his or her data successfully information or not

5.4.4   Implementation Test

The final and the most significant phase is the implementation. Engage users training, system testing and successful running of developed system.

5.5 Test Result and Reports

To enhance a system's proficiency of all the tests and integration can be completed through software way where each error can be found and solved. We will be demonstrated screenshots of test results of our system in bellow.

CHAPTER 6
Conclusion and Future Scope

6.1 Discussion and Conclusion

Teacher and Student Communication System is a very exciting topic to work. After going through the work, we faced many challenging tasks that are surprisingly related to our educational system.

We researched so many communication tools that showed us the direction how to develop our system. We interact with the students that what type of problems they are facing. They were very happy to take this application as it will give them some relief in modern online era.

We talked with several teachers, took some guideline that helped us a lot to develop this application. They encouraged a lot to do this project.

Despite everything we achieved, we faced many challenges to finish this project. After all it's an online based system so in real life both teacher and student needs to follow the using rules otherwise it's goal will be failed.

It's an innovative idea. The opportunities that provided through this application is huge. We interact with too many students, listen their problems, try to understand the communication gap and come up with this application. Hope it will help them a lot.

6.2 Scope of Further Development

Communication system is always a changeable system. It develops day by day, getting better and better. Today what's look good is tomorrow becomes old. So, we have to update this system from time to time. It can useable not only for universities but also for all the educational institutes from all over the world. To fulfil that goal, we have several ideas to do.

1. We want to develop it for all the educational institutes.

2. We want to make this application more suitable, flexible, user friendly, keep update the users time to time.

3. Now it has only text messaging option to its user but we want to start the voice messaging, video sharing etc.

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APPENDIX

Appendix A: Project Reflection

The purpose of this Appendix is to provide an introduction to Project refection. The groupresearch project was a challenging and enjoyable experience typical of the course as a whole. Wehave had little exposer to group work at university. So, it was a nice change to be part of aneffective and dynamic team. We complemented one another quite well both in bringing togetherinter disciplinary perspectives and in balancing the work at hand.

The experience taught us that planning and crafting responses takes a longer time in teams thanon your own. The extensive effort required was ultimately a good think. When working alone,we can end up with a result that is identical to our initial plans. In our group we are constantlydeveloping and refining one another's ideas. It was fascinating just how productive our groupmeetings were. The time seemed to fly and yet we always got a lot done and manageto helpanother along the way towards the end point of having a substantive policy.
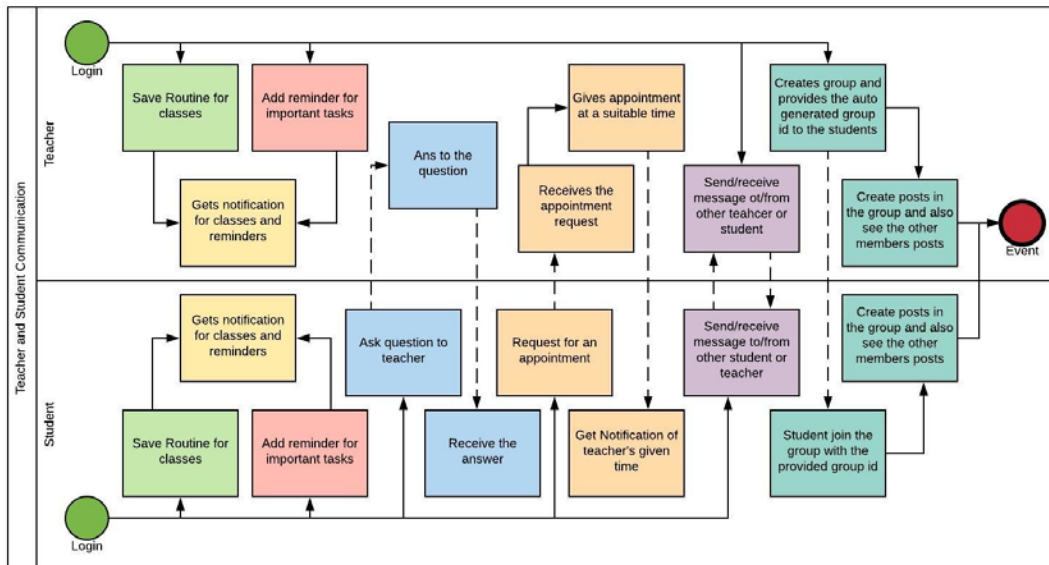
Appendix B: Related Diagrams

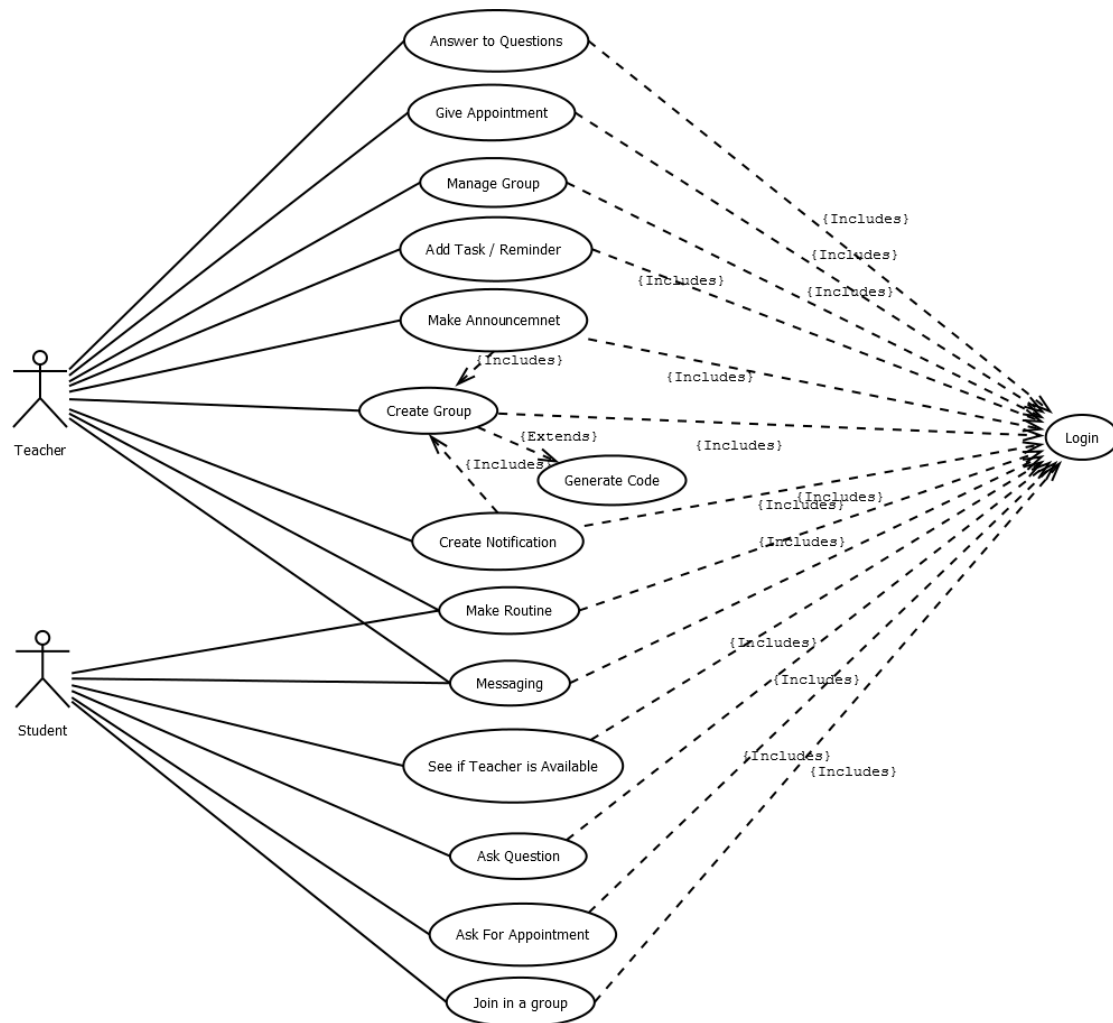Figure 3.1: Business Process Modeling of UniConnect.

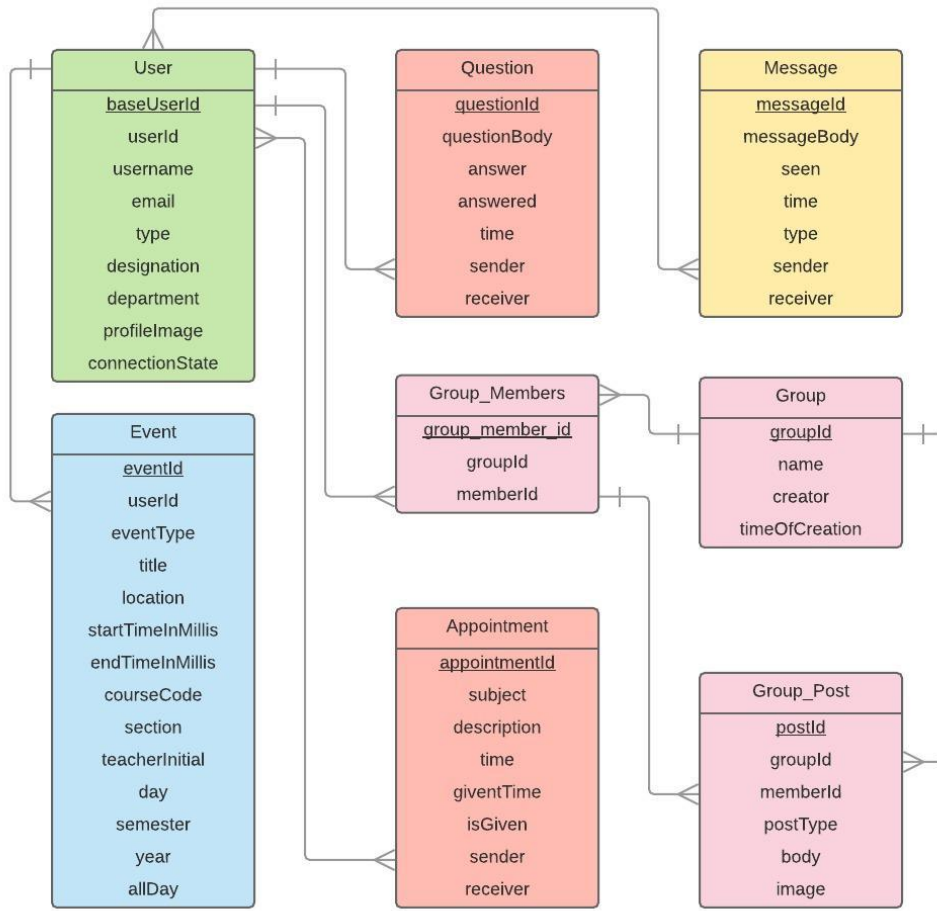Figure 3.2: Use Case Modeling of UniConnect.

Figure 3.3: Logical Data Model of UniConnect.