

# **COMP2043.GRP Final Group Report**

## **OLLE Evolution**

**Author – GRP Team 13**

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# **Chapter 1**

## **Introduction**

The OLLE (Online Language Learning Exchange) Project developed by GRP Team 13 this year is an updated version of the project developed by another group of the same module in the last year [2]. Its original purpose is to provide a software that can support and enhance the online language learning exchange at UNNC. Now by the end of this year, a software and a WeChat Mini-program have been made to meet the new needs of stakeholders.

This report provides a comprehensive introduction to this project, covering four stages of software engineering: software specification, software development, software validation & verification and software evolution. Software specification, also known as requirement engineering, is a process for defining the functionality of software and constraints of its operation. Software development, as the name suggests, is the process of producing the system. Software validation & verification includes a series of tests to ensure the product does what the stakeholder wants and to find whether the product is performed as wished. And finally, software evolution is the development of software to meet the updates of user requirements.

Chapter 2 is a background introduction of the project, including the initial problem statement, status of the current system, and proposed solution. Chapter 3 describes the research that the team had done before started to develop the product. Chapter 4 documents the process of requirements engineering, mainly referring to the elicitation and validation of users' requirements. The software design process is shown in Chapter 5 to 8. Chapter 9, 10 and 11 explain the tools that the team used, an evaluation of how team performs in this year and a reflection of project. In the final chapter, we conclude what we've done, and the appendices contain a number of documents we used, including minutes of meeting, test

case of software, etc.

# Chapter 2

## Background

### 2.1 Initial Problem Statement

The task of us this year is to improve the product made by the last GRP team. According to the information we've got from stakeholders, now they are still using the web-based platform on Moodle. The platform is mainly composed of open learning log and regular tasks. Figure 2.1 shows the relevant content on the Internet.

The screenshot shows a Moodle forum page titled "OPEN LEARNING LOG". The page header includes the University of Nottingham logo and the URL https://moodle.nottingham.ac.uk/mod/forum/view.php?id=3225377. The forum navigation bar shows "Dashboard > My Modules > Peer Supported Online Language Learning Exchange [XX153NN] (Nottingham Advantage Award) (UK) (18-19) > General > OPEN LEARNING LOG". A search bar and a "Search forums" button are also present. The main content area displays a list of discussions:

Discussion	Started by	Replies	Unread	Last post
Fengrui Chen's learning log	Fengrui CHEN	5	0	Sun, 4 Nov 2018, 11:55 AM
Chenghi ZHANG's learning Log	Chenghi ZHANG	6	0	Fri, 2 Nov 2018, 10:45 PM
Ruyu Zhang's Learning Log	Ruyu ZHANG	6	0	Fri, 2 Nov 2018, 7:35 PM
Chenghang LU's learning Log	Chenghang LU	5	0	Fri, 2 Nov 2018, 7:35 PM
James's Learning Log	James Lambell	4	0	Fri, 2 Nov 2018, 6:32 AM
Jingyu LUO's learning log	Jingyu LUO	6	0	Fri, 2 Nov 2018, 5:41 PM
Lingyun ZENG's learning Log	Lingyun ZENG	3	0	Fri, 2 Nov 2018, 5:17 PM
Ru Chen's learning log	Ru CHEN	6	0	Sat, 3 Nov 2018, 3:14 PM
Yiqing Li's learning Log	Yiqing Li	3	0	Fri, 2 Nov 2018, 9:42 PM

A "Useful Links" sidebar on the right contains links to "ABOUT Nottingham Advantage Award" and "Learning Community forum".

Figure 2.1: Moodle Page of Open Learning Log

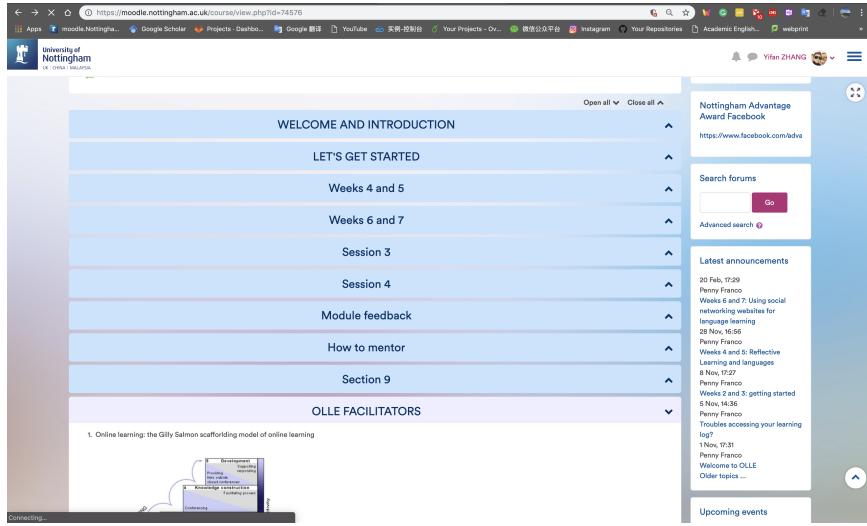


Figure 2.2: Moodle Page of Tasks

## 2.2 Current System

The product we've got from the last year team is made up of four components:

1. Forum
2. Chat room
3. Calendar
4. My OLLE (personal information page)

Forum is a place where administrators can publish and modify topics. It performs like the open learning log<sup>1</sup> on Moodle now, but it also contains the task topics (for NAA users).

Chat room is for users to exchange learning knowledge and experience, and it is created to replace WeChat<sup>2</sup> group chat used at present. The administrator can create a chat about specific topics.

Calendar is used to show events in the past, at current and in the future.

*My OLLE* is a page to show the personal information of each user and allow them to make a modification, such as username and password.

Although most of the features of this product are performing well, it is still incomplete, according to the last year's team [2], basically in six aspects:

<sup>1</sup>A module that contains topics in which users can share their experience on language learning strategy.

<sup>2</sup>A messaging application developed by Tencent in China.

1. The product cannot distinguish between NAA users and Non-NAA users.
2. The administrator of the system cannot enroll users into NAA accounts.
3. The mail function that is used to send verification code is not working.
4. The product cannot be put into use since it is not available in application stores<sup>3</sup>.
5. The product lacks pay function so that users outside the Nottingham universities cannot pay to use it.
6. The product cannot push notifications to users, e.g. users will not get reminded when there is a new topic created.

## 2.3 Proposed Solution

Except finishing the incomplete functions listed above and putting the product in the application store, this year we have created a new WeChat Mini-program for the OLLE project.

**Why WeChat Mini-program?** WeChat Mini-program is a kind of program running on WeChat. It is much smaller than traditional applications (the latter usually takes up at least dozens of megabytes) and does not need installation, which means that it will save a lot of space and launch faster. Besides, WeChat has a lot of users and opens to all mobile operating systems, therefore, the mini-program has a large number of potential users without deliberate advertise.

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<sup>3</sup>A platform that users can download applications from the Internet.

# **Chapter 3**

## **Preparations**

In this chapter, we provides our research of background information. It includes literature review, technology and market analysis. It evaluates the mobile-assisted language learning approach, supporting technologies and tools, existing language learning applications and the procedures of how to launch a application.

### **3.1 Literature Review**

Mobile-assisted language learning (MALL) is an approach that enhances a learner's language learning experience through the use of mobile devices, such as mobile phones and tablet computers [7]. The popularity of mobile devices has changed the way we learn, communicate, and live. Use of technologies like social networking used in mobile applications encourage the changes occurring in MALL by extending learning opportunities and reshaping language learning styles [16]. Since mobile devices can easily communicate with other devices, learners can share files, data or simple messages with each other, they can also cooperate with their peers or teachers, by being connected to a network, further enhancing interaction and communication [4][5]. In the work of Troussas, Aleous and Virvou [5], they designed a mobile-assisted language learning system with collaborative learning and social interactions, research on this system showed that language learning can benefit from the cooperation between students who can learn everywhere with the support of wireless technology<sup>1</sup>. Thus, a mobile language learning application equipped with interactions and communications will be helpful for learners.

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<sup>1</sup>Technology that allows us to communicate without using cables or wires.

## 3.2 Technology Research

### 3.2.1 Instant Messaging Technology

Instant messaging technology is a type of online chat, that offers real-time text transmission over the Internet [9]. It applies in chat and forum, we try to find the methodology which is reliable and fast.

#### Push Technology

Based on the conclusion of the final group report from last year on page 33 [2], their implementation increased the amount of traffic through the network connection, and caused battery life damage as well, they recommended pushing technique to recreate real-time functionality.

Push technology, or server push, is a style of Internet-based communication where the request for a given transaction is initiated by the server instead of waiting for the client to make a request [26]. There are several platforms provide push technology implementation.

1. The Diffusion Intelligent Data Platform [36] synchronizes, manages, and distributes data among applications, devices, and systems – via web, mobile, and satellite networks. Diffusion solves the challenges of real-time streaming and messaging, simplifies application development, and extends the functionality of in-place messaging products.
2. An open-source cross-platform messaging service called Signal [33] that can serve both the mainstream and the specific niche application domain such as a MANET network of sensing devices.
3. SendBird provides free APIs<sup>2</sup> for implement private messaging, group and public chat rooms, it can push notifications which deliver real-time updates to users.

### 3.2.2 Push Notification

1. Introduction to OneSignal<sup>3</sup> and Notification<sup>4</sup>

- (a) OneSignal: a push notification sevice

OneSignal is a push notification sevice for iOS, Android and Web. Therefore, we can integrate this service into our application to allow that we can send notifications through this service.

---

<sup>2</sup>Application Programming Interface which allows communication between software.

<sup>3</sup>OneSignal is the market leader in customer engagement, powering mobile push, web push, email, and in-app messages for 600,000+ business orldwide [25].

<sup>4</sup> Push notifications are a communication channel between users and apps [15].

Otherwise, it's not that easy to create notifications from our own service, so that's why there are quite a few services like OneSignal, the ionic cloud service and it is completely free.

(b) Features of Onesignal

- i. Since we use ionic framework, it is convenient to combine these two together.
- ii. Need certificate generator<sup>5</sup> for iOS.
- iii. Real time tracking
- iv. Segmentation<sup>6</sup>
- v. Tag<sup>7</sup>: Tags are one of OneSignal's most powerful features, allowing customers to store arbitrary data attributes on each user. Tags are available on all OneSignal accounts, and are a very popular feature among our customers.
- vi. API: Server Rest API which we can use to create our notifications. So, we do not need to always go through some wizard inside the web pages to create notifications.

(c) What are Push Notifications:

- i. Communication channel from us to users of our application.
- ii. Get device ID from iOS
- iii. We send our device/ user ID to OneSignal
- iv. OneSignal sends message to iOS servers
- v. These servers send push to our device

(d) A Notification is comprised of:

- i. General fields: Title, Subtitle, Message
- ii. Additional: Payload data
- iii. Handle all actions on the device

---

<sup>5</sup> A certificate identifies our team within a distribution provisioning profile and allows us to submit our app to the Apple App Store [10].

<sup>6</sup> According to the data property such as activity, location, and interests, segments divide all users into specific users so that we can send notifications to these specific users [20].

<sup>7</sup> Tags allow users to store arbitrary data property on each use and this is the most distinctive part of OneSignal [19].

### 3.3 Market Research

#### 3.3.1 Existing Applications

1. HelloTalk [12] is an app that allows users practice languages they want to learn. It connects people who speak a language fluently with those who are trying to learn the same language. Besides, Hellotalk includes an open feed where everyone is encouraged to post a short update or photo. The feed works like a forum and other users can reply to others post. HelloTalk succeeds in connecting speakers of different languages by the social network.
2. Tandem [34] is a community-based application that enables its members to practice their languages one on one via text, audio recordings, audio calls or video calls. It is available for both iOS and Android. Tandem includes three important sections, which are the community, tutors and chat. Community section allows users to search for new people, in tutors section, learners can find and book tutorial from tutors, the user can view all their conversations with others in the chats section.

#### 3.3.2 Developer Certificates

One of the main requirements of this project was to put the application on the application stores, so there were researches done to find out how we could get permission to release the product to the public.

##### App Store

The App Store is a platform for downloading applications developed by Apple.

1. Enrolling as an organization means the school has an account and applications that are already in the App Store. School should have a D-U-N-S Number<sup>8</sup> assigned by Dun Bradstreet<sup>9</sup> to verify organizations identity and legal identity issues [3].
2. Enrolling as an individual is more probable, it only needs an Apple ID and basic personal information and pay 99 USD per year [3].

##### Google Play

In Google Play we need to sign up for a Google Play Developer account and accept the Developer Distribution Agreement, then pay registration fee which is 25 USD and complete account details [11].

<sup>8</sup>A number used as a standard business identifier

<sup>9</sup>A company that provides commercial and professional services for business

## **Chapter 4**

# **Software Requirements Engineering**

In this chapter, a summary about the progress in requirements engineering will be given. Unlike last year team that has three stakeholders [2], this year we have two stakeholders, who are VAV and Ms. Franco. The next section will give a description about them, and how we work together to finish the project.

### **4.1 Stakeholders**

#### **4.1.1 Vis-a-Vis (VAV)**

The students from Vis-a-Vis have played a very active role throughout the project. They are willing to meet regularly, and helpful in giving introduction about the project and confirming requirements with us. In addition, they communicate with us online very frequently and we can reach them fast and easily when things happen.

#### **4.1.2 Ms. Franco**

As one of the stakeholders who has the highest authority, Ms. Franco was less likely to spend a lot time in this project. On the one hand, she is very busy in working; on the other hand, she is in charge of the entire project but is not responsible for specific operations. Although she hardly replies email, she is a good and approachable lady.

## 4.2 Requirements Gathering

### 4.2.1 Preparations Made Before Meeting Stakeholders

Before meeting stakeholders to gathering requirements, we have already mastered the relevant information from the project brief file and last year team's final report. Therefore, in order to make meetings more efficient, we made two preparations. Firstly, we listed the requirements that old crew of the project have failed to meet. Secondly, we wrote a user story based on these information in case they are not good at telling the detailed requirements. The user story made can be found in the appendices.

### 4.2.2 Meeting With Stakeholders

#### Meeting with VAV

The meetings with VAV were smooth since the the team could easily grasp the direction of the meeting. They were showed the requirements list and user story, and they gave their suggestions on the spot.

#### 4.2.3 Meeting with Ms. Franco

The meetings held with Ms. Franco were not as smooth as VAV's. She could easily turn the topic into the direction she wants. Therefore, it took two meetings to finish the requirement gathering process, which was slower than we expected.

# **Chapter 5**

## **Agile Software Development**

In this chapter, we talk about the changes brought by switching from traditional waterfall development model to agile software development methods.

### **5.1 Traditional Waterfall Development Model**

Before the second semester began, the team had been following waterfall model. The reason for doing that is because this model, compared to agile methodology, has a strict structure<sup>1</sup> [28], which is good for those of us inexperienced developers to avoid chaos.

However, this model also has a disadvantage. Since the structure asks us to strictly follow the procedure, the team work efficiency had not been high since the person who finished the work needed to wait for others to complete the task. What is more, If we always followed its principles, we would not be able to deal with the updating requirements that could be put forward by stakeholders in the later stages of the project.

### **5.2 Agile Software Development**

In the second semester, the team has switched to agile development to speed up project development. The customer participation has increased, specifically embodied in meetings. In the first semester, meetings

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<sup>1</sup>According to Sommerville, there are five stages: requirements analysis and definition, system and software design, implementation and unit testing, integration and system testing as well as operation and maintenance [29]

with stakeholders were held about once a month, but in this semester, the routine has been adjusted to once a week. Meanwhile, the connection between the team and stakeholders has also been enhanced.

For the development aspect, everyone's role was no longer fixed. Meanwhile, according to the progress of the project, the team members can flexibly adjust the content of the work. For instance, Yifan Zhang, one of the team members, according to the team plan, supposed to finish the payment function of the OLLE application. However, considering the test might not be held as scheduled due to many factors, he turned out to develop the WeChat Mini-program so that it could be finished on time.

# **Chapter 6**

## **Updated Design and Interface**

### **6.1 WeChat Mini-program**

This section discusses the content and user interface of the WeChat Mini-program.

#### **6.1.1 Sign UP**

The figure showing below is the login and sign up page of the mini-program.

#### **6.1.2 Enter Verification**

When the user finishes the registration, a verification email will be sent to the user's email account that he (or she) filled in. Meanwhile, the mini-program will enter the verification page to wait for the code to be entered in. If the user does not finish this process, next time when he (or she) enter the username and password, the page will be redirect to the verification page again.

#### **6.1.3 Home Page**

This is the home page and users can see some tips posted by administrators. Although it can upload images and videos just like the topic page, it is used as a guidance. For example, there will be an introduction page showing the functionalities and instructions about the mini-program and application.

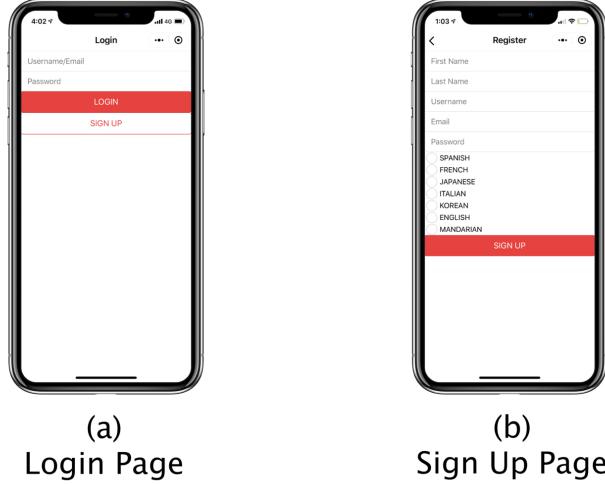


Figure 6.1: Login and Sign Up Page

#### 6.1.4 Forum

The forum now performs the same function as the one on Moodle: posting regular assignments. The users will submit their work under each topic. Besides, there is a kind of topic that will only be visible to NAA users, which means that Non-NAA users will not find this kind of topics in the forum. Just like what the Figure 6.4 shows. In addition, the create topic button (the plus sign at the right top corner) will only be visible to administrators.

For the details of the topic, there are places where you can reply topics or comment to other's reply. Like the creation of home page, the author can also insert video and images into topics. The detailed user interface is showed in Figure 6.5.

Whenever there is a new topic created or there is a new reply posted, all users can get a notification from WeChat, which is showed in Figure 6.7.

Like home pages, the topic can also include multiple kinds of media. However, now each topic can only contains one video or image or both.

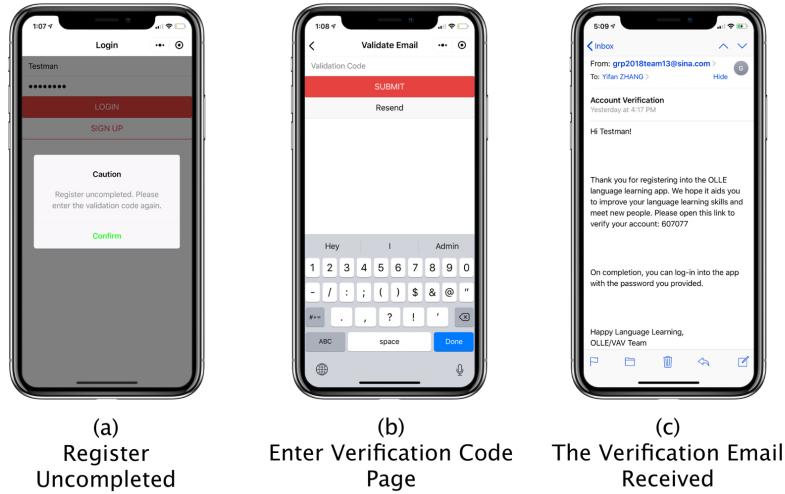


Figure 6.2: Email Verification

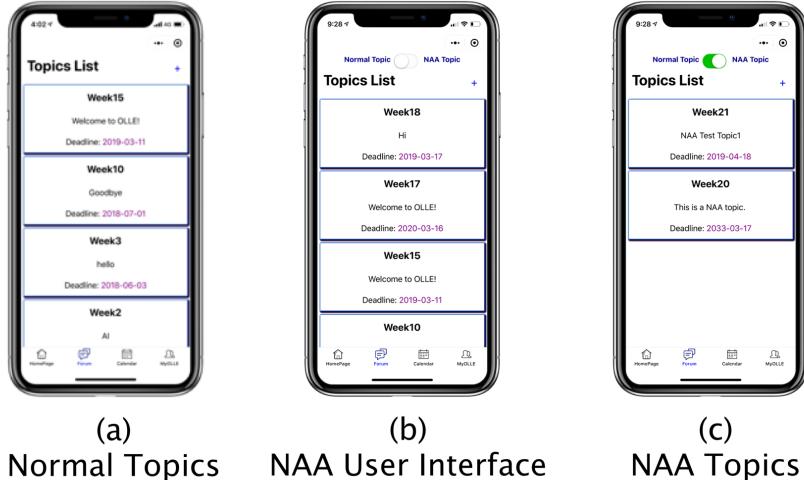


Figure 6.4: Forum

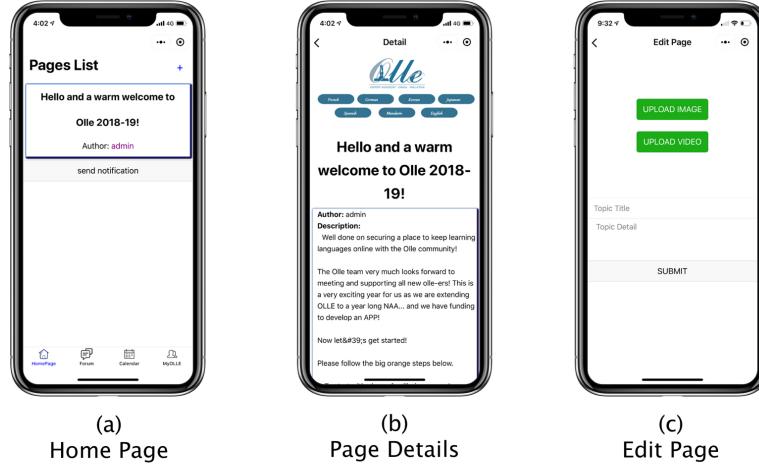


Figure 6.3: Home Page

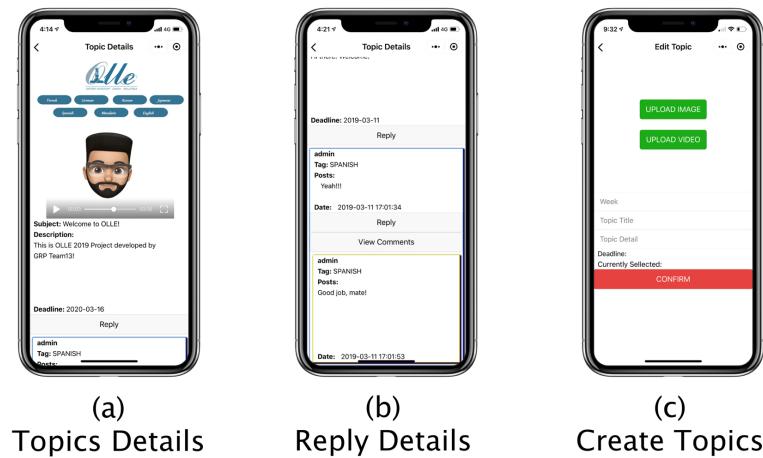


Figure 6.5: Forum Details

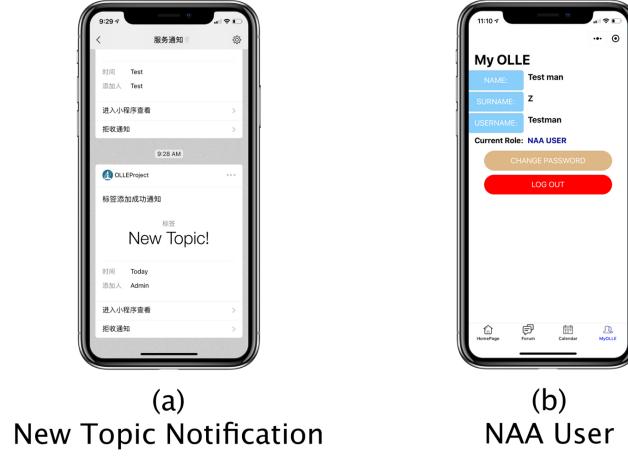


Figure 6.6: Notification

### 6.1.5 My OLLE

My OLLE is a place where the user can edit his (or her) information, including name, surname, username and password. Besides, it will also show the current role, such as administrator, NAA user or Non-NAA user. Just like Figure 6.8 shows.

Figure 6.9 shows the page where the user can edit their personal information or password. The mechanism to trigger it is by clicking the corresponding blue box and button.

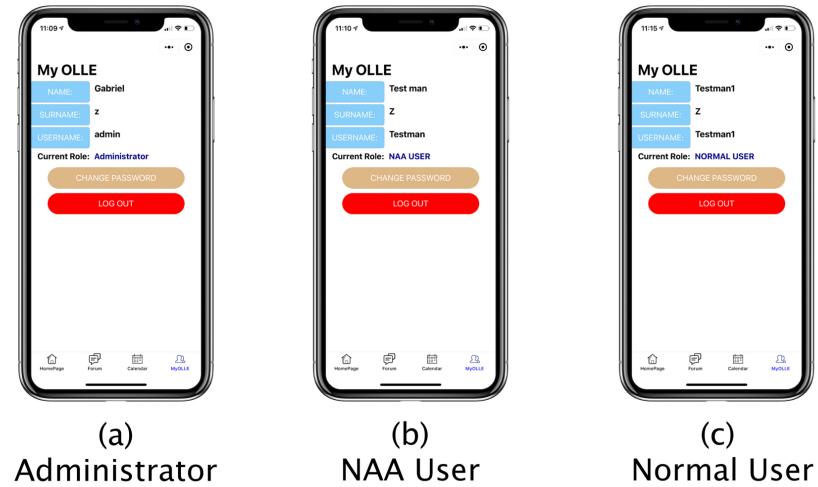


Figure 6.7: MyOLLE

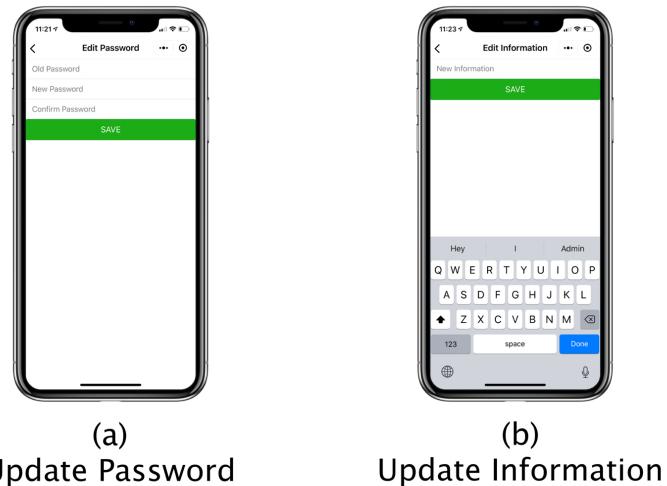


Figure 6.8: Update Password or Personal Information

### 6.1.6 Calendar

The calendar page here uses a mature plugin called Ji Dian Calendar [6]. It offers a calendar that allows users to select the day. However, it does not provide the detailed event handling when users clicking the day. Therefore, it is a part of our job to finish the function so that the page will show the event when users click a specific day.

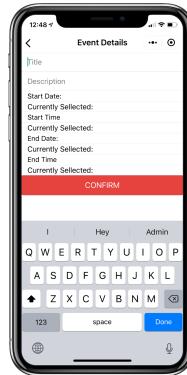


Figure 6.9: Calendar Edit Page

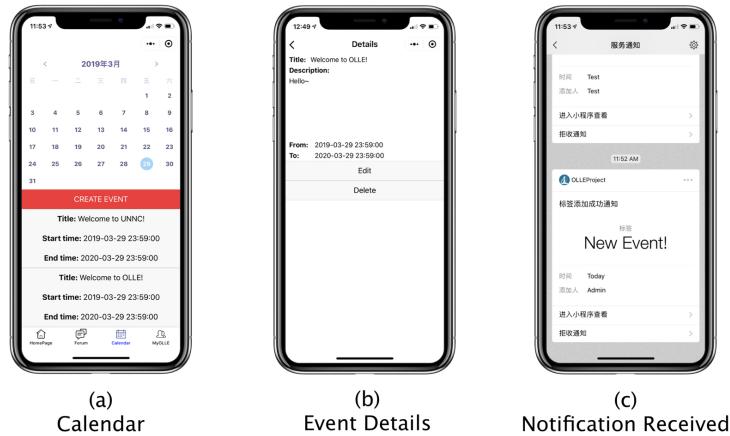


Figure 6.10: Calendar

## 6.2 OLLE Application

### 6.2.1 Separating NAA and Non-NAA Users

As for the requirements, the team is required to design a new function that the Forum could create two kinds of topics. Divide the NAA projects and the normal topics for the NAA users and the Non-NAA users, and the Non-NAA users can only view the normal one, while the NAA users can view both.

We had designed the Forum pages interface which include adding the NAA Topic button, Non-NAA Topic button as well as changing the New Topic button position. If you are the NAA user, click on the NAA Topic, the forum will list all the NAA topics, while if you click on the Non-NAA topic, the forum will list all the normal topics. And if you are not the NAA user, the NAA Topic button will not be shown on the screen. Also if you are not the administrator, the New Topic button will not be shown on the screen.

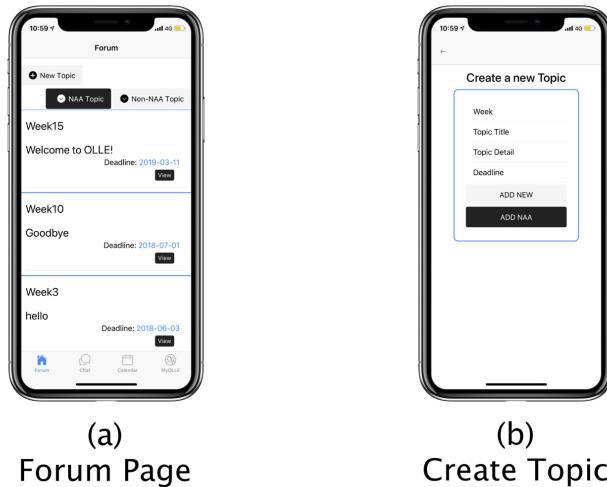


Figure 6.11: Forum View in OLLE Application

### 6.2.2 Administrator Authorities

- Completed administrator functionalities included add new topic, edit a topic, delete a topic, add new chat room, delete a chat room, add new calendar event, edit a calendar event.
- Now the manage user function is added to update user status. When an administrator click the

“Update User” in MyOLLE, a page shows all users information. Administrator can click the “update status” to change a user status from “registered” to “validated” and vice versa. Therefore, administrator can control users enter or leave a NAA project easily.

- Another new function is put a reply on the top of all other replies to let users see it first. The reply may be useful and valuable, which can encourage user to participate in the discussion. Administrator can click the button “Top” of a reply, then it shows on top.

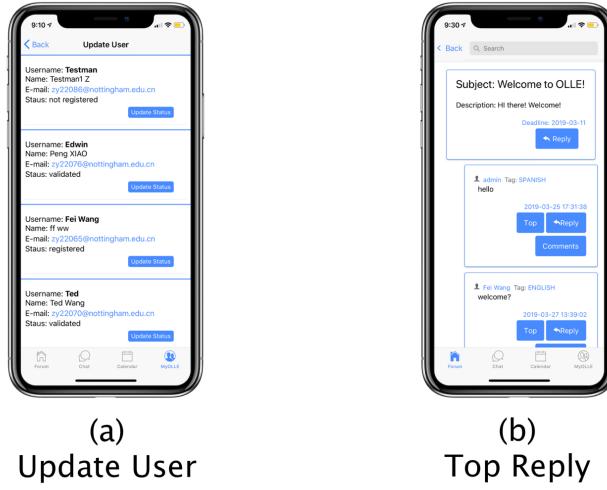


Figure 6.12: Update Users Status

### 6.2.3 Push Notifications

#### 1. Implementation part1:

Send Notification Automatically:

Method: Local Notifications in ionic framework

- We start with our app and add the Ionic native package and also the according Cordova Plugin for local notifications.
- Next thing we need is to add the plugin to our app/app.module.ts
- Coding implementation Scheduling Local Notifications

**2. Implementation part2:**

Send Notification Manually:

Method: Use OneSignal platform and Postman<sup>1</sup>

And the steps are below:

- (a) Setup our OneSignal app
  - i. Create a account at onesignal.com
  - ii. create a new app
  - iii. connect our app to OneSignal
  - iv. Install the ionic OneSignal package inside our app
  - v. coding implementation
- (b) Configure iOS push
  - i. Need a iOS developer account which we have already purchased it
  - ii. create a new app id
  - iii. generate the push notification certificate wizard
  - iv. Configure iOS platform
  - v. coding implementation
- (c) Handling incoming Push Notifications
- (d) Using the OneSignal REST API
- (e) Performing actions after push notifications
- (f) Tagging and segmentation

**3. Testing:**

- (a) Test push notification on iOS
- (b) Both simulators and real phones are used to test the notification part.

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<sup>1</sup>Postman Tools Support Every Stage of the API Lifecycle: Through design, testing and full production, Postman is there for faster, easier API development—without the chaos [23].

# **Chapter 7**

## **System Design**

### **7.1 Key Implementation Ideas**

#### **7.1.1 Software Design Ideas**

This part will talk about the design ideas of the software, including those that have been put into practice and new ideas. In this year, we did not make big changes in the existing system's structure, and we focused mainly on the functionalities that have not been realized as well as improving the performance of the whole system.

#### **Hybrid Mobile App Development - Ionic**

Ionic is an open-source SDK<sup>1</sup> that is used for hybrid mobile application development. Users can use it to build apps that can run on Android, iOS, Windows or modern browsers<sup>2</sup> [43]. It uses Cordova<sup>3</sup> plugins to get access to operating components, such as GPS and camera, which helps users create and deploy their apps.

By integrating with Angular, a front-end web application platform [39], Ionic can provide components and interactions customized by users. The main reason for why we choose it is that it can work on multi-platforms<sup>4</sup> so that we do not need to create a new software that uses different programming languages and structures once we want to move the original code to a new platform.

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<sup>1</sup>Software Development Kit, a collection of software used for developing specific products.

<sup>2</sup>Operating Systems for modern smart phones and computers

<sup>3</sup>An open-source mobile development framework.

<sup>4</sup>The framework performs well on many platforms, e.g. Android and iOS.

### Stateless Structure - RESTful API

Before talking about the REST structure, an important concept called API needs to be introduced. API, full name is *Application Programming Interface*, is a set of communication protocols and tools for building software and allowing applications to communicate with each other [40].

Now is the introduction of the REST structure. REST, full name is *Representational State Transfer*, is a set of rules that define resources exchanging in a distributed system. The reason for choosing it is that it is stateless, which means that we just need to build one back-end and then multiple front-ends as the server is not directly connected to the front-end since the communication is happening via REST interface [35].

Another important feature of The RESTful API is that it provides developers a lot of flexibility by breaking down a transaction to create a series of small components which speed up a particular part of the process [27].

### Web Server Package - XAMPP

XAMPP is a powerful, open source cross-platform web server package that contains Apache HTTP Server, MariaDB and other interpreters written in PHP and Perl programming language [45]. It is useful as a local server, allowing programmers and developers to test their works on the local computer. Meanwhile, it can be used to create and manipulate databases in MariaDB and MySQL.

## 7.2 WeChat Mini-program

In this section we will talk about the design of OLLE WeChat Mini-program.

### 7.2.1 Code Hierarchy

Figure 7.1 shows the activity diagram of the product.

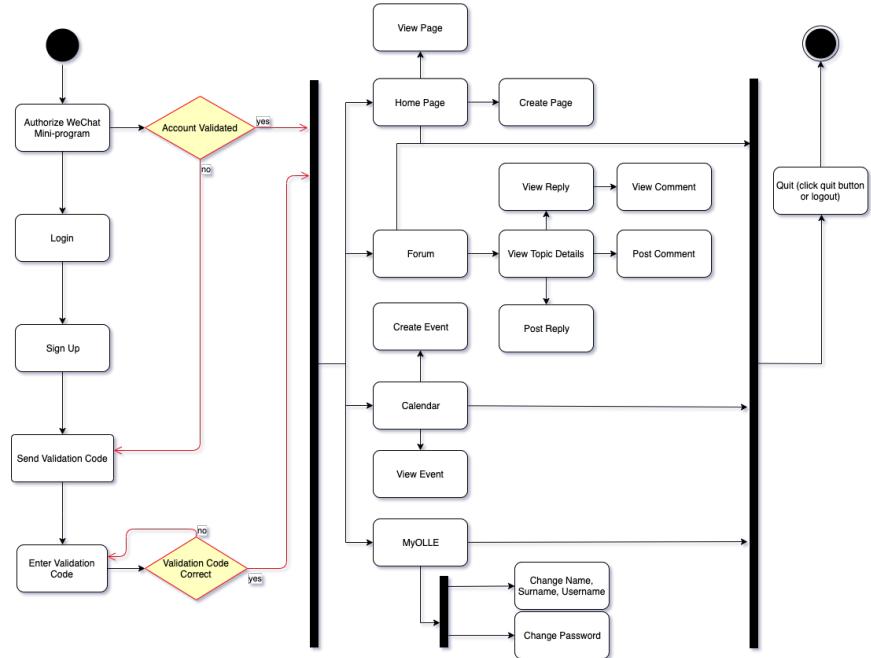


Figure 7.1: Activity Diagram of WeChat Mini-program

The figure below shows the functions that each module has in the mini-program (bullet points).

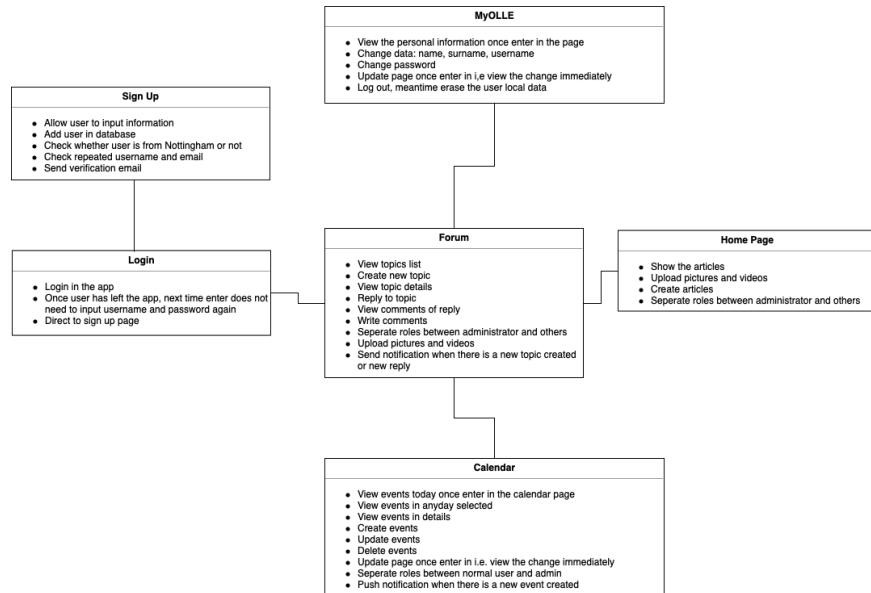


Figure 7.2: Functions in Each Page

### 7.2.2 Login in WeChat Mini-program

When users want to use WeChat Mini-program, what they first need to do is to login in. An important point is that this login is different from entering username and password to use the program, while the former one is used to obtain the user identity provided by WeChat and quickly establish a user system within the applet. Figure 7.1 visually shows the steps to log in. The following content will give a detailed description of these steps with the help of WeChat official Mini-programs documentation.

**Step 1: The client side uses `wx.login()` to get code.** `wx.login()` is an API provided by WeChat to call the interface to get the code, which is the login credential of users.

**Step 2: The client side sends the code to the developer service by using `wx.request()`.**

**Step 3: The server adds code, appId and appSecret as three request parameters to the URL, and initiates a request to the WeChat server interface. Then the interface returns the session key and openid for later usage.** The appId and appSecret correspond to the mini-program's unique ID and app secret, which the former one is the own identification of the program and the latter one is a secret to generate access tokens and secure the usage of the program to those trusted users. The openid is the user's unique ID and the session\_key is the key for cryptographically signing user data.

**Step 4: The server uses openid and session\_key to generate 3rd\_session key as the login status token sent by the server to the user for user permissions and data management.**

**Step 5: The client side store the 3rd\_session key**

**Step 6: The client side reads 3rd\_session from storage if it detects that the user's login status has not expired. When the `wx.request()` of the user ID is required, it is sent to the server for verification as a user ID, and the server determines whether it is legal. If it is, then return data that the client requests.**

### 7.2.3 Store Image and Video on the Server

The core idea of this function can be divided into two components:

1. Store media on the server

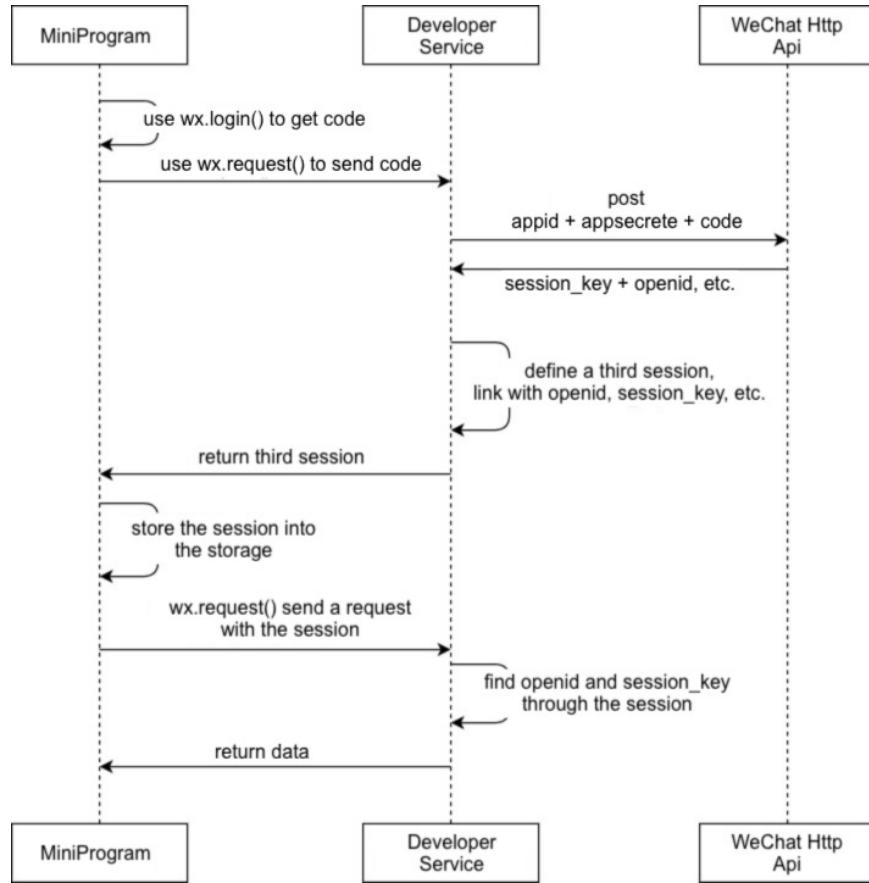


Figure 7.3: WeChat Mini-program Login

## 2. Store file paths in the database

**Store media on the server** Theoretically, there are two ways to store media: one is directly storing data in the database; another approach is using service provided by the service provider (in our case is Tencent Cloud). The reason why we use the second method is that storing images or videos in database would cost a lot of time to access, which would not only be a burden on the system but also greatly reduce user experience.

The service we choose is Tencent Cloud Object Storage (COS), which is a distributed storage service for unstructured data and accessible via HTTP/HTTPS protocols [37]. There are the benefits of using the service, provided by Tencent Cloud [37], which are “Stable and Durable, Secure and Reliable, Low Costs, Ease of Use, Convenient Access and Service Integration”.

After getting access to the service, the next step we need to do is to create a bucket. The bucket here

refers to the container used to store data in COS. Once created, in order to use it, we need to obtain APPID<sup>5</sup>, SecretId<sup>6</sup>, and SecretKey<sup>7</sup> from the service.

**Store file path in the server** If storing process is successful, the server side will return an address URL pointing directly to the file. Then what we need to do is upload this address with the other data (e.g. in creating topic the data is week, title, description, etc.) so that the database will only store the address of the file. When the program needs to load the images or videos, it just need to set the file address in the corresponding components (e.g. <img> or <video>).

#### 7.2.4 Push Notifications

The WeChat Mini-program offers functions to push notifications under specific templates. These templates can be selected at the official website of Mini-program and the content can be modified by users' will. However, there are also strict limitations, and the ones related to the project are listed as follows:

"If the user has carried out the submission of forms within the Mini Program, and the forms are declared as forms that send template message, when the developer needs to provide services for the user, the developer is allowed to send a limited number of template information to the user within a 7-day period (1 form submission allows the sending of 1 message, calculations for multiple submissions are made independently, they do not affect one another)." [38]

There are two points important in the description. First is that the message is allowed to send users only if users submit a form. Technically speaking, there will be a form id given to users once they successfully submit a form. Second is that each form id only allows one opportunity to send messages, which means that we cannot send the number of messages as many as we want and each id has only 7-day validated period.

Therefore, the idea to deal with this situation is by gathering as many form ids as possible so that we can send messages to users when there is a new topic created, a new event created or a new reply posted to the topic. The implementation has three steps:

1. Change the logic of button to form submit so that when users click the button, there will be a form submit (but actually not submit anything) to exchange a form id.
2. Store the form id in the global variables<sup>8</sup>.

---

<sup>5</sup>A unique resource ID in user dimension owned by a developer when accessing COS services, which is used to indicate resources.

<sup>6</sup>The project identity ID owned by a developer, which is used for identity authentication.

<sup>7</sup>The project identity key owned by a developer.

<sup>8</sup>A variable with global scope.

3. Change the logic of each page in *onLoad*<sup>9</sup> function so that when a new page is loaded, there will be an operation that stores the form id into the database.

The operations listed above happens only in the front-end, here are what the back-end performs when we need to send notifications:

1. Getting one of the form id of each user.
2. Sending users notifications.
3. Deleting the used form ids.

However, technically speaking, the method here still cannot totally solve the problem, that is, if users do not use the mini-program in a week, then we cannot push notifications to them. There is no solution on the Internet also, so what we can only do is to keep users active, which is not hard since due to stakeholders, users should submit their work every week.

### 7.3 OLLE Application

#### UML Design

All the users need to register accounts and then use the app, some administrator accounts will be provided to VAV team and our stakeholder. Tri-campus students of Nottingham can register by using the Nottingham e-mail and other users who are not Nottingham students can also register by using their own e-mail address. NAA users of Nottingham students can undertake almost all the functions of this app, however, Non-NAA users can only undertake part of the functions of this app. Besides, there are four main systems, which are User Profile System, Forum System, Chat System and Calendar system. For NAA users, they can click **MyOLLE** button below the app interface to edit their personal information, which are setting First Name and Last Name, setting Username, changing password. NAA users can click **Forum** button to view NAA and Non-NAA topics, view learn logs, reply to a log and create a new log. NAA-users can click **Chat** button to select a room and send message in the group. NAA users can click **Calendar** button to view calendar and the deadline of the events. Non-NAA users undertake the same functions when they click **MyOLLE**, **Calendar** buttons compared with NAA users. However, when Non-NAA users click **Chat** button, they can only view the chat room, but cannot send message in the group. When Non-NAA users click **Forum** button they can only view Non-NAA topics and learning logs but cannot modify or create

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<sup>9</sup>A function triggered when the page loads. Each page has its own onLoad function and only calls it once

anything. As soon as Non-Nottingham Students register, they can perform as same as Non-NAA users. For administrators, they can click **MyOLLE** button to edit their personal information and can also enroll users to NAA group or remove users from NAA group. They can click **Forum** button to view both NAA and Non-NAA topics, create topics, modify topics and delete topics. Administrators can click **Chat** button to send message, create chatrooms and delete chatrooms. Administrators can click **Calendar** button to view, create, modify and delete events.

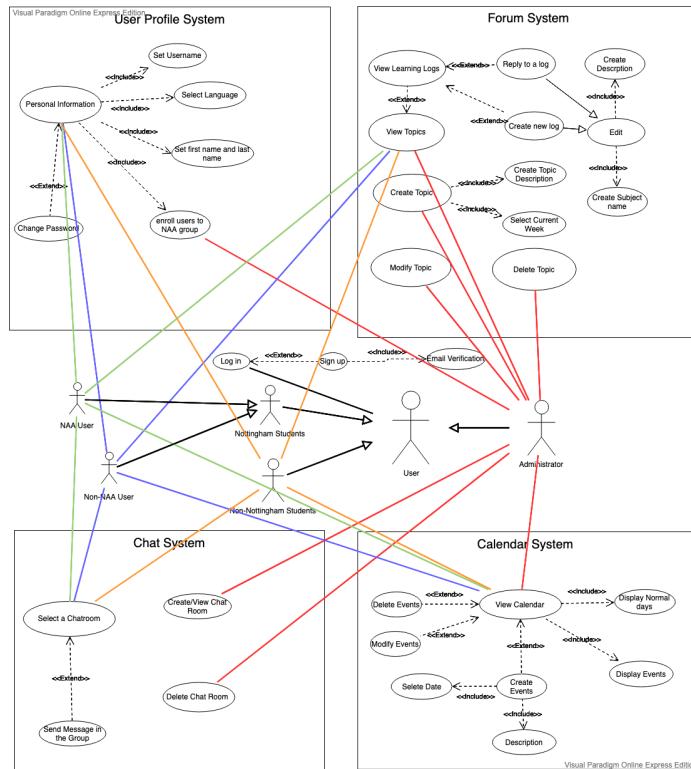


Figure 7.4: Use Case Diagram

### Separating NAA and Non-NAA Users

There are four main parts in the program: Forum, Chat, Calendar and MyOLLE. As for the Forum part, what the last year team has done is that the interface of topics. There is a button to create topic. The message in the new topic can be transmitted to the database and the get a new topic on the list. The button view is used to get the detail message from the topic. The user can reply the topic from this button. What we have done is add a new topic tag on the database. Create a new function to distinguish NAA and Non-NAA topic when create a topic. According to the tag, add a new list NAA project to show

all of the topics of NAA. Add a new judgement whether the user is NAA or Non-NAA. So that if the user is NAA user, he can view all the projects he wants. And the normal user will just get the Non-NAA list. As for the interface part, we change the color and some composition to make it more artistic. We change the position of the buttons and set another size for them. The Chat part is used to communicate with others. According to different languages, everyone can post their views. The calendar part is to post event based on date. The MyOLLE part can modify the personal information.

### User Authentication & Validation

The Role Based Authentication System (RBAS) is updated to separate NAA students and Non-NAA students. There were four roles, including registered, validated, admin and master previously. Registered role was the user who had not been validated without entering validation code, validated user were who finished the validation, they could see the content of this app. Now, not-registered role replace the former registered role. After validation, not-registered role becomes registered role which represents the Non-NAA users, and validated role represents NAA users, which is controlled by administrator. The difference between NAA users and Non-NAA users is that some specific topics are only for the NAA users to complete their NAA module, Non-NAA users can communicates in other topics, but they are not allowed to see or reply NAA topics. Admin and master accounts still have read-write rights, which allow them to see, create, edit and delete content.

#### 7.3.1 Pushing Notifications

##### 1. Implementation part1:

Send Notification Automatically [1]:

Method: Local Notifications in ionic framework [13]

- (a) The installation is pretty easy for this one, we start with our app and add the Ionic native package and also the according Cordova Plugin for local notifications.
- (b) Next thing we need is to add the plugin to our app/app.module.ts
- (c) Coding implementation Scheduling Local Notifications

##### 2. Implementation part2:

Send Notification Manually:

Method: Use OneSignal platform and postman

- (a) Setup our OneSignal app
  - i. Create a account at onesignal.com
  - ii. create a new app
  - iii. connect our app to OneSignal
  - iv. Install the ionic OneSignal package inside our app
  - v. coding implementation
- (b) Configure iOS push
  - i. Need a iOS developer account which we have already purchased it
  - ii. create a new app id
  - iii. generate the push notification certificate wizard [18]
  - iv. Configure iOS platform
  - v. coding implementation
- (c) Handling incoming Push Notifications
- (d) Using the OneSignal REST API
- (e) Performing actions after push notifications
- (f) Tagging and segmentation

### 3. Testing:

- (a) Test push notification on iOS
- (b) Both simulators and real phones are used to test the notification part.
- (c) Due to the fact that

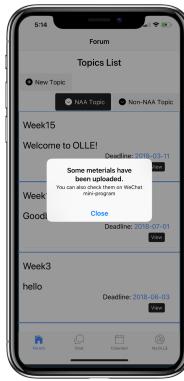


Figure 7.5: OLLE Application Notifications Inside

### 7.3.2 Submit the Application to App Store

Here is the detailed information of how to submit an application into App Store [14].

1. Requirements
  - (a) Xcode
  - (b) A Paid Apple Developers account
  - (c) A valid provisioning profile
  - (d) App Development and Distribution certificates

#### 2. Generating a release build

Generating certificates for iOS is a bit of an involved process, so check Apple's official documentation on what certificates are and how to generate. To create the certificates and profiles needed, visit Apple's member center and follow the links described in Apple's documentation.

#### 3. Generating Signing Certs

After generating to correct certificates, there are options to either have Xcode automatically manage certificates or manually mange them. It's suggested to let Xcode automatically manage certificates.

#### 4. Signing the App in Xcode.

5. Updating an app
6. Download the app

# **Chapter 8**

## **Testing**

This chapter describes the system testing and user testing of the products.

### **8.1 System Testing**

System testing is the process of testing each components functionalities and how the performance of transferring data between different parts and interface. The system testing of WeChat Mini-program involves platform compatibility test (test whether the program works well in different platforms: Android & iOS<sup>1</sup>), screen Compatibility Test (test whether the program works well on different resolution screens<sup>2</sup> and functional test (test whether program's functions meet with the requirements). The detailed test content and result can be found in the appendices.

### **8.2 User Testing**

User testing is a process to gain advice from users or customers by providing them with the product [30]. It can be divided into three different types: alpha testing, beta testing and acceptance testing. The testing type we used here was alpha testing, where we worked together with the selected group of system users to test the early version of software.

In our case, the alpha testing was done with the VAV OLLE group, which was composed of seven people. The beta testing was going to be done with a larger group with randomly picked testers. Finally,

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<sup>1</sup>For OLLE application, temporarily could only be tested in iOS platform since the Android version is not currently available.

<sup>2</sup>the number of distinct pixels in each dimension that can be displayed

the acceptance testing would be done among all university users.

The result of user testing can be found in the appendices as well.

# **Chapter 9**

## **Supporting Tools**

### **9.1 Supporting Development Tools**

These tools are used regularly to help improve the efficiency of work and communication, including task management software Teambition, version control platform GitHub and online L<sup>A</sup>T<sub>E</sub>X editor Overleaf. The following paragraphs will explain why they are chosen as our preferred tool.

#### **9.1.1 Team Work Organization Method - Teambition**

Teambition is a powerful product that can provide functions to enable efficient collaboration among team members. It has ‘Project’ as one of its basic units, and in each project members could create tasks, organize meetings, and have a chat either as a group or personal. According to the official site of Teambition, each task could be divided into subtasks, and members could upload attachments, set deadlines and have discussions [24]. The more useful function is that it has cloud-based file storage that offers a platform for team members to access files and exchange ideas, which is why we chose it to coordinate the teamwork along with the task management function.

#### **9.1.2 Code Hosting Platform - GitHub**

GitHub is a version control system which is web-based and uses Git<sup>1</sup>. It provides a set of functionalities of Git, such as distributed version control and source code management, as well as the features of its own. It can be used to track bugs, manage tasks and provide wikis [41]. By using GitHub, users are able

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<sup>1</sup>A version control system

to retrieve the previous version of the code and update their own version. It can play a role as a backup code repository in case the code is lost or there is a crash [42].

### 9.1.3 High-efficiency Documentation Tool - Overleaf

Overleaf is an online  $\text{\LaTeX}$  editor that does not need installation and offers version control function as well as hundreds of  $\text{\LaTeX}$  templates [21]. The core of its functionalities,  $\text{\LaTeX}$ , is a powerful document preparation system that helps users to generate documentations in a more academic way. In other words, it can liberate users from worrying about the articles' visual appearance so that they can focus more on the content they write [44].

# **Chapter 10**

## **Requirements Evaluation**

In this chapter, we talk about the requirements that we failed to finish by now. The accomplished ones will be shown in the appendices.

### **10.1 Pending Requirements**

#### **10.1.1 WeChat Mini-program**

The WeChat Mini-program accomplishes most of the requirements except payment function since it requires a non-individual developer account. However, in the current situation, it is not possible to get another kind of account, e.g. organization account. There are two reasons for that. On the one hand, only registered entities can register for such accounts [22]; on the other hand, even if we get the school's permission, it still needs a period of time to finish the whole process, which means that we are not able to finish it within the deadline.

#### **10.1.2 OLLE Application**

For the application, there are three requirements that the team has failed to reach:

1. Payment function
2. Application covers major operating systems
3. Sending or receiving images and videos in forum

Payment function is pending since the team does not have time to finish it before the deadline of the project. The absence of OLLE Android application is due to the fact that the components used to pushing notifications to users can only be available on oversea Android devices and the team did not have time to figure out a solution<sup>1</sup>. The absence of sending and receiving media function is also due to the lack of time.

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<sup>1</sup>For Android, OneSignal relies on Google's GCM / FCM servers and Google Play services on the device for pushing notifications. However, most Google's servers are blocked in China Mainland. GCM (Google Cloud Messaging ) is a service that enhancing communications between client side and server side; and FCM (Firebase Cloud Messaging) is a new platform Google created to replace GCM [17].

# **Chapter 11**

## **Reflection**

### **11.1 Experience**

In this section we will talk about the authentic software engineering experience we have during the whole progress.

#### **11.1.1 Requirements Engineering**

In the requirement engineering stage, the team has formed an effective pattern: discovery, classification, prioritization and negotiation as well as documentation. Before going straight forward to stakeholders, we have spent time collating the requirements we had already got from the final report of the last GRP team, and picked out the ones that needed us to finish in this year.

During the meeting with stakeholders, we presented the user story we wrote and showed a list of requirements waiting to be updated. As soon as gaining the information we required, the team started documenting and preparing for the next stage.

#### **11.1.2 System Development**

The stage of developing can be divided into two periods: in the winter vacation and the new semester. Since it was in the December when the team finished the requirements engineering process, the design and developing work had to be postponed to the winter vacation so that the members could have time to prepare themselves for the exams. At first, everyone was confident that there would be great jobs done in the vacation, but after going home, things changed. In a whole month, the team had been struggling

in running the product we got from the last team smoothly and solving issues caused by incompatible plugin versions. Meanwhile, there was almost no communication in the vacation since the group chat remained silent every time after the team leader asked about the rate of progress of each member.

Then in this semester, everyone realized that the time left was not enough and put their attention on the developing work. Fortunately, the efficiency and enthusiasm of the team was quite high. The products finally meet most requirements (the pending requirements can be found in the above section).

### **11.1.3 Communication with Stakeholders**

In the first semester, the meeting with stakeholders was only held a few times. The biggest problem we've faced was losing contact with Ms. Franco for a certain period of time. At first, the team did not realize the importance of VAV as one of our stakeholders, and lack of communication with them turned out to be a bad idea. The truth is that they were more enthusiastic to give advice and help, which was what we have learned at the start of this semester. It is a great lesson that every stakeholder is of the equal importance and we should not waste our time just waiting for a reply from a specialized one.

## **11.2 Strong Points**

### **11.2.1 Same Goals**

One of the good qualities the team has is that everyone has the same goals, which means that when there were things happened, an agreement could be made fast and easily. Besides, no one disagreed with the importance of this module and was not willing to work hard in this area.

Therefore, although sometimes the efficiency could be low, the project was not going out on the wrong path.

### **11.2.2 Harmonious Interpersonal Relationship**

Another good aspect is the harmonious atmosphere in the team. When come to some issues, the team tended to solve them through negotiation and brainstorming. Besides, everybody respects each other, which is important to drive the team to run smoothly.

### 11.2.3 Good Use of Agile Methodology

At the second half of the development, the team has switched the strategy from traditional development to agile methodology. The biggest benefits was reflected in the developing of WeChat Mini-program. According to the traditional development methodology, the program should start after the testing of the application, but that caused a situation that all the people who have completed the jobs need to wait for the person who have not finished to complete the current work, which would delay the whole progress and have a bad influence on the project. But thanks to agile methodology, the mini-program was started early and finished in time.

## 11.3 Weak Points

### 11.3.1 Incomprehension of Task Workloads and Member's ability

A major reason for the progress delay is that at the task allocation process, the leader did not fully grasp each member's ability and preferred schedule. For example, some tasks were more complicated such that they need more than one developers but actually there was only one member working on them, while some other tasks had more than required developers, which turned out to be a waste of resources.

Another phenomenon is that some members liked to work early and had a more balanced working time, while others preferred to spend most of the time in developing before deadline. As a result, it might be better to set different deadlines for these people to improve the developing efficiency.

### 11.3.2 Insufficient Task Management

Despite the wrong task deadline setting discussed above, another defect is that the team was short of a reward and punishment mechanism. When there was a late submission, nothing would happen to the person who should be responsible for being late. Therefore, for a long time, the team members were not sensitive for deadlines and such phenomena even became the normal state.

In addition, the team was lack of using the task management tools, such as Teambition. The chats usually happened in WeChat and members were not interested in checking and ticking the tasks published in another software.

### 11.3.3 Thoughtless and Overly Optimistic Planning

The development plan included in the interim report was proved to be hasty and overly optimistic. The time of making this plan was short, and it did not consider enough factors that could affect the progress of the project.

What is more, the deadline of each task turned out to be misleading, and the workload distribution was not reasonable enough. For example, as the plan said, one member would develop the function of pushing notifications, but the truth was that there should be at least two people working on this task to ensure it finishes on time.

## 11.4 Evaluation by Using COCOMO II Cost Estimation Model

In this section, we use COCOMO II to estimate the workload and time needed for this project, and by comparing to the realistic situation, finding out the performance of the team. COCOMO is one of the best known algorithm cost modelling technique which comes from a large number of software engineering projects. COCOMO II, developed from the old models, considers many modern software engineering approaches and embeds some submodels, which are: application composition model, early design model, reuse model and post-architecture model [31].

### 11.4.1 The Post-architecture Model

The post-architecture model is used when the initial architecture design of the system is clear. Below is the formula of calculation provided in Sommerville's book *Software Engineering 10th Edition* [31]:

$$PM = A * Size^B * M$$

*PM* stands for *person per month*; *A* in this case is a coefficient whose value is 2.94; *Size* refers to the size of the system, expressed in KSLOC (the number of thousands of lines of source code); the exponent term *B* is scale drivers, which reflects the efforts increased to input as the software size is increasing or the complexity of the project, which is usually between 1.1 and 1.24; *M* is the multiplication of 17 cost drivers that are used to adjust *PM* [32].

### Calculating the Exponent Term *B*

According to Sommerville, *B* is based on five factors, which are shown in Figure 11.1. Here is the scale factors used in post-architecture model: The factors have six rates, where 0 represents “extra high” and

Scale factor	Explanation
Architecture/risk resolution	Reflects the extent of risk analysis carried out. Very low means little analysis; extra-high means a complete and thorough risk analysis.
Development flexibility	Reflects the degree of flexibility in the development process. Very low means a prescribed process is used; extra-high means that the client sets only general goals.
Precedentedness	Reflects the previous experience of the organization with this type of project. Very low means no previous experience; extra-high means that the organization is completely familiar with this application domain.
Team cohesion	Reflects how well the development team knows each other and works together. Very low means very difficult interactions; extra-high means an integrated and effective team with no communication problems.
Process maturity	Reflects the process maturity of the organization as discussed in web chapter 26. The computation of this value depends on the CMM Maturity Questionnaire, but an estimate can be achieved by subtracting the CMM process maturity level from 5.

Figure 11.1: Scale factors used in the exponent computation in the post-architecture model from Sommerville [31]

5 means “very low”. The calculation method to get exponent is by adding all five scales together, divided by 100, then plus 1.01. Here is the detailed rates of five scales of our team:

1. Architecture/risk resolution, rated nominal (3). There are general risk analysis carried out in the term.
2. Development flexibility, rated high (2). The clients have hardly involved in development progress, and only set for general objectives.
3. Precedentedness, rated very low (5). There has been no previous experience of the team related to this kind of project.
4. Team cohesion, rated high (2). The team members known each other before the project.
5. Process maturity, rated nominal (3). Some process control is in place. (Check this!)

The sum of the values is 15. By dividing this value by 100 and adding 1.01 to the result, now we can get the value of *B*, which is 1.16.

### Getting the value of M.

Since M is the multiplication of 17 cost drivers, now M could be analyzed based on the tables provided in the manual of using COCOMO II [32]:

Cost Driver List			
Cost Driver Name	Full Name	Ratings	Multiplier
RELY	Required Software Reliability	Nominal	1.00
DATA	Data Base Size	Nominal	1.00
CPLX	Product Complexity	Nominal	1.00
RUSE	Required Reusability	High	1.14
DOCU	Documentation match to life-cycle needs	Nominal	1.00
TIME	Execution Time Constraint	High	1.11
STOR	Main Storage Constraint	Nominal	1.00
PVOL	Platform Volatility	Nominal	1.00
ACAP	Analyst Capability	Very High	0.67
PCAP	Programmer Capability	Nominal	1.00
PCON	Personnel Continuity	Very High	0.84
AEXP	Applications Experience	Very Low	1.22
PEXP	Platform Experience	Low	1.12
LTEX	Language and Tool Experience	Nominal	1.00
TOOL	Use of Software Tools	Nominal	1.00
SITE	Multisite Development	High	0.92
SCED	Required Development Schedule	Low	1.10

Table 11.1: Cost Drivers of Our Team

Then by multiplying the multipliers above together, we can get that M is 0.98.

### Estimating the Size of Programs

The original method uses function points to estimate the size of the program. However, since the product is basically finished, we can now use another method to estimate the size more accurately. The method we use now is a GitHub open source program called CLOC (Count Lines of Code). It can count the lines of code automatically in many languages [8].

By using the tool, here is the result of the OLLE mini-program:

```

Desktop -- bash -- 80x24
Gabriels-MacBook-Pro:~ gabrielz$ cd desktop
Gabriels-MacBook-Pro:desktop gabrielz$ cloc MP Code
    0 text files.
    0 unique files.
    0 files ignored.

2 errors:
Unable to read:  MP
Unable to read:  Code
Gabriels-MacBook-Pro:desktop gabrielz$ cloc MPCode.zip
    82 text files.
    76 unique files.
    43 files ignored.

github.com/AlDanial/cloc v 1.80  T=0.10 s (408.3 files/s, 46745.5 lines/s)
-----
Language      files    blank   comment     code
-----
JavaScript      22      1045      623      2971
JSON            20         7        0       163
SUM:           42      1052      623      3134
-----
```

Figure 11.2: WeChat Mini-program Size of Codes

It can be found that the size of mini-program code is 3.1 KLOC.

However, for OLLE application, since the code that the team added is mixed in the original ones, therefore we could only roughly calculate the size, which is around 800 lines of codes (0.8 KLOC).

Therefore, the overall project size is  $3.1 + 0.8 = 3.9$  KLOC.

#### 11.4.2 Estimating The Workload of the Project

Now bringing values into the formula, we can get

$$PM = 2.94 * 3.9^{1.16} * 0.98 = 14$$

Therefore, the final result indicates that the project requires 14 person-month, in other words, 14 people work a month. Then, if we divide this value by the number of developers in the team, which is five, we can get that

$$14/5 = 2.8 \text{ months}$$

indicating that every one in the team needs to take 2.8 person-months to finish the project. According to the golden rules given in the GRP Handbook, each member should spend 9 hours per week, therefore, by converting it into month, we can get that each person-month is corresponding to 36 working hours.

As a result, we can get the final result below:

$$2.8 * 36 = 100.8 \text{ hours}$$

### 11.4.3 Comparing the Estimated Result With the Real Situation

Actually, according to the original plan (which can be found in the appendices), the team should start software development on December 25th, 2018. Since we have switched to the agile development model in this semester, the end of the development date is proper to set as the deadline of the project, which is April 11th, 2019. If we set the working hours (working hours here means the time spent in doing the project) as 4 hours per working day (Monday to Friday), 0.5 hour per day in the winter vacation, 1 hour in other days, including holidays, then by calculation we can conclude that the number of days between these two dates is 107, and the working hours in total are

$$\text{Working days : } 45$$

$$\text{Winter vacation days : } 30$$

$$\text{Other days : } 32$$

$$\text{Working hours : } 45 * 4 + 30 * 0.5 + 32 * 1 = 180 + 64 + 32 = 276 \text{ hours}$$

Then by comparing the actual result with the expected result, it can be found that the actual working hours are longer than the expected working time (i.e. 100.8 hours calculated from above).

As a result, there is still a lot of room for improvement in the efficiency of the team. Combined with the actual situation, we wasted a lot of time in the winter vacation due to many factors, and here we listed three main points:

1. Wasted a lot of time to make the product run smoothly
2. Lack of communication
3. Being too lazy to spend time on the project

#### **Wasted a lot of time to make the product run smoothly**

Since some functions of the application need to work with specific Ionic packages, while some packages have different requirements on the version of the system, there was a version conflict among these pack-

ages. The team spent a lot of time try to make theses packages worked together. Besides, there were issues related to simulators as well. In all, most time was spent in these kind of actions instead of the development of the system.

### **Lack of communication**

There were few conversations in the team group chat in the winter vacation. The team leader just asked the progress of everyone every week and there were even no replies sometimes. Of course, there was no any online meetings either.

### **Being too lazy to spend time on the project**

# **Chapter 12**

## **Conclusion**

This chapter gives a summary about the team work and product in the whole year, and a brief description of the possible future changes happen on the products.

### **12.1 Team work Summary**

The requirement engineering process is successful. The team made adequate preparation and got the right feedback from stakeholders. However, the team performance in the software development procedure is less satisfying since there was a lot of time wasted in the winter vacation. The action of switching from traditional waterfall development method to agile development method was right because it indeed improved the efficiency of team work.

### **12.2 Product Summary**

Currently, the OLLE application has already been put into the App Store and iOS users can try to download it. The OLLE mini-program is also available on WeChat now and users can search it by name.

The product on the android platform is currently not available.



Figure 12.1: The Application in iOS App Store

### 12.3 Possible Future Improvements

We list the possible updates of the product in the future, most of them are the functions we failed to achieve in this year.

1. The product will be available on Android platform.
2. The users outside the Nottingham universities can pay to use it.
3. There may be a desktop version of the product, achieving basic full platform coverage (on PC operating system and mobile operating systems).

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## Appendix A

# Meeting Records

### A.1 The First Formal Meeting

**Date:** 2018.10.16

**Meeting Members:** Team 13 and Dave

**Contents:**

1. introduce everyone
2. question to be ask
3. Tips:
  - Aim: to make some change
  - prepare to speak with Stakeholders
  - textbook review -> (need to know everything)
  - prepare for the interview
4. WeChat Group
5. Sofware: Teambition & Github

## A.2 The Second Formal Meeting

**Date:** 2018.10.23

**Meeting Members:** Team 13 and Dave

**Contents:**

1. Everyone's work last week
2. Interview
  - Sample Prepared questions
  - What is the interviewee's current work
  - How the interviewee want the app to help their work
  - Who are the major users (Chinese students?)
  - Are the requirements from last year changed? Other requirements involved?
  - Specify every requirement and new requirement
  - User Story
  - Stakeholders can make comments
  - 2 team members (5 is unnecessary)
  - Record the interview
  - Ask for permission
3. Team work:
  - Team ambition
  - Website (worth 2%)
  - Github - Build: Gabriel
  - Deadline: Friday 26 Oct.
  - Update - one person per month
4. Roles
  - Discuss in informal meeting
  - e.g. Everyone can take the role of Editor

### 5. Materials to prepare

- Consider form
- Information sheet
- Email to stakeholders

## A.3 The Third Formal Meeting

**Date:** 2018.10.30

**Meeting Members:** Team 13 and Dave

**Contents:**

### 1. Details about the interview

- Does Franco reply the email?
  - No. We came to her office to meet.
- Where to hold the meeting? (what other people do?)
  - In Trent 437. The other people will not show up at that time.
- brief report about the meeting preparation works (by Darren and Ted)
  - e.g. questions, procedures, etc.
  - Important points before asking questions:
  - Give her consent form and information sheet.
  - Ask for her permission to record.

### 2. Weekly Report

- What we did in the past week.
- The plan for the week.
- The help we may need.

### 3. Meeting VAV:

- Preparing email
- Put all needed files on the Moodle

4. When shall we meet the last year team and get their source code?
5. Read Chapter 5 and get familiar with methods and languages mentioned in it.
6. Make summary about what you learned.

## A.4 The Fourth Formal Meeting

**Date:** 2018.11.06

**Meeting Members:** Team 13 and Dave

**Contents:**

1. Talking about the work we have down
2. Talking about the weekly report
3. Continue to discuss about the requirement
4. Make decision about what we will going to do: 500h -> work
5. Real discussion about the payment
6. Build a system – find out the resource (even overseas)
7. Make sure what we think we should do!!!
8. 51h – get this down (Tuesday 3pm)

## A.5 The Fifth Formal Meeting

**Date:** 2018.11.13

**Meeting Members:** Team 13 and Dave

**Contents:**

1. Meeting with VAV
2. Literature Research
  - Payment
  - Developer Certificates

- Communication Technology
3. Suggestions

## A.6 The Sixth Formal Meeting

**Date:** 2018.11.20

**Meeting Members:** Team 13 and Dave

**Contents:**

1. Time plan
  - Maybe we'll get it wrong, but we'll have experience to try to do our time plan and do our best to get it right.
  - COCOMOII: In the interim report, write down the details about it and explain how to use it. (this will surprise the supervisor.)
2. COCOMO II
  - In the interim report, write down the details about it and explain how to use it. (this will surprise the supervisor.)
3. Requirements
  - About the requirements that last year team have implemented, find out if there is some modification we need to implement. For instance, the user interface.
  - About the requirements that last year team did not implement, talk with stakeholders to ask if we still need to implement. For instance, the payment system. (Franco said this is required.)
  - About the requirements which are put forward this year, we must implement these.
  - In the references: the author name, the title, something like in brackets: unpublished final report for GRP 2017-2018
4. Prototype
  - It is not wrong to draw pictures, but it will be strange because we already have the working system. (However, we haven't run the program successfully.)

- It is not wrong to draw pictures, but it will be strange because we already have the working system. (However, we haven't run the program successfully.)

#### 5. Next Week Work

- Because it will be the last meeting, it is necessary to finish the report to get the advice from the supervisor.
- Other background researches.
- Everyone needs to run the program successfully.

### A.7 The Seventh Formal Meeting

**Date:** 2019.02.21

**Meeting Members:** Team 13 and Dave

**Contents:**

1. What are we going to do this week?
  - Finish the final interim report
  - Hold a meeting with the last GRP team to solve the software running problem
2. Requirements updating with Ms. Franco
  - Adding developing WeChat Mini-program in the schedule
3. Feedback on the interim report draft

### A.8 The Eighth Formal Meeting

**Date:** 2019.02.28

**Meeting Members:** Team 13 and Dave

**Contents:**

1. Details
  - Finish the final interim report
  - Tencent server->put on the store

- IP address->use to put mini program online->test about 1 month ->login and signup part already down->payment problem not solved(maybe no need, the users are all our campus )->campus level

## 2. Tasks

- get account iOS 99, android25
- meeting with Ms.Fransco
- maybe show the application to VAV in one week
- Better to working on our Final report now

## A.9 The Ninth Formal Meeting

**Date:** 2019.03.05

**Meeting Members:** Team 13 and Dave

**Contents:**

### 1. WeChat Mini-program

- 75% completed by Gabriel

### 2. Application

- Build payment system but need official account and test
- Administrator almost finished, there are bugs to fix.
- Purchased developer account to test on iOS
- Notification succeeded locally but failed on app, may because of ionic version
- Added new topic only for NAA users and added new tag but not return
- Database disappeared on sever

### 3. Meeting with stakeholder

- Mini-program is a light version of application without chat module
- New role: Observer
- Time: Next Monday

#### 4. Next to do

- Put all code together, continue coding and solve problems
- Test and write document to record test situation
- Prepare for Final Report and Presentation
- Meeting with stakeholder can be a challenge
- Sitting and working together is recommended

## A.10 The Tenth Formal Meeting

**Date:** 2019.03.12

**Meeting Members:** Team 13 and Dave

**Contents:**

#### 1. Details

- penny satisfied with the project
- solve the administrator part
- finish the NAA function part
- when to test the program
- the payment part has not been tested
- put the project online
- give a presentation on May

## A.11 The Eleventh Formal Meeting

**Date:** 2019.03.19

**Meeting Members:** Team 13 and Dave

**Contents:**

#### 1. Details

- WeChat mini-program development finished

- application sending e-mail problem -> get feedback from Penny
- wait for the feedback from Apple to put the app into store
- payment part -> basic things already finished
- April 2 do not have meeting
- go to GRP tomorrow

## A.12 The Twelfth Formal Meeting

**Date:** 2019.03.25

**Meeting Members:** Team 13 and Dave

**Contents:**

### 1. Details

- Final Report
- Choose another time to meet stakeholders
- Cannot finish the payment part

# **Appendix B**

## **Test Cases**

### **B.1 System Testing**

#### **B.1.1 OLLE WeChat Mini-program**

Figure B.1 below is the system test done with the OLLE WeChat mini-program.

#### **B.1.2 OLLE Application**

Figure B.2 below shows the system testing of the administrator authorities function. Figure B.3 shows the system testing of the function that separating NAA and Non-NAA users. Figure B.4 shows the system testing of the function that pushing notifications to users.

### **B.2 Alpha Testing**

This section shows the alpha testing result we gathered from the testers.

#### **B.2.1 OLLE WeChat Mini-program**

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass/Fail
1	Compatibility test	Open WeChat Mini-program	Andorid	run normal	as expected	Pass
2	Compatibility test	Open WeChat Mini-program	iOS	run normal	as expected	Pass
3	Screen compatibility test	Open WeChat Mini-program	iPhone X	run normal	as expected	Pass
4	Screen compatibility test	Open WeChat Mini-program	iPhone XS MAX	run normal	as expected	Pass
5	Screen compatibility test	Open WeChat Mini-program	Sumsang S7 Edge	run normal	as expected	Pass
6	Screen compatibility test	Open WeChat Mini-program	Huawei P20 Pro	run normal	as expected	Pass
7	Screen compatibility test	Open WeChat Mini-program	iPhone 8 Plus	run normal	as expected	Pass
8	Show topic switch button	Enter forum page	Admin	A switcher that can switch between NAA topic and Notmal Topics	as expected	Pass
9	Show topic switch button	Enter forum page	NAA User	A switcher that can switch between NAA topic and Notmal Topics	as expected	Pass
10	Show topic switch button	Enter forum page	Non-NAA User	There is no switcher	as expected	Pass
11	View topic (both kinds)	Click button	Admin	Show both kinds of topics	as expected	Pass
12	View topic (both kinds)	Click button	NAA User	Show both kinds of topics	as expected	Pass
13	View normal topics	Enter forum page	Non-NAA User	Show only normal topics	as expected	Pass
14	View topic's reply	Entering Topic Detail Page	Admin	Show topic details	as expected	Pass
15	View topic's reply	Entering Topic Detail Page	NAA User	Show topic details	as expected	Pass
16	View topic's reply	Entering Topic Detail Page	Non-NAA User	Show topic details	as expected	Pass
17	Reply to topic	Entering Edit Page and Post Reply	Admin	Post successfully	as expected	Pass
18	Reply to topic	Entering Edit Page and Post Reply	NAA User	Post successfully	as expected	Pass
19	Reply to topic	Entering Edit Page and Post Reply	Non-NAA User	Post successfully	as expected	Pass
20	View comments	Click button	Admin	Show Comments	as expected	Pass
21	View comments	Click button	NAA User	Show Comments	as expected	Pass
22	View comments	Click button	Non-NAA User	Show Comments	as expected	Pass
23	Reply to comments	Entering Edit Page and Post Reply	Admin	Post successfully	as expected	Pass
24	Reply to comments	Entering Edit Page and Post Reply	NAA User	Post successfully	as expected	Pass
25	Reply to comments	Entering Edit Page and Post Reply	Non-NAA User	Post successfully	as expected	Pass
26	View Calendar	Click Calendar	Admin	Show events on the day picked	as expected	Pass
27	View Calendar	Click Calendar	NAA User	Show events on the day picked	as expected	Pass
28	View Calendar	Click Calendar	Non-NAA User	Show events on the day picked	as expected	Pass
29	Create Calendar Events	Click create button	Admin	Create successfully	as expected	Pass
30	Create Calendar Events	Click create button	NAA User	No such button	as expected	Pass
31	Create Calendar Events	Click create button	Non-NAA User	No such button	as expected	Pass
32	View personal information	Choose MyOLLE	Admin	Shows successfully	as expected	Pass
33	View personal information	Choose MyOLLE	NAA User	Shows successfully	as expected	Pass
34	View personal information	Choose MyOLLE	Non-NAA User	Shows successfully	as expected	Pass
35	Change personal information	Click the corresponding button	Admin	Change successfully	as expected	Pass
36	Change personal information	Click the corresponding button	NAA User	Change successfully	as expected	Pass
37	Change personal information	Click the corresponding button	Non-NAA User	Change successfully	as expected	Pass
38	Change password	Click button	Admin	Change successfully	as expected	Pass
39	Change password	Click button	NAA User	Change successfully	as expected	Pass
40	Change password	Click button	Non-NAA User	Change successfully	as expected	Pass
41	Create page	Click button	Admin	Post create window and create successfully	as expected	Pass
42	Create page	Click button	NAA User	No such button	as expected	Pass
43	Create page	Click button	Non-NAA User	No such button	as expected	Pass
44	View page details	Click page	Admin	Show page details	as expected	Pass
45	View page details	Click page	NAA User	Show page details	as expected	Pass
46	View page details	Click page	Non-NAA User	Show page details	as expected	Pass

Figure B.1: OLLE Mini-program System Testing

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass/Fail
1	Top a post	Click button	Admin	Post show on top	as expected	Pass
2	Untop a post	Click button again	Admin	Post not show on top	as expected	Pass
3	View Update User button	Enter myOLLE Page	Admin	Show Update User button	as expected	Pass
4	View Update User button	Enter myOLLE Page	NAA User	Not show Update User button	as expected	Pass
5	View Update User button	Enter myOLLE Page	Non-NAA User	Not show Update User button	as expected	Pass
6	View Update User Page	Enter myOLLE Page and click Update User	Admin	Show a list of users information	as expected	Pass
7	View Update Status button	Enter Update User Page	Admin	Show Update User button on user information card	as expected	Pass
8	Update User status	Click Update Status button	Admin	User status transfer from validated to registered	as expected	Pass
9	Update User status	Click Update Status button	Admin	User status transfer from registered to validated	as expected	Pass

Figure B.2: OLLE Application System Testing - Administrator Authorities

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass/Fail
1	view topic (both kinds)	Click button	Admin	show both kinds of topics	As expected	Pass
2	view topic (both kinds)	Click button	NAA user	show both kinds of topics	As expected	Pass
3	view Non-NAA topic	Click button	Non-NAA user	show only Non-NAA topics	As expected	Pass
4	add new topic	Click button	Admin	show two buttons of both topics	As expected	Pass
5	add new topic	Click button	NAA user	can not find the button	As expected	Pass
6	add new topic	Click button	Non-NAA user	can not find the button	As expected	Pass
7	add NAA topic	Enter new topic page and click button	Admin	can add NAA topics	As expected	Pass
8	add NAA topic	Enter new topic page and click button	NAA user	can not enter the page	As expected	Pass
9	add NAA topic	Enter new topic page and click button	Non-NAA user	can not enter the page	As expected	Pass
10	add Non-NAA topic	Enter new topic page and click button	Admin	can add Non-NAA topics	As expected	Pass
11	add Non-NAA topic	Enter new topic page and click button	NAA user	can not enter the page	As expected	Pass
12	add Non-NAA topic	Enter new topic page and click button	Non-NAA user	can not enter the page	As expected	Pass

Figure B.3: OLLE Application System Testing - Separating NAA and Non-NAA Users

Test Case ID	Test Scenario	Test Steps	Test Data	Expected Results	Actual Results	Pass/Fail
1	Push Notification to NAA Users to remind the task deadline	Click send button	NAA User	Show the notification on top	as expected	Pass
2	Push Notification to NAA User to remind the topic is created	Click send button	NAA User	Show the notification on top	as expected	Pass
3	Push Notification to all User to remind some materials are uploaded	Click send button	NAA User and Non-NAA User	Show the notification on top	as expected	Pass

Figure B.4: OLLE Application System Testing - Push Notifications

# **Appendix C**

## **Test Report**

### **C.1 Introduction**

#### **C.1.1 Revision History**

This is the first beta testing of the application.

#### **C.1.2 Purpose and Scope**

This document is used for beta testing of the application: *OLLE Nottingham*. The users would be the OLLE group (VAV) and GRP develop team.

#### **C.1.3 List of Reference Documents**

- Requirements.pdf
- Test Form.pdf
- Contact Information.pdf

### **C.2 Beta Test Scope, Strategy, and Timeline**

Define the scope and strategy for testing the system at one or more customers.

### C.2.1 Beta Test Customers, Environment, and Scope.

The testing people will test the OLLE Nottingham app on their own iOS devices. The purpose of this test is to find the problems before pushing the app to all users.

### C.2.2 Testing Criteria

#### Beta Ship Criteria

1. The application can be downloaded from iOS App Store.
2. The user can open the application successfully.
3. The user can sign up and login in the application.

#### Beta Install and Criteria to Begin Testing

1. The testing device has to be iOS devices.
2. Requires iOS 11.0 or higher.
3. Compatible with iPhone, iPad and iPod touch. Does not compatible with Mac.



### C.2.3 Testing Scope

#### Features to be Tested

Roles	Unit	Activities
Administrator	Forum	View topic (both kinds) Create Topic View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments Push Notification
		Enter each chatroom View chat contents Send messages
		View calendar View calendar events Create calendar events
		View personal information Change personal information Change password Update user
	MyOLLE	View topic (both kinds) View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments
		Enter specific chatroom View chat contents Send messages
		View calendar View calendar events
		View personal information Change personal information Change password
NAA User	Forum	View topic (only normal topics or Non-NAA topics) View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments
		Enter specific chatroom View chat contents Send messages
		View calendar View calendar events
		View personal information Change personal information Change password
	MyOLLE	View topic (only normal topics or Non-NAA topics) View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments
		Enter specific chatroom View chat contents Send messages
		View calendar View calendar events
		View personal information Change personal information Change password
Normal User	Forum	View topic (only normal topics or Non-NAA topics) View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments
		Enter specific chatroom View chat contents Send messages
		View calendar View calendar events
		View personal information Change personal information Change password
	MyOLLE	View topic (only normal topics or Non-NAA topics) View topic details View topic's reply Reply to topic View comments Reply to comments View other's comments
		Enter specific chatroom View chat contents Send messages
		View calendar View calendar events
		View personal information Change personal information Change password
Notes: the blue items are functions need to be reconfirmed.		

Figure C.1: Functions of Application

### **Features Not to be Tested**

1. Creating topics with images and videos.
2. Payment function

### **Other items to be evaluated**

1. Interface design (good or bad?)
2. Interaction logic (simple or complex?)
3. Learning complexity (Is it hard to learn to use?)

### **Safety-related Testing (not applicable)**

### **Overall Test Strategy and Timeline**

Time	Activities
<b>Day 1</b>	Software installation
	User registration
<b>Day 2 - 4</b>	Functionalities testing
<b>Day 5</b>	Feedback to team

Figure C.2: Timeline

## **C.3 Test Descriptions**

For each major set of tests to be run (such as major functional groups, and performance, stress) describe the types of tests to be run.

### **C.3.1 Functional Tests**

Verification that the system meets its functional/feature requirements.

### **C.3.2 Configuration Tests**

Testing to assure that all functions work under all combinations (hardware configurations, device assignment combinations, etc.)

### C.3.3 Load and Performance Tests

Testing to confirm that performance objectives are satisfied. Includes accuracy testing.

### C.3.4 Stress Tests

Testing which attempts to break the system by stressing all of its resources.

### C.3.5 Recovery and Error Handling Tests

Testing to confirm that the system recovers from hardware and/or software malfunctions without losing data or control, or that it follows the error handling requirements defined for the product.

### C.3.6 Specific Safety-Related Tests

Any tests specific to verification of safety-significant software.

### C.3.7 Tools and Test Equipment Required

- Equipment: iOS devices
- Testers: OLLE Team and GRP Team
- Equipment provided: Testers' own devices

## C.4 Roles and Responsibilities

### C.4.1 Develop Team

Who	Role	Responsibility	Contact (email)	Back-up contact (WeChat)
<b>Gabriel</b>	Develop Team Leader; Developer of WeChat Mini-program	WeChat Mini-program problem solving; Team work coordination	<a href="mailto:zy22086@nottingham.edu.cn">zy22086@nottingham.edu.cn</a>	ZYF19971205
<b>Edwin</b>	Developer of function: push notifications	Application problem related to notifications	<a href="mailto:zy22076@nottingham.edu.cn">zy22076@nottingham.edu.cn</a>	xp5738446
<b>Fay</b>	Developer of function: update user	Other application problems	<a href="mailto:zy22065@nottingham.edu.cn">zy22065@nottingham.edu.cn</a>	affie725
<b>Ted</b>	Developer of function: separate NAA and Non-NAA topic	Other application problems	<a href="mailto:zy22070@nottingham.edu.cn">zy22070@nottingham.edu.cn</a>	wyt1998-6522070
<b>Darren</b>	Developer of function: separate NAA and Non-NAA topic	Other application problems	<a href="mailto:zy22033@nottingham.edu.cn">zy22033@nottingham.edu.cn</a>	Darren98F

Figure C.3: Team Information

## C.5 Problem Recording, Issues Management and Escalation, Rework, and Resolution

### C.5.1 How issues will be recorded and who records them

- By screenshots;
- Better offer detailed steps so that we can recur the problem.

### C.5.2 How will/ who will review the issues each day and decide what gets worked on first

- Gabriel will take and process feedback regularly.

### C.5.3 What issues are serious enough that they should be raised to management immediately, and what is the escalation procedure for them

- Software running problem
- Database problem

### C.5.4 How enhancement requests will be logged and handled

- The enhancement requirements will be gathered and documented so that the team can continue developing in the summer vacation and later.

### C.5.5 People Authorities

- The team will decide how to test the fix and stakeholders will decide whether the issue is corrected and can be put in the issues log.

## C.6 Exit Criteria

The system meets all the functions mentioned above and have acceptable interface and logic (refer to point 2.3.3).

## Appendix D

# Time Plan

## D.1 Time Plan

Here is the time plan made in the interim report.

Figure D.1: Time Plan made in the Interim Report

## D.2 User Story

Jack is a year-one student from UNNC. When he came to school in the first week, he found that talking to teachers and discussing with others using English was difficult to him. Therefore, he was introduced to a project called OLLE. He was suggested to download an app, which he could share his learning resources and experiences on a forum and get related news. Jack's friend, Mike, who enrolled on NAA language modules, got his grades marked by Language Center teachers also on the software. Besides, he viewed all the learning events through the calendar of the platform and submitted weekly tasks on the forum.

Scott, a UNUK student, and Linda, a UNMC student, also use the software as an approach of learning foreign language. Since Scott is from Spanish and Linda is from French, they often communicate with each other and teach their native speaking languages. This year, they met Jack and soon all of them have become good friends. Later, they felt that the group was not large enough so that they asked one of their friends who is in VAV governing this project to post their stories on the forum. Many students come to join them, including those from other universities who paid a fee to use the software.

## **Appendix E**

### **User Test Results**

In this chapter, we present the result gathered from the VAV testers, including the OLLE application and mini-program.

Name	From	Contact (email)	Backup Contact (WeChat)
LI Xinyuan	VAV	shyx12@nottingham.edu.cn	/
Roles	Unit	Activities	Result
Administrator (username: admin)	Forum	View topic (both kinds)	✓
		Create Topic (including insert picture and video)	
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
		Push Notification	
		Enter each chatroom	
Calendar	Chat	View chat contents	
		Send messages	
		View calendar	✓
MyOLLE	MyOLLE	View calendar events	✓
		Create calendar events	✓
		View personal information	✓
		Change personal information	✓
Home Page	Home Page	Change password	✓
		Update user	✓
		Create Page (including image and video)	✓
		View Page Details	✓

<b>NAA User</b>	<b>Forum</b>	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
		View Page Details	
<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non- NAA topics)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	

		Send messages	
<b>Calendar</b>	View calendar	✓	
	<a href="#">View calendar events</a>	<a href="#">✓</a>	
<b>MyOLLE</b>	View personal information	✓	
	Change personal information	✓	
	Change password	✓	
<b>Home Page</b>	View Page Details	✓	

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

**Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)**

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem
<b>Create new event: English error</b>	“Currently Selected” instead of “Currently Sellected”
<b>Inconsistent with “OLLE”</b>	Everything with “OLLE” should be in capital letters

Name	From	Contact (email)	Backup Contact (WeChat)
SHI Yuanxing	VAV	hiyys3@nottingham.edu.cn	/
Roles	Unit	Activities	Result
Administrator (username: admin)	Forum	View topic (both kinds)	✓
		Create Topic (including insert picture and video)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	Chat	Push Notification	
		Enter each chatroom	
		View chat contents	
	Calendar	Send messages	
		View calendar	✓
		View calendar events	✓
	MyOLLE	Create calendar events	✓
		View personal information	✓
		Change personal information	✓
		Change password	✓
		Update user	✓
NAA User	Forum	Home Page	✓
		Create Page (including image and video)	✓
		View Page Details	✓
		View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
	Chat	Reply to comments	
		View other's comments	
		Enter specific chatroom	
	Calendar	View chat contents	
		Send messages	
		View calendar	
	MyOLLE	View calendar events	
		View personal information	
		Change personal information	
		Change password	

	<b>Home Page</b>	View Page Details	
<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non-NAA topics)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	✓
		View calendar events	✓
	<b>MyOLLE</b>	View personal information	✓
		Change personal information	✓
		Change password	✓
	<b>Home Page</b>	View Page Details	✓

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

**Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)**

Admin account:  
Username: admin  
Password: admin123

Problems	How to trigger that problem
<b>Create new event: English error</b>	“Currently Selected” instead of “Currently Sellected”
<b>Inconsistent with “OLLE”</b>	Everything with “OLLE” should be in capital letters



Name	From	Contact (email)	Backup Contact (WeChat)
<b>WANG Qingyu</b>	VAV	scyqw4@nottingham.edu.cn	/
Roles	Unit	Activities	Result
<b>Administrator (username: admin)</b>	<b>Forum</b>	View topic (both kinds)	
		Create Topic (including insert picture and video)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
		Push Notification	
	<b>Chat</b>	Enter each chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
		Create calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
		Update user	
	<b>Home Page</b>	Create Page (including image and video)	
		View Page Details	
<b>NAA User</b>	<b>Forum</b>	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	

	<b>Home Page</b>	View Page Details	
<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non-NAA topics)	Yes
		View topic details	Yes
		View topic's reply	Yes
		Reply to topic	Yes
		View comments	No
		Reply to comments	No
		View other's comments	No
	<b>Chat</b>	Enter specific chatroom	--
		View chat contents	--
		Send messages	--
	<b>Calendar</b>	View calendar	Yes
		View calendar events	Yes
	<b>MyOLLE</b>	View personal information	Yes
		Change personal information	Yes
		Change password	Yes
	<b>Home Page</b>	View Page Details	Yes

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

**Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)**

Admin account:  
Username: admin  
Password: admin123

Problems	How to trigger that problem

Name	From	Contact (email)	Backup Contact (WeChat)
Pin-Wen Wang	VAV	biypw2@nottingham.edu.cn	wxid_w9hjabsv2v7s22
Roles	Unit	Activities	Result
Administrator (username: admin)	Forum	View topic (both kinds)	✓
		Create Topic (including insert picture and video)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	Chat	Push Notification	
		Enter each chatroom	
		View chat contents	
	Calendar	Send messages	
		View calendar	✓
		View calendar events	✓
	MyOLLE	Create calendar events	✓
		View personal information	✓
		Change personal information	✓
		Change password	✓
	Home Page	Update user	✓
		Create Page (including image and video)	✓
		View Page Details	✓
NAA User	Forum	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	Chat	Enter specific chatroom	
		View chat contents	
		Send messages	
	Calendar	View calendar	
		View calendar events	
	MyOLLE	View personal information	
		Change personal information	
		Change password	
		View Page Details	

<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non-NAA topics)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	✓
		View calendar events	✓
	<b>MyOLLE</b>	View personal information	✓
		Change personal information	✓
		Change password	✓
	<b>Home Page</b>	View Page Details	✓

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

Users that first sign up are seen as Non-NAA users!

Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)

Admin account:  
Username: admin  
Password: admin123

Problems	How to trigger that problem
<b>Create new event: English error</b>	“Currently Selected” instead of “Currently Sellected”
<b>Inconsistent with “OLLE”</b>	Everything with “OLLE” should be in capital letters

Name	From	Contact (email)	Backup Contact (WeChat)
<i>Chen LING</i>	<i>OLLE</i>	<i>Biycl5@nottingham.edu.cn</i>	<i>CCClara0818</i>
Roles	Unit	Activities	Result
<b>Administrator</b> <b>(username: admin)</b>	<b>Forum</b>	View topic (both kinds)	✓
		Create Topic (including insert picture and video)	
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
		Push Notification	
		Enter each chatroom	
<b>Calendar</b>	<b>Chat</b>	View chat contents	
		Send messages	
		View calendar	✓
<b>MyOLLE</b>	<b>Calendar</b>	View calendar events	✓
		Create calendar events	✓
		View personal information	✓
		Change personal information	✓
<b>Home Page</b>	<b>MyOLLE</b>	Change password	✓
		Update user	✓
		Create Page (including image and video)	✓
		View Page Details	✓

<b>NAA User</b>	<b>Forum</b>	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
		View Page Details	
<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non- NAA topics)	✓
		View topic details	✓
		View topic's reply	✓
		Reply to topic	✓
		View comments	✓
		Reply to comments	✓
		View other's comments	✓
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	

		Send messages	
<b>Calendar</b>	View calendar	✓	
	<a href="#">View calendar events</a>	✓	
<b>MyOLLE</b>	View personal information	✓	
	Change personal information	✓	
	Change password	✓	
<b>Home Page</b>	View Page Details	✓	

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

**Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)**

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem
<b>Log-in takes a long time, sometimes even find it hard to log in.</b>	Maybe the system need to be accelerated

Name	From	Contact	Backup Contact (WeChat)
Violet	VAV	biyjs10@nottingham.edu.cn	iqaijoahs1999
Roles	Unit	Activities	Result
Administrator (username: admin)	Forum	View topic (both kinds)	√
		Create Topic (including insert picture and video)	√
		View topic details	√
		View topic's reply	√
		Reply to topic	√
		View comments	√
		Reply to comments	√
		View other's comments	√
		Push Notification	?
	Chat	Enter each chatroom	?
		View chat contents	?
		Send messages	?
	Calendar	View calendar	√
		View calendar events	√
		Create calendar events	√
	MyOLLE	View personal information	√
		Change personal information	√
		Change password	√
		Update user	√
	Home Page	Create Page (including image and video)	?
		View Page Details	
NAA User	Forum	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	Chat	Enter specific chatroom	
		View chat contents	
		Send messages	
	Calendar	View calendar	
		View calendar events	
	MyOLLE	View personal information	
		Change personal information	
		Change password	

	<b>Home Page</b>	View Page Details	
<b>Normal User</b>	<b>Forum</b>	View topic (only normal topics or Non-NAA topics)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	<a href="#">Enter specific chatroom</a>	
		View chat contents	
	<b>Calendar</b>	Send messages	
		<a href="#">View calendar</a>	
	<b>MyOLLE</b>	<a href="#">View calendar events</a>	
		View personal information	
		Change personal information	
		Change password	
	<b>Home Page</b>	View Page Details	

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

**Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)**

Admin account:  
Username: admin  
Password: admin123

Problems	How to trigger that problem

Name	From	Contact (email)	Backup Contact (WeChat)
LI Xinyuan	VAV	shyx12@nottingham.edu.cn	/
Roles	Unit	Activities	Result
Administrator	Forum	View topic (both kinds)	Y
		Create Topic	N
		View topic details	Y
		View topic's reply	Y
		Reply to topic	Y
		View comments	Y
		Reply to comments	Y
		View other's comments	Y
		Push Notification	Y
	Chat	Enter each chatroom	Y
		View chat contents	Y
		Send messages	Y
	Calendar	View calendar	Y
		View calendar events	Y
		Create calendar events	N
	MyOLLE	View personal information	Y
		Change personal information	Y
		Change password	Y
		Update user	Y
NAA User	Forum	View topic (both kinds)	
		View topic details	
		View topic's reply	
		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	Chat	Enter specific chatroom	
		View chat contents	
		Send messages	
	Calendar	View calendar	
		View calendar events	
	MyOLLE	View personal information	
		Change personal information	
		Change password	
	Forum	View topic (only normal topics or Non-NAA topics)	
		View topic details	
		View topic's reply	

<b>Normal User</b>		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	<a href="#">Enter specific chatroom</a>	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		<a href="#">View calendar events</a>	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

Need to go to application side and use administrator account to update user status

(validated: NAA | registered: Non-NAA)

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem

Name	From	Contact (email)	Backup Contact (WeChat)
SHI Yuanxing	VAV	hiyys3@nottingham.edu.cn	/
Roles	Unit	Activities	Result
Administrator	Forum	View topic (both kinds)	Y
		Create Topic	Y
		View topic details	Y
		View topic's reply	Y
		Reply to topic	Y
		View comments	Y
		Reply to comments	Y
		View other's comments	Y
		Push Notification	Y
	Chat	Enter each chatroom	Y
		View chat contents	Y
		Send messages	Y
	Calendar	View calendar	Y
		View calendar events	Y
		Create calendar events	Y
	MyOLLE	View personal information	Y
		Change personal information	Y
		Change password	Y
		Update user	N
		View topic (both kinds)	Y
NAA User	Forum	View topic details	Y
		View topic's reply	Y
		Reply to topic	Y
		View comments	Y
		Reply to comments	Y
		View other's comments	Y
		Enter specific chatroom	N
	Chat	View chat contents	Y
		Send messages	Y
		View calendar	Y
	MyOLLE	View calendar events	Y
		View personal information	Y
		Change personal information	Y
		Change password	Y
	Forum	View topic (only normal topics or Non-NAA topics)	
		View topic details	
		View topic's reply	

<b>Normal User</b>		Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
<b>Notes: the blue items are functions need to be reconfirmed.</b>			

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

Need to go to application side and use administrator account to update user status  
 (validated: NAA | registered: Non-NAA)

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem
<b>The character is not clear</b>	Once you open the app
<b>Admin cannot control enroll</b>	Click the + button

Name	From	Contact (email)	Backup Contact (WeChat)
Chen LING	VAV	Biycl5@nottin gham.edu.cn	CCClara 0818
Roles	Unit	Activities	Result
Administrator	Forum	View topic (both kinds)	Y
		Create Topic	N
		View topic details	Y
		View topic's reply	Y
		Reply to topic	Y
		View comments	Y
		Reply to comments	Y
		View other's comments	Y
		Push Notification	Y
		Enter each chatroom	Y
NAA User	Chat	View chat contents	Y
		Send messages	Y
	Calendar	View calendar	Y
		View calendar events	Y
		Create calendar events	N
	MyOLLE	View personal information	Y
		Change personal information	Y
		Change password	Y
		Update user	Y
		View topic (both kinds)	
	Forum	View topic details	
		View topic's reply	
		Reply to topic	
		View comments	

		Reply to comments	
		View other's comments	
<b>Normal User</b>	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
		View topic (only normal topics or Non-NAA topics)	
		View topic details	
		View topic's reply	
	<b>Forum</b>	Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
		Enter specific chatroom	
		View chat contents	
	<b>Chat</b>	Send messages	
		View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	

**Notes: the blue items are functions need to be reconfirmed.**

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**Users that first sign up are seen as Non-NAA users!**

Need to go to application side and use administrator account to update user status  
(validated: NAA | registered: Non-NAA)

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem
<b>Can not create topic and create topic events</b>	

Name	From	Contact (email)	Backup Contact (WeChat)
Zihan XIA	VAV	Biyxz4@nottin gham.edu.cn	13029970 809
Roles	Unit	Activities	Result
Administrator	Forum	View topic (both kinds)	Y
		Create Topic	N
		View topic details	Y
		View topic's reply	Y
		Reply to topic	Y
		View comments	Y
		Reply to comments	Y
		View other's comments	Y
		Push Notification	Y
		Enter each chatroom	Y
NAA User	Chat	View chat contents	Y
		Send messages	Y
	Calendar	View calendar	Y
		View calendar events	Y
		Create calendar events	Y
	MyOLLE	View personal information	Y
		Change personal information	Y
		Change password	Y
		Update user	Y
		View topic (both kinds)	
	Forum	View topic details	
		View topic's reply	
		Reply to topic	
		View comments	

		Reply to comments	
		View other's comments	
<b>Normal User</b>	<b>Chat</b>	Enter specific chatroom	
		View chat contents	
		Send messages	
	<b>Calendar</b>	View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	
		View topic (only normal topics or Non-NAA topics)	
		View topic details	
		View topic's reply	
	<b>Forum</b>	Reply to topic	
		View comments	
		Reply to comments	
		View other's comments	
		Enter specific chatroom	
		View chat contents	
	<b>Chat</b>	Send messages	
		View calendar	
		View calendar events	
	<b>MyOLLE</b>	View personal information	
		Change personal information	
		Change password	

**Notes: the blue items are functions need to be reconfirmed.**

Attention: if the software meets the corresponding functions, then just write a click in the *Results* column; otherwise write the situation below.

**Users that first sign up are seen as Non-NAA users!**

Need to go to application side and use administrator account to update user status

(validated: NAA | registered: Non-NAA)

Admin account:

Username: admin

Password: admin123

Problems	How to trigger that problem
<b>Can not create topic and create topic events</b>	

# User Manual

April 10, 2019

## 1 Introduction

### 1.1 Purpose

This manual is to help user to understand and use the Online Language Learning Exchange (OLLE) application. It shows the functions and operations of the application, how to use the Forum, Chats, Calendar and other. This manual includes wechat mini-program and the application. Since some of functions are not modified from last year, there are some descriptions are from last year's report.

### 1.2 Intended Users

This manual is primarily intended for students who enroll in OLLE module as NAA users, non-NAA users and an administrator of VAV.

### 1.3 User Roles and Access Rights

The user roles includes normal students who are non-NAA users, students who enrolled OLLE NAA module and administrator. Students can view content and use Forum and Chats to communicate, but only administrators have the right to edit, delete content and push notifications.

### 1.4 Features

The application is aimed at improving the efficiency and effectiveness for students in learning languages and for staffs in OLLE in managing students activities. Main functions of Forum, Calendar and Chats are in the following:

1. Writing a learning log regarding to a topic Normal user and Administrator
2. Top a post of learning log in a topic Administrator
3. Manage topics (create, delete and modify topics) Administrator
4. Check impending events in the calendar Normal user and Administrator
5. Manage calendars events (create) Administrator
6. Share learning experiences with other students in chat rooms Normal users, Administrator
7. Manage chats rooms including create and delete chat rooms and modify topics Administrator
8. Manage users to change their account status from NAA to non-NAA and vice versa.

## 2 WeChat Mini-Program

Wechat mini-program is an extend of the application, to help user access new content more easily and quickly. It is a completely new implementation this year.

### 2.1 Getting started

This section includes the details of registration, logging on process and how to change personal information and password.

#### 2.1.1 Registration

User need to create an account to log in the app.

1. Click SIGN UP in the log in page
2. User has to fill in a registration form using a university email and you are strongly recommended to use a password differs from the university emails password for a safety reason.
3. Once user submits a correct registration form, user is prompted to provide the validation code that has been sent to the university email address. Then, user have access to the application as a non-NAA user.

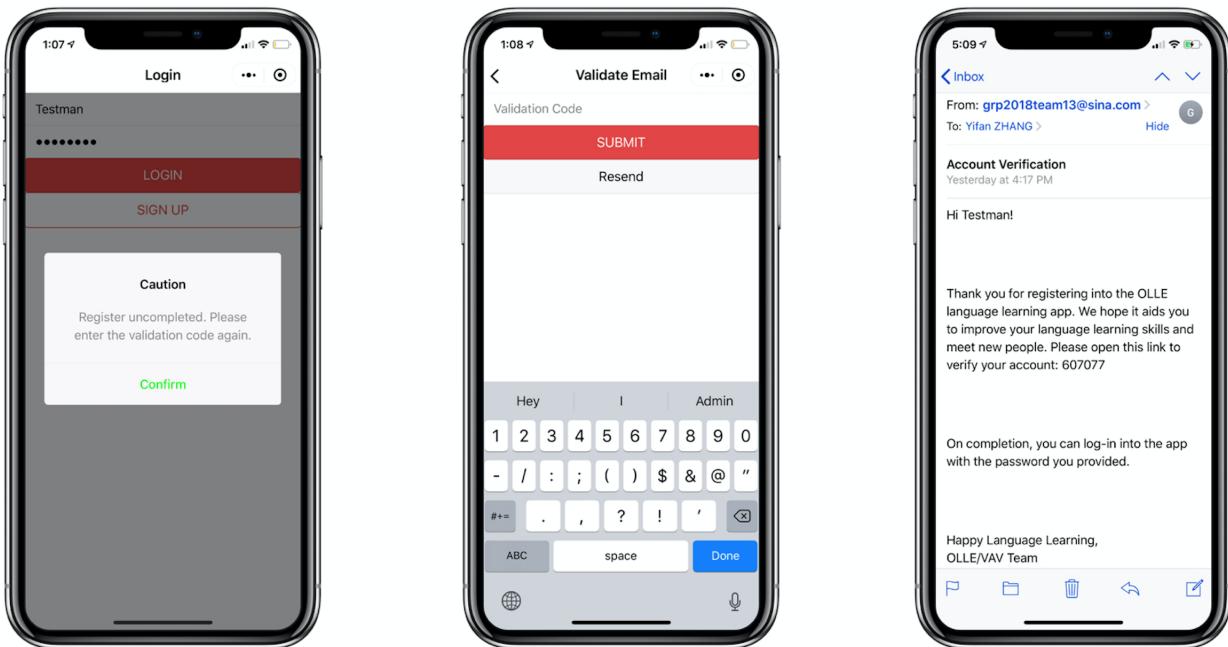


Figure 1: Validation

#### 2.1.2 Logging in

Access to the application is limited to students who have accounts. To use it, first log on to the app with email or username and password.

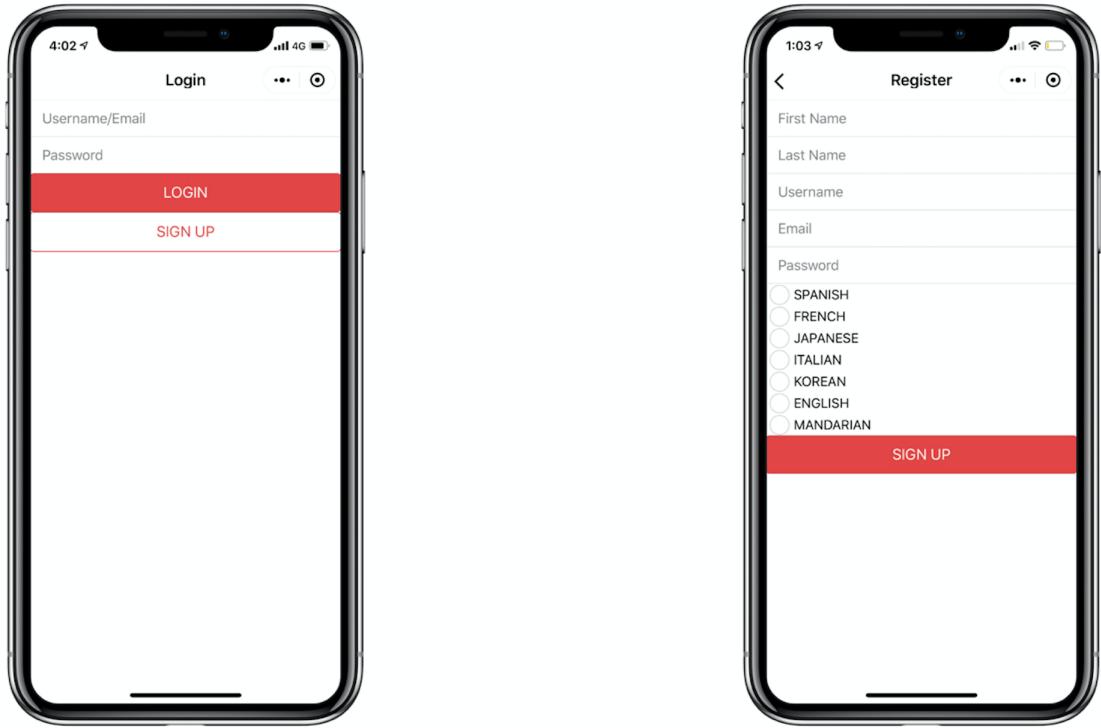


Figure 2: Log in and Registration

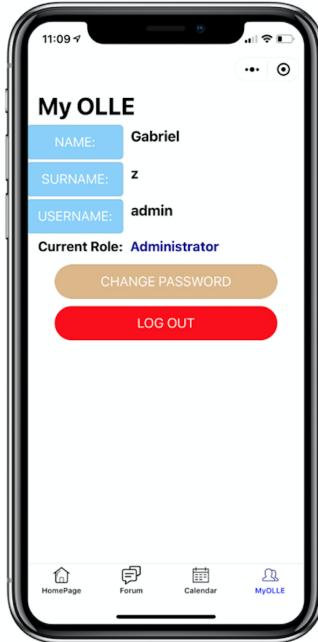


Figure 3: myOLLE Page

#### 2.1.3 Change password

1. Click MyOLLE and go to the Account Management page.

2. Click CHANGE PASSWORD.
3. Edit your password and click SAVE to finish changing your password.

#### 2.1.4 Change information

1. Click MyOLLE and go to the Account Management page.
2. Click Username or other information you want to change.
3. Edit your username and click SAVE to finish changing your username.

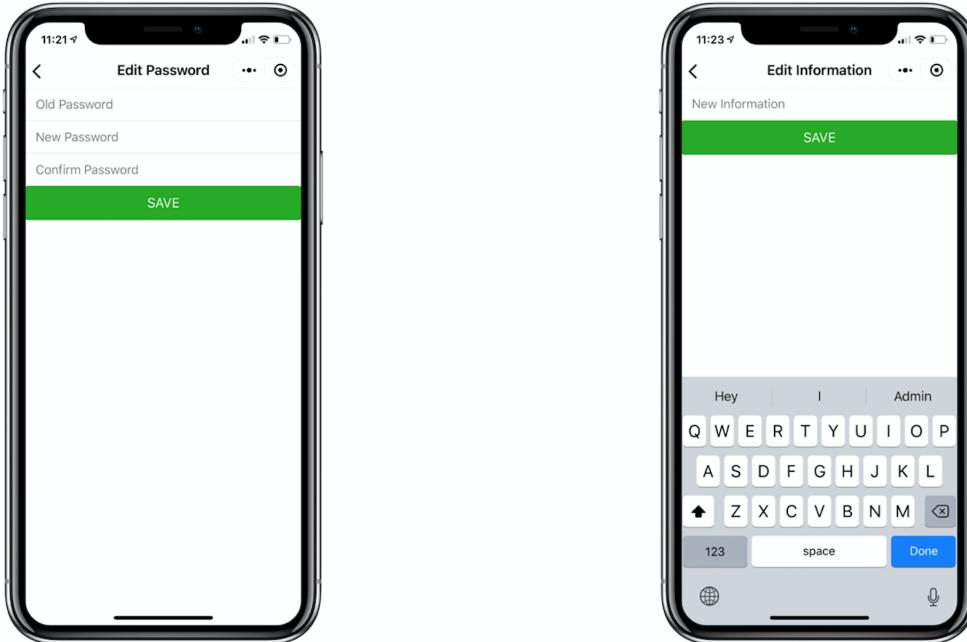


Figure 4: Edit Password and information

## 2.2 HomePage

HomePage is controlled by administrator, which shows important information. Administrator can upload pictures and videos, and edit the description. All users can view the content.

#### 2.2.1 Create a new page (Administrator)

1. Click the + icon. The edit page appears.
2. Fill the form
3. Upload image or video is optional.
4. Click submit. A new page shows in the HomePage.

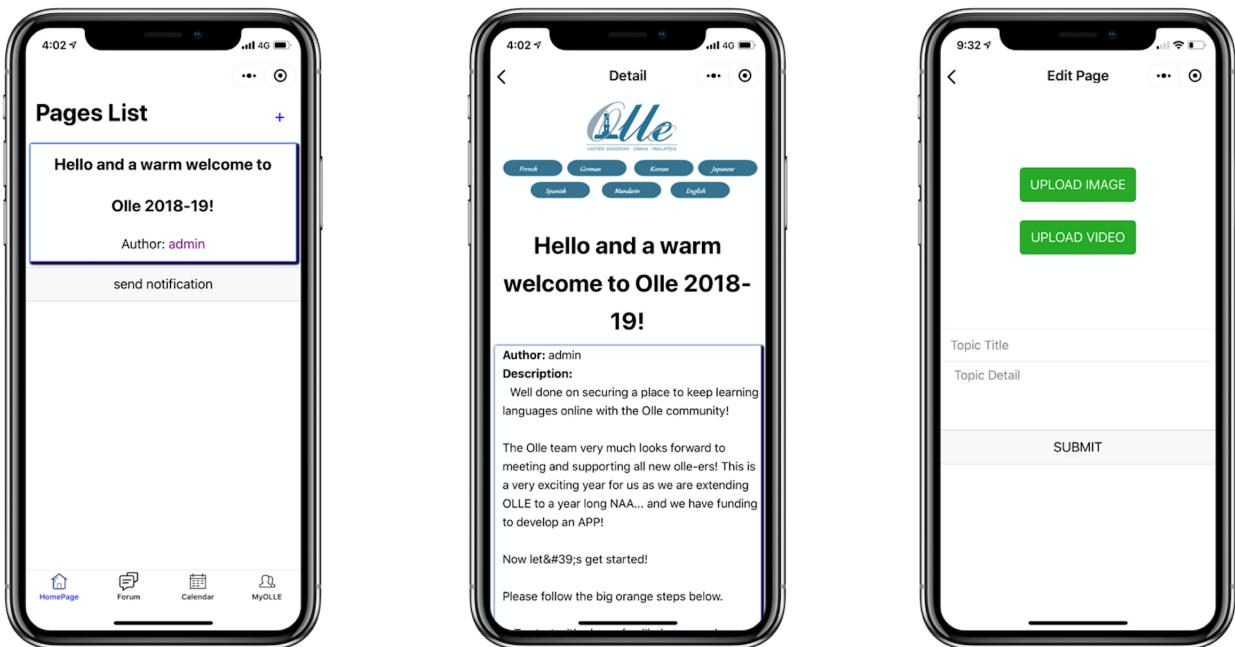


Figure 5: HomePage

### 2.3 Forum

Users can post their learning logs on Forum to communicate and learn languages. Administrator can create topic weekly to make students participate in.

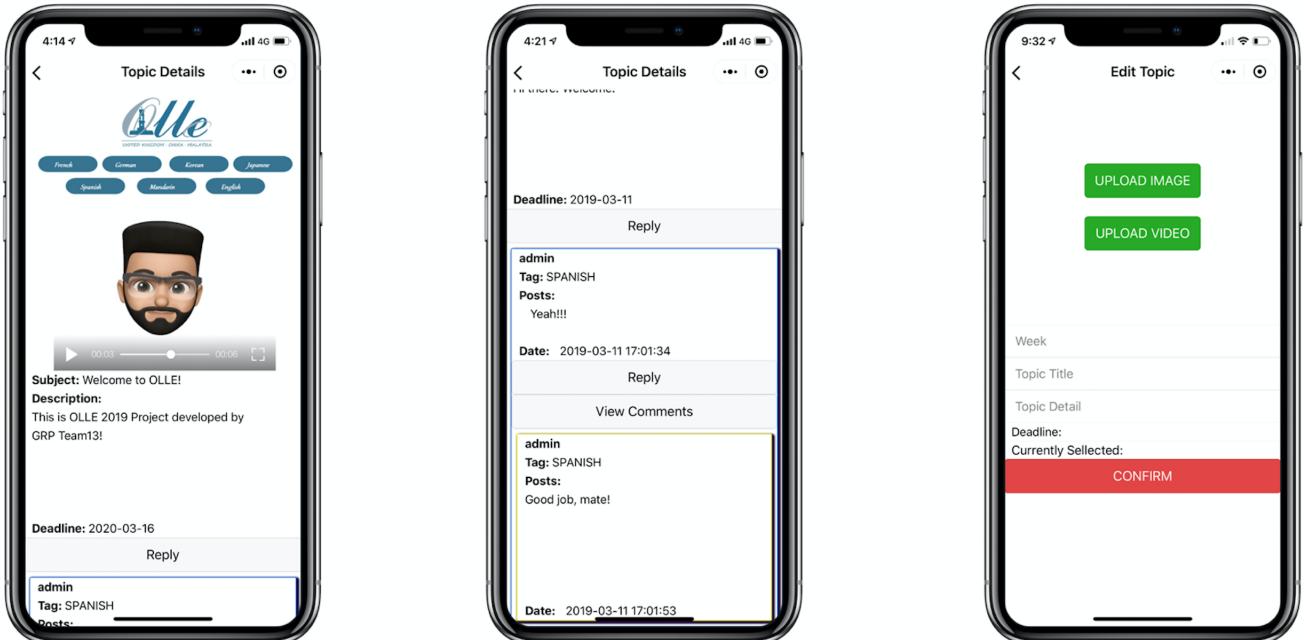


Figure 6: Forum and Topics

### 2.3.1 Create a weekly topic (Administrator)

1. Click + icon. A prompt shows to choose the type of topic, normal topic or NAA topic.
2. Fill in the form.
3. A new topic should be presented in the forum page.(If the creation of a new topic is not successful, a toast with corresponding error message should be prompted.)

### 2.3.2 View NAA Topic (Administrator and NAA user)

1. Switch the button to NAA topic.
2. A list of NAA topics appears.

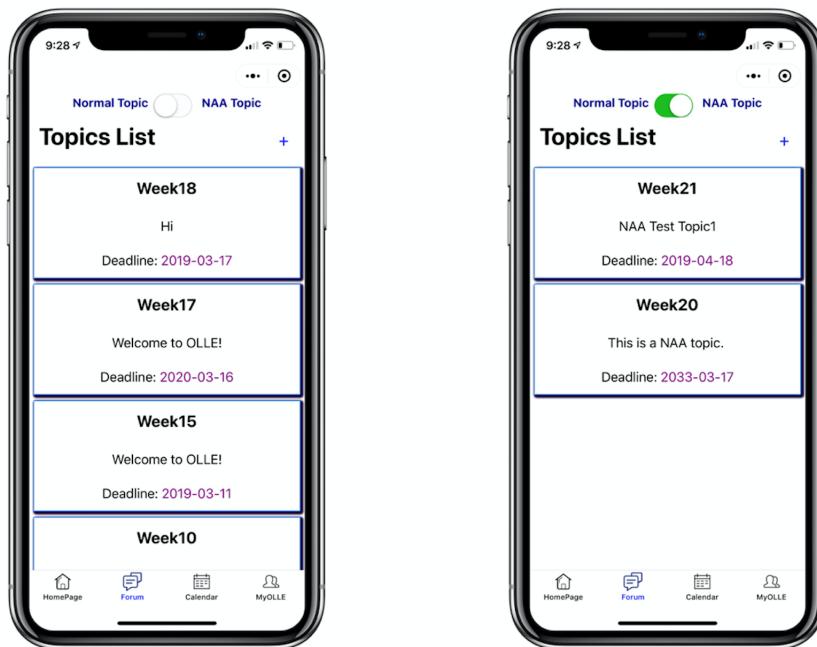


Figure 7: Swith to NAA Topics

### 2.3.3 View detail of a topic

Click a topic. The topic detail page with related others learning logs appear.

### 2.3.4 Post a learning log

1. Click REPLY within topic detail. The Reply page appears.
2. Write down your log and click SUBMIT.

### 2.3.5 Reply to others learning logs

1. Click REPLY within someones learning log. The Reply page appears.
2. Write down your comment and click SUBMIT.

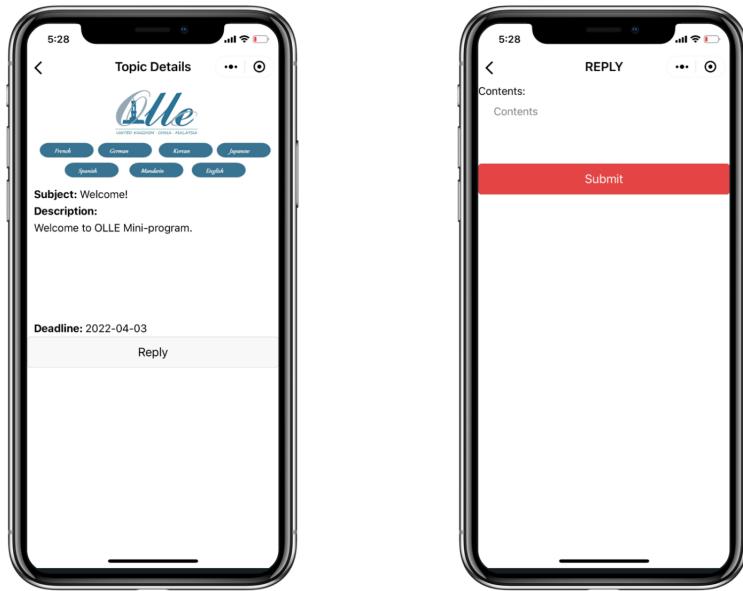


Figure 8: Topics Details and Reply

3. On successful submission, to see your comment, click COMMENTS and your comment will be presented below.

## 2.4 Calendar

Calendar can remind users to attend events.

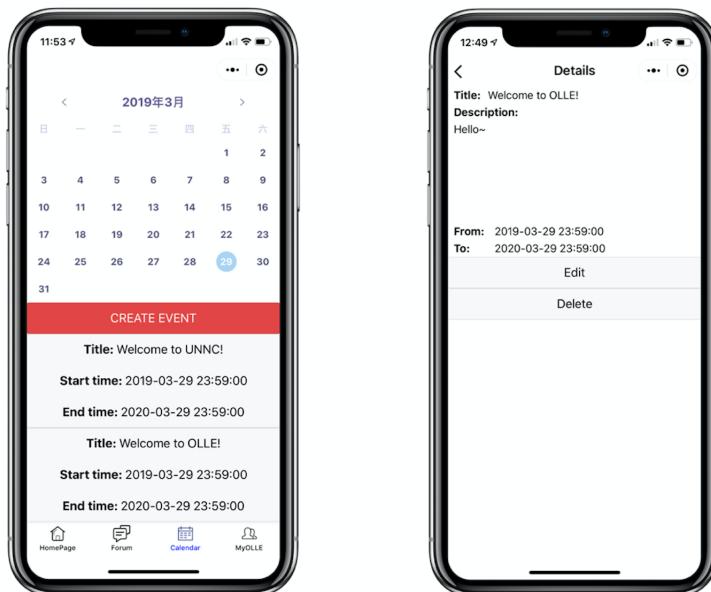


Figure 9: Calendar

#### **2.4.1 Check an event**

1. A list of events shows below the calendar.
2. Click a event you want to check.
3. Event details pages appears.

#### **2.4.2 Create an event (Administrator)**

1. Click the add button and the New Chat Form page appears.
2. Fill the detail of an event in the text field.
3. Select a start time, then select an end time.
4. Click Confirm. A new event should be created if you check that days event.

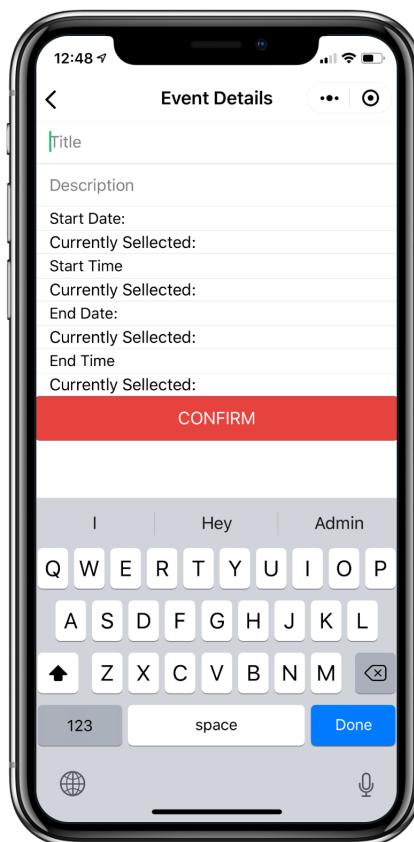


Figure 10: Modify Event

#### **2.4.3 Modify an event (Administrator)**

1. Click the event you want to modify. Event details pages appears.
2. Click Edit.
3. Fill the modified details.
4. Click Confirm.

#### **2.4.4 Delete an event (Administrator)**

1. Click the event you want to delete. Event details pages appears.
2. Click Delete.
3. Click Confirm.

### **3 iOS Application**

Main functions are same as the wechat mini-program, but there are some features are not included in the wechat mini-program.

#### **3.1 Chat**

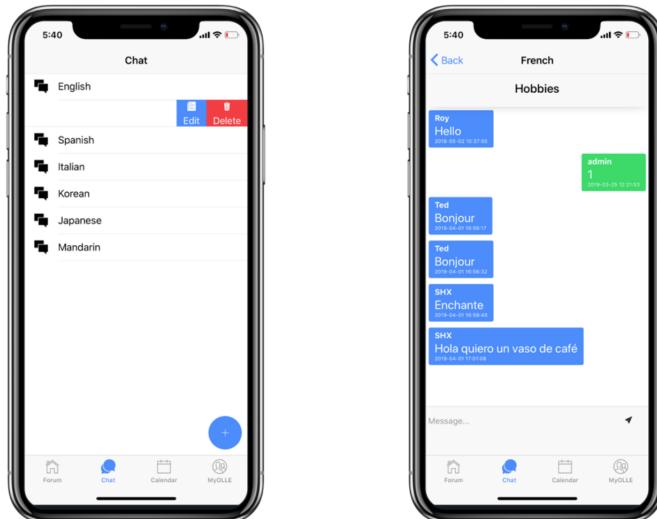


Figure 11: Chat

#### **3.1.1 Create a chat room (Administrator)**

1. Click the add button and the New Chat Form page appears.
2. Fill in the form.
3. A new chat room should be presented in the chat page.

### 3.1.2 Modify a topic in a chat room (Administrator)

1. Slide a chat room to left and click Edit and a Chat Settings page should be presented.
2. Fill in the form.
3. Click Save to confirm the modification.

### 3.1.3 Delete all messages (Administrator)

1. Slide a chat room to left and click Edit and a Chat Settings page should be presented.
2. Click Delete Messages.
3. Click Proceed to Proceed

### 3.1.4 Send messages

1. Select a language group and enter it.
2. Scroll down the drawer, and a chat topic should be displayed.
3. Write a text in the text filed.
4. Click send icon to send a message.

## 3.2 New Features

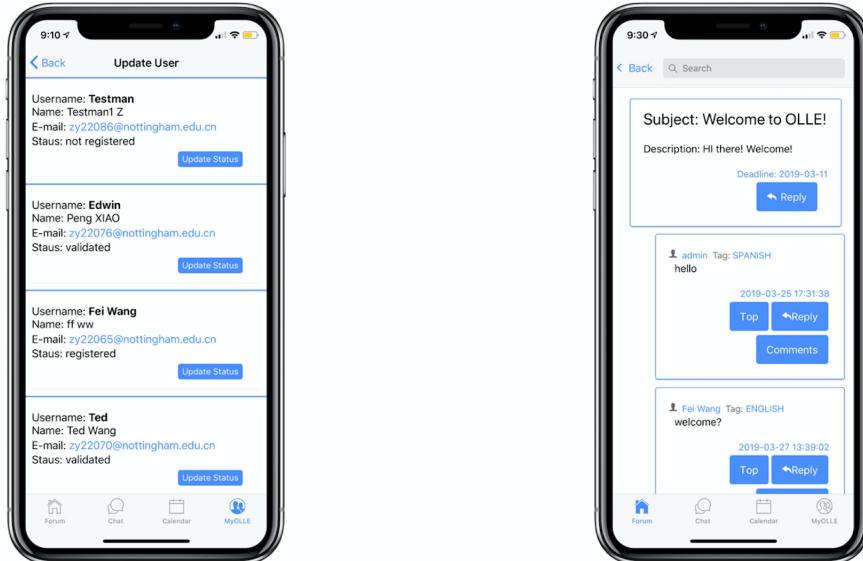


Figure 12: Administrator Features

### **3.2.1 Top a learning log (Administrator)**

1. Enter a topic details page.
2. Click Top button on a post.
3. The post shows on top

### **3.2.2 View all users information (Administrator)**

1. Enter myOLLE page.
2. Click Update User button
3. A list of all users information appears.

### **3.2.3 Change user status**

1. Enter Update User page Click Update Status of a user to switch the user status.